

# Avances mas reseñables en eólica en España (2016)

Ignacio Cruz  
Unidad de Energía Eólica  
CIEMAT



Gamesa G-128 5 MW offshore wind turbine installed in Arinaga (Gran Canaria island). (Canary islands)



# Technology



## Large wind turbines developments

### GAMESA



- **Mainstream 2/2.1/2.5 MW**
  - **G97 and G114**
- **Multi-MW 5/5.5 MW (on- and offshore)**
  - PMG and 2 stages planetary gear.
  - **G132 and G144**

### ADWEN

New **G16X** platform 7-8 MW being developed according to market needs

**NEW!!**

### ACCIONA WINDPOWER



**acciona**  
Windpower

- **AW 132/ 3000 (IEC Class IV)**
  - For moderate wind sites (Class IIIb)
  - 64.7 m blade design and manufacture
  - Steel/Concrete tower

# Technology

OEMs: Siemens and Gamesa have signed binding agreements to merge Siemens' wind business with Gamesa.

June 17th, 2016

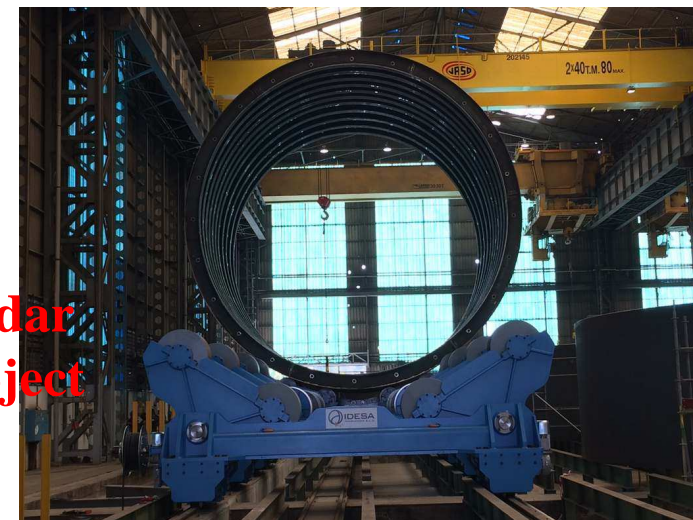
Navantia and Iberdrola hold event to mark delivery of first jackets for Wikinger offshore windfarm

July, 1st 2016

Offshore wind farm substation developed by Navantia (November 2016)



**SPAR  
Foundation  
Developed at  
Navantia/Windar  
HYWIND Project**



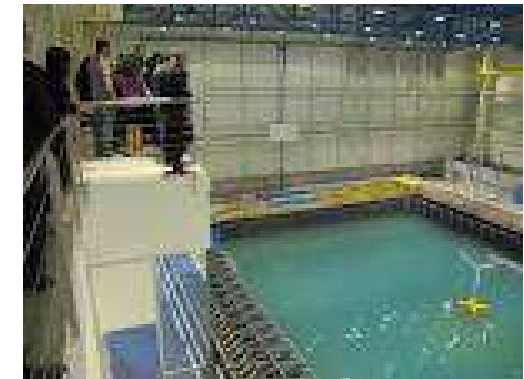
# New Initiatives



**NAUTILUS Floating Solutions S.L.** is an industrial and technological consortium for the offshore deep water development.

- **Partners:**

- MURUETA Shipyards
- TAMOIN Engineering
- VELATIA Power grids, Power electronics and telecom.
- VICINAY MARINE INNOVACIÓN Chains and moorings lines
- TECNALIA (Research Center)



- **Objective:** Development of cost competitive **semisubmersible platforms for 5 to 10 MW** floating offshore wind applications, easy to be built in conventional shipyards, easy to be assembled in conventional ports and easy to be towed by conventional ships to the operation site.



# R&D Activities

- Japanese manufacturer Hitachi is sending its **5MW offshore wind turbine nacelle and drivetrain** for testing at Spain's Wind Turbine Test Laboratory (LEA), run by the **National Renewable Energy Centre (Cener)** in Pamplona, according to several sources at an offshore floating wind power seminar in the city.



# Environment Impact mitigation

- **(Dec 2016) U.S. Department Of Energy Funds Evaluation Of the Spanish DTBird® System.**
- DTBird®, teamed up with the American Wind Wildlife Institute, has been selected to be funded by the U.S Department of Energy under the program “Wind Energy-Eagle Impact Minimization Technologies and Field Testing Opportunities”. DTBird® Detection and Collision Avoidance Modules’ ability to detect and to reduce the overall collision risk to eagles will be improved and evaluated. More specifically, researchers will assess how well the DTBird® Detection Module detects eagles, how strongly eagles respond to the sounds emitted by DTBird® Collision Avoidance Module, and calculate how much the DTBird® system reduces the overall risk to eagles.

