Επισκόπηση Τεχνολογιών για την Αξιοποίηση της Αιολικής Ενέργειας

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iWIND Renewables P.C.

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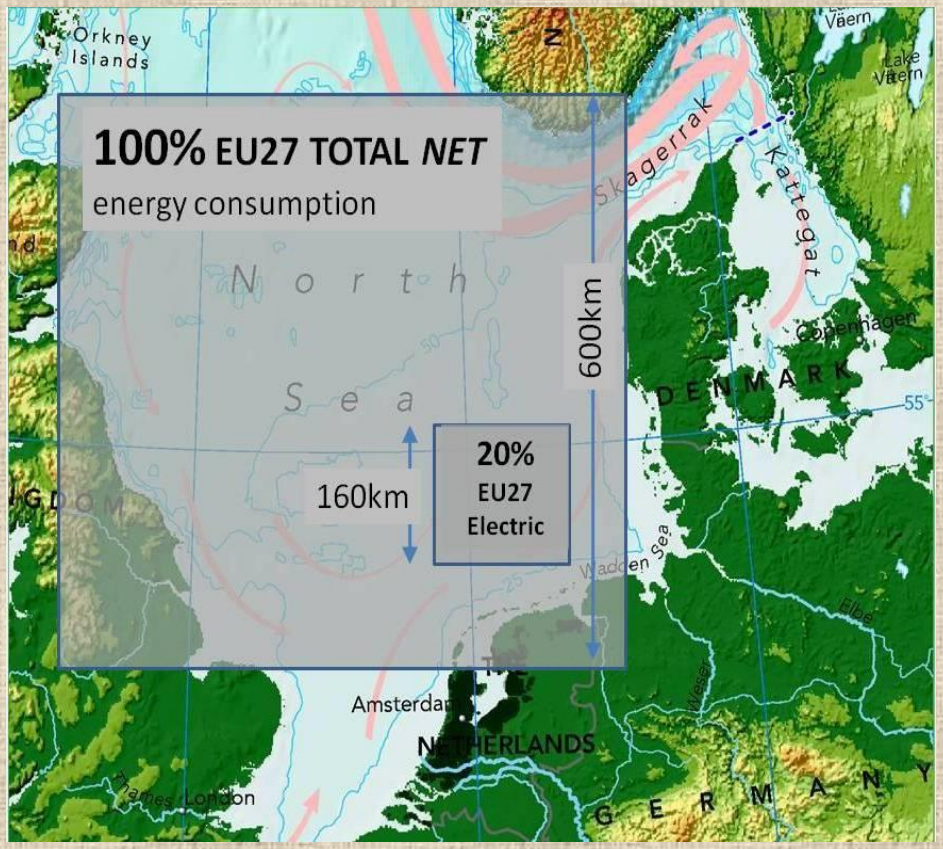
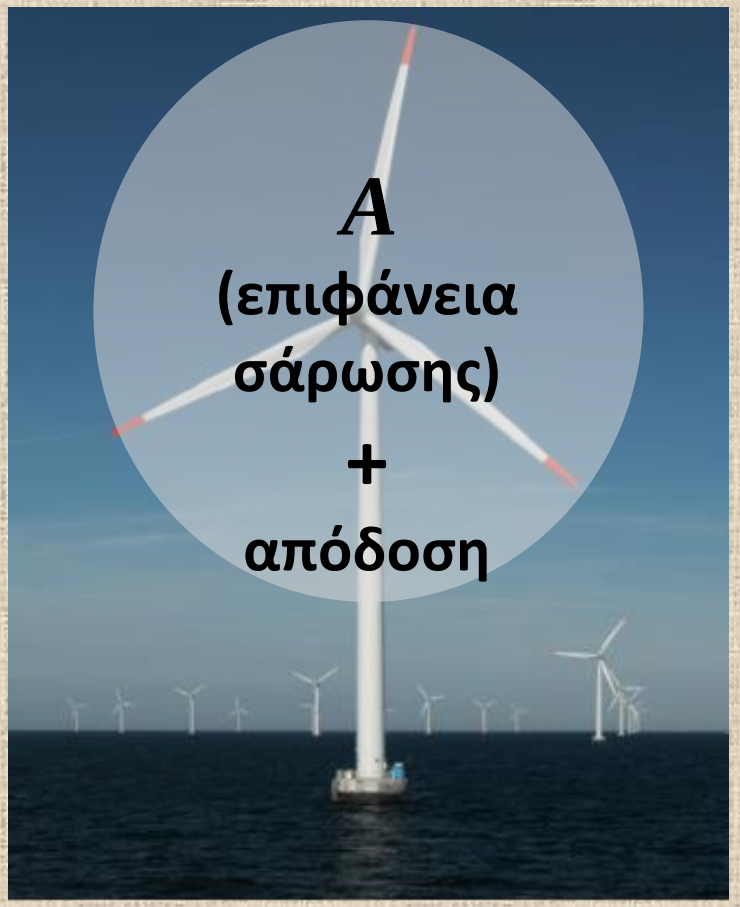
Από τον Αέρα στην Αιολική Ισχύ

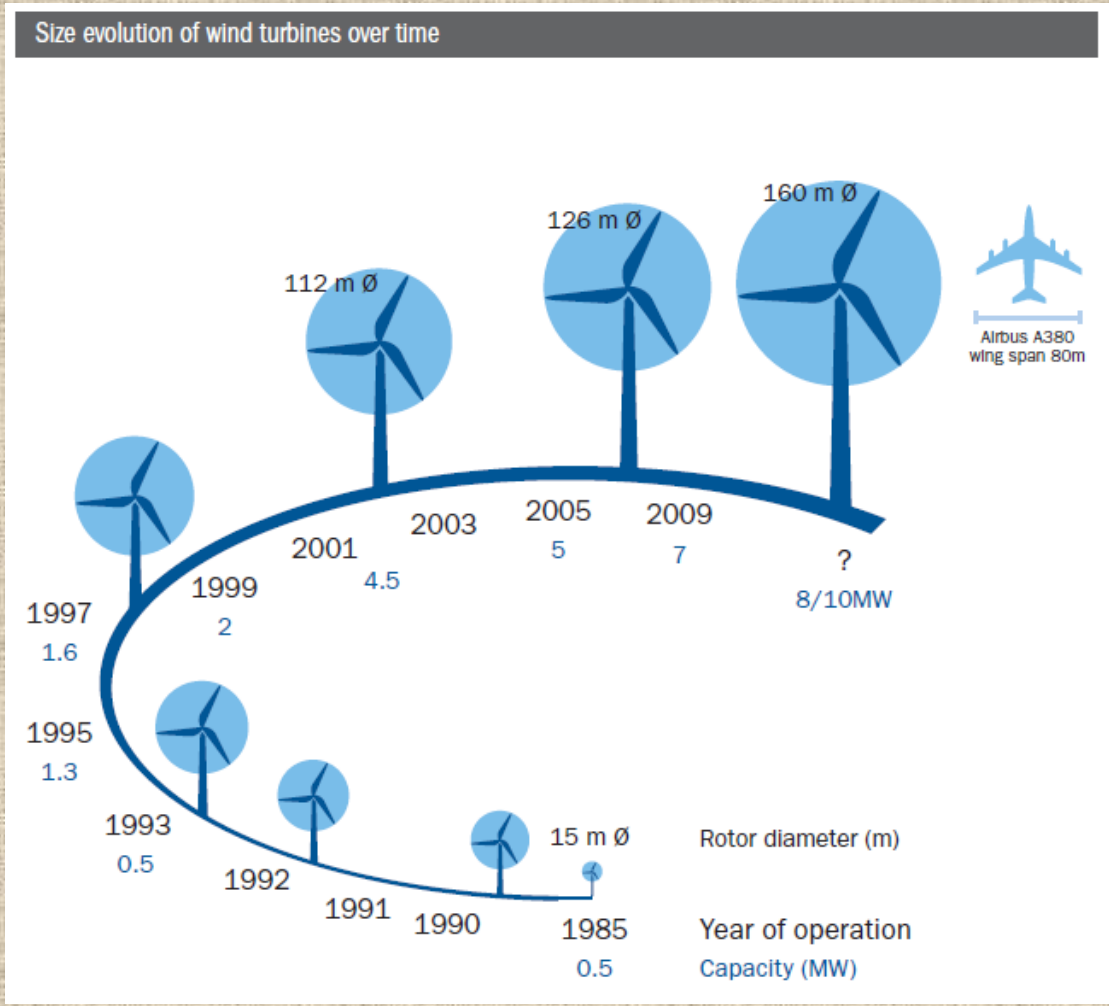
$$Power = (\tfrac{1}{2}\rho U^3) * (A \cdot C_P)$$

άνεμος **ανεμογεννήτρια**





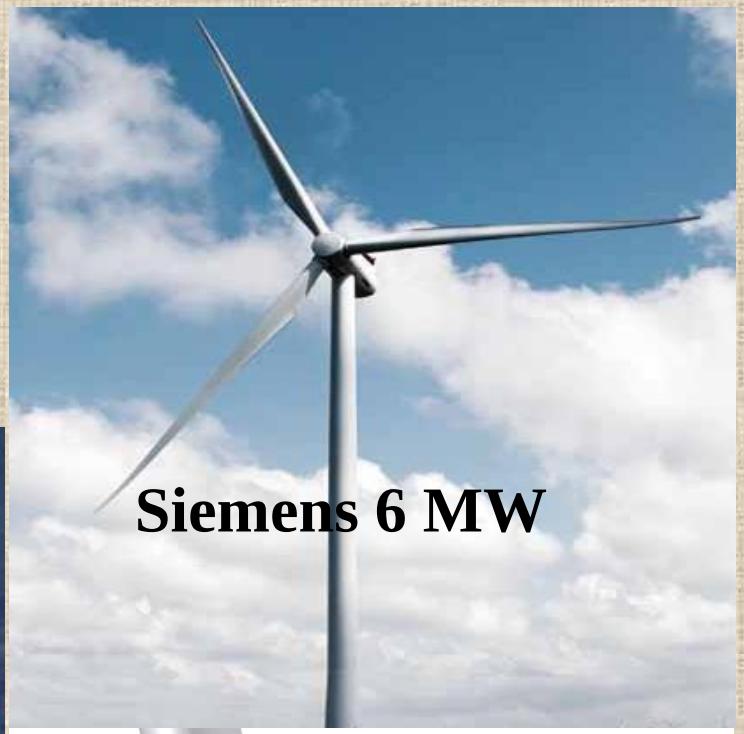
Τεχνολογικές Τάσεις– Μέγεθος Α/Γ



Source EWEA

Turbines

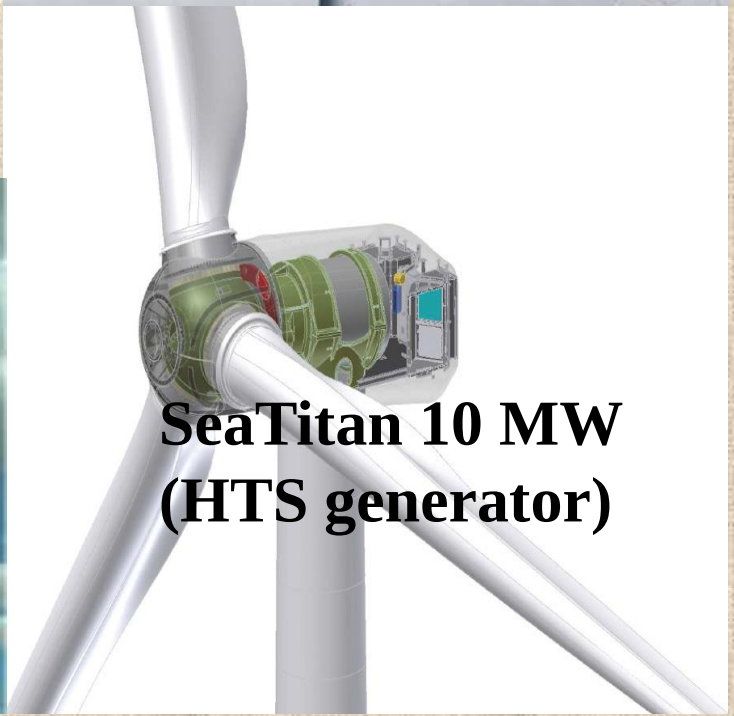
V164-8.0 MW



Siemens 6 MW

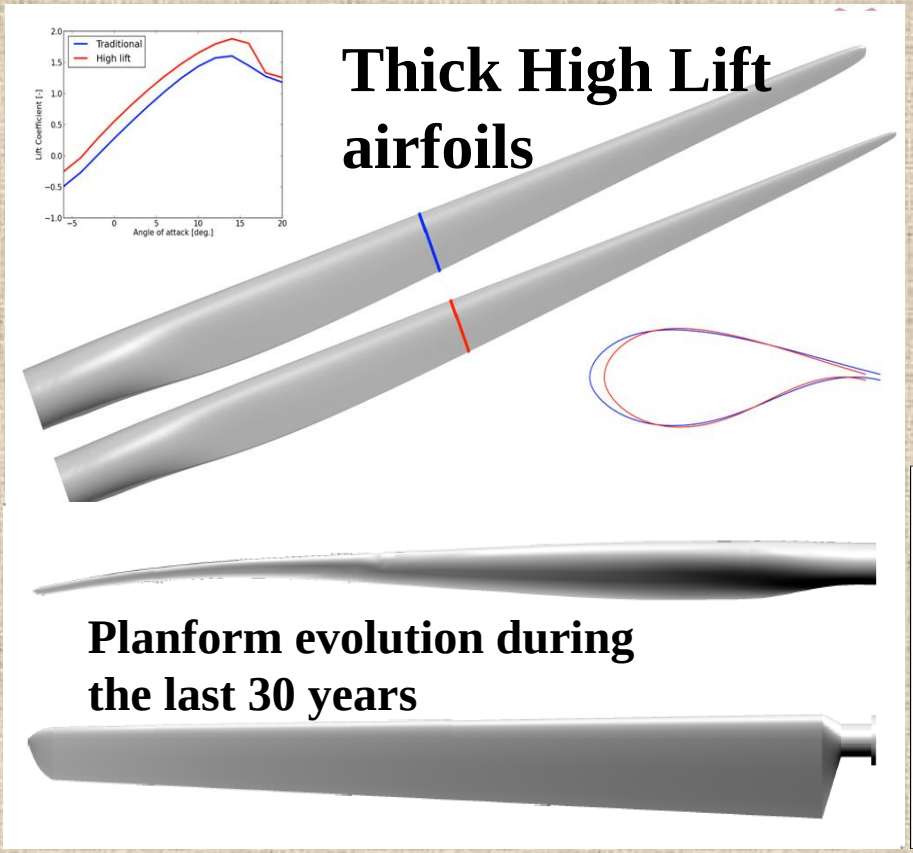
Alstom Haliade 150-6MW

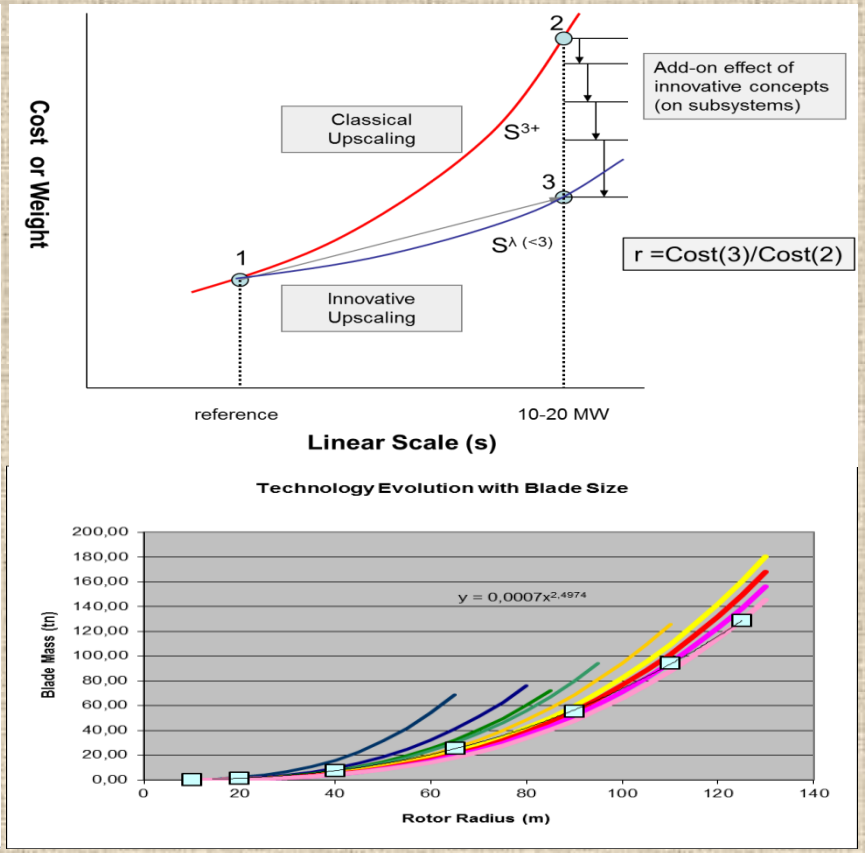
Sway 10 MW



SeaTitan 10 MW
(HTS generator)

Τεχνολογικές Τάσεις– Πτερύγια

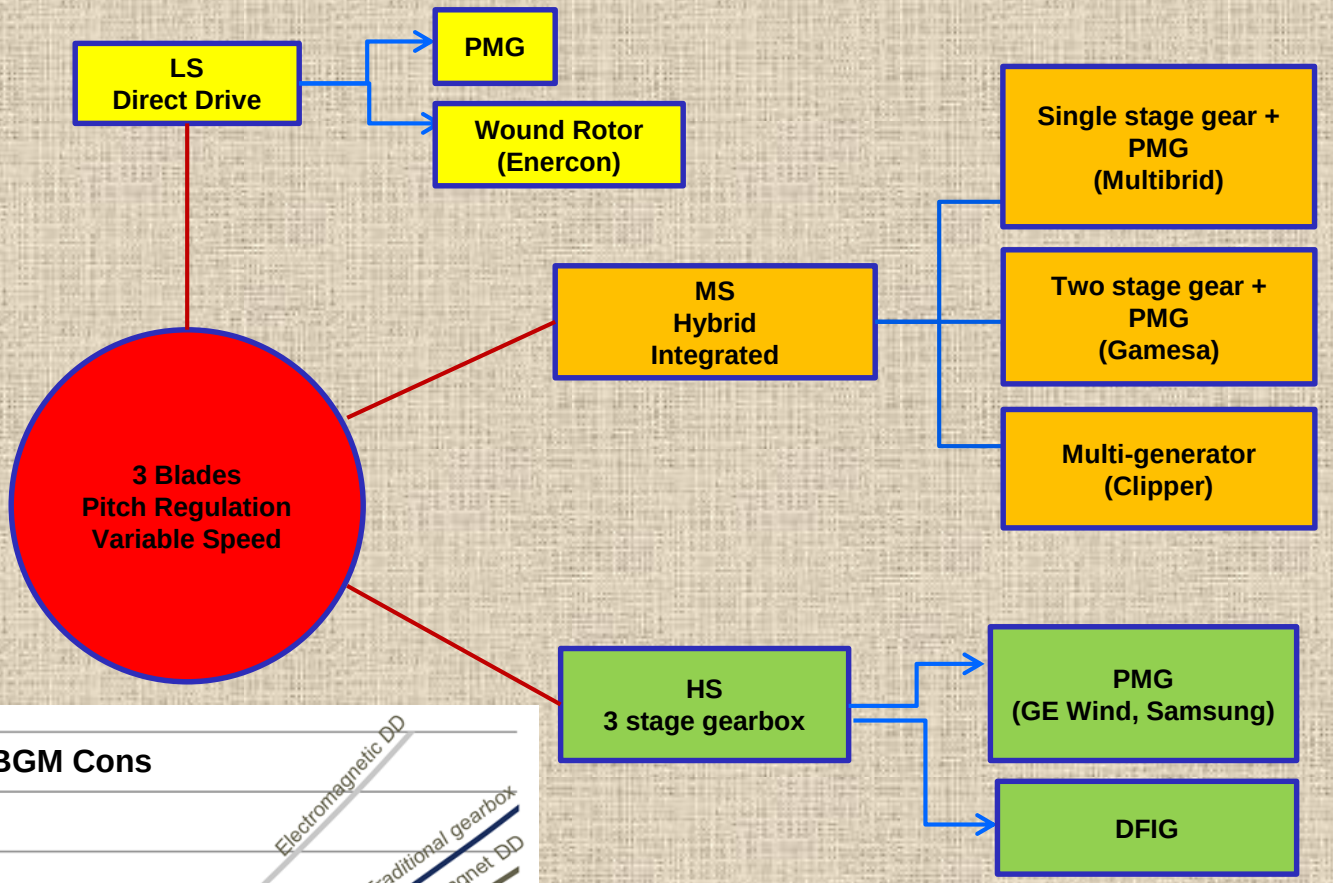


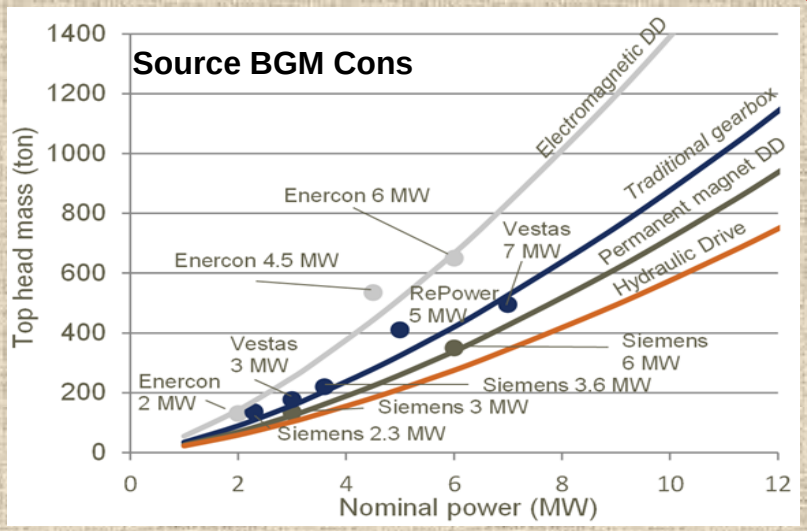


Source DTU IE Report 2014

Source UPWIND Final Report 2011

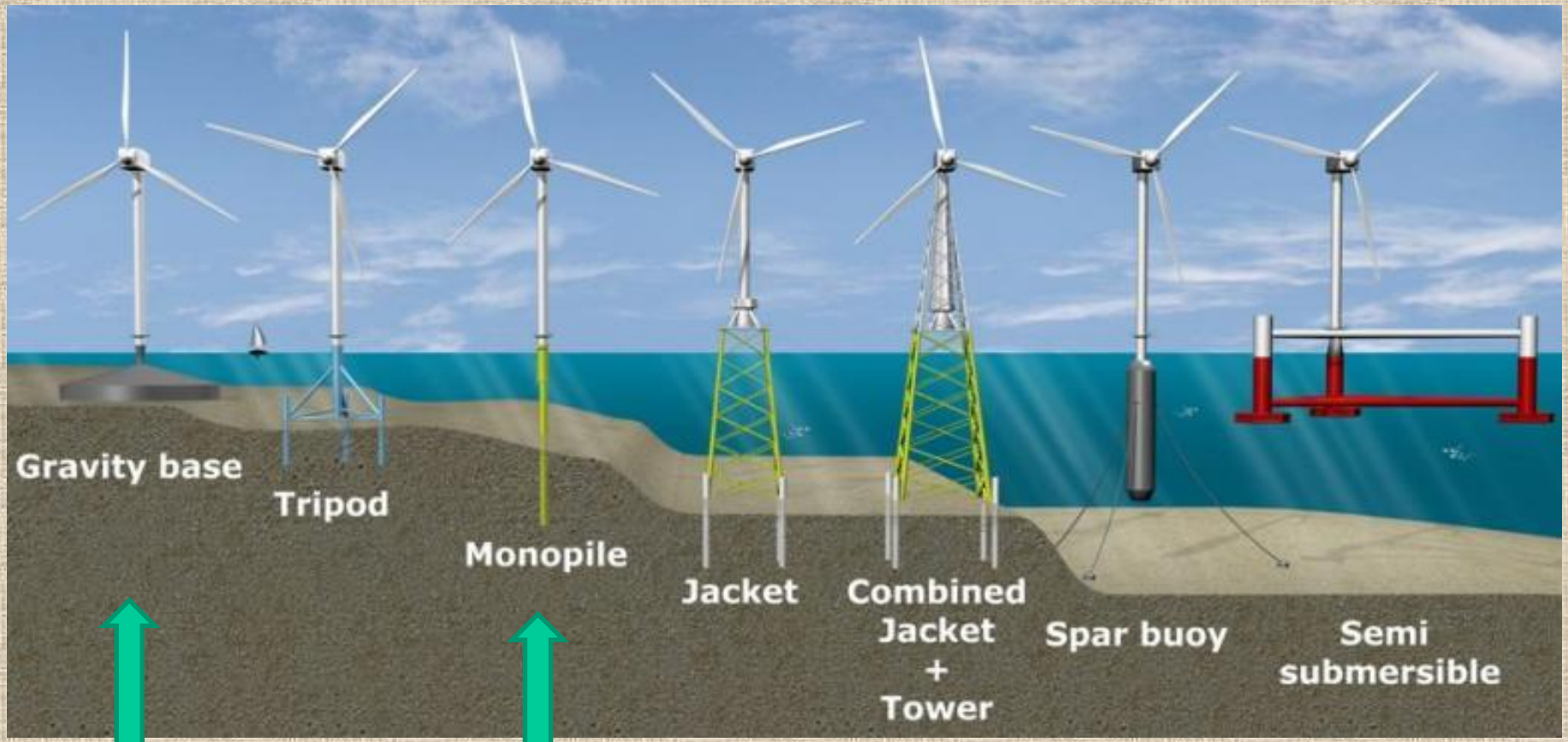
Τεχνολογικές Τάσεις – Μέσα στην Άτρακτο





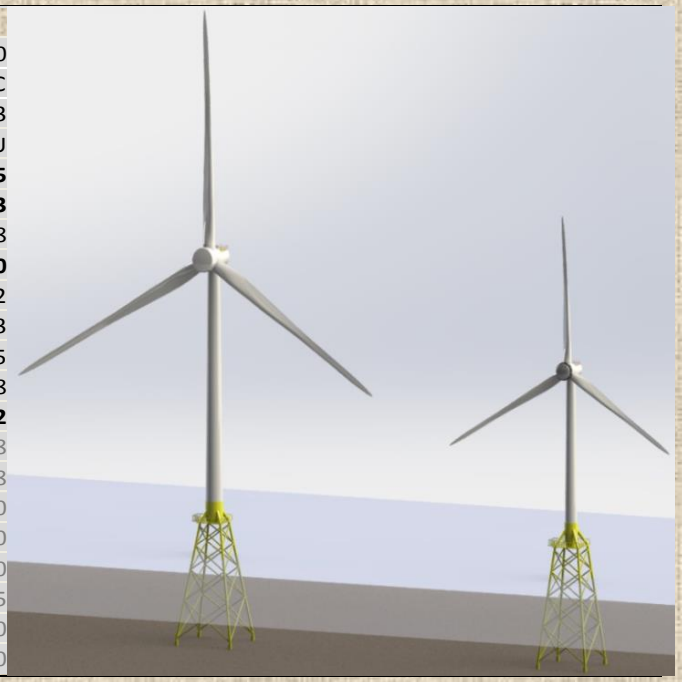
Source Peter Jamieson

Υποθαλάσσιες Στηρίξεις

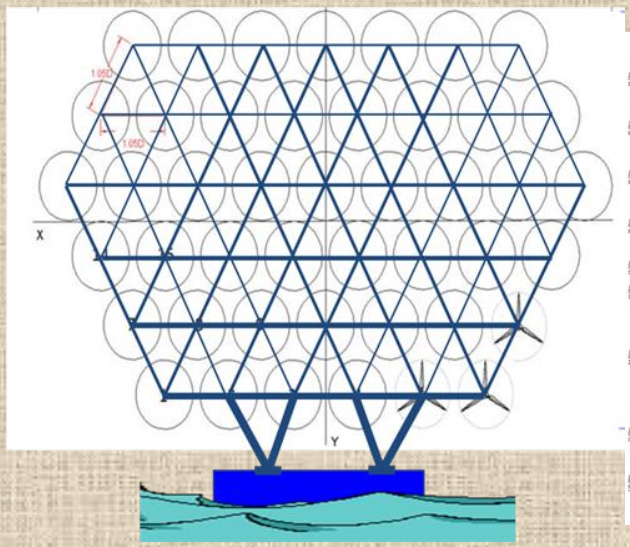


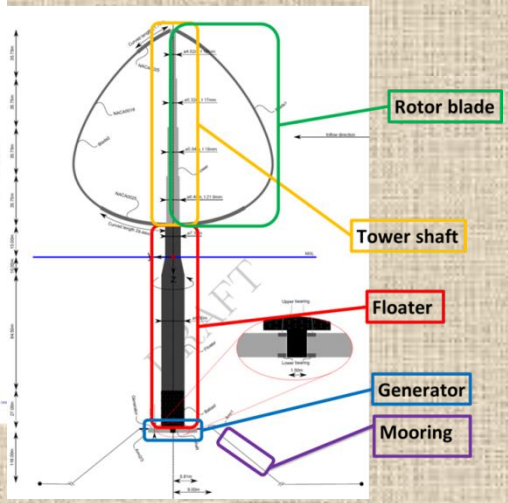
INNWIND.EU (FP7 EU Project)

EVOLUTIONARY ARCHITECTURES		
Rated Power [MW]	10	20
IEC Class	IA	IC
Number of blades [-]	3	3
Rotor Placement (Upwind-Downwind)	U	U
Rotor Diameter [m]	**178-202**	**252-285**
Hub Height from m.s.l. [m]	**119-131**	**168-173**
Blade Length [m]	86-98	122-138
Rated Wind Speed [m/s]	**11.4-11.0**	**11.4-11.0**
Minimum Rotor Speed [RPM]	6	4.2
Rated Rotor Speed [RPM]	9.6	7.13
Optimal TSR [-]	7.5	7.5
Gear Ratio [-]	50	48
Blade Mass [tons]	**37-49**	**100-132**
Hub Mass [tons]	105.5	278
Nacelle mass [tons]	446	1098
Tower mass [tons]	628.4	1600-1780
Tower Top Mass, RNA [tons]	676.7	1730
Water depth (mean sea level - m.s.l.) [m]	50	50
Access Platform a.m.s.l. [m]	25	25
Jacket Mass [Tons]	1210	1670
Transition piece mass [Tons]	330	450

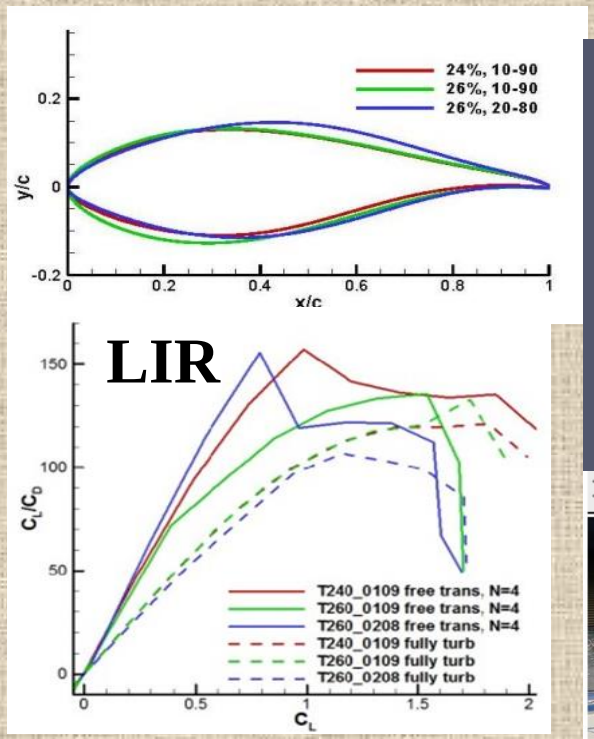


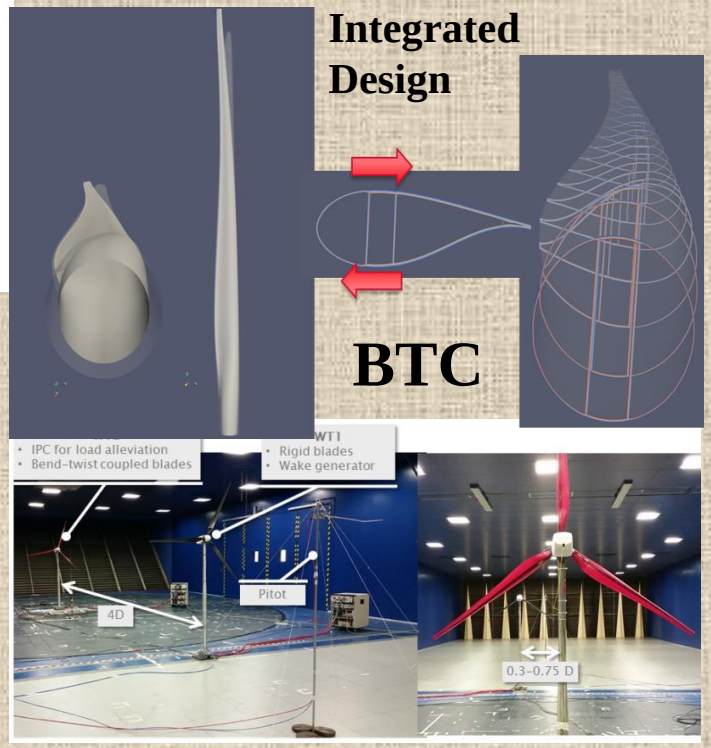
- **Evolutionary**
- **Radically New**
- **Revolutionary platforms**



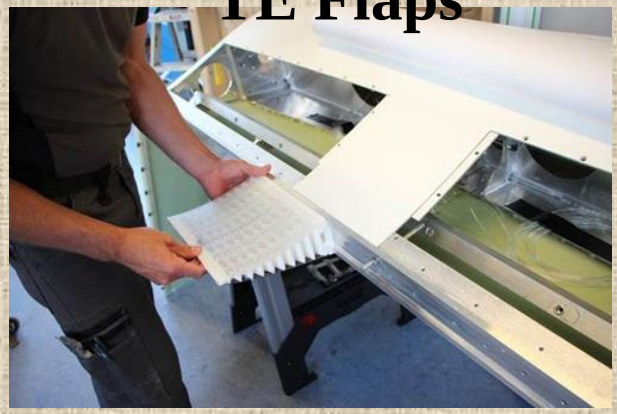


Καινοτόμοι δρομείς (πηγή INNWIND.EU)



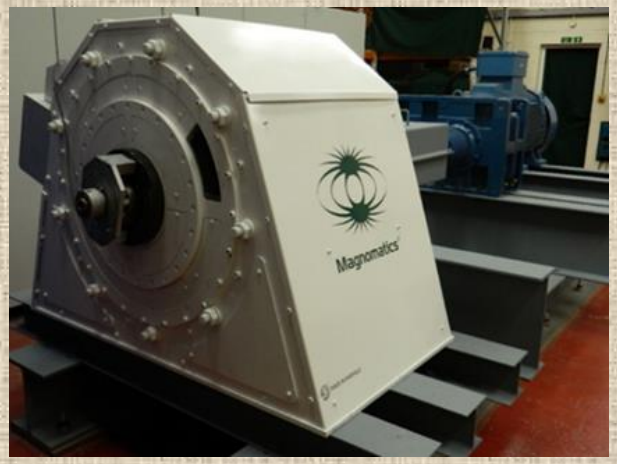


TE Flaps

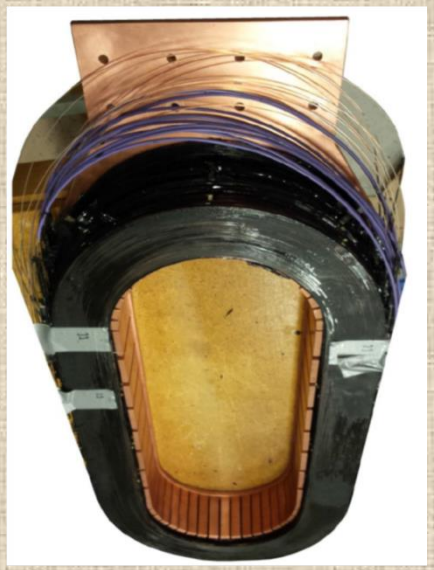


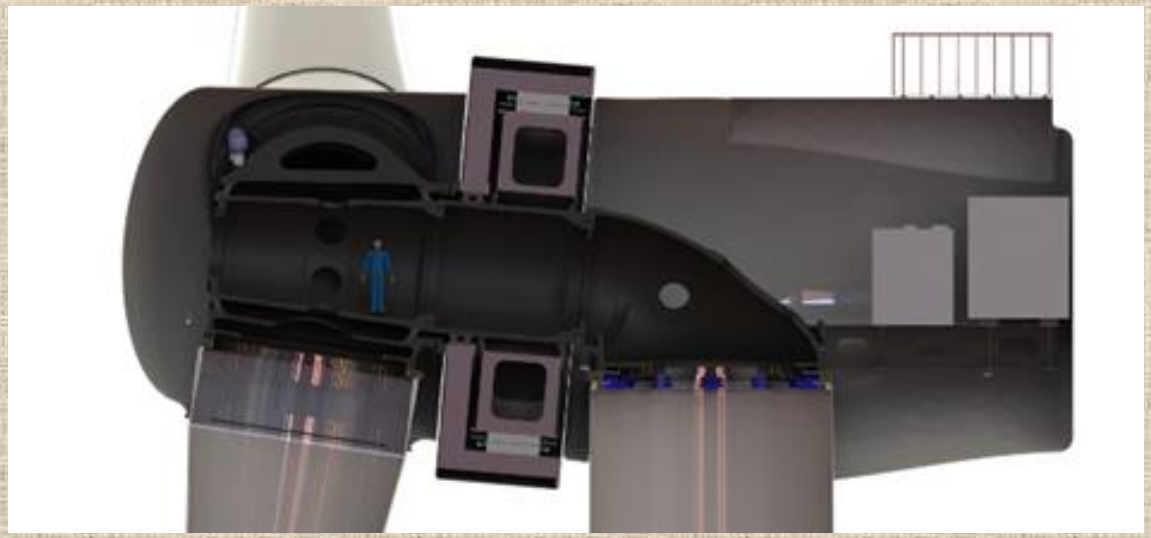
- **Rotor, although a small contributor to the OWT CAPEX, is having the main responsibility for the energy production**
- **Larger rotors with constrained self- and downstream- loading are the preferable option for large OWTs. This can be accomplished combining lower induction level (LIR) , aeroelastic tailoring (BTC) and advanced active control (incl. Trailing Edge Flaps).**
- **Integrated rotor aeroelastic design with a large number of blade planform and inner structure parameters is nowadays an option, which was widely explored in INNWIND.EU**

Καινοτόμες γεννήτριες (πηγή INNWIND.EU)



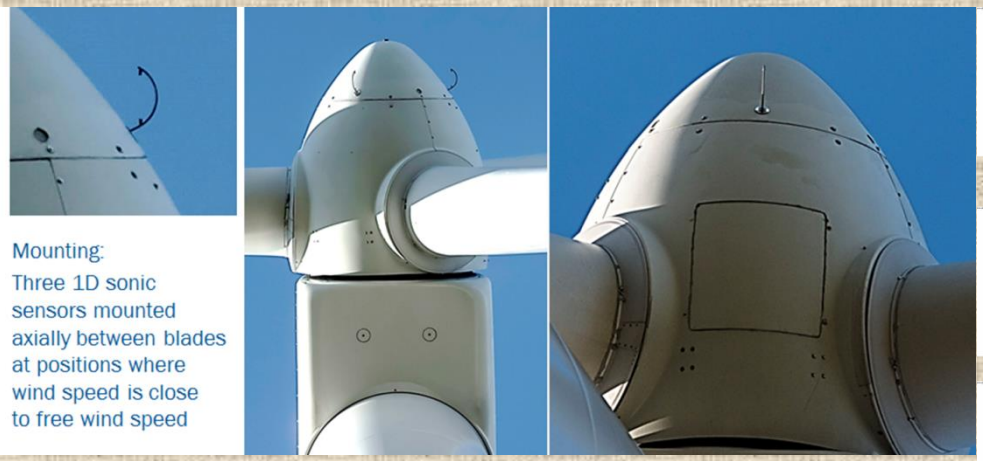
Pseudo-magnetic direct drives (5,16 and 200 kNm demonstrators)

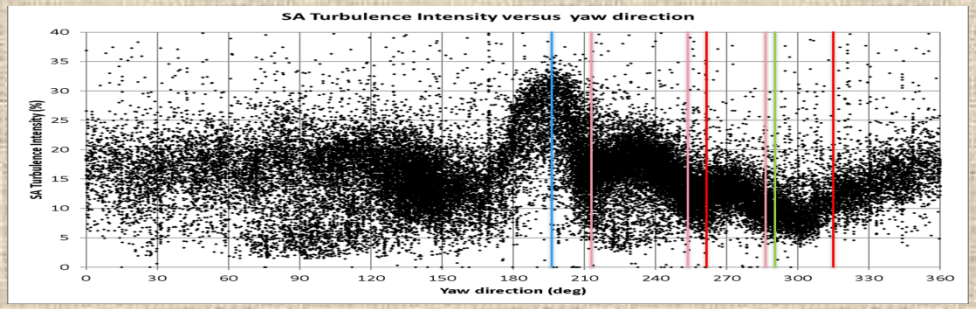


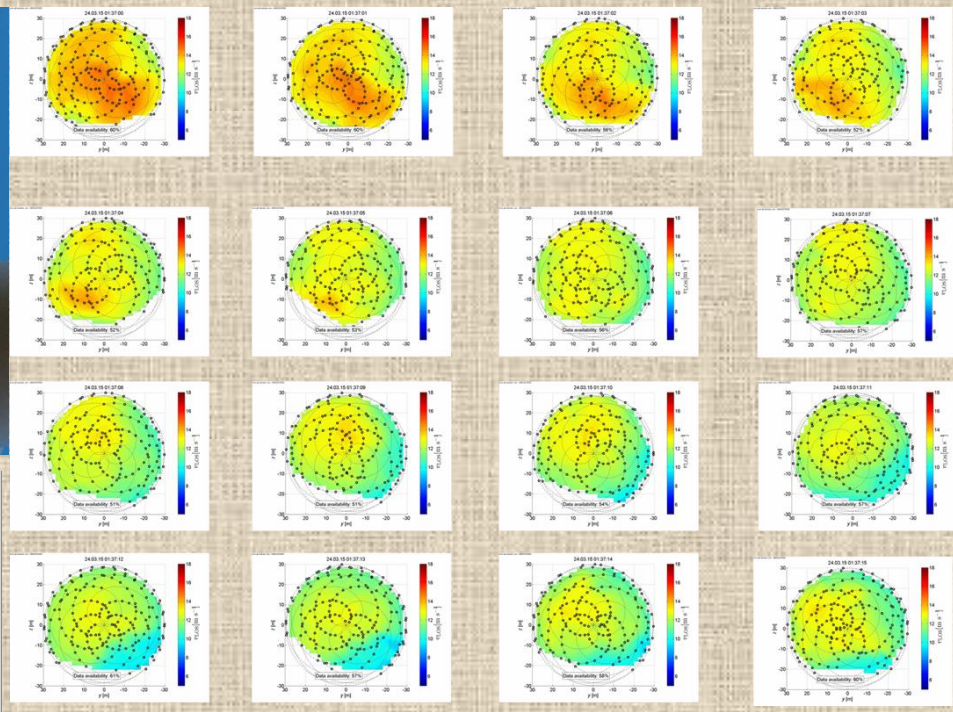


High-temperature Superconducting generators, MgB2 race track coil & 20MW concept

Καινοτόμα συστήματα ελέγχου (πηγή INNWIND.EU)



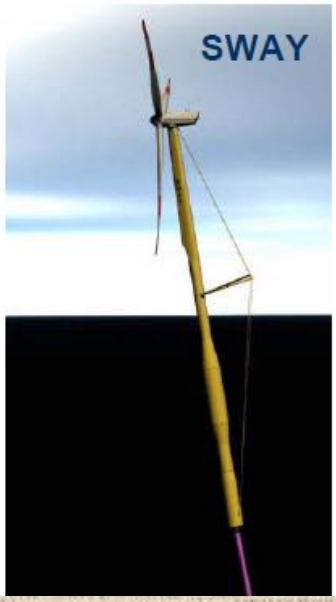




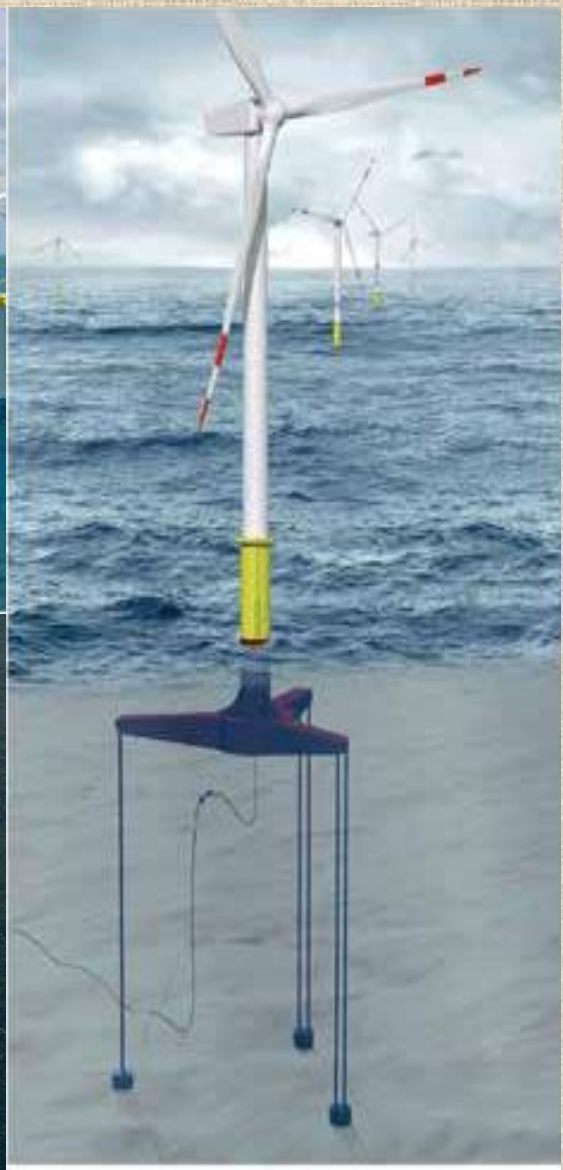
2D rotor plane wind fields @ 400 measurement points per sec

- Demonstration of wind measurement capabilities of Spinner Anemometer and Spinner Lidar
- Individual Pitch Control (IPC), Individual Flap Control (IFC) and combined IPC/IFC tested and assessed
- Extreme turbulence control
- Intelligent shut-down with flaps

Πλωτές Α/Γ – Το μέλλον για τις βαθιές θάλασσες?



Και μερικές ακόμα …




Ευχαριστώ για την παρουσία
σας και την προσοχή σας