



Environmental Considerations for Nearshore Ecosystems from Cable Landfall, Navigation, and Port Development for Offshore Wind Energy Infrastructure

Sept 13, 2023
Shane Phillips, P.E.

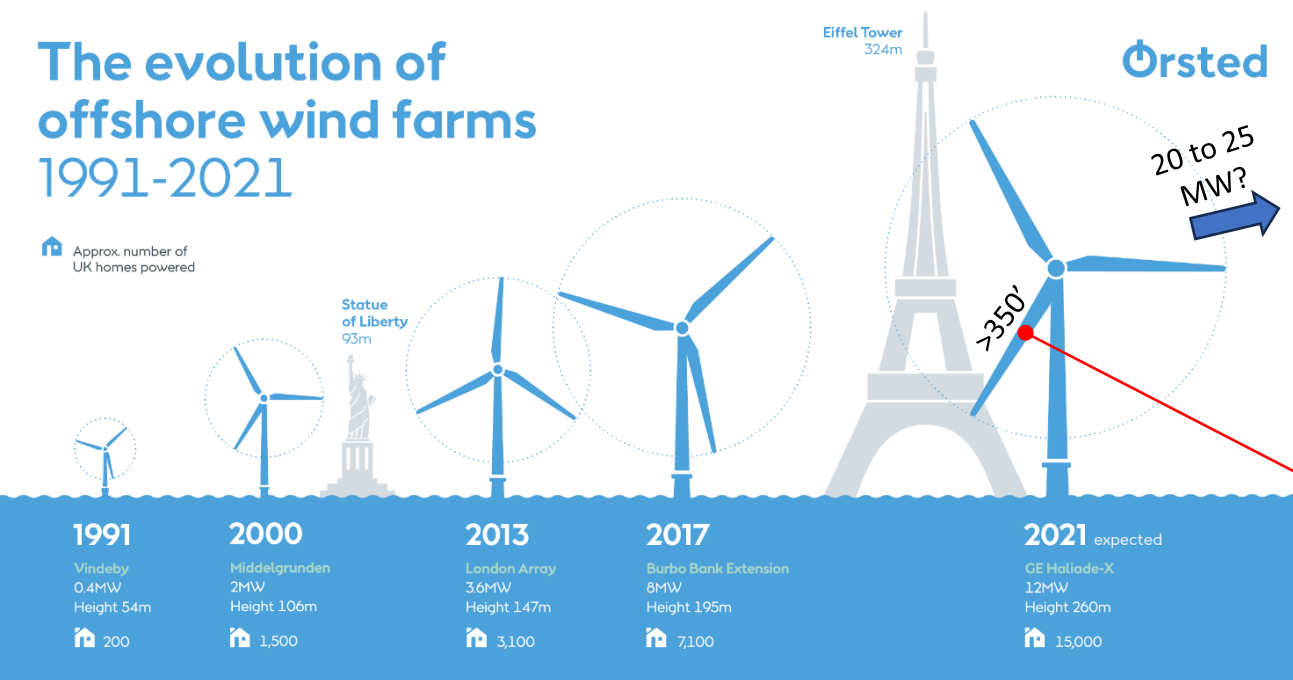
Fixed



Floating



Port & Navigation Infrastructure - Overview



Marine Transportation Dependent Industry

- Combination Size & Location of Projects
- Ports & Navigation Channels

Trending Larger

- Future Proofing Considerations
- Purpose & Need



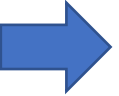
Offshore Wind Port Classifications



Manufacturing Port (MP)



Staging & Integration – Floating (shown)
Marshalling – Fixed (not shown)



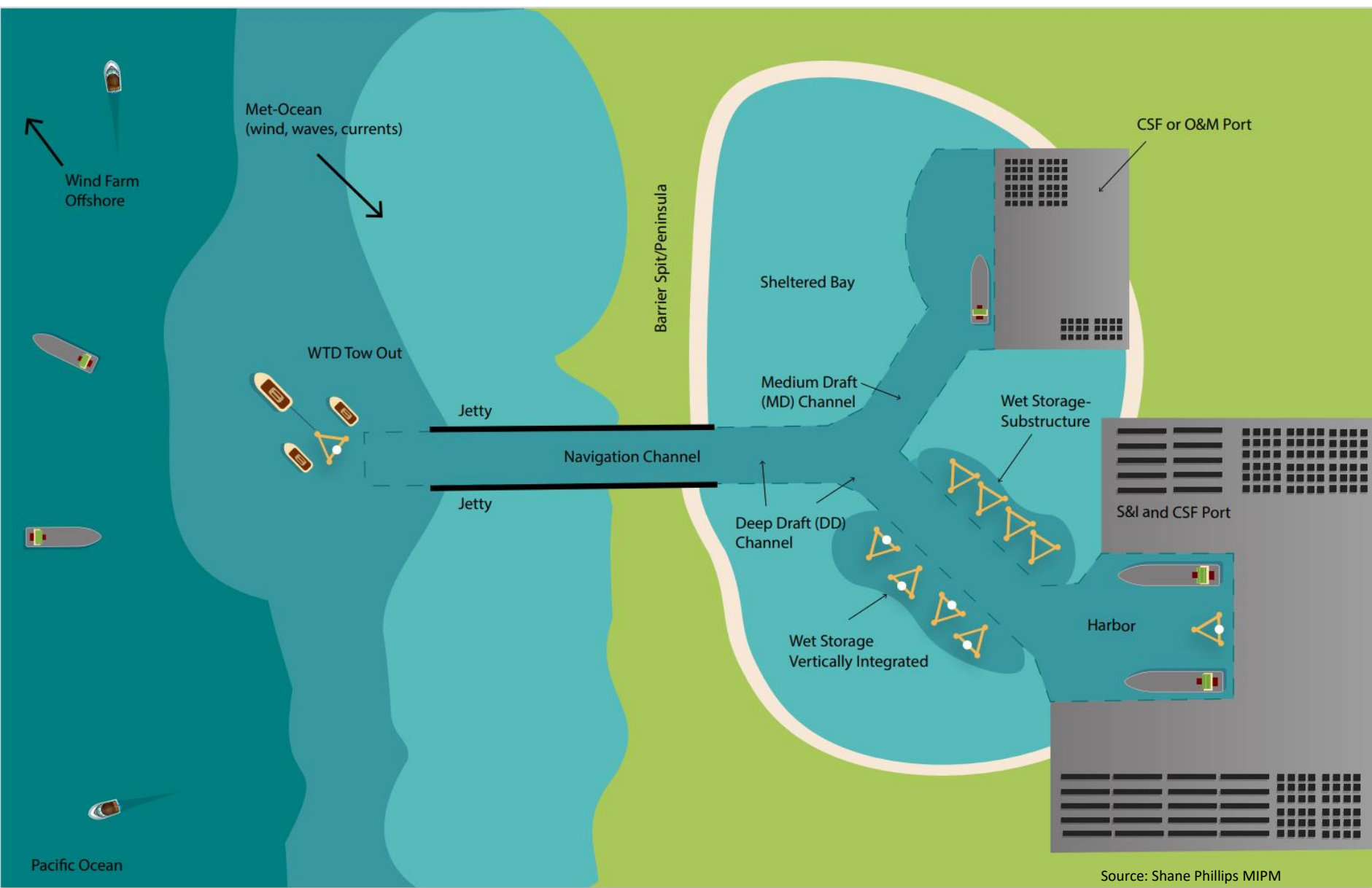
Operations & Maintenance (O&M) Port



Construction Support Facility (CSF) Port

- Similar Types of Port Infrastructure
- Varying Levels of Size, Capacity

Port & Navigation Infrastructure Overview



Where?

- Protected Harbors for construction staging

Infrastructure

- Navigation Channels
 - Maintenance Dredging
 - Capital Dredging
 - Changes in Use
- Wet Storage (floating)
 - Mooring Structures
 - Dredging
- Berth & Wharf
 - Berth Dredging
 - Pile Supported
 - Bulkheads & Seawalls

Port Infrastructure & Nearshore Construction



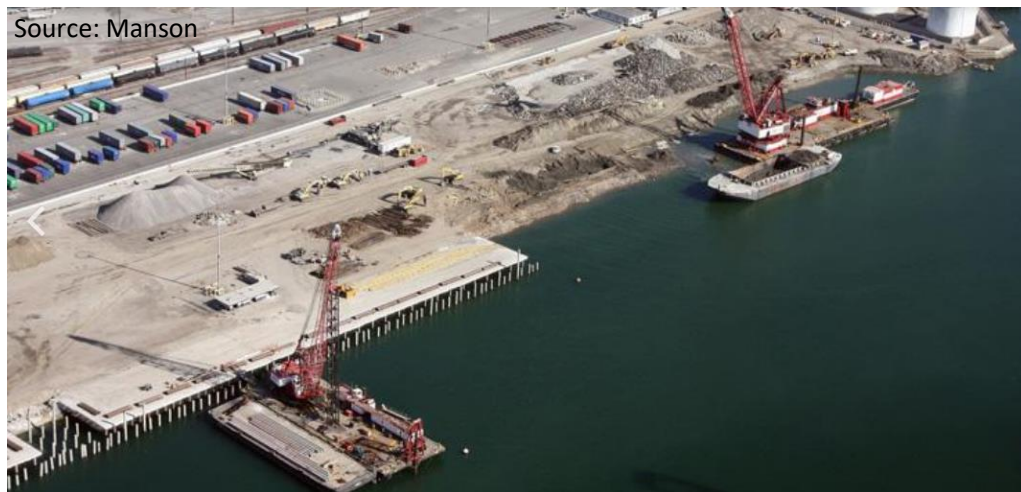
Source: Manson

Wharf & Berth Construction Work

- Pile Driving
- Dredging
 - Vessel Berth & Channel
- Slope Rock Armoring
- Dredged Material Placement
 - Open Water, Upland, Beneficial Reuse

Considerations

- Marine Mammal & Fisheries Protection
- Aquatic Habitat Impacts
- Water Quality
- Contaminated Sediment



Source: Manson

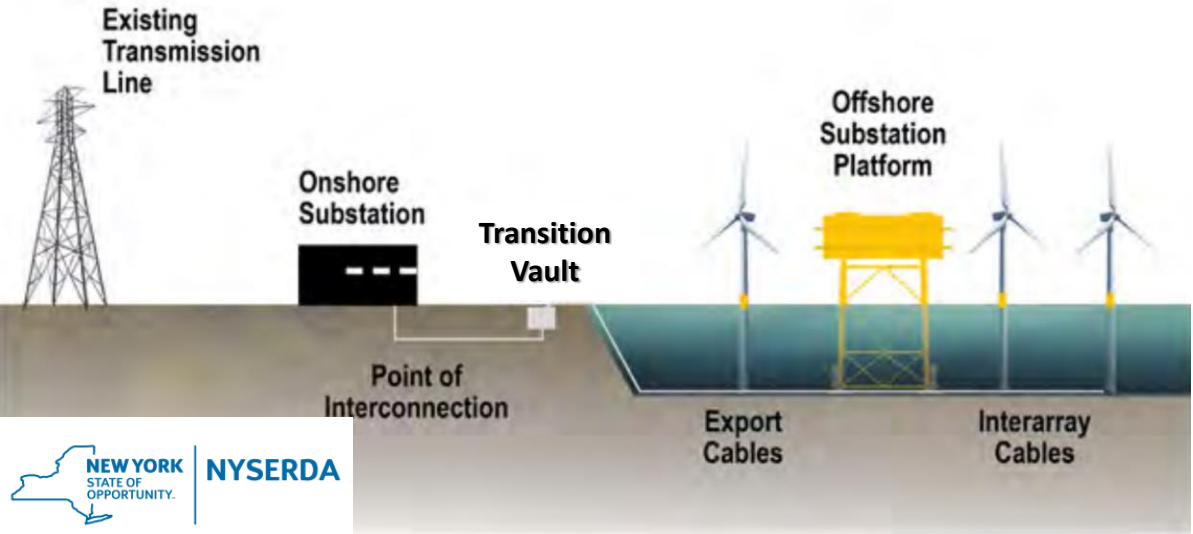
Terminal Construction Work

- Access Roads
- Utilities
- Soil Improvement
- Site Grading
- Shoreline Protection
- Buildings

Considerations

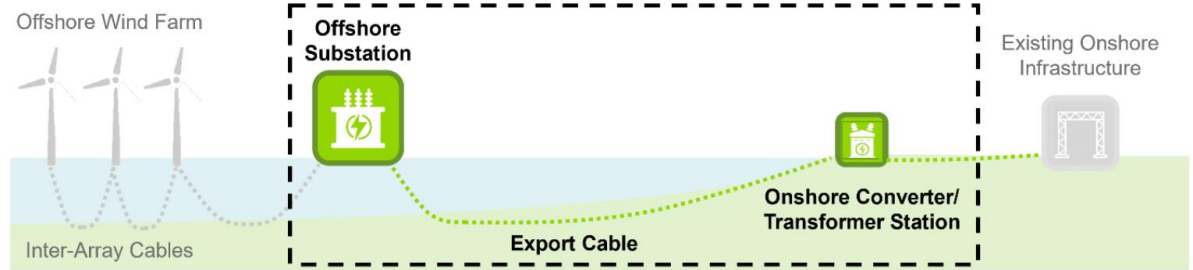
- Contaminated Soils
- Terrestrial Habitat Impacts
- Stormwater Treatment
- Visual
- Noise
- Electrification

Export Cable Landfall Infrastructure



Infrastructure in/near Coastal Zone

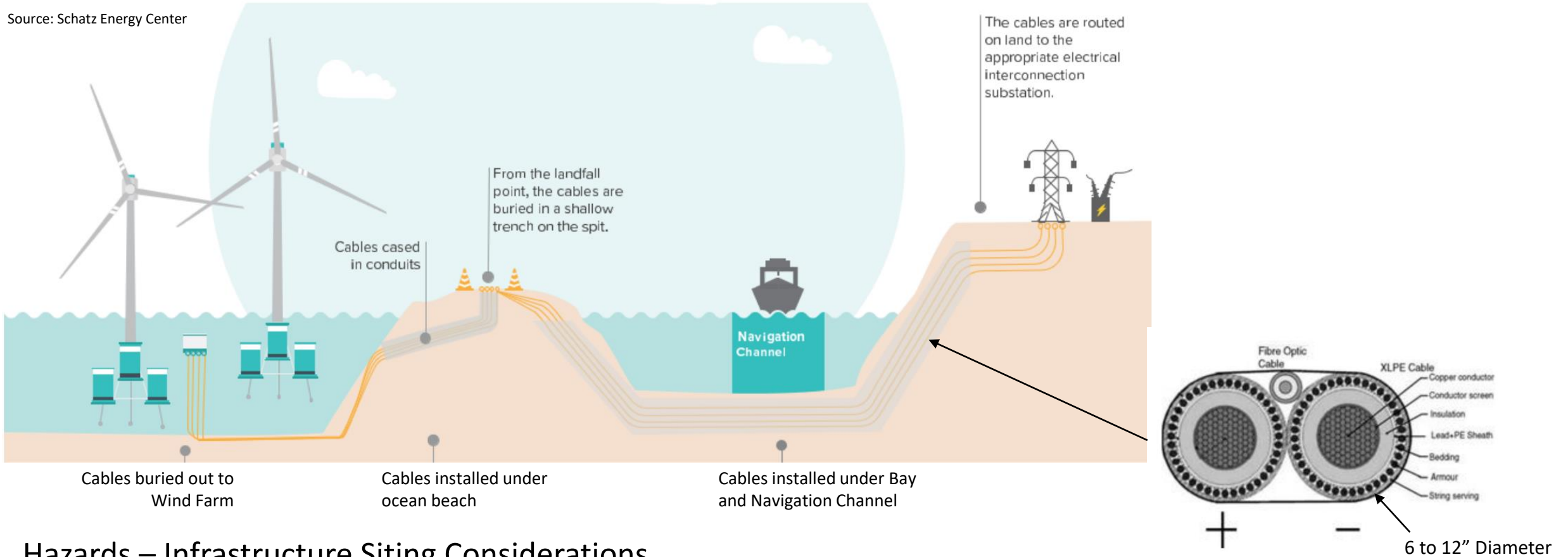
- Offshore Substation or Converter Station
- Buried Cable
- Scour Protection
- Transition Vault
- Onshore Substation
- Transmission – Overland or Marine Route



Source: Guidehouse

Export Cable Considerations

Source: Schatz Energy Center



Hazards – Infrastructure Siting Considerations

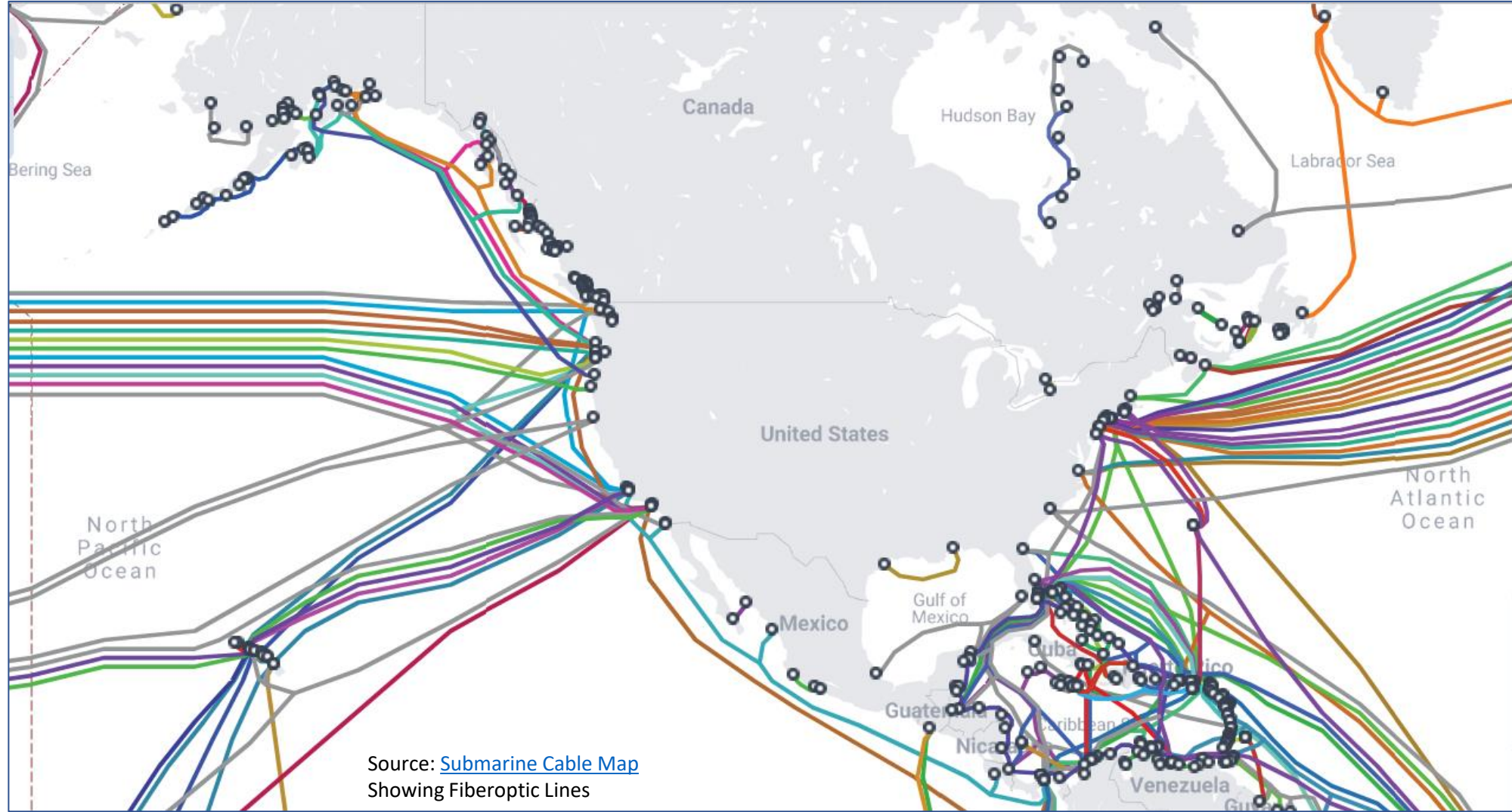
- Coastal (Offshore, Bays, Estuary, Channels)
 - Shore Change, Flooding, Tsunami, Ocean bottom Sand Waves, Channel Migration, SLR
- Vessels
 - Anchoring, Fishing, Navigation Channel
- Geologic
 - Faults, Canyons, Earthquake
- Constructability
 - Sea state for waves during construction for offshore equipment
 - Separation Distances & Min Cover

Subsea Cable Routing To Shore – Is it Common Practice?

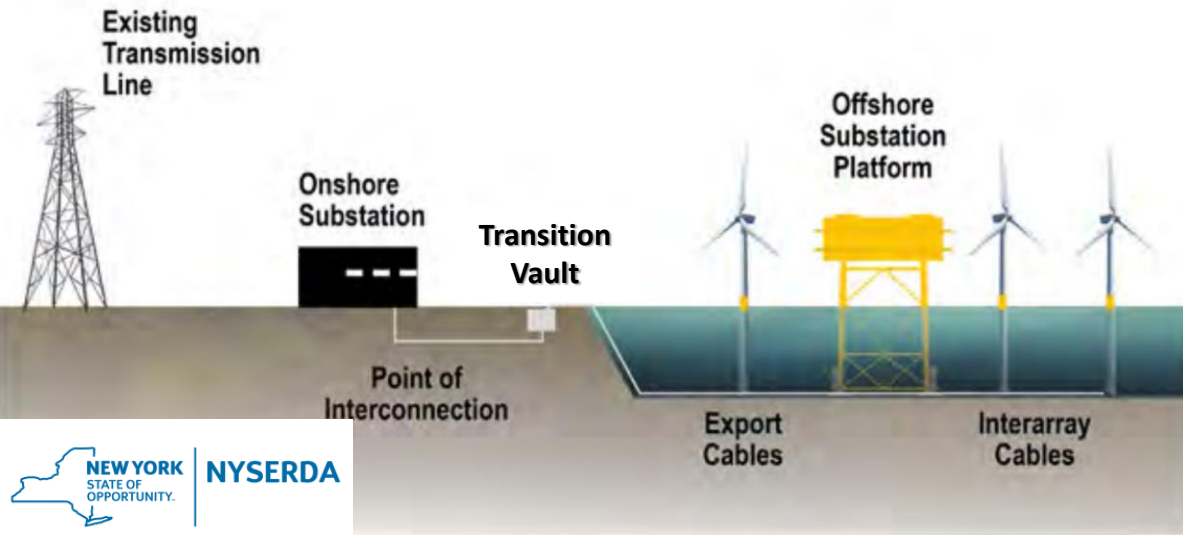
Yes.....

Industries?

- Telecommunications
Fiberoptic,
Telephone
- Power
- Gas
- Oil
- Others



Export Cable Landfall Installation



Combination of

- In Water Work using various techniques
- Nearshore Excavation and Staging work
- Work Window Seasonality

Cable Installation

- Trenchless - HDD



Cable Installation

- Trenching - Plow



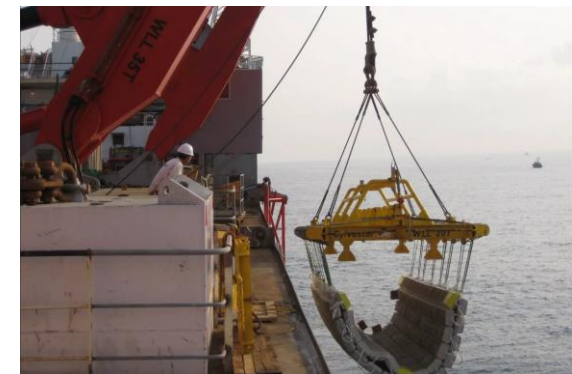
Cable Installation

- Trailing Suction Hopper Dredge Trench Prep



Scour Protection

- Concrete Mats
- Rock





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