

The background of the slide features a blue-tinted image of a modern glass-walled building. A man's face and hands are superimposed over the image, appearing to interact with a laptop. The building has a sign that reads 'FICHTNER'.

FICHTNER

Offshore Wind Power Fichtner Group

WindEnergy Hamburg Digital 2020
01 - 04 December 2020



Established in 1922 and
family-owned ever since



Project experience in
more than 170 countries



Total turnover of
€217 million in 2019



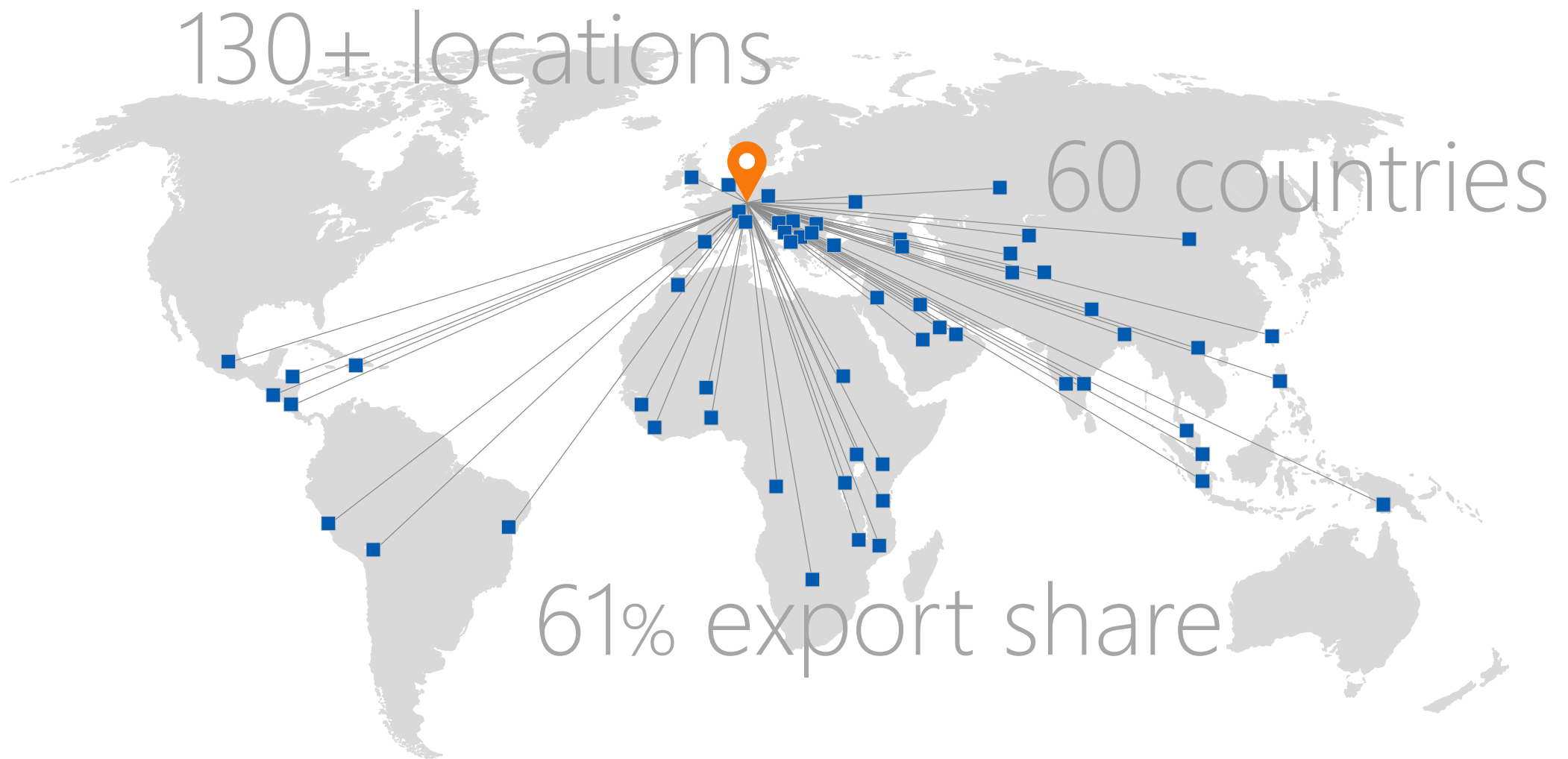
1500 employees
worldwide – over 500 of
these in our home office



Long-standing employees
from 66 nations



Certified systems for quality,
workplace health, safety, compli-
ance, environmental protection



Home office in Stuttgart | Present in 60 countries worldwide
Represented at over 130 locations by subsidiaries and affiliates, branches and project offices
61% of Group revenues generated outside of Germany

Offshore Wind Power

Services and Project Experience



Offshore Wind Power

Range of Services

The Fichtner Group can call on a network of highly qualified engineers and consultants to cover all aspects of offshore wind power. Our engineers are as conversant with the requirements of national and international investors and development banks as they are knowledgeable about local energy supply markets, tariff structures and regulatory permit approval procedures.

- Due diligence audits
- Feasibility studies
- Energy yield assessments and turbine micrositeing
- Owner's engineer throughout all project phases
- Conceptual engineering, FEED, and detail design
- Owner's engineering for grid tie-in
- Drawing up operation and maintenance concepts
- Geotechnical expert in accordance with BSH standards (Federal German Maritime and Hydrographic Agency)
- Soil investigations in accordance with BSH standards
- Geotechnical design and concept studies for foundations



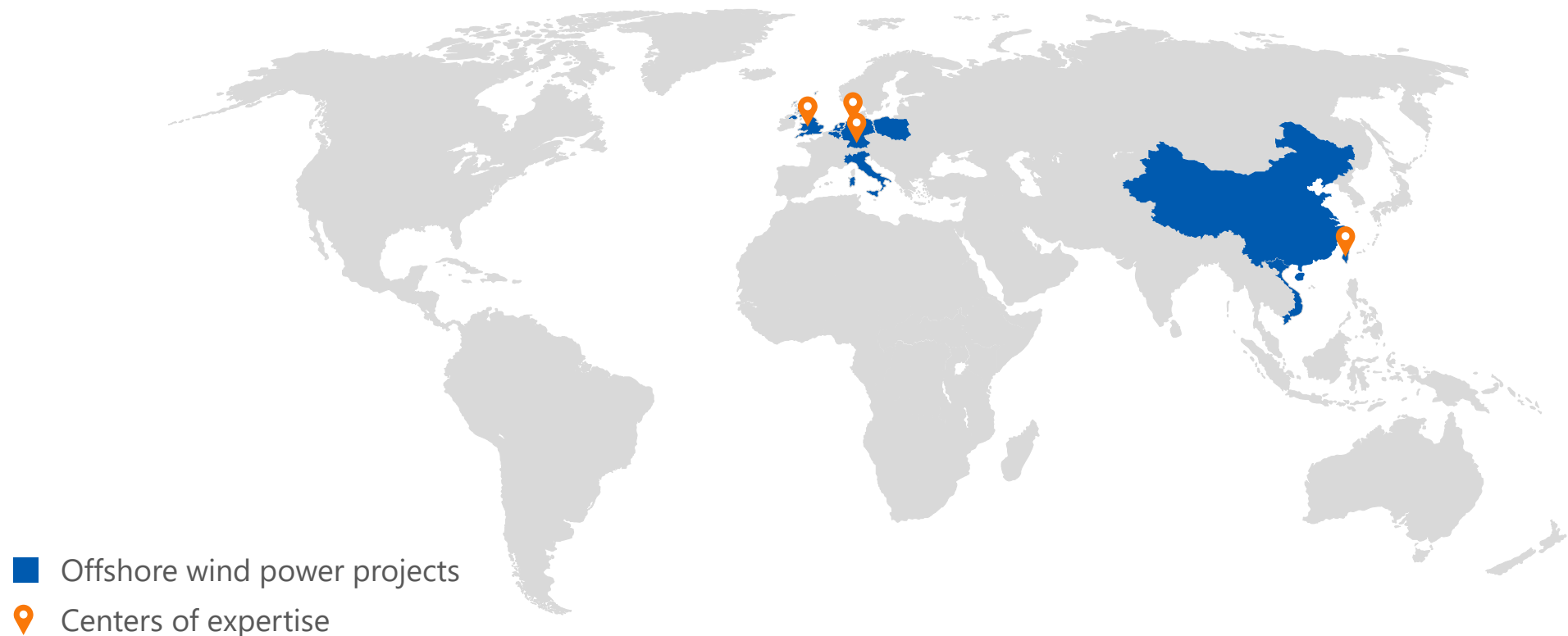
Offshore Wind Power

Experience – Overview



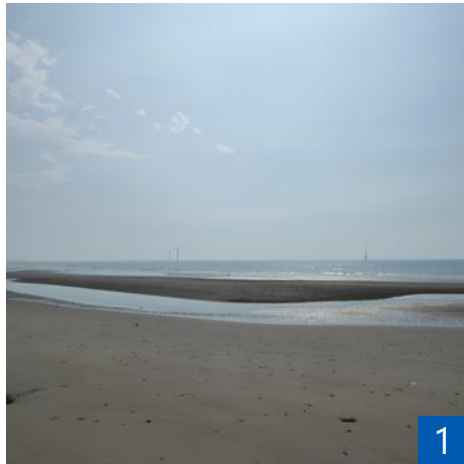
Fichtner has assisted in the realization of more than 80 offshore wind power projects with a total capacity of almost 20 GW, including:

- lender's engineering and due diligence projects
- projects as owner's engineer
- Studies and energy yield assessments



Offshore Wind Power

Reference Projects (selection)



1	Due diligence for an offshore wind farm in Taiwan	 06/2018 – 09/2018	 128 MW
2	Owner's engineer for the TSO TenneT for the HelWin2, DolWin2, DolWin3 and BorWin3 projects	 10/2011 – 12/2020	 3.4 GW
3	Consultancy services for preparing studies for future wind farms off the Netherlands coast	 08/2017 – ongoing	 700 MW
4	Bilfinger Construction GmbH: Wikinger Offshore Wind Park – pile loading trials	 09/2018 – 12/2018	 80 x 5 MW (400 MW)

Offshore Wind Power

Due diligence for an offshore wind farm in Taiwan

JERA Co., Inc. assessed to enter into an agreement with Macquarie Capital and Swancor to acquire an equity interest in the Formosa 1 offshore wind power project, located off the north-western coast of Taiwan. The 128MW Formosa 1 project represents Taiwan's first utility-scale offshore wind farm. The first phase of 8MW has been successfully operated for over 18 months, with the additional 120MW under construction expected to start operations in late 2019. JERA contracted Fichtner to perform the technical Due Diligence.

Fichtner's services

- DD Review including
- Energy Yield Assessments
- Technical Concept
- Grid Connection
- O&M Concept and Structure
- CAPEX and OPEX
- Site Visit
- Risk Analysis



06/2018 – 09/2018



128 MW

Offshore Wind Power

Owner's engineer for the TSO TenneT's projects HelWin2, DolWin2, DolWin3 and BorWin3

From 2011 to 2014, TenneT published several European tenders for construction of HVDC grid connection systems for windfarms located in the German North Sea. Currently 9 single HVDC offshore platforms are located in the German North Sea, bundled to clusters, namely BorWin, DolWin, HelWin and SylWin. A cluster typically exists of 1 to 3 HVDC transmission systems, varying between 400 and 916 MW transmission power each. Their purpose is bundling offshore wind energy and transmit it to the German onshore EHV grid.

Fichtner's services

- site supervision and coordination of the technical project team
- QA/QC of works at mechanical completion and commissioning
- risk management
- contract management
- time scheduling and expediting
- cost management in the planning and realization phases
- HSE and occupational safety coordination on site
- documentation review and acceptance at project closeout



TenneT Offshore GmbH



10/2011 – 12/2020



3.4 GW

Offshore Wind Power

Consultancy services for preparing studies for future wind farms off the Netherlands coast

The Netherlands Enterprise Agency (RVO.nl) is responsible for publishing the site information companies require to prepare bids for the permit tenders. These works consist of an assessment of the suitability of the Hollandse Kust (noord) Wind Farm Zone for wind farms with 10 MW+ WTG's. Fichtner provided consulting activities and a strategic advice in this matter.

Fichtner's services

- Review of proposed methodology for the Wind Resource Assessment
- Technical support with regard to the execution of the Wind Resource Assessment
- Review of the Wind Resource Assessment deliverables and its interface with the metocean Desk Study.
- Support and participation in Expert Sessions
- Strategic advice



Netherlands Enterprise Agency (RVO.nl)



08/2017 – 09/2019



700 MW

Offshore Wind Power

Bilfinger Construction GmbH: Wiking Offshore Wind Park – pile loading trials

Iberdrola as project developer for the Offshore Wind Park - Viking (400 MW) has commissioned Bilfinger Construction GmbH to carry out a pile test campaign upfront the construction work to verify the resistance of the pile foundations. Static and dynamic test loads were carried out at various locations in the construction field and measured during pile driving. Fichtner was contracted by Bilfinger Construction GmbH for complete consulting services for carrying out test loads.

Fichtner's services

- Pile driving studies and pile testing
- Development of all BSH-relevant documents
- Dynamic test loads
- Monitoring of measurements
- Evaluation and analysis of the measurements
- Technical advice for test loads
- Development of the test load concepts
- Offshore - Monitoring



Bilfinger Construction GmbH



06/2014 – 01/2015



80 x 5 MW (400 MW)

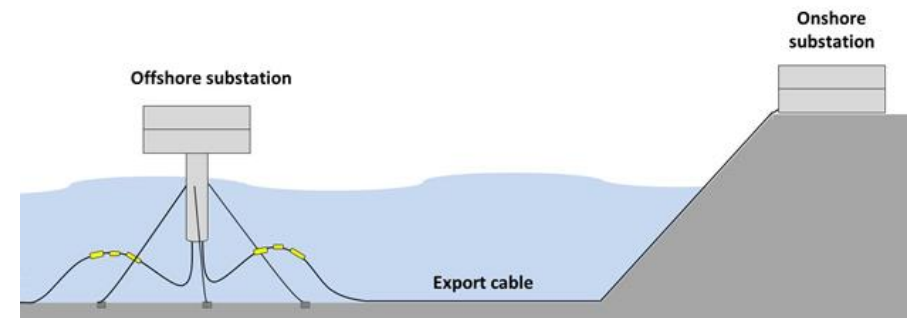
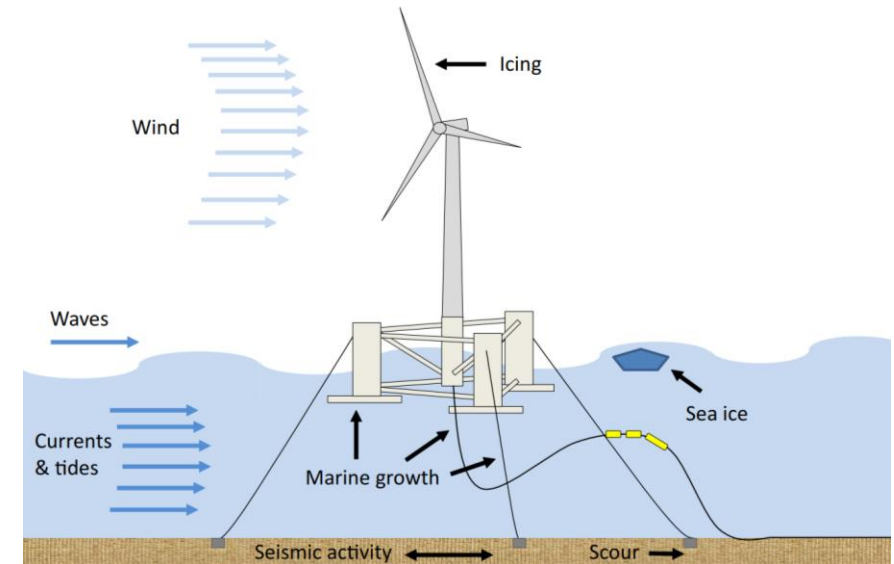
Floating Offshore Wind Power

Experience

Fichtner is capable to render the technical advisory service for floating offshore wind farms and has inhouse experts with the necessary skills, experience and availability to provide the added value. This expertise comes from our experts' personal project experience in offshore and floating offshore wind projects.

Fichtner's services

- Independent review of technology
- Evaluation of technical readiness
- Project feasibility
- Market studies
- Site assessment and concept selection
- Energy yield assessment
- Wind farm layout and turbine micro-siting
- Assessment of CAPEX & OPEX assumptions
- Technical due diligence audits



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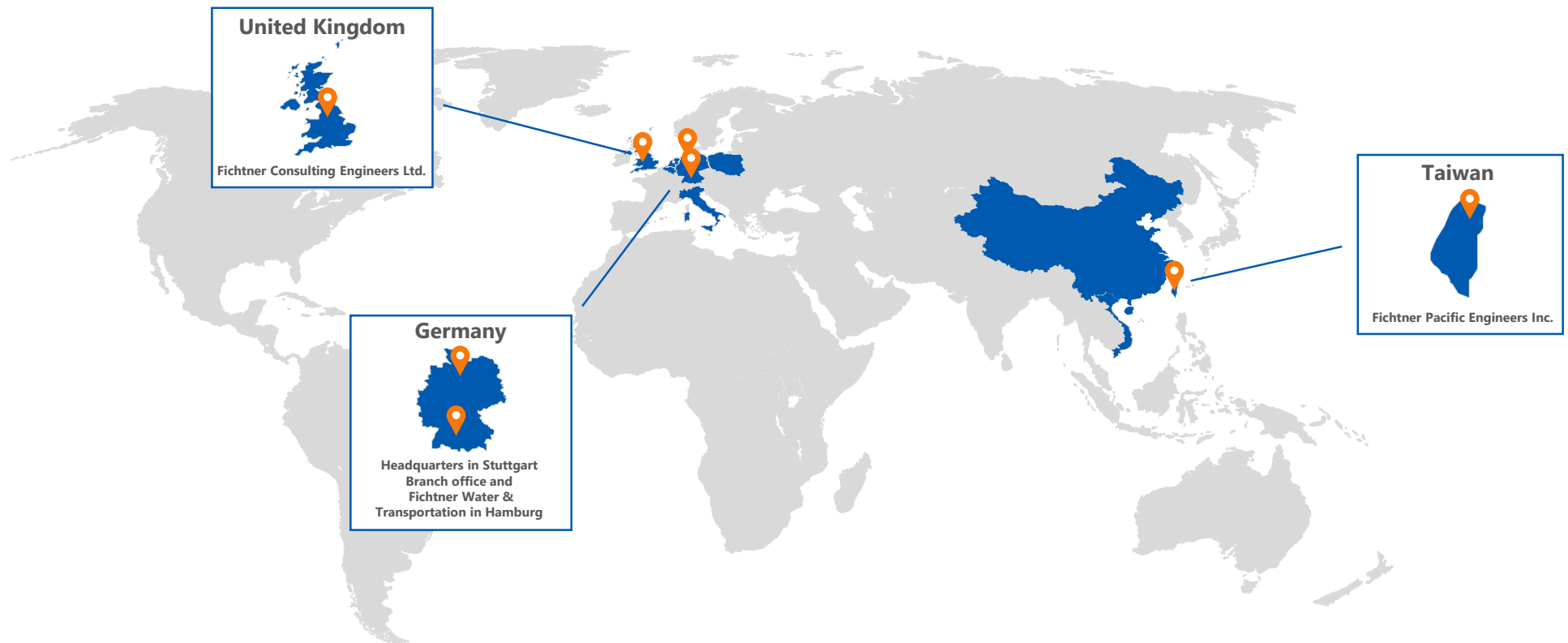


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Offshore Wind Power

Centers of Expertise – Presence in Key Markets



■ Offshore wind power projects

📍 Centers of expertise

Fichtner Pacific Engineers Inc., Taiwan

1989



Established in 1989 in
Taipei

35



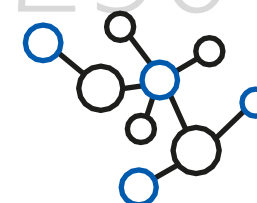
35 employees
in Taipei and Macau

100%



100% owned by
Fichtner Head Office in
Germany

250



More than 250 projects in
different countries

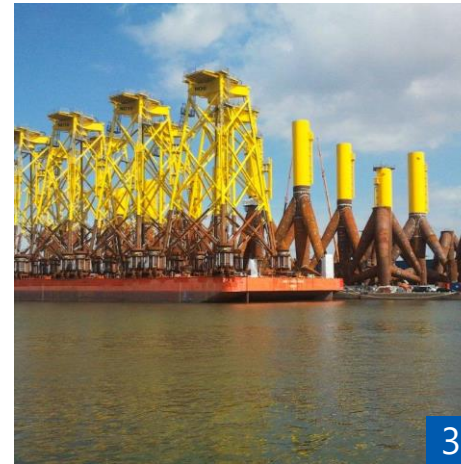
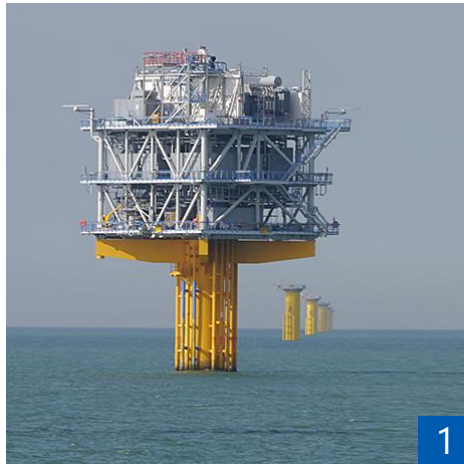
For more than 30 years Fichtner Pacific Engineers has been one of the leading independent advisors in Taiwan and the region.









Our engineers cover the disciplines from civil / structural, electrical, mechanical and environmental engineering.

Fichtner Pacific Engineers is and have been involved in several offshore wind projects in Taiwan. Our team is experienced in providing support in the role as owner's engineer as well as lender's technical advisor.

Offshore Wind Projects in Taiwan

Reference Projects (selection)



1	Expert support for market entry and tendering for various Taiwanese Offshore Wind Projects	 2017 – 2019	 confidential
2	Due Diligence Review of the Formosa 1 Offshore Wind Farm Project	 2018	 128 MW
3	Due Diligence Reviews of a Taiwanese Offshore Wind Farm Projects	 2019 – 2020	 confidential
4	Design Review and independent calculations for an onshore substation of an offshore wind farm	 ongoing	 69/230 kV

FICHTNER



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1991



Established in 1991 in
Stockport, UK

120



120 employees
in UK and Ireland

100%



Privately owned by UK
staff & Fichtner group

£18m



All energy disciplines with
£18m turnover in 2019

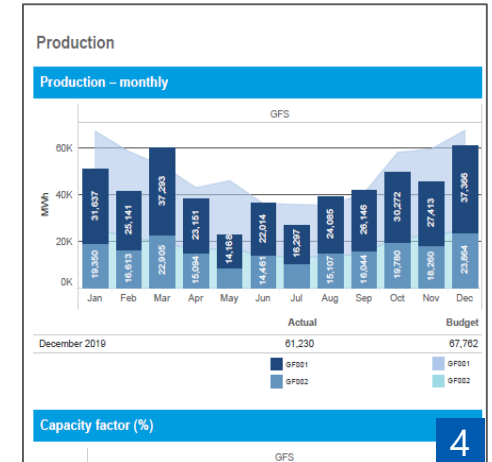
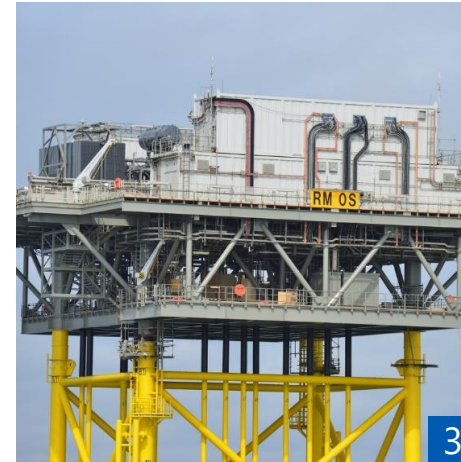
For nearly 30 years, Fichtner Consulting Engineers in the UK, has been a totally independent part of the Fichtner Group and a leading advisor for the energy industry in the UK and Ireland.

Our engineers cover disciplines from civil, structural, electrical, mechanical, environmental engineering and all main renewables technologies, including offshore wind and hydrogen.

Fichtner UK is and has been involved in numerous offshore wind projects in the UK, including those in development, construction and operations. Our team is also experienced in providing support to the offshore wind OFTO grid infrastructure regime.

Offshore Wind Projects in the UK

Reference projects



1	Due diligence for Walney offshore wind farm for PKA		2017		660MW
2	Due diligence for Jera purchase of Gunfleet sands		2018 - 2019		173MW
3	Technical advisor for OFTO bids for Macquarie (six projects in TR3, TR4 & TR5)		2016 - 2019		300 – 600 MW
4	Operational technical advisor for Gunfleet Sands Ownership (DBJ and Jera)		2019 - 2020		173MW

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