



# Presentation of the construction site for the first offshore wind turbine in France

*Press kit*



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



## First offshore wind turbine in France

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*“FLOATGEN is proof that in the field of marine renewable energies, the Pays de la Loire region is at the forefront of innovation. The region provides practical support to boost this momentum through both the positioning of offshore windfarms and the development of floating wind power. From the SEM-REV project to the Vendée Globe to the Port of Saint-Nazaire, the sea, for us, is an ocean of opportunities that we must seize to build the future.”*



**Bruno Retailleau,**  
President of the  
Regional Council of  
Pays de la Loire



**Arnaud Poitou,**  
Director Centrale Nantes

*“Floatgen is a milestone in the school’s history. SEM-REV, our offshore test site, a visionary project back in 2007, is today proving itself as a vital tool in the development of a new industrial sector in France.”*

*“Floatgen is an essential step for the company culminating in the offshore launch of the first unit of our technology, but it’s also a key moment for France and Europe which have the opportunity to become world leaders in this emerging market.”*



**Paul de la Guérvivière,**  
CEO Ideol



**Benoît Lange,** Sales Director  
Bouygues Travaux Publics

*“Bouygues Travaux Publics’ investment in the FLOATGEN project signals our desire to leverage, within the framework of Marine Renewable Energies, our extensive experience in port and maritime infrastructure projects, in France and abroad. The floating concrete platforms, produced on an industrial scale, represent a competitive solution for offshore wind turbines.”*

## Press Release

### **Ideol, Centrale Nantes and Bouygues Travaux Publics present the construction site for the first offshore wind turbine in France**

**To date, there are no - fixed or floating - offshore wind turbines in France. The project led by Ideol, Centrale Nantes and Bouygues Travaux Publics, known as FLOATGEN, the name given to a 2MW floating wind turbine, will constitute the first offshore wind turbine in France. Construction of the floating foundation is now in full swing at the port of Saint-Nazaire and will lead to the installation of the wind turbine at the SEM-REV offshore test site, off the coast from Le Croisic, before the end of 2017.**

#### **Innovation at all levels**

Be it the very concept of the square ring-shaped floating foundation, or the offshore test site, or the type of concrete used in the construction, or even the material for the mooring lines; innovation is present throughout the project.

FLOATGEN's concrete foundation was developed by French start-up Ideol: a ring-shaped floating platform, open in its centre, providing optimum stability at a lower cost. FLOATGEN will be the first unit using this technology to be installed offshore, before the installation of a second unit in Japanese waters in summer 2018.

The use of concrete as the main construction material for Ideol's floating foundation is remarkable in itself and sets it apart from rival floating solutions, mainly made from steel. Bouygues Travaux Publics, the Bouygues Construction subsidiary in charge of building the foundation, has specifically developed a lightweight self-placing concrete to build the foundation as well as innovative construction methods on three interconnected barges.

The Centrale Nantes SEM-REV offshore test site on which the wind turbine will be installed is a research tool of international calibre. It allows demonstrators or prototypes for the recovery of offshore energy (wind and waves) to be developed under real and full-scale conditions. Researchers and industry thus have the necessary means at their disposal for the testing of prototypes prior to industrial use.

Finally, the innovative anchoring system consisting of three doubled mooring lines does not use steel, but rather a synthetic fibre – nylon – which is extremely resistant and not prone to corrosion.

#### **Boosting activity in the region**

At its peak, the project will directly employ 70 people in Saint-Nazaire for the construction of the floating foundation: the type of concrete used for Ideol's foundation means that construction can take place very close to the installation sites. The construction techniques developed and implemented by Bouygues Travaux Publics make it possible to blend into the local economic landscape and to easily adapt to local port constraints.



Le Béon Manufacturing heads up the consortium selected to supply the nylon mooring lines. A significant portion of the forged components were produced in their factory in Morbihan, Brittany.

FLOATGEN's partners have opted to source the majority of their parts or logistical support from suppliers based in the Saint-Nazaire area. The same principle has been applied to project procurement, be it communication or even insurance.

### **FLOATGEN, the starting-point for mass rollout**

The FLOATGEN project, first offshore wind turbine and first demonstrator of Ideol's floating foundation technology, is already providing and will continue to provide the consortium's partners with unique feedback, particularly with regard to construction methods, installation and use of the floating system. It will also serve as a showcase for export sales.

On 13 July 2016, the French government selected a consortium, headed up by Quadran, and bringing together Ideol's floating foundation and the expertise of Bouygues Travaux Publics, for the first offshore windfarm project in the Mediterranean (the EOLMED project - 4 units off the coast of Gruissan and one of the best wind resources in Europe).

Many countries have entered the offshore wind turbine market, chief among them Japan, currently in the midst of redefining its energy mix. The Japanese Environment Ministry foresees production of between 2.7 GW and 5.6 GW from floating offshore wind farms by 2030. Mid-2018, Japan will install a floating wind turbine demonstrator using Ideol's technology.



# The FLOATGEN project

# Offshore wind turbines in France and around the world

## Onshore wind turbines, fixed-bottom offshore wind turbines and floating offshore wind turbines: definitions

Produced by the force of the wind, wind energy can be harnessed on land (by onshore wind turbines) or at sea (by offshore wind turbines).

There are two ways of installing offshore wind turbines: they can be fixed on the seabed (these are known as fixed-bottom offshore wind turbines) or floating and held in position by an anchorage system (known as floating offshore wind turbines).



*Fixed-bottom offshore wind turbine Floating offshore wind turbine*

Floating offshore wind turbines have a number of benefits: free from the constraint of shallow depths, floating offshore wind turbines can be installed further out to sea, which means that not only will they have a low or non-existent visual impact from the coast, they will benefit from stronger and more sustained winds, thus increasing the efficiency of electricity generation. **Floating offshore wind turbines are the future of offshore wind energy.**

## Offshore wind turbines: the present situation

More than 3,200 offshore wind turbines had been installed around the world by the end of 2015, giving approximately 12 GW of installed capacity. All of them are fixed-bottom, with the exception of six floating turbines installed in Norway (one), Portugal (one) and Japan (four).

**No offshore wind turbines have been installed in French waters to date, whether fixed-bottom or floating.**

Several projects are under development and have reached various stages of advancement: six commercial projects for fixed-bottom turbines of 500 MW each (located at Le Tréport, Fécamp, Courseulles-sur-Mer, Saint-Brieuc, Noirmoutier-en-l'Île/Île d'Yeu and Saint-Nazaire) and four projects for floating wind turbines of 25 MW each (located at Groix, Leucate, Gruissan and Fos-sur-Mer) have already been attributed by the French government, with installation scheduled for between 2020 and 2021.

Due to be installed in 2017, the FLOATGEN wind turbine will not only be the first offshore wind turbine in French waters, it will also be the first floating offshore wind turbine that is 100% European.



Floating offshore wind turbines are now taking off all around the world, with projects underway in Japan, Scotland, Portugal, the United States and France.

# The project

FLOATGEN is the name that has been given to France's first 2 MW offshore floating turbine, which will be installed off the coast from Le Croisic, in Brittany, on the SEM-REV test site, belonging to the Centrale Nantes engineering school. The turbine will be installed for an initial period of two years and the electricity generated will be injected into the national power grid throughout the operational period.

## Milestones



## Key data on the project



### Fondation flottante

Flotteur de 36 mètres de côté et de 9,5 mètres de haut (7,5 mètres de tirant d'eau)

Equipée du système Damping Pool® d'Ideol et construite en béton armé pré-contraint par Bouygues TP



### Eolienne

Modèle Vestas V80 de 2 MW

Diamètre de rotor : 80 mètres

Hauteur de mat incluant la pièce de transition : 60 mètres



### Système d'ancrage

Ancrage semi-tendu

6 lignes en fibre synthétique (nylon)



### Site d'installation

Installation sur le premier site d'essais connecté au réseau multi-technologies SEM-REV, opéré par Centrale Nantes et le CNRS au Croisic



### Profondeur et distance de la côte

33 mètres de fond

12 miles nautiques du rivage (22 kilomètres)



### Conditions météocéaniques

Conditions particulièrement difficiles avec une hauteur maximale de vague (autrement appelé Hmax) de 16 mètres

## Le financement du projet

L'Union Européenne soutient le projet FLOATGEN à travers le 7<sup>ème</sup> Programme-cadre de recherche et de développement technologique en apportant un financement total d'environ 10 millions d'euros.

L'ADEME, au titre du programme des investissements d'avenir (PIA), apporte son soutien à hauteur de 5,7 million d'euros.

## FLOATGEN will confirm the performance of floating offshore wind turbines

The primary purpose of the project is to confirm the technical feasibility and economic viability of floating wind turbines. FLOATGEN has been designed as a starting point for developing commercial floating wind farms. The project will provide many hours of wind turbine operation and feedback expected to demonstrate that Ideol's technological solution is the most competitive on the market.

## A European consortium based on technology developed by Ideol, a French start-up

To achieve these aims, seven European partners (three of them French: Ideol, Bouygues Travaux Publics and the Centrale Nantes engineering school) have joined forces and are combining their respective expertise. The technology of the floating foundation (also called the Damping Pool® – see the following section) developed by the lead company in the consortium, French start-up Ideol, is at the heart of the project, which got under way in 2013.



**IDEOL** (Coordinator – France)

Engineering of the floating system (mooring, floater, electrical export cable), supply of the turbine and installation offshore



**CENTRALE NANTES ENGINEERING SCHOOL** (France)

Ocean engineering and provision of the SEM-REV test site off the coast from Le Croisic, supply and installation of anchorage system



**BOUYGUES TRAVAUX PUBLICS** (France)

Manufacturing engineering, construction and launch of the floater at the port of Saint-Nazaire



**RSK GROUP** (United Kingdom)

Analysis of the environment impact of the floating system



**ZABALA** (Spain)

Management of the consortium and internal project communication



**UNIVERSITY OF STUTT GART** (Germany)

Contribution to digital simulations and evaluation of the measuring campaign



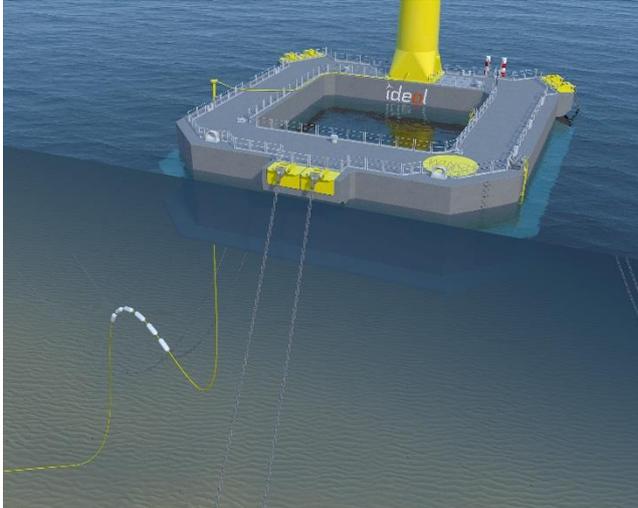
**FRAUNHOFER-IWES** (Germany)

Benchmarking of the FLOATGEN floating system and other comparable floating systems

# Innovation at all levels

Innovation is at the core of this project, be it the very concept of the square ring-shaped floating foundation, the offshore test site, the type of concrete used in the construction or the material that will be used for the mooring lines.

## A floating foundation designed by the French company, Ideol



The floating foundation used for FLOATGEN is derived from a concept developed by the French start-up, Ideol. The company has patented a ring-shaped foundation system open in its centre (known as the Damping Pool®), which provides optimal stability at low cost.

Ideol's solution is the simplest and most compact, and is designed to be the most competitive on the market.

The floating foundation is held in place on-site by means of a mooring system consisting of double mooring lines at the front and double

mooring lines on either side at the rear, also designed by Ideol.

FLOATGEN will be the first unit using Ideol's floating technology to be installed offshore, before the installation of a second unit in Japanese waters in summer 2018 (see the detailed page about Ideol).

## A concrete formulation and innovative construction methods developed by Bouygues Travaux Publics

The use of concrete as the main construction material for Ideol's floating foundation is remarkable in itself, setting this project apart from rival floating solutions, most of which employ steel. Bouygues Travaux Publics, responsible for building the foundation, has **specifically developed a lightweight self-placing concrete to build the foundation.**

In addition, the construction methods used for the prototype, also developed by Bouygues Travaux Publics, are highly innovative. The initial solution envisaged construction on dry land followed by an exceptional handling operation to transfer the completed floater to a slipway. To take full advantage of existing port infrastructures and eliminate the need for the transshipment phase, a solution was chosen that consists in constructing the floating foundation directly on three interconnected barges moored at the quayside. The assembly of barges will then be towed to the Louis Joubert Lock at the entrance to the port, where the structure will be floated.

## The SEM-REV offshore test site, operated by Centrale Nantes

The SEM-REV platform is a collaborative research tool on international calibre used to develop demonstrators, pilots and prototypes for recovering offshore energy (wind, waves) in real conditions, up to full scale. Researchers and industrial operators have all the necessary means at their disposal for testing prototypes before they go into industrial use.

The SEM-REV facility consists of:

- a land base: research centre and electrical substation
- an export cable: 20kV and 24 optical fibres
- a delimited 1 square-kilometre zone at sea
- an underwater electrical connection station allowing three simultaneous connections
- meteorological and oceanographic measuring instruments (wind, waves and current and other local parameters)

The world's first multi-technology offshore testing site for marine renewable energies (MRE), SEM-REV, which is connected to the French national power grid, has been granted all possible prior full authorisations. Jointly operated by Centrale Nantes and the CNRS, its sea- and land-based equipment is designed for the development of marine renewable energy production systems (floating wind turbines, wave energy) in real ocean conditions. SEM-REV was official opened on Tuesday, August 25, 2015 at Le Croisic, in Brittany.

Begun in 2007 under the terms of a French government programme for funding regional projects running from 2007 to 2013, this visionary project with an annual budget of around €20 m, currently receives €17 m of funding from several front-line partners, including the Pays de la Loire region (€9.9 m), the French government and the Loire-Atlantique department.

It is fundamental to the success of the MRE sector in the Pays de la Loire region and a key asset for developing the MRE sector on a national level.

SEM-REV will also be employed as a vital tool for initial and continuing training in MRE, particularly for installing, maintaining and dismantling turbines.

## Synthetic fibre mooring lines

The experience they have gained in the offshore industry has been useful to Centrale Nantes and Ideol in developing the specific properties of an innovative mooring system. Rather than manufacturing the mooring lines in steel, Ideol (system designer) and Centrale Nantes (system supplier) have chosen to use a synthetic fibre – nylon – which is extremely resistant.

Le Béon Manufacturing, selected as the supplier of this innovative system, is working with two industrial partners highly experienced in offshore projects: Bexco, a Belgian company specialising in synthetic fibre, and Dai-Han, a South Korean company specialising in mooring chains. Le Béon Manufacturing is responsible for constructing the forged alloy steel connectors (specified composition).



The principal advantage of nylon fibre over traditional mooring solutions is that it is not prone to corrosion. Although polyester fibre is generally used for offshore oil platforms because of the stiffness it provides for the moorings, nylon fibre was preferred in the case of FLOATGEN, for its characteristics of elasticity. Nylon will partially absorb the movements of the swell and the force generated by the floater on the surface.

# Progress of the project

## The floating foundation

The floating foundation is being constructed on three assembled construction barges moored on the Quai des Charbonniers quayside in Saint-Nazaire. After several weeks of preparatory work, the concreting of the apron of the foundation has been completed and the first walls are under construction.

To monitor the construction process live, the project website, [www.floatgen.eu](http://www.floatgen.eu), allows you to visualise images filmed by a camera close to the site.



September 5, 2016



October 7, 2016



November 4, 2016



December 9, 2016



January 6, 2017

The concreting and finishing works will continue until spring 2017.

The three construction barges joined together will then be towed to the dry dock at the entrance of the port (the Louis Joubert lock) and then immersed so that the floater can set afloat. The floater will then be towed back to the quayside for the installation of additional equipment (mooring foundations, transition piece, railings and ladders, etc.), and then the wind turbine itself. **Carrying out these operations with the structure afloat and in the shelter of a dock like the Saint-Nazaire Penhoët shipyard will be virtually unique in the construction of offshore wind turbines** (this type of operation usually being carried out at sea, which is a source of hazards and risks).

## The wind turbine

The Vestas V80 2.0 MW wind turbine which will equip FLOATGEN was unloaded at the port of Saint-Nazaire in June 2016.

It will undergo a number of minor modifications before being installed in the dock on the transition piece.



*One of the wind turbine's the three blades  
(40 metres long)*



*Part of the mast*

## The mooring system

Virtually all the elements of the mooring system have been delivered to Saint-Nazaire: chains, mooring lines, buoys, anchors, etc.



*Chains*



*Foreground: anchors  
Background: reels of nylon mooring lines*

The mooring system will be pre-installed at sea on the SEM-REV site in spring 2017.

The wind turbine and floating foundation will be towed to the installation site in summer 2017. The turbine will be connected to the electricity network (using the electrical export cable already in place at the site) before the end of 2017.

# A project anchored in the region

# A project very firmly anchored in the region

## 70 direct jobs at peak periods in Saint-Nazaire for the construction of the floating foundation

Unlike the situation when floating foundations are made of steel and are mostly manufactured in low-cost countries, **when the Ideol foundation is made of concrete it can be constructed in proximity to the site of installation. The construction techniques developed and implemented by Bouygues Travaux Publics embeds the project in the local economic landscape** and allows it to adapt easily to the requirements of host ports.

**Locating the construction at the port of Saint-Nazaire**, situated only a few kilometres from the site of installation, emerged naturally as the optimal solution both logistically – the industrial fabric of Saint-Nazaire is particularly dynamic – and in socio-economic terms, because it ensures numerous benefits for the region.



Bouygues Travaux Publics will employ **70** people at the peak of construction of the floating foundation.

## Brittany company Le Béon Manufacturing supplies mooring system

Following a call for tenders for the supply of the mooring system, the Centrale Nantes engineering school and Ideol, which designed the system, selected a consortium led by Le Béon Manufacturing (the consortium also involves Bexco as manufacturer of the nylon mooring lines). A significant portion of the forged components have been produced in their factory in Brittany.

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## Choice of local suppliers for other components

The FLOATGEN partners have opted to award the majority of contracts for supplies of components and for logistical services to companies operating in the Saint-Nazaire region. These include Artelia (project management), Ceteal (technical engineering), Point P-Trouillard (supply of concrete), Shipelec (electrical works), Tissot (logistics), TGO (logistics and storage), Mécasoud (mooring foundation) and Octra (hire of construction barges), etc. The same sourcing principle has been applied to all other areas of project procurement, such as communications (a Nantes-based communications agency) and insurance (Cabinet Bessé, also based in Nantes).

# The outlook for floating offshore wind turbines in France and around the world



## FLOATGEN, the starting-point for mass rollout

The FLOATGEN project, the first offshore wind turbine in French waters and the first demonstrator of Ideol's floating foundation technology, has already provided, and will continue to provide, the consortium partners with unique feedback, particularly with regard to methods of constructing, installing and operating the floating system. It will serve as a showcase for export sales.

## Pilot wind farms and a commercial call for tenders in France

On July 13, 2016, the French government selected a consortium headed up by Quadran and bringing together Ideol's floating foundation and the expertise of Bouygues Travaux Publics, for the construction of the first offshore wind farm in the Mediterranean (the EOLMED project, consisting of 4 units installed off the coast of Gruissan, south-west France, one of the best wind resources in Europe). Ségolène Royal, French Minister of the Environment, is holding consultations in preparation for a call for tenders for commercial-size wind farms (i.e. approximately 50 wind turbines). France has high potential with regard to floating offshore wind turbines, estimated at 6 GW (equivalent to 3.6 EPR nuclear plants).

France is able to call on the know-how of leading companies and players, such as Ideol and Bouygues Travaux Publics, and has the objective of developing a competitive national industry with a focus on exports and an ambition to become leader on this market.

## Ambitious international targets for a very high potential market

Many countries have entered the floating offshore wind turbine market. One of the leaders is Japan, a country currently engaged in redefining its energy mix. The Japanese Environment Ministry envisages the installation of between 2.7 GW and 5.6 GW of floating offshore wind farms by 2030. It will install a floating wind turbine demonstrator using Ideol's technology in mid-2018.

The United Kingdom, the United States and South-East Asia are also among the most advanced and most promising markets. As the CEO of WindEurope, the association of European players in the wind energy industry, commented at a recent international symposium on floating offshore wind energy held in Marseille: "Floating offshore wind turbines will have a big part to play if governments are going to meet their renewable energy targets by 2030."

# Partners in the project

With the conviction that the offshore wind turbine market, which at that time was based on fixed-bottom wind turbines, meaning that the technology only worked in relatively shallow waters, would rapidly turn to floating foundations, which would also be more respectful to the marine environment, **Paul de la Guérivière and Pierre Coulombeau founded Ideol in June 2010**. Their aim was clear: to develop floating foundations for offshore wind turbines guaranteeing not only technical reliability, but also maximum economic viability. Ideol's experienced and multi-disciplined teams then designed a disruptive technical solution based on the patented Damping Pool® concept. The exceptional hydrodynamic properties of this system enable the Ideol floating foundation to be compatible with all wind turbines now on the market, compact (even with the most powerful turbines), technically reliable and at optimal cost.

Thanks to this range of benefits, the young company headquartered in La Ciotat, in the South of France, and currently enjoying rapid growth (personnel at the company's head office have doubled each year since the company was founded, and now number approximately 65 people), is able to work on several projects around the world, including FLOATGEN. Two demonstrators using Ideol technology – one in concrete and the other in steel – are also in the final phase of design in Japan as part of a partnership with the major Japanese group, Hitachi Zosen. Construction of the steel version is planned to begin before summer 2017, with installation scheduled for 2018. The Japanese government – for which floating offshore wind farms are strategically crucial – has decided that only Ideol's technology was able to guarantee a significant reduction in the cost of floating wind turbines, in the face of Japanese, American and Norwegian competition. These pilot and pre-commercial projects have now positioned **Ideol as a French ambassador for floating offshore wind turbines in international markets, and as a world leader in this very rapidly expanding market.**

- > Company founded in La Ciotat in 2010
- > Sales of €2.8 m in 2015, €4 m in 2016 (100% export)
- > 60 people, 90% of whom are experienced engineers
- > Internationally acknowledged patented Damping Pool® technology
- > 1 demonstrator, FLOATGEN, soon to be operational in France
- > 1 demonstrator under construction in Japan (installation mid-2018)
- > 1 24 MW pilot wind farm under development in the Mediterranean



## Centrale Nantes engineering school: unique expertise

After more than 30 years of research partnership with the CNRS in this field, with high-profile European ocean engineering platforms and start-ups incubated that have enjoyed exceptional growth, the Centrale Nantes engineering school is one of the European leaders in research and innovation in marine renewable energies.

### Training to meet the needs of the business world and with a focus on innovation

Centrale Nantes is an engineering school offering academic programmes based on the most up-to-date scientific and technological developments and the best management practices. Beyond its renowned teaching activities, Centrale Nantes also has close links with the business world, through a dialogue between research and industry. Many groups take advantage of its experimental facilities (unique in their field) and the school's research laboratories as a proving ground for their work on current and future technologies.

With annual research contracts worth more than fifteen million euros and around twelve industrial research and teaching chairs each year, Centrale Nantes is responsible for academic and applied research at the highest level in Europe and the world. It is able to benefit from a particularly dynamic surrounding region which has the ambition of becoming leader in such high-potential business sectors as marine renewable energies (MRE).

Centrale Nantes is strongly focused on areas such as ocean engineering, naval architecture and construction, harnessing ocean energy (wind, waves, currents), calculating structures, geotechnical engineering, composite materials, robotics, command and control, digital simulation and supercomputing.

### Research platforms, ideal for learning about and putting into practice new techniques for MRE

Ocean test basins, unique in Europe on a university site, allow model structures to be tested under real conditions. The research installation most in demand by the MRE sector in Europe, the wave basin can reproduce all sea conditions encountered in oceans all around the world. Equipped with a vast wind machines, it can simulate the wind and storm conditions to which marine structures are subjected.

SEM-REV is one of Centrale Nantes' principal testing grounds, financed under the France's regional funding plan 2007-2013 with a heavy contribution from the Pays de la Loire Region. SEM-REV is the only offshore testing site in Europe granted a full range of authorisations for prototypes and a connection to the national power grid: power generated by demonstrators is injected into the network for the benefit of every French household.

- > School founded in 1919
- > 2,500 students
- > 550 academic staff and research personnel
- > 60 doctoral theses per year
- > Over 100 research contracts per year
- > 11 major research platforms







## A leading player in the construction of innovative maritime infrastructures

Bouygues Travaux Publics, a subsidiary of Bouygues Construction, is an acknowledged specialist in carrying out major infrastructure projects: underground works, river and maritime works, linear projects (railways, roads and highways), industrial civil engineering (including nuclear, energy and environmental projects), earthworks and open-cast mining. In France and in many other countries, the company has widely acknowledged expertise in designing and carrying out complex operations combining project finance, management of large-scale projects and mastery of cutting-edge techniques. Particularly active in the construction of maritime infrastructures, Bouygues Travaux Publics is currently working in this area on a port extension (Calais 2015), offshore land reclamation (the Anse du Portier land extension project in Monaco) and a quay extension (Montoir, in the port of Nantes Saint-Nazaire) as well as on offshore engineering structures, including the viaduct for the new coastal highway on Reunion Island and the world's longest sea bridge between Hong Kong, Zhuhai and Macau. Projects completed by the company have included numerous innovations, such as the construction of a concrete barge for the Total group in 1995 which was still afloat in 2017 of the coast of the Congo on the N'Kossa gas field.

The company has been actively involved for several years in the development of marine renewable energies (MRE) in France, with the clear idea that civil engineering techniques can make a positive contribution to the development of MRE: by reducing costs (concrete remains a very economical means of constructing durable structures offering good resistance to the marine environment), as well as by the creation of a construction technique that is genuinely local and cannot be delocalised, a factor that ensures greater public acceptance of these kind of projects.

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Since 2013, Bouygues Travaux Publics and Ideol have worked closely together in order to pool their expertise. A partnership encompassing the construction of the FLOATGEN project was formed. The first commercial application of this partnership was the selection of Bouygues Travaux Publics and Ideol as a consortium for the EOLMED floating wind farm project. This first step will help make it possible to begin developing solutions for the industrial production of floating foundations, building on know-how acquired in the mass construction of caissons for port structures (the illustration shows the creation of the breakwater of the Tanger Med II port).

Bouygues Travaux Publics:

- > Sales in 2015: €2,000 m
- > Number of employees: 2,777



Tanger Med II port: mass prefabrication of 105 5,000-tonne caissons