

Overview of Floating Offshore Wind Port Requirements

Northwest Seaport Alliance

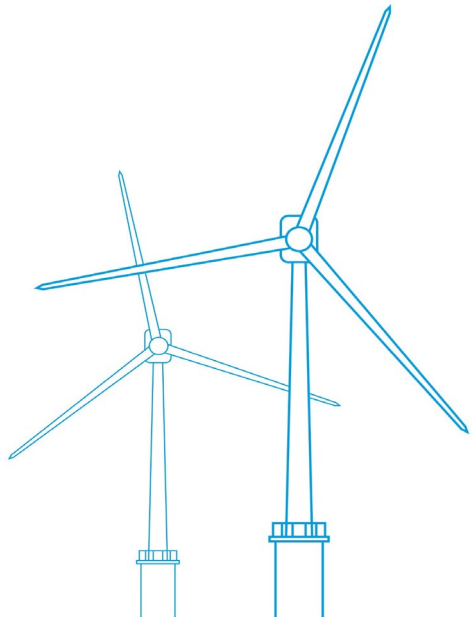
Tacoma, Washington

May 24, 2023



Ramboll – World-leading Offshore Wind Consultant with Nationwide U.S. Presence

World-leading offshore wind consultant with more than 30 years experience and a powerful global work force

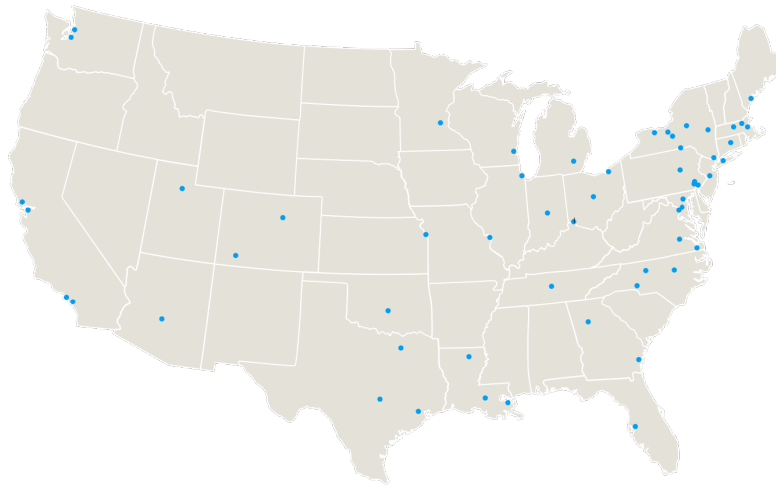


500
wind
experts

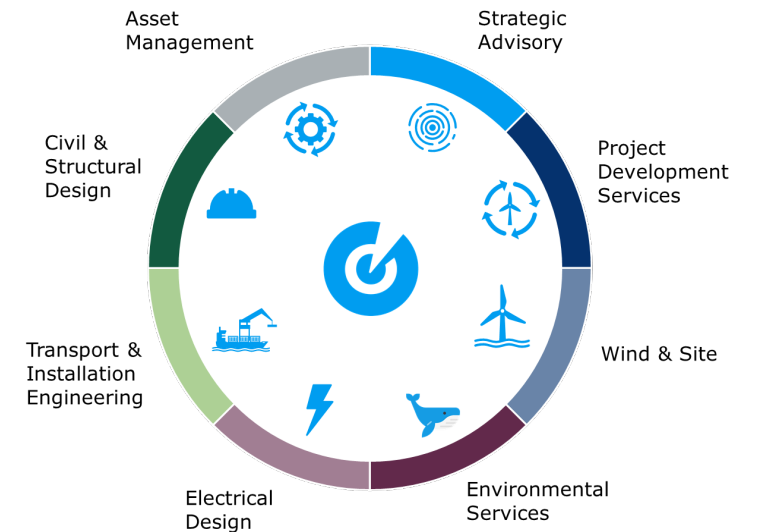
4,500
projects

35+
countries

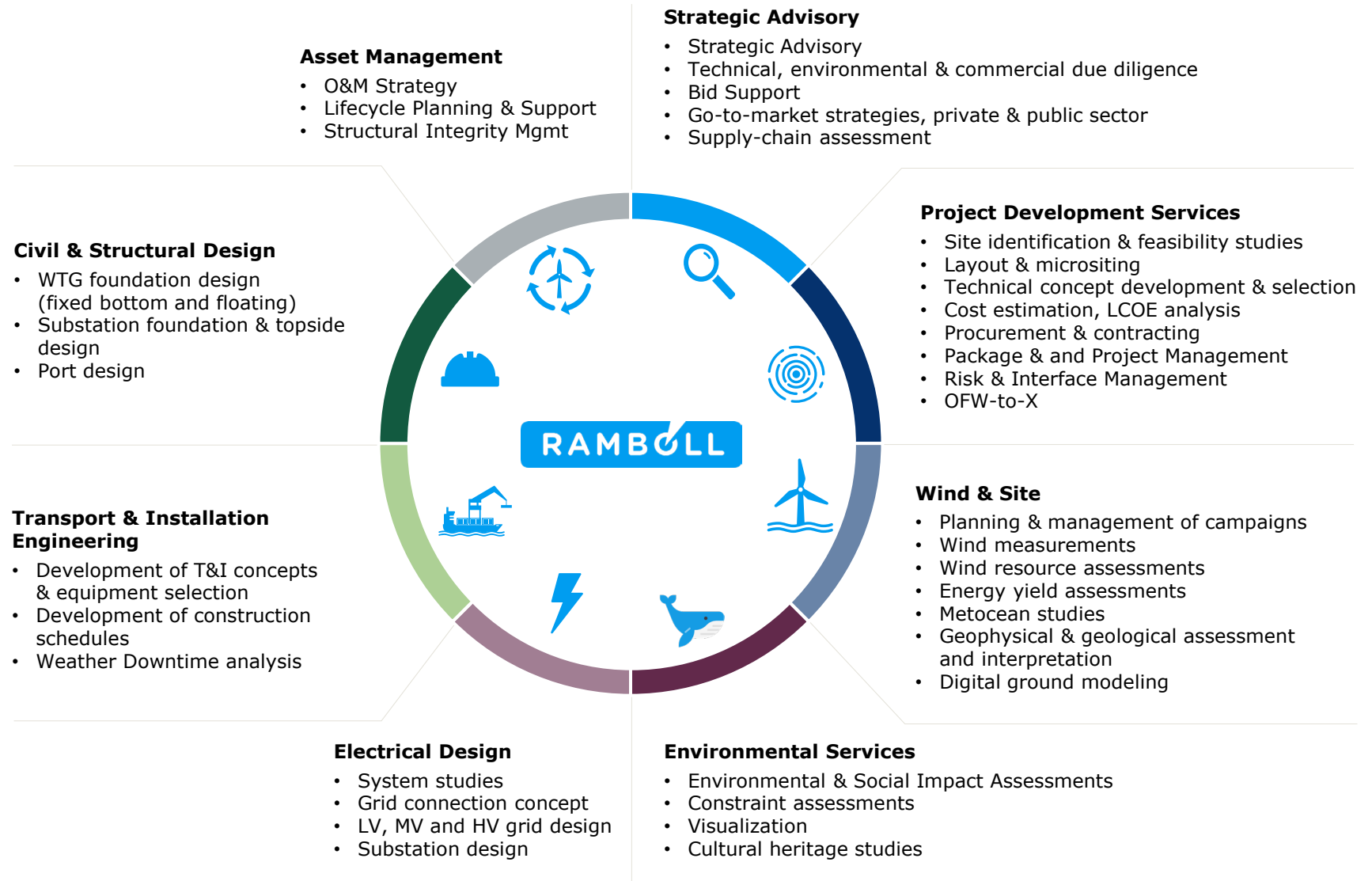
60 locations across United States, with 2,000+ local experts working on innovative solutions and projects



30 local plus more than 500 global colleagues offering a comprehensive range of offshore wind services covering the entire value chain



Ramboll's offshore wind services cover the full project lifecycle

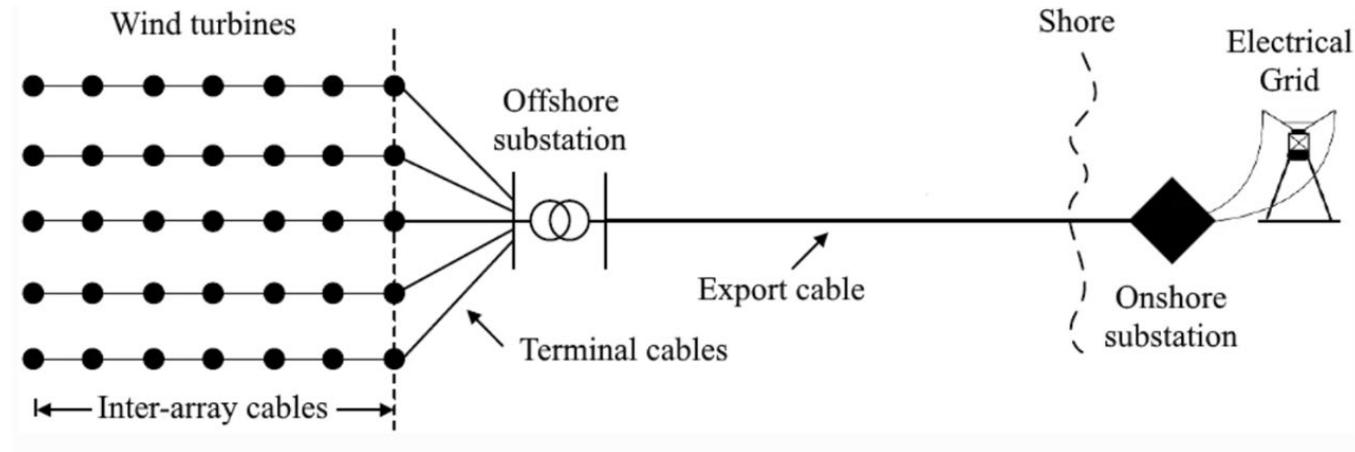


Ramboll provides holistic solutions to clients to enable thorough decision making

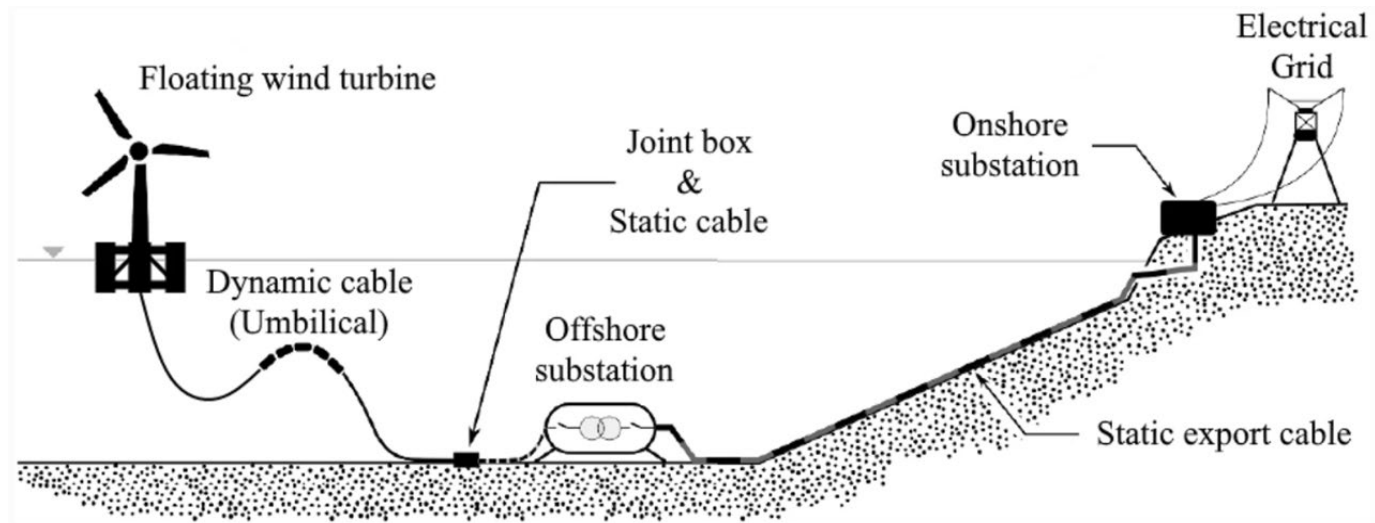


Overview of an Offshore Wind Project

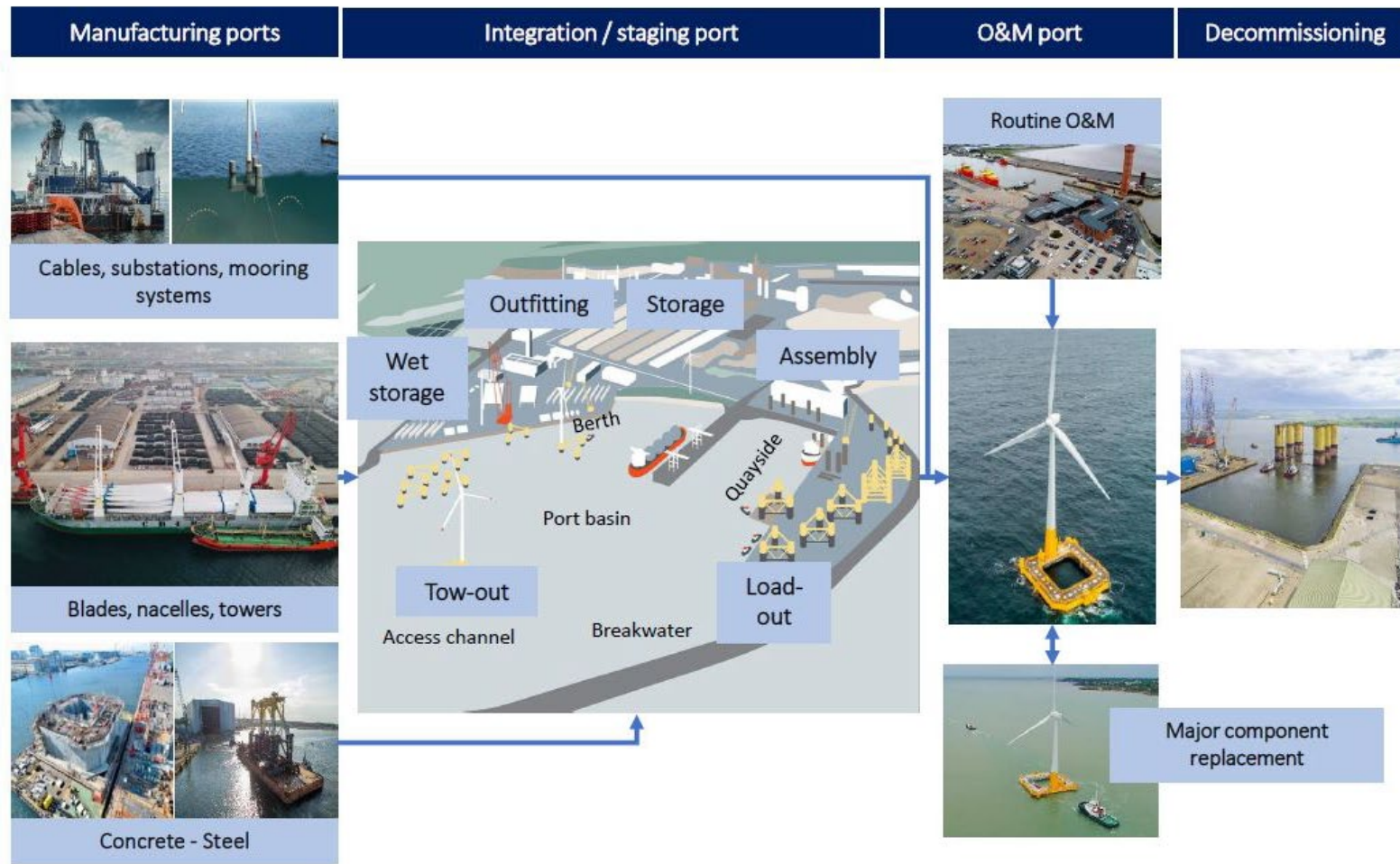
- Topview



- Sideview



Floating Offshore Wind Ports – General Requirements



Facility requirements for **installation of floating offshore wind projects** are somewhat different from requirements when installing fixed-bottom offshore wind projects.

Ports can offer facilities for the whole supply and installation chain, or parts of the chain.

Floating Offshore Wind Ports

Heavy Lift Equipment

Launching of Floaters & Turbine Integration

- Future crane capacity requirements for floating offshore wind uses may exceed 1,000 tons
- Special heavy-lift equipment ("Ring Cranes") are needed



Source: Mammoet



Source: Mammoet

Ring cranes are used either:

- (a) when exceptionally large single lifts are essential, or
- (b) when the ability to repeatedly perform such lifts would accelerate a construction project sufficiently to make the use of such a specialized crane cost-effective.

Ring cranes combine:

- Lifting capacity (up to 5,000 tons)
- Long reach (jib lengths up to 160 m give a lifting radius of 50-70m for a 1,000 ton lift)

Typical ring crane lifts:

- Petrochemical plant modules
- Nuclear reactor vessels
- Bridge components
- Offshore O&G and wind equipment

Floating Offshore Wind Ports

Heavy Lift Equipment

Launching of Floaters & Turbine Integration

As an alternative, two heavy crawler cranes by tandem lift could be used instead of a single ring crane.

Two crawler cranes could be a more flexible and cost-efficient solution.

An example on right is Vestas' onshore installation of a V-236-15.0 MW prototype unit.



Source: Vestas

Floating Offshore Wind Ports

Example – WindFloat Atlantic (Principle Power)



Source: NREL

Floating Offshore Wind Ports

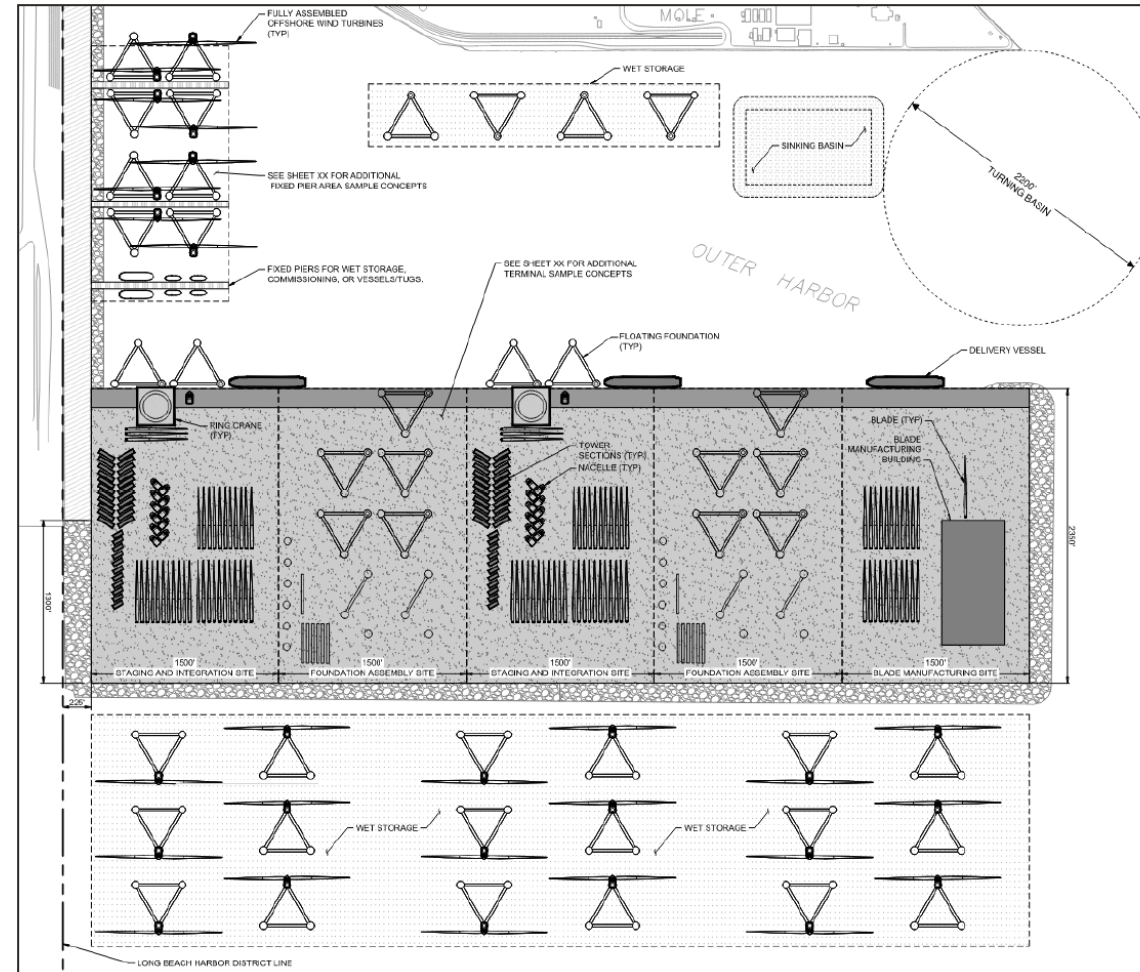
Example – Hywind Tampen (Equinor)



Source: Mammoet

Floating Offshore Wind Ports

Example – Pier Wind (Long Beach, California)



Source: Moffat & Nichol, Pier Wind Project Final Conceptual Report

Let's connect!

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Sustainable change.

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ideas.
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