ADVANCED TECHNOLOGIES FOR RENEWABLES

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OFFSHORE WIND
TEESIDE – 27 SETS OF 2,3 MW TURBINES – 100% EDF GROUP SHARE – GRID CONNECTED IN 2014
OFFSHORE WIND: A MOVE TO HIGHER POWER TURBINES

Test of Halliade 6 MW turbine onshore

Installation of Halliade 6 MW turbine offshore, grid connected now
INDUSTRIAL PLAN FOR OFFSHORE

RETOMBEES POUR LES PORTS EN SYNTHESE...

- Parcs éoliens offshore
- Usines Eoliennes Alstom
- Unités d’assemblage et fondations
- Centres d’exploitation-maintenance
FLOATING WIND OFFSHORE USING VERTICAL AXIS TURBINE

- Useful for high depth zones like Mediterranean sea,
- Advantage on Operation and construction: possibility to bring/bring back the turbine fully mounted,
- Market potential is higher than fixed offshore turbine
- For floating offshore, vertical axis turbine is superior, also more innovative/risky
Floating Offshore: Nenuphar/AREVA partnership with EDF EN

- 2014 Prototype onshore
- 2016 Prototype offshore
- 2019 Pilot Project 30 MW

Technology Provider: Nenuphar
Turbine provided by AREVA
Technology provider for floater still to be determined (RFI underway)
Owner: EDF EN
STORAGE TECHNOLOGY USING NAACL2 BATTERIES
Test in Colombiers: ZEBRA Battery + Control and Command on the Basis of a 57 kW PV/30 kW Battery Plant

Scale 1/100ème
3 Batteries + 57kWc PV
Automate PPC
Energy management System provided by Store & Forecast

Prévision, optimization, regulation

Qualification et performances batterie
Développement contrôle commande
Performances PMS
Performance énergétique globale
Optimisation phase réalisation
Approche O&M
CONCENTRATED SOLAR POWER
EDF EN CSP PROJECT IN MOROCCO

NEW TECHNOLOGY (ALSTOM): MOLTEN SALT POWER PLANT

Main interests → lower LCOE than direct steam, long term energy storage, simplified operation (if MS well handled)

LCOE lower than 140 €/MWh with 7 hours storage (first results of tender results)
EDF EN CSP PROJECT IN MOROCCO

Derived from Ivanpah 150 MWe plant in USA