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<th>19-IEPR-07</th>
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<td>Document Title:</td>
<td>Industrialized Offshore Wind Foundations, The Tetra Concept</td>
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<tr>
<td>Description:</td>
<td>Presentation with information relevant to offshore wind costs from a conference at which Commissioners spoke.</td>
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<td>Filer:</td>
<td>John Hingtgen</td>
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<td>Organization:</td>
<td>California Energy Commission</td>
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<td>Submitter Role:</td>
<td>Commission Staff</td>
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Industrialized Offshore Wind Foundations

The Tetra Concept

Henrik Stiesdal, 02.10.19
Offshore wind power is developing tremendously

Cost development
- Offshore wind power has developed from a costly alternative to a competitive source of electricity

The reasons:
- Competition
- Industrialization
- Low cost of capital
- Low steel prices

Source: GWEC
The fundamental choice regarding the supply chain

The learning curve

We can start here ...

Or we can start here!

15%
The Tetra product range

TetraBase® bottom-fixed foundation
Bottom-fixed foundation with crane-free offshore installation. Suited for 10-60 m depth.

TetraSub® floating foundation
Floating foundation in semisubmersible configuration. Suited for 40-1000 m depth.

TetraTLP® floating foundation
Floating foundation in tension-leg configuration. Suited for 80-500 m depth.

TetraSpar® floating foundation
Floating foundation in spar-buoy configuration. Suited for 100-1000+ m depth.
The TetraSpar Demonstrator

**Stage 1 - 2016**
- Concept
- Initial validation

**Stage 2 - 2017**
- Design
- Tank test OK

**Stage 3 - 2020**
- Prototype
- Full validation

**Stage 4 - 2021**
- Pilot project
- Release

**Prototype**
- Siemens SWT-3.6-130, 3.6 MW rated power, 130 m rotor diameter
- Status 30.05.19: Fabrication start June 2019, installation start scheduled for May, 2020
- Foundation contractor: Welcon
Assembly and installation