

GE Renewable Energy Offshore Wind

French –American Innovation Day

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Boston, MA



GE's Haliade-X 12MW wind turbine technology



Global and US Offshore Wind Trends

GLOBAL

- Advanced Technology Deployment (WTGs and OEM)
- Higher Capacity Factor / lower Capex and Opex producing steady downward trend in LCOE /zero subsidy bids
- Europe still leading but China gaining ground, US and Asian Markets crystalizing early development in other markets
- 25+ GW installed, 4GW (~20Bn USD) in 2017
- Global goals as high as 520 GW of installed capacity by 2050 (Irena)
- Floating solutions making progress

US

- Leverage of state of the art European technology resulting in lower than expected LCOE bids
- 2+ GW with secured revenue 3 GW more with revenue by 2020 and 5GW with COD in 2021-2025
- 15-20 GW in development.
- Global majors positioning, with early consolidation via partnerships, acquisitions, bold investing
- NE leading but other markets also developing (West Coast, Island Markets)



Figure 4: Historical and projected total installed capacity of offshore wind, 2000-2050

Cumulative installed capacity (GW)

Global offshore wind- REmap Case



Fixed Vs. Floating: US Market Levers



FIXED

- RPS, retirement of fossil and older technologies
- Incentives at federal, state, local levels
- Market at Tipping Point, highly competitive
- Additional benefits of nearness to load, peak coincidence, congestion relief
- Driven by balance sheet players with long term vision
- Larger Turbines, storage, hybrids, digital solutions, etc.
- Constrained by needs for investment in infrastructure (Ports, vessels, content)

FLOATING

- Large and constrained markets require Floating Solutions (CA, HI, parts of NE, Gulf? Island markets?)
- Technology at critical development phase: Current vs. New WTG technology
- WTG development outpacing floating demonstration projects
- Viability driven in part by faster/higher local content better fit to current infrastructure
- Required in some markets (depth) and good addition to other markets in deeper depths (NE)



Roadmap for Floating Solutions in US

- Further Accelerate R&D funding and investment
- Solve the substructure technology lag: fully integrated solutions
- Close technology gaps in tethering, cabling, controls, grid solutions
- Target local market parity and factor-in declinations in power rates
- Establish finance-ability by closing the substructure/wtg risk gap
- Build on fixed market momentum and seek synergies with jobs/content
- Plan for scale from the start, develop complete financeable solutions