



Floating offshore wind in France & Europe, the New Frontier

**FAID 2019 – Boston, USA
18th March, 2019**



The French Wind Energy Association - FEE

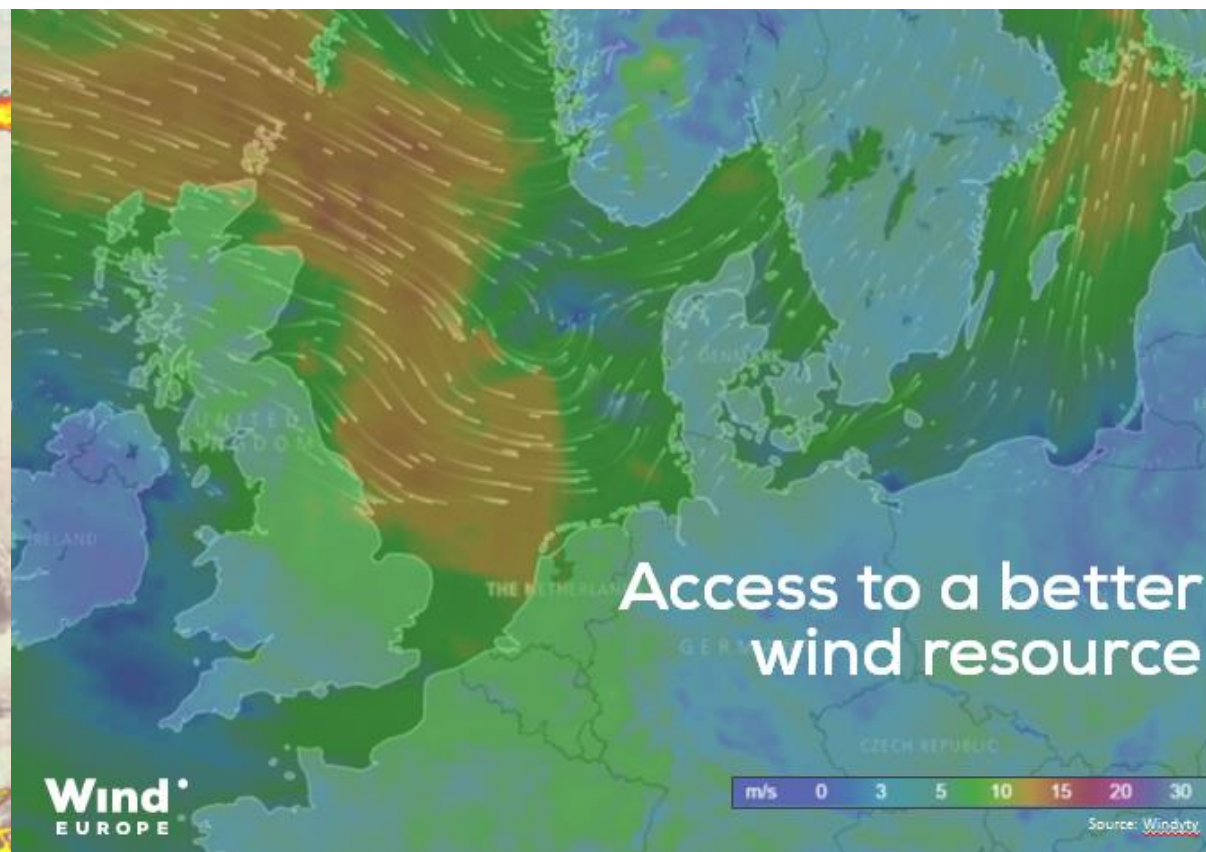
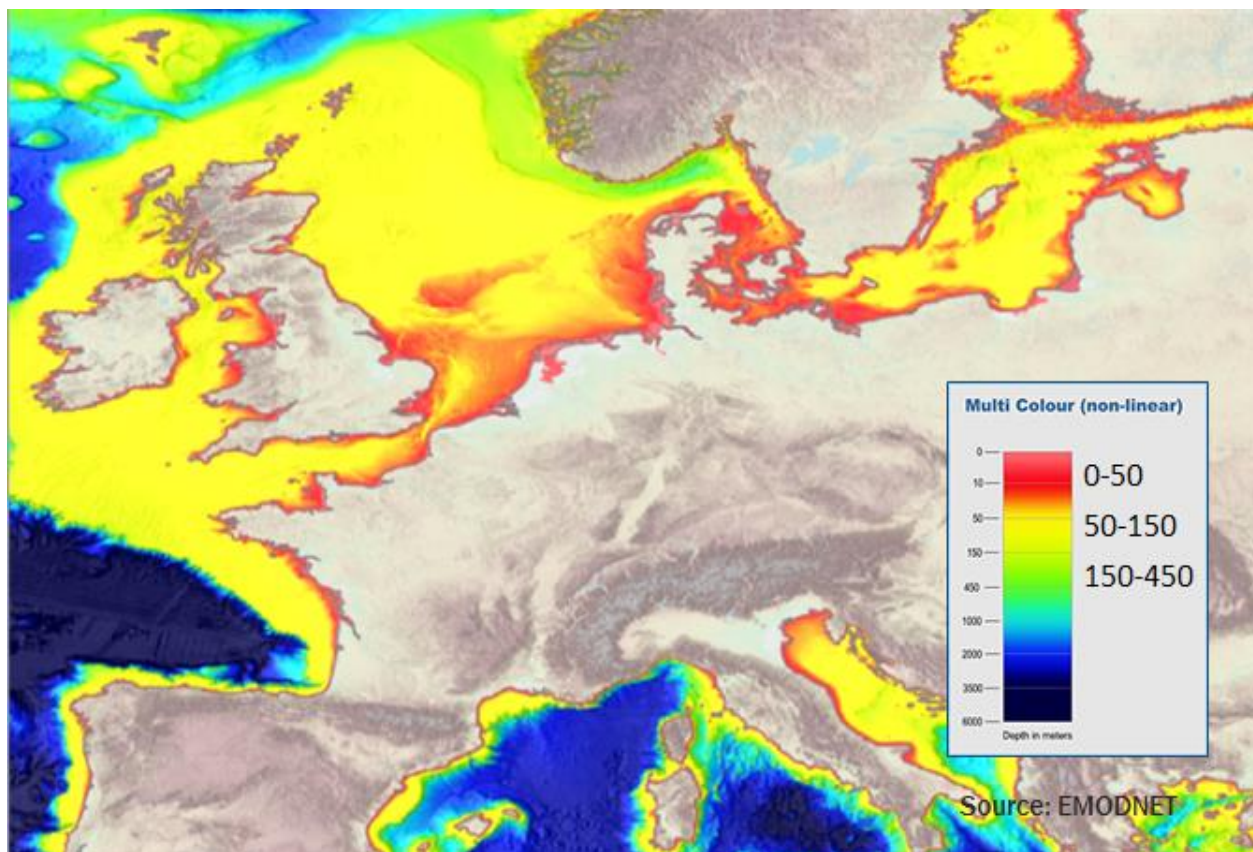
Created in 1996, France Energie Eolienne (FEE) supports and represents the wind energy sector (both onshore & offshore) in France.

Missions

- ✓ **FEE represents the wind industry** at public, national, European and regional authorities and regulating bodies
- ✓ **The association actively participates in the creation of legislative and regulatory texts**
- ✓ **It supports its members and facilitates their development in France.** The association promotes the interests of the association members and organises networking events as the annual national summit: “colloque national éolien” (around 1700 participants in 2018)
- **320 members (March 2019):** they built more than 90% of the installed wind turbines in France and operate 85% of them.
 - The French wind industry represents **17,100 jobs at the end of 2017**
 - 1 or several members of FEE is / are involved in **each French awarded offshore wind project**
- **More information under www.fee.asso.fr**
- **You want to know more about the French market?** Read our annual wind energy market study: [here](#)

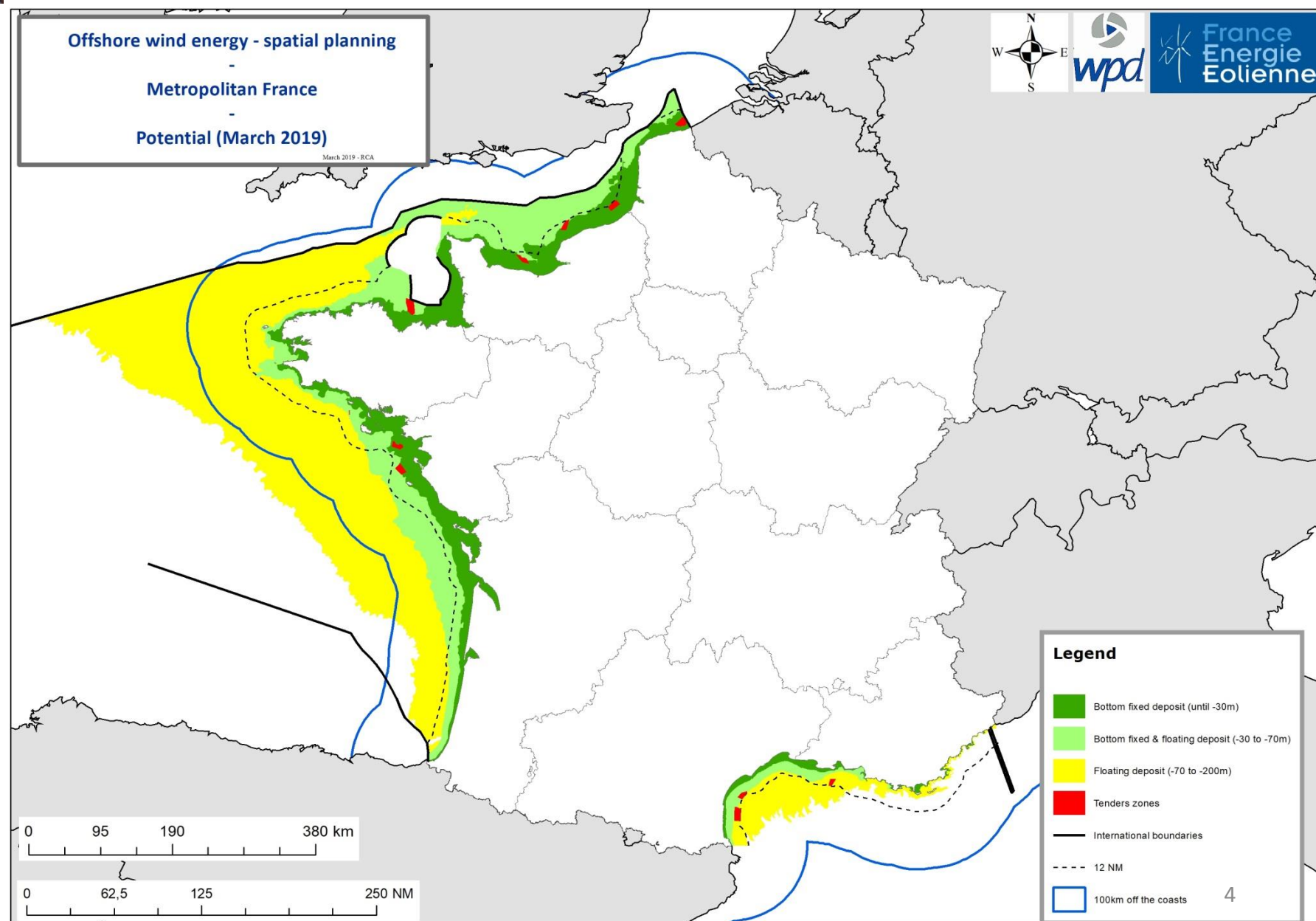


The Old continent, land of offshore wind energy



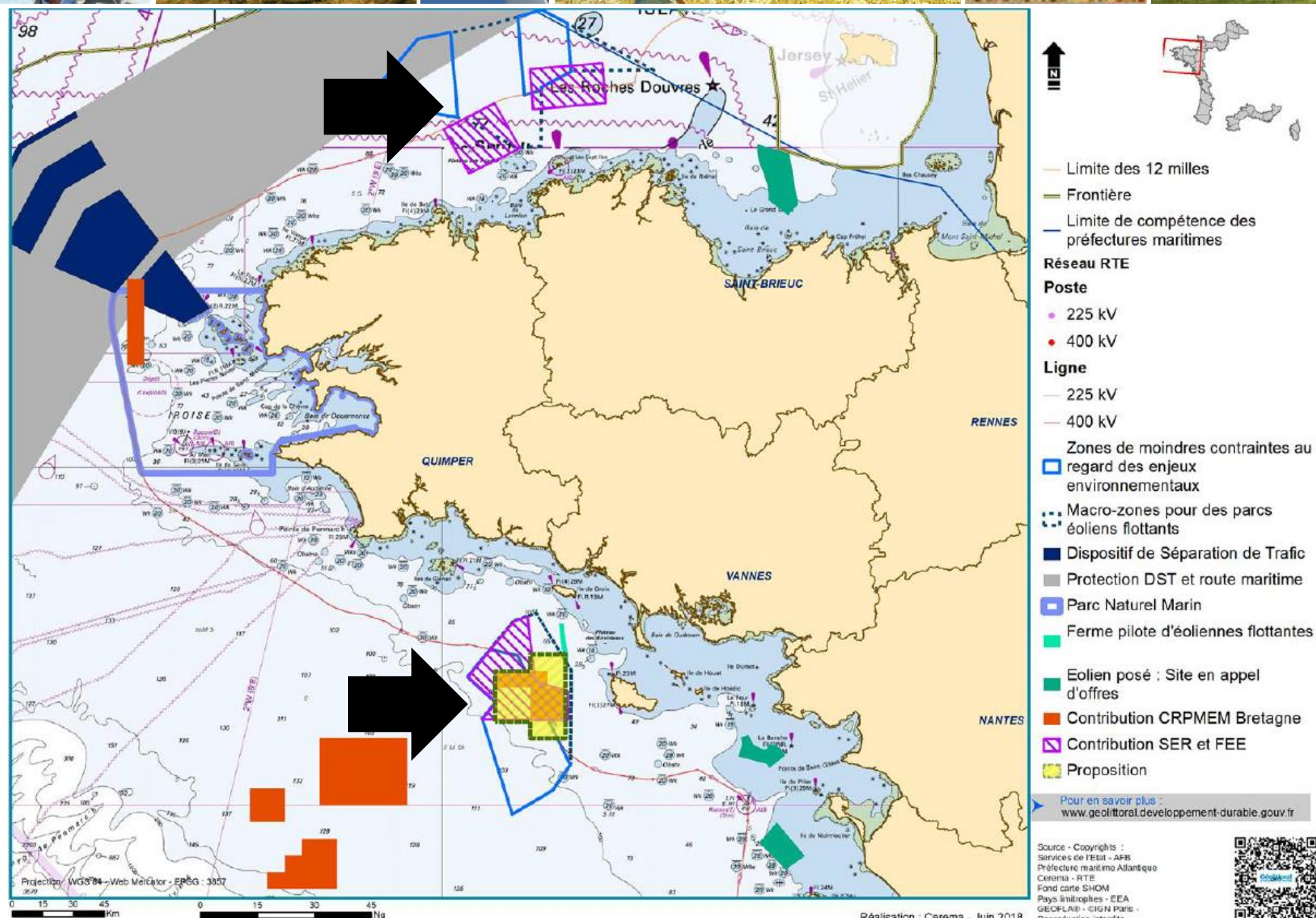


What about
France?
Potential
according to
bathymetry





Top sites for FOW deployment – West of France



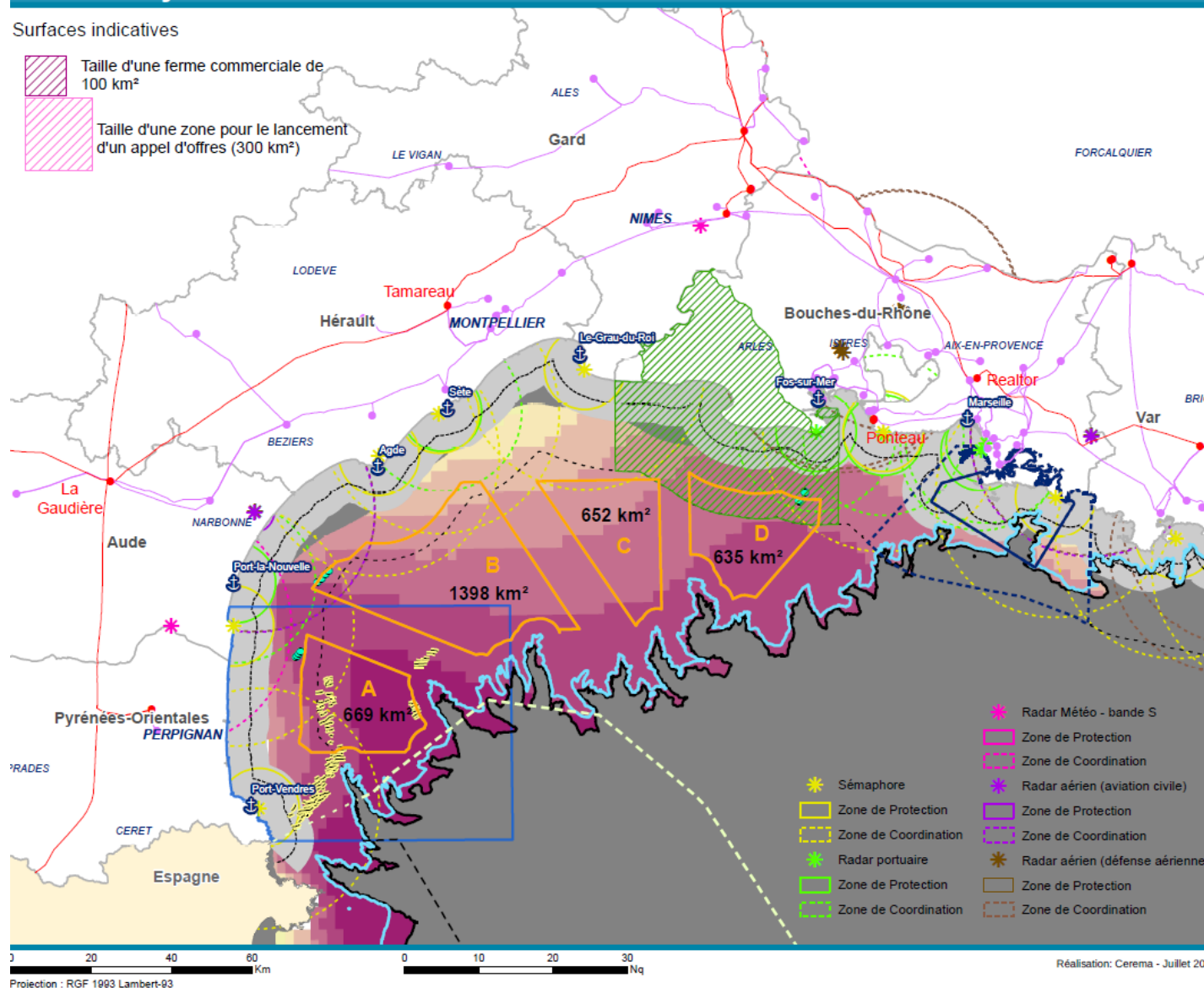


Top sites for FOW deployment – South of France

Carte de synthèse

Surfaces indicatives

- Taille d'une ferme commerciale de 100 km²
- Taille d'une zone pour le lancement d'un appel d'offres (300 km²)



- Réseau RTE**
 - Poste 225 kV
 - Poste 400 kV
- Ligne**
 - Ligne 225 kV
 - Ligne 400 kV
- Vitesse moyenne du vent à 100 m d'altitude (m/s)**
 - 5 - 6
 - 6 - 6.5
 - 6.5 - 7
 - 7 - 7.5
 - 7.5 - 8
 - 8 - 8.5
 - 8.5 - 9
 - 9 - 9.5
 - 9.5 - 10
 - 10 - 10.5
- Macro-zone**
 - Distance de 10km de la côte
- Eolienne ferme pilote**
- Port**
- Ligne bathymétrique - 200 m**
- Ligne bathymétrique - 350 m**
- Limite des 3 milles**
- Limite des 12 milles**
- Limite de la ZEE française**
- Limite de la ZEE espagnole**
- Coeur de parc du Parc Naturel National des Calanques**
- Aire d'adhésion du Parc Naturel National des Calanques**
- Parc Naturel Marin**
- Natura 2000 - Directive Oiseau (Camargue)**
- Dunes sableuses sous-marines profondes**

Pour en savoir plus :
www.geolittoral.developpement-durable.gouv.fr

Source - Copyrights :
MTES
RTE
AFB
Météo France - Modèle AROME (2004 - 2013)
Courants de marée du Shom
Bathymétrie projet Homonim - Shom
Pays limitrophes - EEA
GEOFLA® - IGN Paris - Reproduction interdite



Projection : RGF 1993 Lambert-93

Réalisation: Cerema - Juillet 2018



Offshore wind France's assets

✓ harbours infrastructures

- ✓ **The second potential in Europe**, thanks to more than 3500 km of coastlines, and to an EEZ of more than 11 Mkm²
- ✓ **Industrial know-how**, all along the value chain, with leaders in energy, oil&gas, etc.



- ✓ A well-developed **electrical grid**
- ✓ **A high level R&D base** : universities, laboratories, test sites, etc.

- ✓ **Territories involvement**, with the creation of several clusters in littoral regions

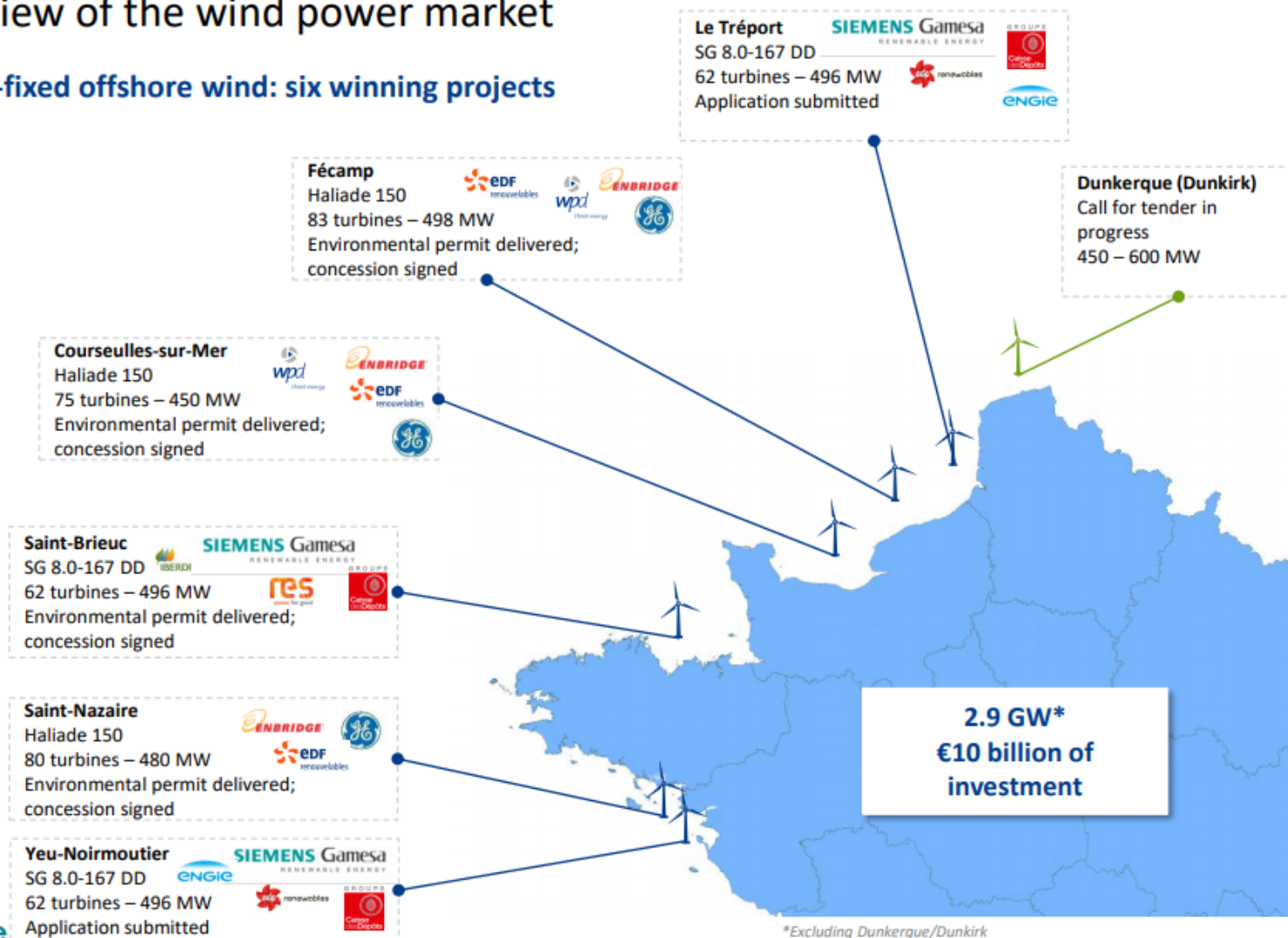


Fixed offshore projects...

- 2 past tenders awarded
 - in 2012
 - In 2014
- Important delays
- **Scheduled commissioning by 2021-22 for 1,428 MW and by 2023-24 for 2,916 MW***

Overview of the wind power market

Bottom-fixed offshore wind: six winning projects





...followed by pre-commercial FOW pilot farms projects

- 4 awarded projects (4x24 MW): 3 in the Mediterranean Sea, 1 off Brittany

FLOATGEN, a floating wind turbine demonstrator
Objective: to validate the performance of the combination of a wind turbine and a floating foundation
Capacity: 2 MW (Vestas V-80)
Installation location: Le Croisic
Water depth: 33 m
Consortium:




Farm	Characteristics	Industrial partners
Faraman	3 turbines – 24 MW	edf renouvelables, SBI OFFSHORE, SIEMENS Gamesa RENEWABLE ENERGY
Groix-Belle Île	4 turbines – 24 MW	EOLFI, 中广核, CGN, NAVAL ENERGIES, VINCI, GE, GROUPE Colas et Daples
Gruissan	4 turbines – 24 MW	Quadran ENERGIES MARINES, ideol, SENVION
Leucate-Barcarès	4 turbines – 24 MW	ENGIE, edp renewables, GROUPE Colas et Daples, EIFFAGE, GE

Pilot farms projects calenders:

July & November 2016: 4 projects – 96 MW (4x24MW) awarded.

2017: conciliation meetings + start of the surveys process

2017-2018: permits application

2019*: permits delivery

2020*: installation

2021*: commissioning



A commercial deployment for FOW to come soon

- **Context:** “Energy transition law for the green growth” voted in August 2015
 - **Ambitious targets for RES:**
 - ✓ 32% of renewable energy in the energy mix in 2030
 - ✓ **40% of renewables in the electricity mix in 2030** (~20% in 2018)
 - **The multiyear energy plan (PPE - decree) / under revision**
 - ✓ Strategic document setting capacity objectives at a 5 years horizon in decrees
 - ✓ Current PPE: Planning objectives at 2018 and 2023 (last decree on 27th October 2016)
 - ✓ Under revision since June 2017 - **1st official revised draft published on 25th January 2019:**
 - ✓ Bottom fixed: between 2500 and 3000 additional MW awarded by 2024
 - ✓ **Floating: between 750 and 1000 additional MW awarded by 2024 – through 3 tenders**
- For FOW, the industry proposes **2250 additional MW awarded by 2024** – through 3 x 250 MW + 3 x 500 MW
(The French potential is **at least 6 GW!**)



Green lights to boost FOW deployment

- **Implementation of the « ESSOC » act, improvement of the offshore wind legal framework and more date and transparency before each tender procedure (competitive dialogues):**
 - Preliminary investigations (wind, geophy, geotech, environment) will be led;
 - Envelope permit and other authorizations will be delivered after the award;
 - + Grid connection works and operational risks covered by the French TSO, RTE (*act adopted on December 2017 and decree published on 28 March 2018*)
- **Improvement of the acceptability** with preliminary public debate on the future area(s)' selection.
- **Working groups on environmental issues and co-activity** for multiple use of the offshore wind areas:
 - Preparation of a « **de-risked** » **approach** on selected areas → the State will lead surveys / investigations before the launch of tender procedures
 - Working groups on **cumulated impacts** on the environment
 - **Multiple use** for offshore wind areas: a serious stake in France



Concrete topics to deal with US

- **Some challenges:**

- **Industrialization and automation** processes;
- scaling up to **larger turbines**: innovating on construction, installation, and maintenance, and defining the turbine size sweet spot for floating wind to be attractive (12, or 15, or 20MW, which size for what water depth?);
- **digitalization and project management**;
- Research on **materials** (concrete, steel) and synthetic mooring systems;
- Research on the **interactions with environment** and biodiversity...

- **Some French competences:**

- Lot of investments in several leading **foundations** technologies;
- **French REX (pilot farms)** will provide data and know-how for the development of FOW worldwide, especially in the US;
- **Digital analysis** (universities, R&D centers, companies);
- Companies positioned **on all the value chain**;
- The **harbors issue** and our experience from the pilot farms.



And because we love debates in France...

- We would be glad to discuss...
 - **Grid connection aspects:** how to organize an intelligent planning of the grid connections deployment;
 - **Environmental assessments:** the « de-risking » approach and the links with the « envelope permit » → several ongoing environmental programmes (FEM; PMM; French State etc.);
 - **Multiple use** in the offshore wind areas: good practice and examples of co-activity?
 - **Harbours adaptation** for a competitive offshore wind industry;
 - **Innovation and R&D:** partnerships with laboratories and universities?
 - **Supply chain competitiveness and possible Franco-American partnerships**
 - Others?



Saw the wind...reap the floating offshore wind!



The **BIGGEST** floating offshore wind event worldwide:

- 850 participants from 20 countries expected
 - B2B & « meet the buyers » services
- Detailed programme and online registrations under

www.fowt-conferences.com



Thank you for your attention!



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