



# **Subsea cabling for offshore renewable energy projects**

- experience from existing  
developments

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# Global Marine Systems Limited

- Specialists in the planning, installation and maintenance of offshore cables
- Global operations
- Operational sectors
  - Telecommunications
  - Renewable Energy & power
  - Defence
  - Oil & Gas
- 150 years of experience

# Renewable Energy track record

- **Offshore cable installation**
  - Blyth Windfarm (UK - 2000)
  - Horns Rev Windfarm (Denmark - 2002)
  - Kentish Flats Windfarm (UK – 2004/05)
  - ***Total – 114 cable links***
- **Cable route studies**
  - Robin Rigg Windfarm – cable route study
  - London Array Windfarm – cable landing study
  - UK Wavehub – cable route study
- **Co-operation agreement with SMIT Heavy Lift Europe B.V.**

# Threats to the cable

- Anchor damage from vessels
- Fishing – trawler board damage
- Sea motion / seabed material damage
- Abrasion

# Options to counter threats

- Sensible routing decisions
- Appropriate burial into seabed
- Additional protection
- Correct design of the cable/turbine interface

# 33kV Export cable



# Cable consenting decisions

- What drives the decisions and constraints?
- What are the authorities trying to achieve?
- What expertise is being used?
- Who is advising the applicants and the decision makers?
  
- What are we seeing;
  - Blanket depth consents for entire cable networks
  - Deep burial requirements (2m/3m) with severe constraints on methods of burial
  - Not a lot of common sense!!

# Environmental constraints

- Restrictions on burial tools causing sediment plumes that might affect shellfish
- Timing restrictions crossing areas used by fish as spawning grounds
- Timing & method restrictions when in region of bird feeding grounds
- Beach access restrictions – timing & location
- Routing restrictions based on all of above

# Impact of consents and constraints

## Major disconnects

- Deep burial and burial into hard soils
  - but trenching/jetting not permitted!
- Some operations forced into poor weather seasons
- Deep burial where not necessary = unnecessary costs

# What should be done?

- Think about the cable route in relation to areas with environmental issues
- Gain a detailed understanding of the threat profile along the route
- Collect detailed soils information along the proposed cable route
- Develop a profiled burial depth consent application based on the above
- **Take better control of the consenting process**

# Operational Challenges



# Operational challenges

- Quality of survey information
  - Specifically for top few metres
  - Poor data can have a major impact on ability to achieve burial
- Weather and sea state conditions
  - Wind and waves and strong tidal flows
  - Impact on barge operations, tower access, diver operations, burial operations, shore landings

# Operational challenges

- Shallow water and shore landings
  - Shallow draft barges
  - Ability to ground at shore landings



# Operational challenges

- Transfer of people at sea
  - To be avoided as far as possible
  - Try to accommodate staff on main barge
- Diver limitations
  - Sea state for entering water
  - Water depths affect diving time
  - Strong currents reduce diver time
  - Try to reduce need for diver intervention



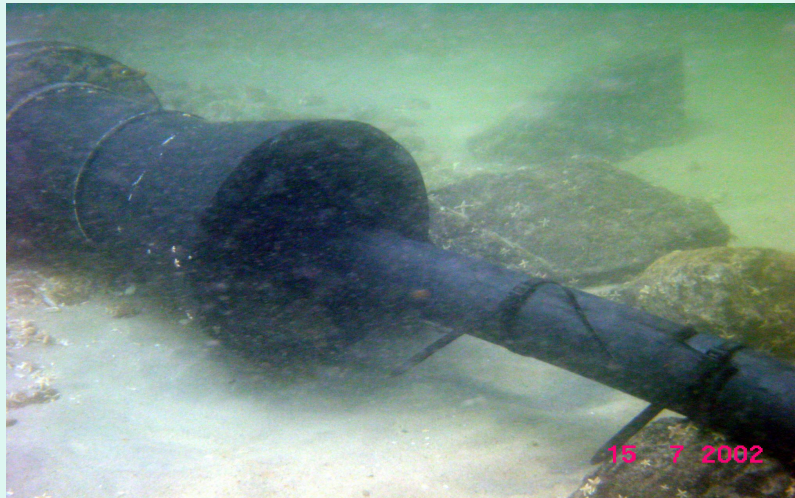
# Operational challenges

- Tower Access
  - Critical limiting factor to operations
  - Access for cable laying is by small boats and turbine ladders
  - Becomes difficult & dangerous when wave heights exceed 1 metre



# Operational challenges

- J-Tube /I-Tube designs
  - Discuss design with cable installer
  - Can be a major area of difficulty if badly designed
  - Must be free from debris & easy to use
- Cable pulling
  - Pulling brackets if tower erected



# Operational challenges

- Regulatory issues
  - Complying with local regulatory authorities
  - Correct certification of all vessels
  - Understanding local labour regulations
  - Safety regulations
- Logistics
  - Managing fleet of vessels
  - Recording people movements
  - Quay side logistics

# Safety Issues

- Weather parameters and sea states that are acceptable for people transfers offshore
- Joint safety and co-ordination meetings between **all** offshore contractors
  - Sharing of safety resources (diver decompression facilities, etc.)
  - Incident reporting and lessons learnt
  - Emergency procedures
  - On site vessel co-ordination

# Future deeper water

- Diver operations become even more restricted
- Ocean swell becomes more significant
- Resources must be suitable for offshore operations
- Likely increase in use of interactive ROV's
- Logistical problems increase

# Summary



# Summary

- Cable installation and burial has been one of the major challenges in early projects
- Developers must get smarter with consenting applications
- Survey information specifically for cable route planning is essential
- Interact with the cable installer at an early stage to minimise problems later
- Cable installation is not the easy, low cost bit at the end – take it seriously!!

# Thank You

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