

附錄(一)：

加拿大北陸電力公司(NPI)及 Nordsee One-332 MW 風場簡介



Taiwan Delegation – Norddeich Visit

Northland Offshore Wind Experience

16 JULY 2018

NPI.TO

AGENDA

- 1 Company Overview
- 2 Experiences & Expertise
- 3 Presence in Taiwan
- 4 European Tariff Progression



COMPANY OVERVIEW

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COMPANY OVERVIEW



- **Over 30 years of successfully developing**, constructing and operating independent power projects
- Well-diversified, **2,458 MW (gross) modern fleet** of high-quality assets
- **Over \$10 billion of assets** constructed since inception and currently under construction
- Overall **availability of 95%** across 27 operating facilities
- **1,296MW in development** (252 MW Deutsche Bucht in-construction; 300 MW of grid allocation and 744 MW of auction secured in Taiwan)
- Enterprise value of approximately **\$12 billion**¹**Significant development opportunities** across multiple markets and technologies
- **Management alignment** through a 34% ownership interest
- Management experience -Combined **over 200 years** of power industry experience

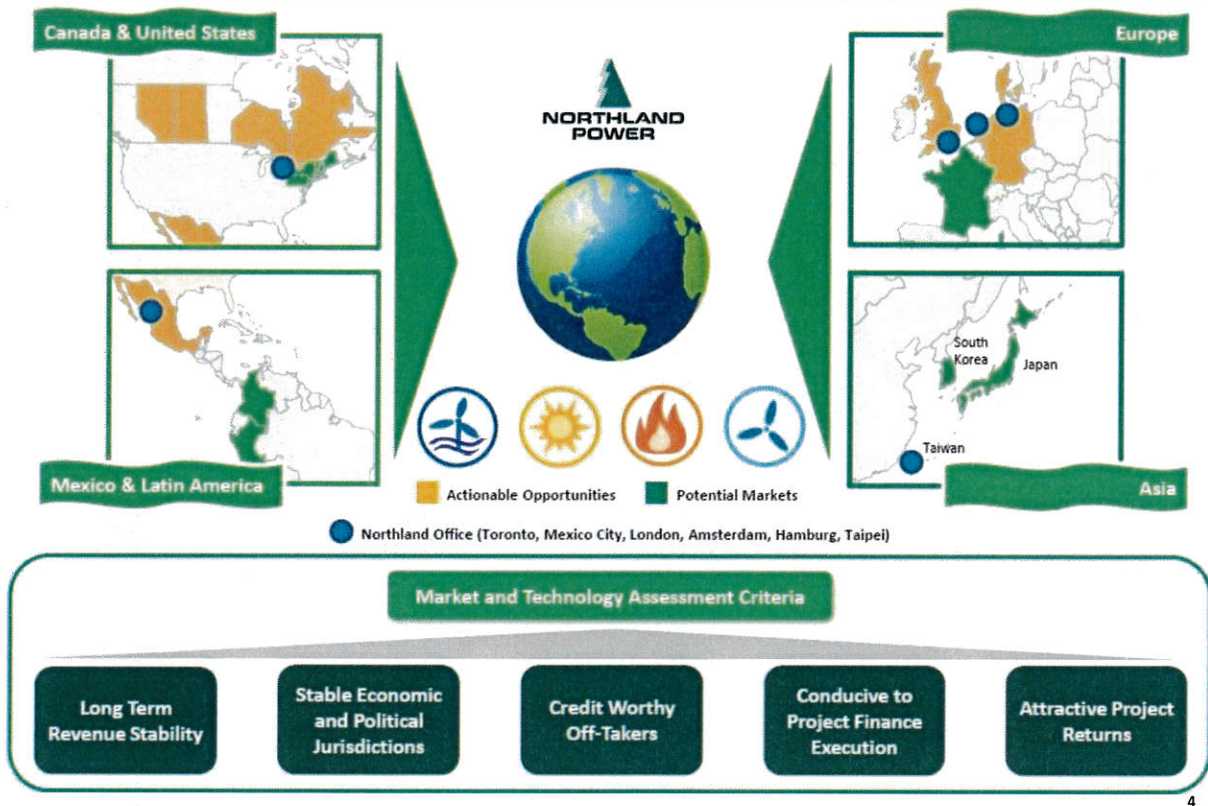


Over 30 Years of Excellence



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MULTIPLE DEVELOPMENT MARKETS & TECHNOLOGIES



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INNOVATION & EARLY MARKET PENETRATION



Northland Firsts

<p>1st Canadian IPP to Enter European Offshore Wind</p>	<p>Largest Project Financing for Renewables Project¹</p>	<p>1st Offshore Wind Project Financing With Only Commercial Financing</p>
<p>One of the First Power Income Trusts</p>	<p>One of the First IPPs to Enter Saskatchewan, Canada, with Gas Generation</p>	<p>1st Long-Term Service Agreement With General Electric</p>
<p>1st Utility-Scale Biomass to Electricity Facility in Ontario</p>	<p>1st to Use LifeCo Financing for a Power Project in Canada</p> <p>Cochrane Was 1st IPP in Canada to Attract Institutional Financing</p>	<p>One of the 1st Wind Farms Developed in Quebec, Canada (Mont Miller)²</p>
<p>1st to Successfully Match Western Canadian Natural Gas Supply With Ontario Electricity Market, Cochrane Power (Gas Component)</p>	<p>Pioneer in Structuring Equity Partnerships With First Nations in Power Generation Projects</p> <p><i>McLean's Mountain/Grand Bend/ Cochrane Solar</i></p>	

1. At Financial Close
2. Assets were subsequently sold after five years of operations

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OUR SUSTAINABILITY PILLARS



- Northland’s vision is to be a **top clean and green power producer, inspiring our people to achieve a sustainable and prosperous future for all stakeholders**
- We will achieve this through our three strategic pillars:



- Prioritizing health and safety
- Fostering our values and culture
- Providing meaningful career development opportunities
- Hiring locally and providing international opportunities



- Focusing on clean and green technologies
- Delivering strong and sustainable financial results
- Generating and distributing economic value
- Capitalizing on revenue generating opportunities through the transition to a low-carbon future



- Supporting sustainable economies through clean energy and responsible business practices
- Investing in our communities
- Partnering with First Nations
- Preserving the natural environment

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SUCCESSES IN THE PAST YEAR



- FY 2017: Adj. EBITDA of \$765 million, a 22% increase over 2016; and Free Cash Flow per share of \$1.46, a 4% increase over 2016
- FY 2017: Operating income of \$632 million, a 24% increase over 2016
- Q1 2018: Adj. EBITDA of \$290M (47% ↑) and Free Cash Flow per share of \$0.84 (250% ↑)
- Increased common share dividend by 11% to \$1.20 per share as of December 2017



- Operating generating capacity increased to 2,029 MW (net), a 46% increase or 2,458 MW (gross), a 61% increase over 2016
- Maintained operational excellence across 27 facilities
- Continued health and safety track record of no lost time incidents
- Northland Europe internalized management for strategic and financial reasons



- European offshore wind projects totaling €4B achieved project completion:
 - 600 MW (net 360 MW) Gemini reached commercial operations on Apr. 2017
 - 332 MW (net 282 MW) Nordsee One reached commercial operations on Dec. 2017
- Deutsche Bucht (DeBu) project achieved Financial Close and construction is underway



- Secured 300 MW of grid allocation under FIT for Hai Long 2 and 744 MW in the Auction for Hai Long 2 & 3 in the Taiwan market.
- Advanced and positioned other projects in the development pipeline
- Established strong international presence with our head office in Toronto plus five international locations

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NORTHLAND POWER

EXPERIENCES & EXPERTISE

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WORLD CLASS OFFSHORE WIND PROJECTS




Project Name	Capacity	Interest	Commissioning (COD)
Gemini	600 MW	60%	Apr 2017
Nordsee One	332 MW	85%	Dec 2017
Deutsche Bucht	252 MW ¹	100%	Late 2019
Hai Long 2 & 3	1044 MW	60%	2024 & 2025

With the successful completion of Gemini and Nordsee One, Management is focused on construction of Deutsche Bucht and development of Hai Long 2 & 3

1. Excludes the 17MW opportunity for two additional demonstration turbines utilizing suction bucket foundations.
 2. Awarded 300MW grid allocation for 2024 COD

EUROPEAN OFFSHORE WIND PROJECT DETAILS



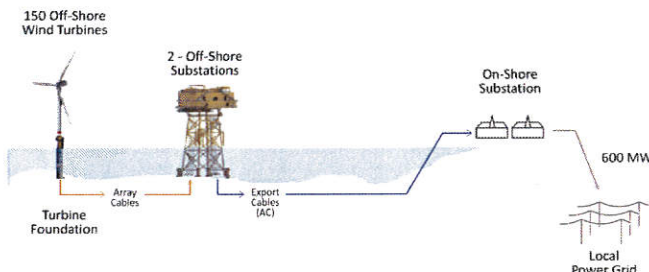
	Gemini	Nordsee One	Deutsche Bucht (DeBu)
Capacity	600 MW	332 MW	252 MW (+17 MW Demonstrators*)
Distance to Shore	85km	40km	95km
Wind Turbines	150 x Siemens 4 MW	54 Senvion x 6.15 MW	33 x MHI Vestas 8MW
Turbine Foundation	Monopile	Monopile	Monopile*
Water Depth	28m to 36m	26m to 29m	39m to 41m
Revenue Contract Type	Contract for Differences (CFD) (FIT-Type)	Feed in tariff	Feed in tariff
Revenue Contract Term	15 years	~10 years	~13 years
Revenue Contract Price	~€169/MWh [No escalation]	€194/MWh for 8 years, €154/MWh for 1.5 years [No escalation]	€184/MWh for 8 years, €149/MWh for 4.7 years [No escalation]
Grid Connection Responsibility	Gemini responsible for connection to shore	Tennet responsible for connection to shore	Tennet responsible for connection to shore
NPI Ownership	60%	85%	100%

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GEMINI PROJECT OVERVIEW



Gemini Structure



	Offshore Wind Project
Location	North Sea, Netherlands
Capacity	600 MW (2 sites x 300 MW)
Northland interest	60% (360 MW)
Power contract	Fixed price; 15-year contract with the Dutch government
Operations & maintenance	Siemens (15-year contract) – guarantees high operating availability
Partners	Siemens (20%), Van Oord (10%), HVC (10%)
COD	Completed in April 2017

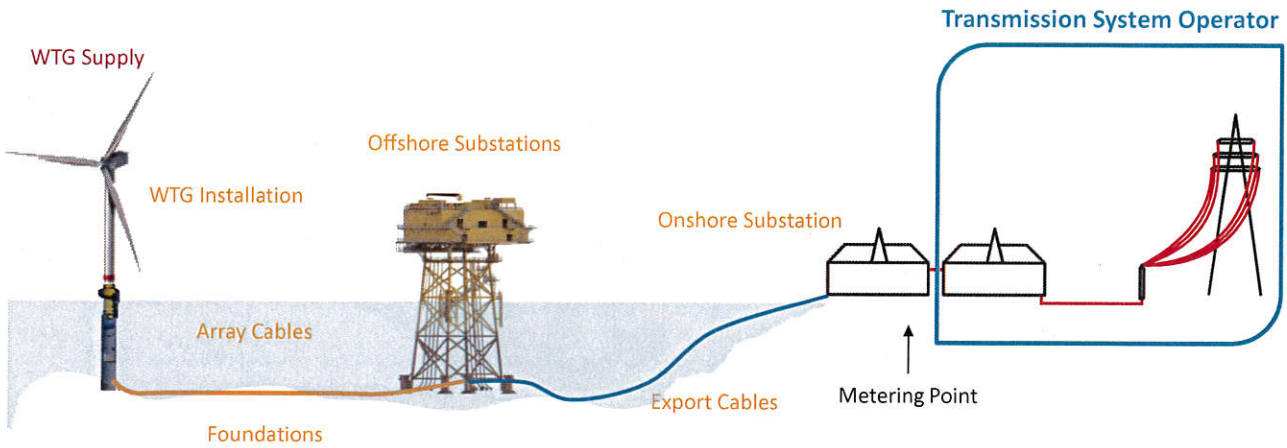
Completed ahead of schedule and under budget

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GEMINI CONTRACT STRUCTURE

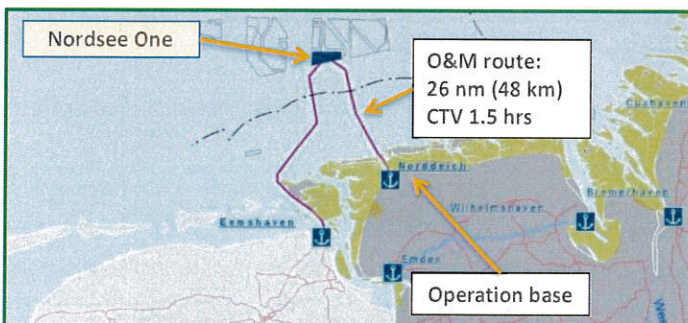


- BOP EPC
- WTG Supply



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NORDSEE ONE PROJECT OVERVIEW



	Offshore Wind Project
Location	North Sea, Germany
Capacity	332 MW
Northland interest	85% (282 MW)
Power contract	A fixed price Feed-in-tariff subsidy for 10 years.
Operations & maintenance	Senvion (10 years) – guarantees high operating availability
Partners	RWE Innogy (15%)
COD	Completed in December 2017
Additional facts	Project debt recently repriced to average all in interest rate of 2.2%

Completed ahead of schedule and under budget

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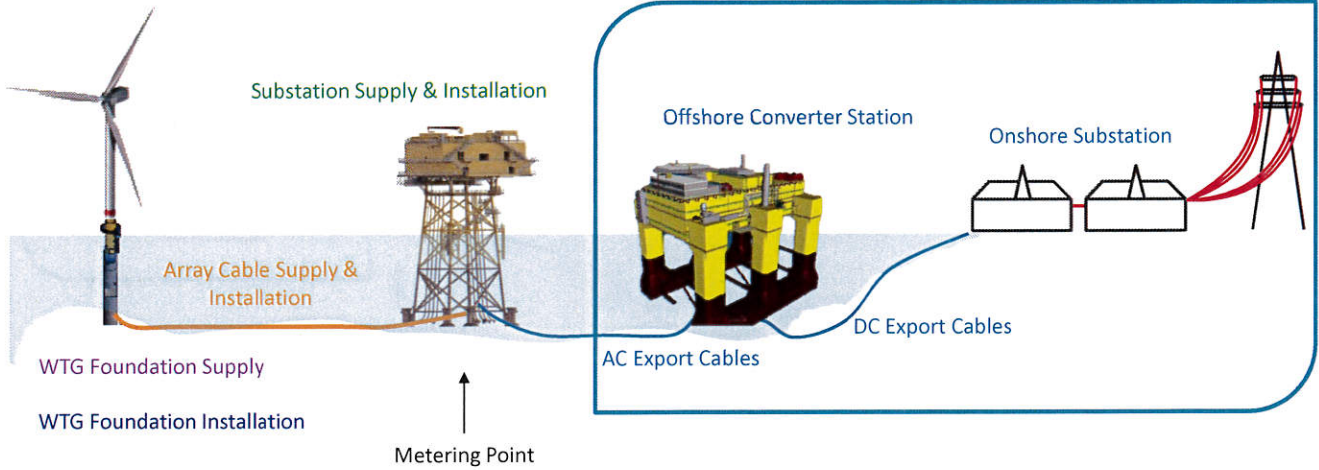
NORDSEE ONE CONTRACT STRUCTURE



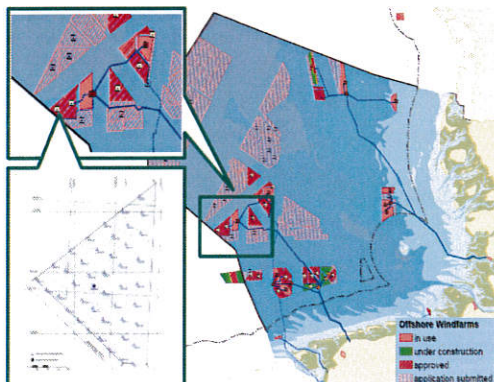
- WTG Supply
- Substation Supply & Installation
- Array Cable Supply & Installation
- WTG Foundation Supply
- WTG Foundation Installation

WTG Supply & Installation

Transmission System Operator



DEUTSCHE BUCHT PROJECT OVERVIEW



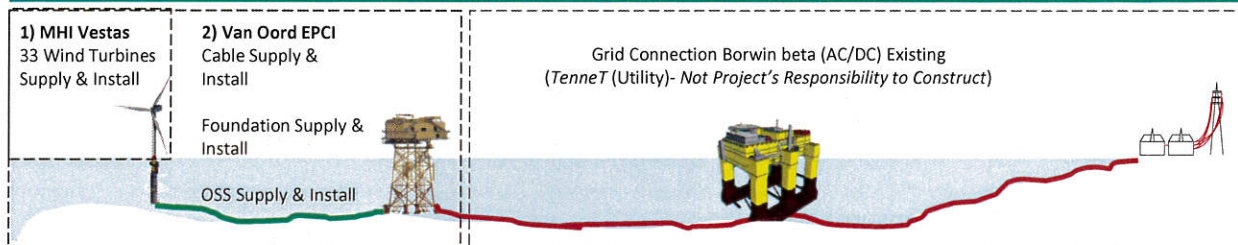
	Offshore Wind Project
Location	North Sea, Germany
Capacity	252 MW
Northland interest	100% (252 MW)
Power contract	13-year fixed feed-in tariff subsidy under the German Renewable Energy Act
Operations & maintenance	MHI Vestas Offshore Wind (~13 years) – guarantees high operating availability
COD	End of 2019
Additional Facts	<p>Opportunity for two additional demonstration turbines utilizing suction bucket foundations.</p> <p>Final investment decision for these two turbines is subject to achieving certain development milestones.</p> <p>If built, they will contribute an additional 17 MW of capacity.</p>

Financial Close Achieved in August 2017

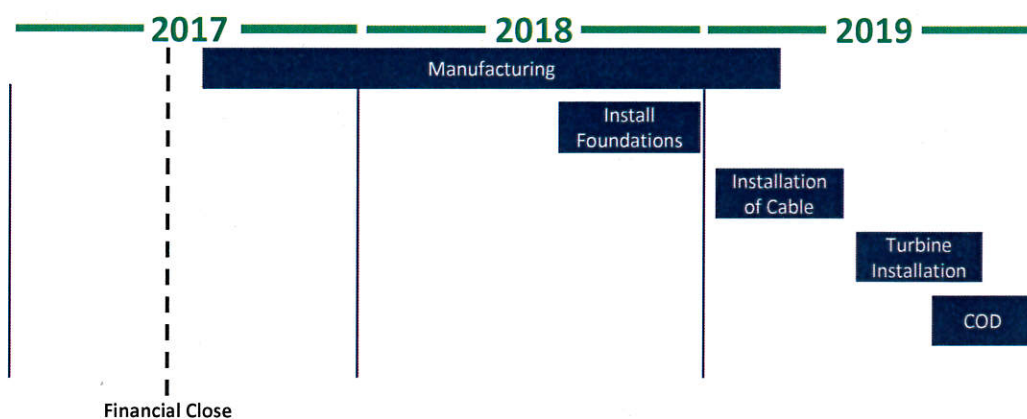
DEUTSCHE BUCHT PROJECT OVERVIEW



DeBu Construction Structure (Two Contracts)



DeBu Construction Timeline

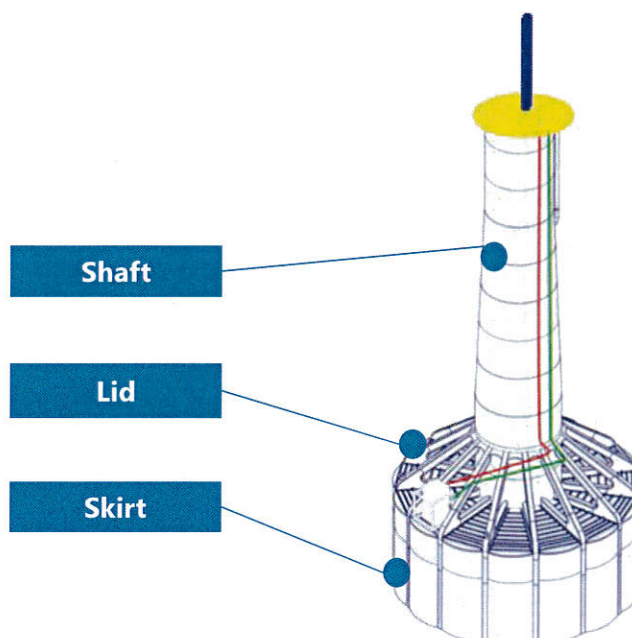


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DEUTSCHE BUCHT THE MONOBUCKET

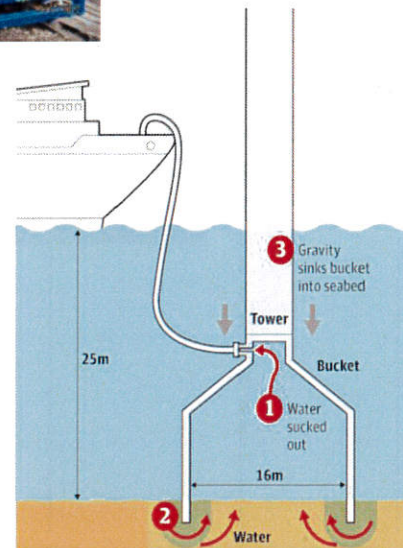


- A hybrid design combining the benefits of a gravity base foundation, a monopile and a suction bucket.
- Optimal range coverage: 20-55 metres
- Noise-Free
- Suitable for +10MW WTGs
- 20-25% lighter than monopiles



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- The suction pump unit is attached to the foundation
- The foundation is lowered to the seabed
- Deadweight and gravity ensures partial self-penetration into the seabed
- The pump unit creates under-pressure inside the bucket and a water pulse nozzle system along the skirt rim ensures localised seabed liquefaction – the combination results in controlled soil penetration
- Verticality is controlled to ensure required inclination tolerance (+/- 0.25 degrees - +/- 0.1 degrees typically achieved in reality)
- The suction pump unit is then recovered to the vessel



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ADDED VALUE OF NORTHLAND O&M

Compared to big utilities, Northland Power's O&M approach is lean and flexible:

1. Flexible:

NPI is prepared to partner up with competitors (e.g. Veja Mate agreement, i.e. space on Substation shared with that of NPI's windfarm)

2. Lean and Multifunctional team:

Team members cross trained and experienced in supporting many phases of the project; open channels of communication with easy and equal access to top management; team leads given decision making authority

3. We accept cultural differences:

Open culture, willingness to learn and share

4. We know how to identify and capture synergies:

Tender for combined O&M scope has been conducted Deutsche Bucht and Nordsee One

We understand what it means to operate far offshore:

Deutsche Bucht is 95km offshore, Gemini 85km and Nordsee One 40km

We bring in expertise and believe in building up the local communities with training and collaboration.

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GEMINI MONOPILE FOUNDATIONS

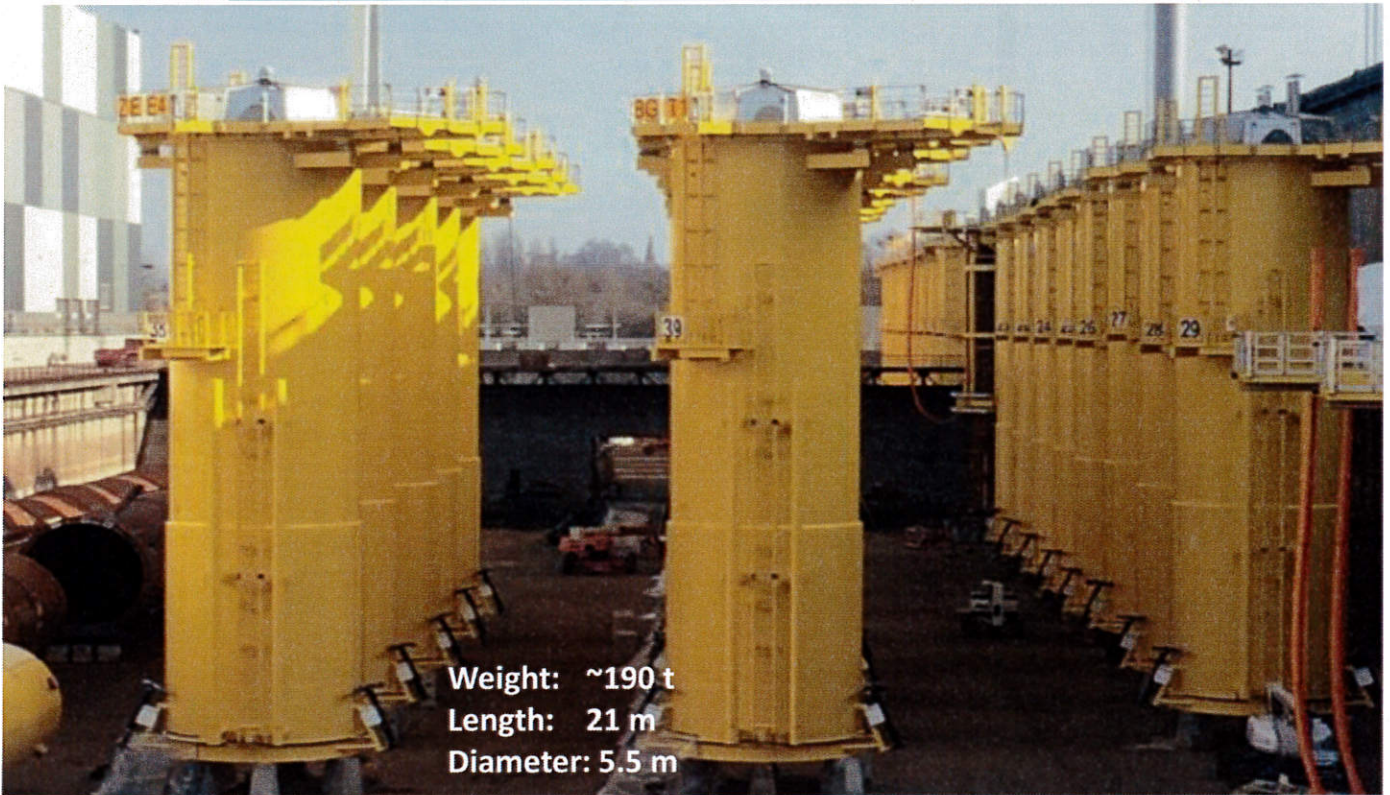


Weight: 670 – 916t
Length: 59 – 73m
Diameter: 5.5 – 7.0m

GEMINI MONOPILE FOUNDATIONS



GEMINI
TRANSITION PIECES



Weight: ~190 t
Length: 21 m
Diameter: 5.5 m

GEMINI
TRANSITION PIECES AT PORT



NORDSEE ONE
MONOPILE LOADOUT



NORDSEE ONE
FOUNDATION TRANSPORT



GEMINI
MONOPILE INSTALLATION



GEMINI
CREW TRANSFER VESSEL



NORDSEE ONE MONOPILE HAMMERING



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GEMINI OFFSHORE SUBSTATION



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GEMINI
OFFSHORE SUBSTATIONS LEAVING PORT



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GEMINI
SUBSTATION JACKET INSTALLATION



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GEMINI
SUBSTATION JACKET INSTALLATION



GEMINI
TOPSIDE INSTALLATION

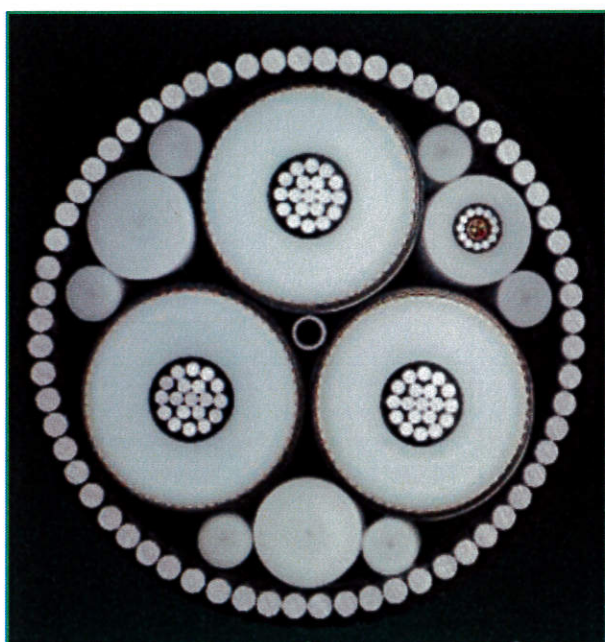


NORDSEE ONE OFFSHORE SUBSTATION



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GEMINI EXPORT CABLES

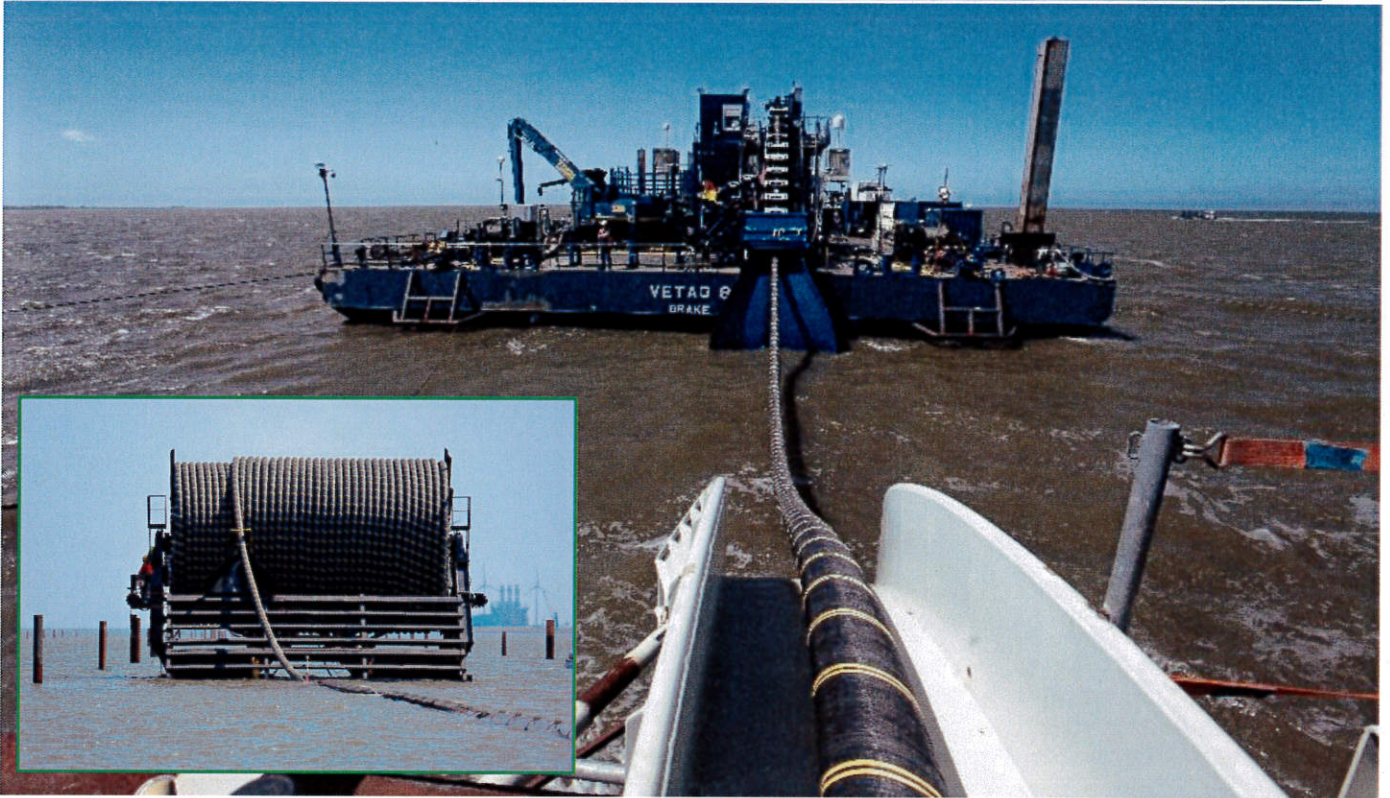


Cross-section - At 108 mm this is the smallest of the 4 infield cable sizes used to connect turbines to OHVS

- More than 140 km of infield cable deployed to connect Gemini's turbines to the offshore high voltage substation.
- Nearly 210 km of export cable required to interconnect the OHVSs, lay/bury cable into the seabed and make the connection.
- 4 diameters of cable required to connect turbines to substation – 108mm, 130mm, 147mm, 153mm – increased diameter = increased capacity
- Up to 7 turbines can be connected in a string – the cable connecting the turbine furthest away from the OHVS has to transport the current of one turbine; the closest has to transport all the current of all turbines in that string

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GEMINI
EXPORT CABLE INSTALLATION



GEMINI
EXPORT CABLE INSTALLATION NEAR SHORE



NORDSEE ONE
INTERARRAY CABLE INSTALLATION



GEMINI
NACELLES, TOWERS AND BLADES AT PORT



GEMINI
TURBINE INSTALLATION



February 2016: First Turbine Installed



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GEMINI
TURBINE INSTALLATION



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GEMINI
TURBINE INSTALLATION



August 2016 – All turbines Installed

NORDSEE ONE
TURBINE TRANSPORT



NORDSEE ONE
TURBINE INSTALLATION



NORDSEE ONE
CTV BERTH



NORDSEE ONE
WINDEA CTV AT OSS FOUNDATION



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PRESENCE IN TAIWAN

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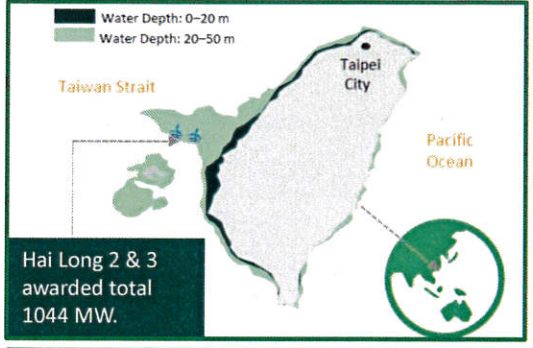
Current Market Themes

- FIT Program currently in place to support renewable policy targets**
 - Current Taiwan Procurement Allocations
 - 2020 – 0.7GW (FIT no local content)
 - 2021-2025 – 3.1GW (FIT with local content)
 - Beyond – 1.7GW (price competitive auction)
 - Major milestones
 - April 2018 – FIT allocation
Hai Long 2a awarded 300MW
 - June 2018 – Price competitive auction
Hai Long 2b awarded 232MW
Hai Long 3 awarded 512MW
- Strong geographic fundamentals for offshore wind**
 - Taiwan Strait benefits from being one of the best wind resources in the world, sufficient to support 6–10 GW
 - Scarcity in land space to site onshore wind solar projects

2018 FIT Rate Encourage Local Investment

- Taiwan’s introduction of the 2018 Feed in Tariff (“FIT”) rate attracts investment from developers and supply chain to make **Taiwan a global leader** in offshore wind
- Revenue certainty, steady construction, and clear grid allocation allow stakeholders to commit capital and **support vital infrastructure build-out**

Site Location



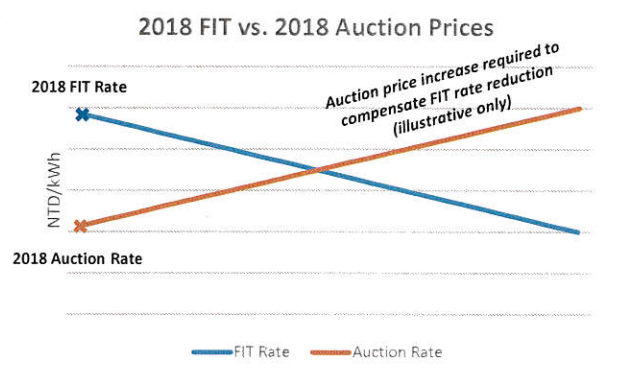
Hai Long Project Portfolio Summary

Project	Capacity (MW)	Grid Connection Date	PPA Rate (NTD/kWh)
Hai Long 2a	300	Q4-2024	5.8498 (2018 FIT)
Hai Long 2b	232	Q4-2025	2.2245 (2018 auction)
Hai Long 3	512	Q4-2025	2.5025 (2018 auction)
Weighted Average PPA Rate			3.4026

HAI LONG FIT & AUCTION SYNERGIES

Sophisticated Procurement Policy Creates Low Auction Prices

- The **combined FIT and auction procurement** was successful in attracting a low cost of energy for offshore wind in Taiwan
- Bids awarded in the auction rely on the stable, predictable build-out of local industry and expertise that the current **2018 FIT rate will enable**



The Hai Long Portfolio: 1 Project, 3 PPAs, Significant Synergies

- Hai Long 2a, 2b, and Hai Long 3 are near in time and space; being **adjacent** and with only 1 year separating grid availability allows efficiency in design, financing, procurement, and construction, and also has **strong synergies** in operations and maintenance
- Hai Long 2b **shares significant infrastructure** with Hai Long 2a, such as mobilization, the offshore substation, etc.; the auction price for Hai Long 2b effectively accounts for adding only marginal cost to realize a 532 MW windfarm

Hai Long Auction Prices Supported by Current FIT Rate

- Hai Long 2b and Hai Long 3 were able to bid so low because Hai Long 2a was previously awarded grid allocation at the **current FIT rate**



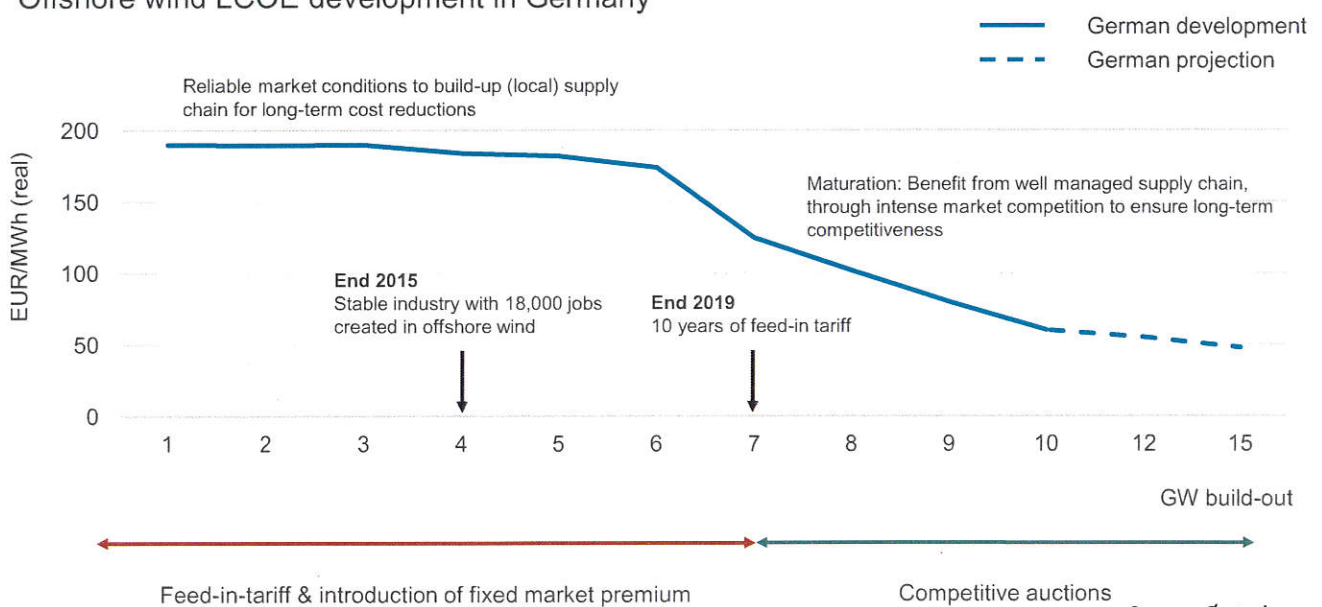
EUROPEAN TARIFF PROGRESSION

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SUCCESS OF FIT PROGRAM IN GERMANY



Offshore wind LCOE development in Germany



Source: Ørsted

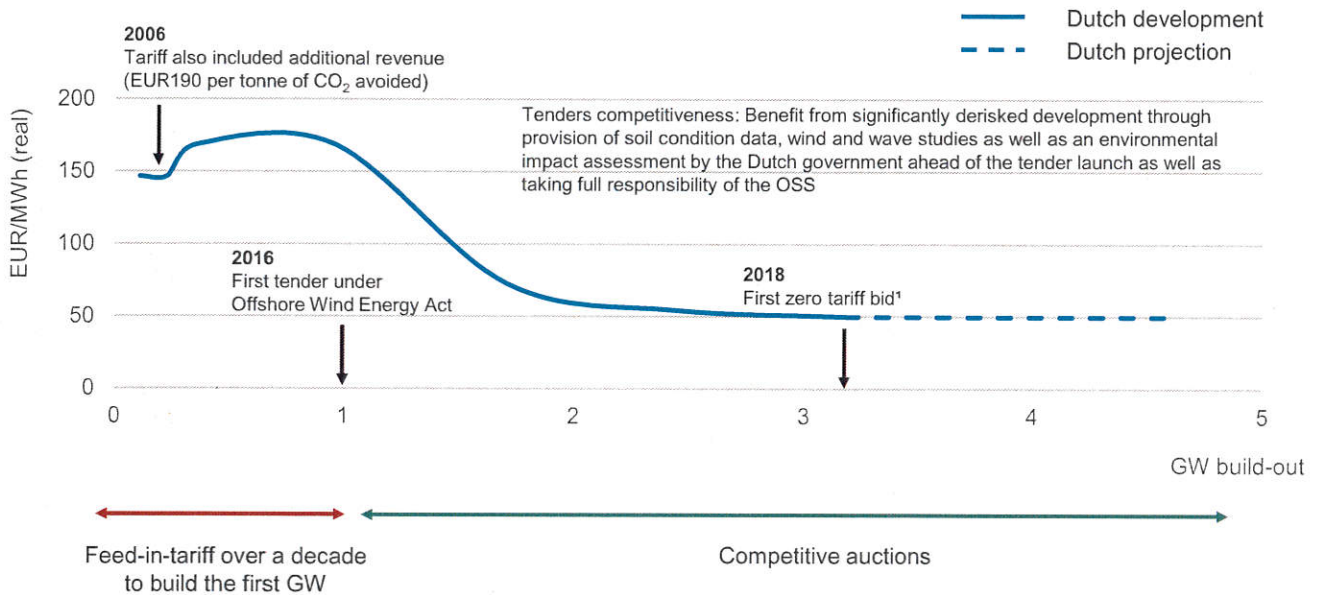
Germany enabled stable remuneration for a decade, setting the ground for drop in LCOE

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SUCCESS OF FIT PROGRAM IN NETHERLANDS



Offshore wind LCOE development in the Netherlands



As for Germany, the Netherlands enabled stable remuneration for a decade, setting the ground for drop in LCOE

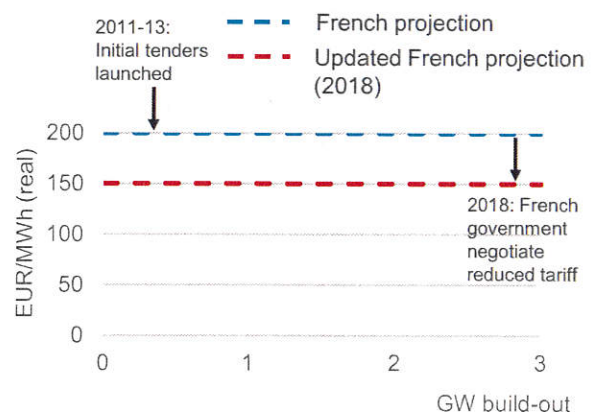
¹ developers are relying on market prices

FIT PROGRAM IN FRANCE



- The French government launched two rounds of OW tenders in **2011 and 2013**
- Local supply requirements imposed in the tender rules despite no existing supply chain
- No previous commercial scale offshore wind projects built in France
- Hence, developers were asked to take a huge amount of risk resulting in high tariffs
- Risks realized as legal challenges, setbacks to local supply chain and the need for additional site studies led to substantial delays
- **7 years after the first tender, 0 GW have been constructed**
- In 2018, tariffs were bilaterally reduced between the government and developers EUR 190-210/MWh to EUR140 – 160/MWh, which is still much higher than other European countries and created a huge amount of uncertainty for investors & lenders

Offshore wind tariff in France



Implementing tenders before having allowed for the supply chain to emerge, learning curve to take place as well as projects to be de-risked resulted in massive delays and no OW capacity built to date in France

Thank you for your attention!

Any questions?



Nordsee One Offshore Wind Farm
*Operations & Maintenance
Presentation*

Norddeich, 16 July 2018

Agenda

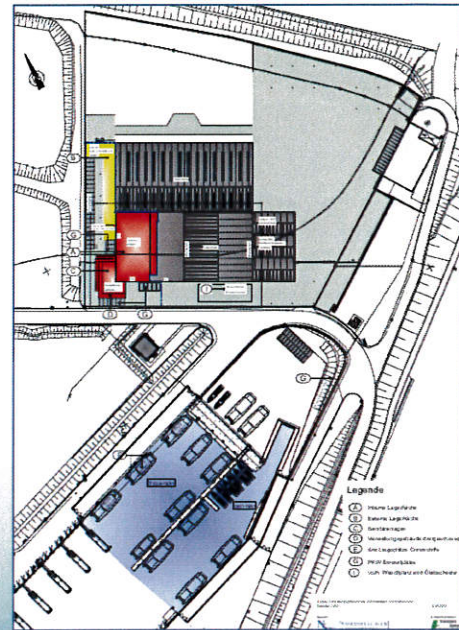
- Health, Safety and Environment induction
- Operations and Maintenance strategy
- Operations and Maintenance set up
- Senvion Wind Turbine Generator contracts
- Information & Communication Technology, Supervisory Control and Data Acquisition as well as Systems

Health, Safety and Environment induction

Assembly Point

The Nordsee One GmbH Onshore Control Center is located in the north-east part of the Port of Norddeich

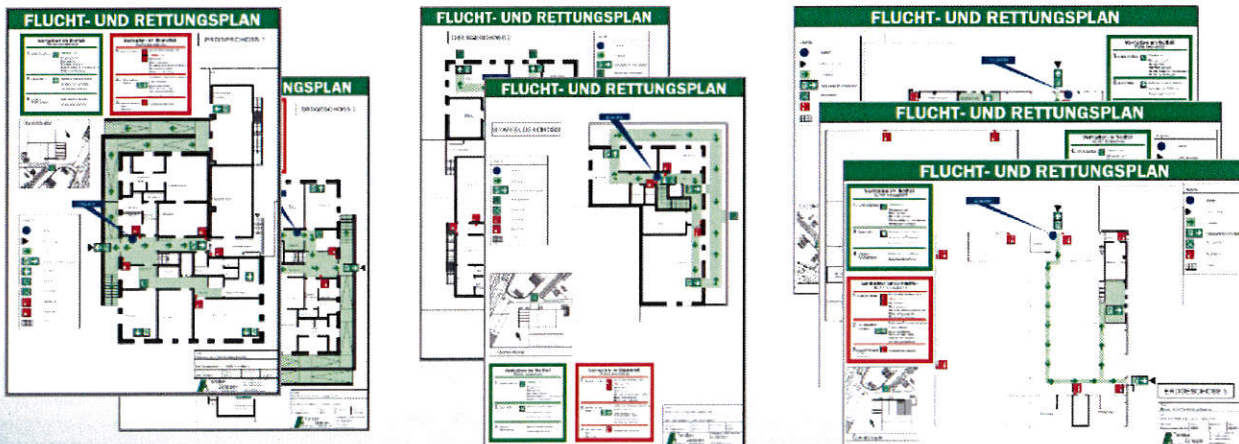
Address:
Am Fischereihafen 1
DE - 26506 Norden



Health, Safety and Environment induction

Escape Routes

Escape and Rescue Plans are located at each level of the building. Please familiarize yourself with the plan. **Emergency number. 112**



Health, Safety and Environment induction

Warehouse

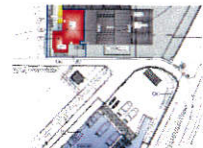
- Only authorized personnel are allowed to enter.
- Follow the instruction given by N1 personell.
- Use only the marked passageways.
- Forklift trucks have the right of way. Keep safe distance to them.
- No passengers on the load or on the bare forks.
- Do not stay or walk under suspended loads.



Health, Safety and Environment induction

Quayside

- Only authorized personnel are allowed to enter.
- Follow the instructions given by the N1 Personnel.
- Wear S3 safety shoes, warning west / jacket and a safety helmet (during crane operations) in the N1 quayside area.
- If walking / staying 2m or closer to the quayside wear a lifejacket in addition. This is not required for boarding the Crew Transfer vessel via gangway system.
- A life ring with lifeline is located on the N1 Quayside Area.
- If a person is falling into harbour waters, keep the life ring line on hand and throw the life ring in direction to casualty. Pull the casualty to the quayside's ladders.



Health, Safety and Environment induction

12 Key Safety Rules

1. No RAMS No Work!

Ensure work is planned and you have read and understood all risk assessments, method statements and permits

2. No Training No Work

Including induction, toolbox talks and professional training



3. LOTO (lock out, tag out) – Isolate energy sources!

Disconnect mains. Prevent reconnection. Verify system is dead. Carry out earthing and short circuits. Provide protection of nearby live parts

4. No permit, no switching!

Comply with the Nordsee One electrical safety rules, seek permission from the Verantwortliche Elektrofachkraft

5. Never walk under suspended loads!

Be aware of works conducted above you



6. Use equipment including PPE as instructed!

Do not use equipment that you're not authorised to use



7. Know the emergency plan!

Especially confined space, working at height and unfamiliar workplaces and vessels

8. One hand for the vessel, one hand for you!

Use care when moving around on vessels



9. Use Chemicals only in compliance with MSDS and task RA!

Material Safety Data Sheets and Risk assessments must be available for all hazardous substances

10. Keep it clean and tidy! Dispose waste responsibly!

Keep passageways clear. Do not throw waste into the sea

11. Observe the rules on smoking, drugs and alcohol!

Only smoke in designated areas. No Drugs. No Alcohol



12. Stop and report all unsafe acts and conditions!

A stop work policy and no blame culture is our philosophy

Agenda

- Health, Safety and Environment induction
- Operations and Maintenance strategy
- Operations and Maintenance set up
- Senvion Wind Turbine Generator contract set up
- Information & Communication Technology, Supervisory Control and Data Acquisition as well as Systems

Operations and Maintenance strategy

Operations and Maintenance Philosophy and Key Principles

• Philosophy:

- Performance orientated, safe and cost efficient wind farm operation
- Reduce costs, but still get the **highest performance** out of the wind farm
- **Partnership approach**, place risks where controlled best (Fair contract situation between Employer and Contractors)

• Key principles:

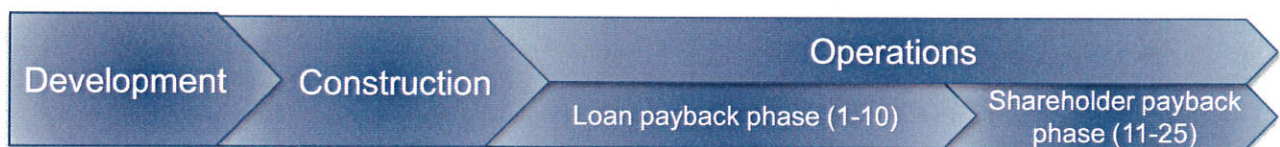
- Take **full operational control**, and manage risks internal, which can't be contracted at reasonable conditions
- **Active monitoring** of contractual agreed conditions (scope, quality and warranties)
- **Build up of internal operational knowledge** to gain more flexibility and to have a fall-back option in case this is required
- **Performance critical topics** must be **part of the supply contract** to increase the quality and reliability of the turbines
- **Improving plant reliability and optimizing output** to increase revenue

- Wind turbine generators maintenance fully transferred to the supplier (for 10 years) to minimize possible risks and improve bankability
 - Full service agreement → No supply chain risk
 - All provision of logistics by Servion → No access and logistic risk
 - Avoiding of claims under availability guarantee or warranty claim → No provision of own personnel

Operations and Maintenance strategy

Operations Timeline

Operational control and development of competence is key to enable N1 to optimize the operation of the wind farm after year 11 → contractual setup to reduce costs by taking on more risks



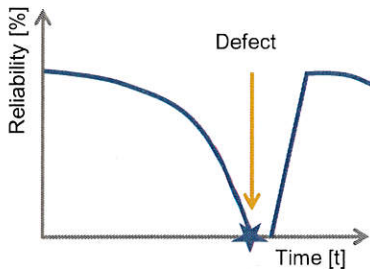
- | | | | |
|--|---|--|---|
| <ul style="list-style-type: none"> • Operations lifecycle planning and design support of systems and assets • Procurement of turbine service agreement and negotiation of relevant sections of supply contracts • Preparation of OpEx for Financial Close | <ul style="list-style-type: none"> • Support of commissioning coordination and execution → ramp up of site team • Coordination of maintenance activities prior handover • Procurement of all relevant operations contracts • Set up of processes, systems and site organization | <ul style="list-style-type: none"> • Active monitoring of the wind farm and contractual agreed conditions • Operational control and development of competence by learning from contractors • Coordination of maintenance activities to ensure technical integrity and performance • End of warranty inspections based on monitoring data and operational experience (Year 5) • Contract, claim and insurance management | <ul style="list-style-type: none"> • Active monitoring of the wind farm • Operational control • Performance and coordination of maintenance activities to ensure technical integrity and performance • Optimizing the revenue by implementing a performance orientated and cost efficient strategy (together with new power purchase agreement to be optimized) |
|--|---|--|---|

Operations and Maintenance strategy

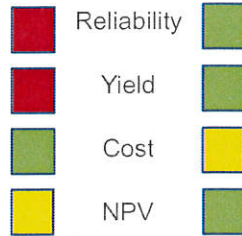
Maintenance strategy

- Servion activities will be closely monitored in order to ensure they implement a predictive strategy and planned preventive maintenance activities in low wind speed periods in order to have the wind turbine generators available during high wind speed

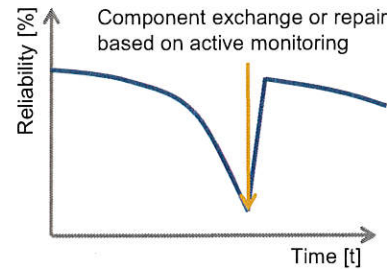
Corrective Approach



Performance



Predictive Approach



N1 sensitivities

Key figure	Production	Revenues ¹ (FiT)	Maximum Impact ²
Assuming 3700 full load hours	1228.8 GWh	238.4 m€	-
1% Availability per year	12.3 GWh	2.4 m€	-
1 WTG stopped for 1 day	62 MWh	12,094 €	28,044 €
Wind Farm stopped for 1 hour	140 MWh	27,212 €	63,099 €
Wind Farm stopped for 1 day	3,366 MWh	653,099 €	1,514,376 €

Downtime during high wind speed periods will have major impact!

¹Revenues during feed in tariff period
²Full capacity

Agenda

- Health, Safety and Environment induction
- Operations and Maintenance strategy
- **Operations and Maintenance set up**
- Servion Wind Turbine Generator contract set up
- Information & Communication Technology, Supervisory Control and Data Acquisition as well as Systems

Operations and Maintenance set up

Service Base in Norddeich



- N1 O&M team moved in in August 2016
- 24/7 control room for wind farm monitoring and electrical operation
- Maintenance site management
- Large warehouse for strategic and recommended spare parts
- 90 m of dedicated and fenced quayside



Operations and Maintenance set up

Owner's Control 24/7 set up in Norddeich

Full control with N1

- Permanent in-house substation and grid monitoring
- Substation and grid operations including performance of switching operations
- Interface to TenneT
- Marine monitoring
- In-house defect and performance analysis
- Optimised work planning based on latest information

Planning Works

- Scheduled maintenance according to maintenance plan
- Consideration of predictive maintenance in long and mid term maintenance planning

Monitoring Works

- Permanent active monitoring and control via SCADA and systems
- Marine coordination and people tracking
- Permit to work and works management
- Offshore works monitoring by own offshore technicians

Offshore Works

- Inspection → Maintenance → Repair

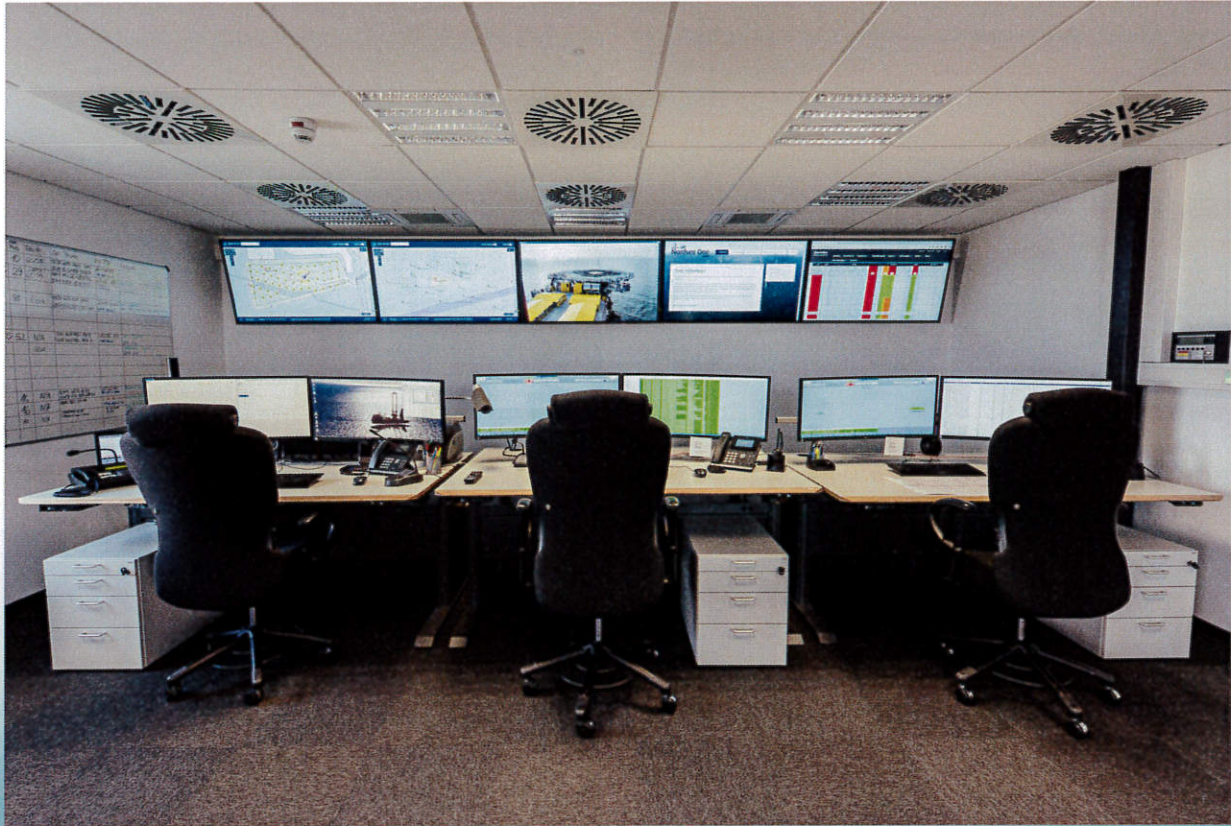


Norddeich

- Offices
- Control room
- Sanitary & welfare facilities
- Warehouse
- Vessel berth
- Heliport
- Additional logistics on demand

Operations and Maintenance set up

Owner's Control Room



Operations and Maintenance set up

Crew Transfer Vessel

- Long term charter agreement signed with Ems Maritime Offshore for the „Windea Four“
- Travel time to site between 70 and 90 min and seats for 24 technicians
- Access at nearly 2m significant wave height achieved



Operations and Maintenance set up

Maintenance Contract Setup

	Wind Turbine	Foundations	Substation	Cable
Years 1-5 (Warranty Period)	<ul style="list-style-type: none"> Warranty to cover all defects of the wind turbine generators for five years. All maintenance and repair to be undertaken by Senvion. technical availability guaranteed, with 100% power curve guarantee. Senvion takes all weather risk 	<ul style="list-style-type: none"> Warranty under supply agreements to cover all defects of the monopile structures and offshore substation Maintenance contract with Semco Maritime GmbH - Monopiles, transition pieces and offshore substation <ul style="list-style-type: none"> Structural maintenance Low voltage and auxiliary maintenance High voltage maintenance Subsea inspection contract with NDE Offshore A/B Performance of all subsea inspections on the assets and cable surveys 	<ul style="list-style-type: none"> Warranty to cover all defects of the cables for five years. Cable storage Contract with Siem Offshore 	
Years 6-10	<ul style="list-style-type: none"> Full scope under Service and Maintenance Agreement including technical availability guarantee already negotiated. 	<ul style="list-style-type: none"> 1 time five year extension options for each Semco and NDE Alternative - New inspection, maintenance and repair contract. 	<ul style="list-style-type: none"> New inspection, maintenance and repair contract. 	
Years 11-25	<ul style="list-style-type: none"> 2 times five year extension options 25 years spare part supply guaranteed under the supply contract 	<ul style="list-style-type: none"> New inspection, maintenance and repair contract. 20 year spare part supply guaranteed under supply contracts 	<ul style="list-style-type: none"> Design lifetime >30 years 	
Lifetime	<ul style="list-style-type: none"> Operations personnel, service base, long-term crew transfer vessel charter with extension options with Ems Maritime Offshore up to 10 years. 			

Agenda

- Health, Safety and Environment induction
- Operations and Maintenance strategy
- Operations and Maintenance set up
- **Senvion Wind Turbine Generator contract set up**
- Information & Communication Technology, Supervisory Control and Data Acquisition as well as Systems

Senvion O&M WTG Contracts

Full service contract to minimise risk

- Service contract to cover all relevant maintenance issues and availability risks for the first 10 years at a very competitive price

Services	Year 1-10
Maintenance	Scheduled ✓
	Unscheduled ✓
All Logistics	✓
Spares & Components	✓
Personnel	✓
Remote Monitoring & Support (24/7)	✓
Technical Availability incl. access risk	✓

- N1 is only witnessing the Senvion works and performs quality inspections as well as monitors and controls the planning and site management
- Senvion chartered two crew transfer vessels (24 seats each) for the performance of all offshore works
- Minimum team size is three technicians – Senvion is working in a shift system (14 on and 14 off) with approx. 24 technicians plus Site Management per shift
- Senvion might adjust the logistical concept to a sea based campaign utilising a walk-2-work vessel (same strategy as DeBu and Gemini) in case that Senvion turbines will be installed in neighbouring wind farms

Agenda

- Health, Safety and Environment induction
- Operations and Maintenance strategy
- Operations and Maintenance set up
- Senvion Wind Turbine Generator contract set up
- **Information & Communication Technology, Supervisory Control and Data Acquisition as well as Systems**

Information & Communication Technology, Supervisory Control and Data Acquisition as well as Systems

Definitions and Understanding

- **The Nordsee One SCADA & System landscape is threefold:**

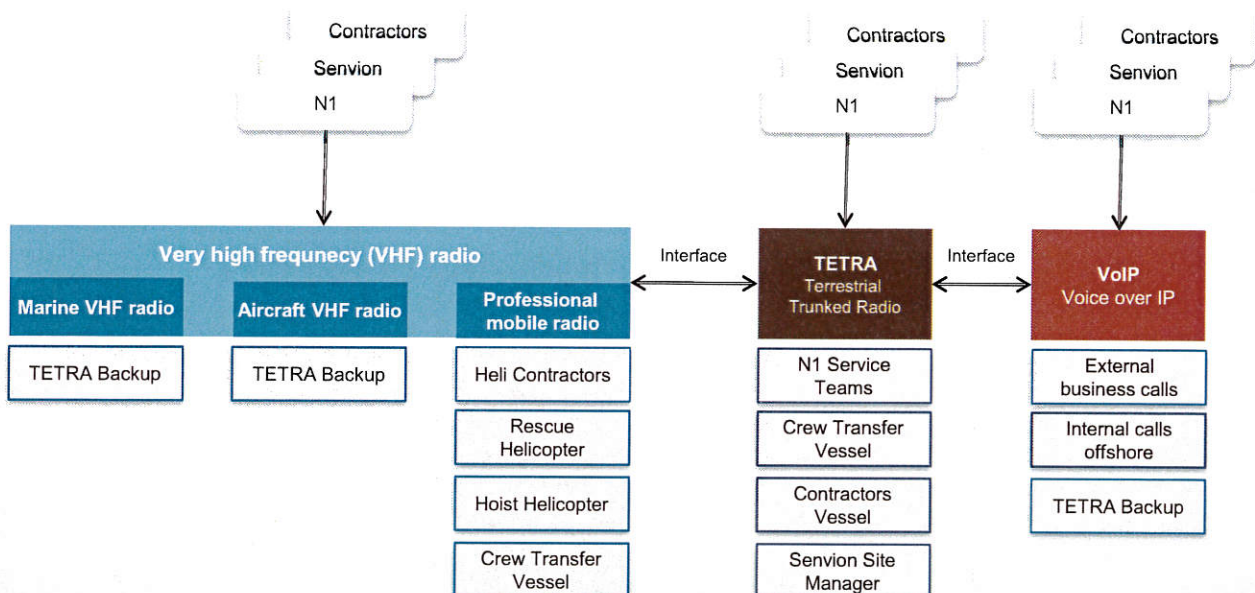
- Information & Communication Technology (ICT) System (Internet, Computer, Telephone) for unified communication and integration of IT systems → Implemented by N1
- Supervisory Control and Data Acquisition (SCADA) is for surveillance and control of assets → Supplied by Contractor
- Special Systems tailored for offshore use to ensure full operational control, measuring and reporting → Implemented by N1

- **Philosophy & Key principles:**

- Get all raw data from each asset in order to built up the wind farm management system on an **independent N1 database**
- Take **full operational control** and internally manage risks, which can't be contracted at reasonable conditions
- **Active monitoring** of contractual agreed conditions (scope, guarantees, quality and warranties)

Information & Communication Technology, Supervisory Control and Data Acquisition as well as Systems

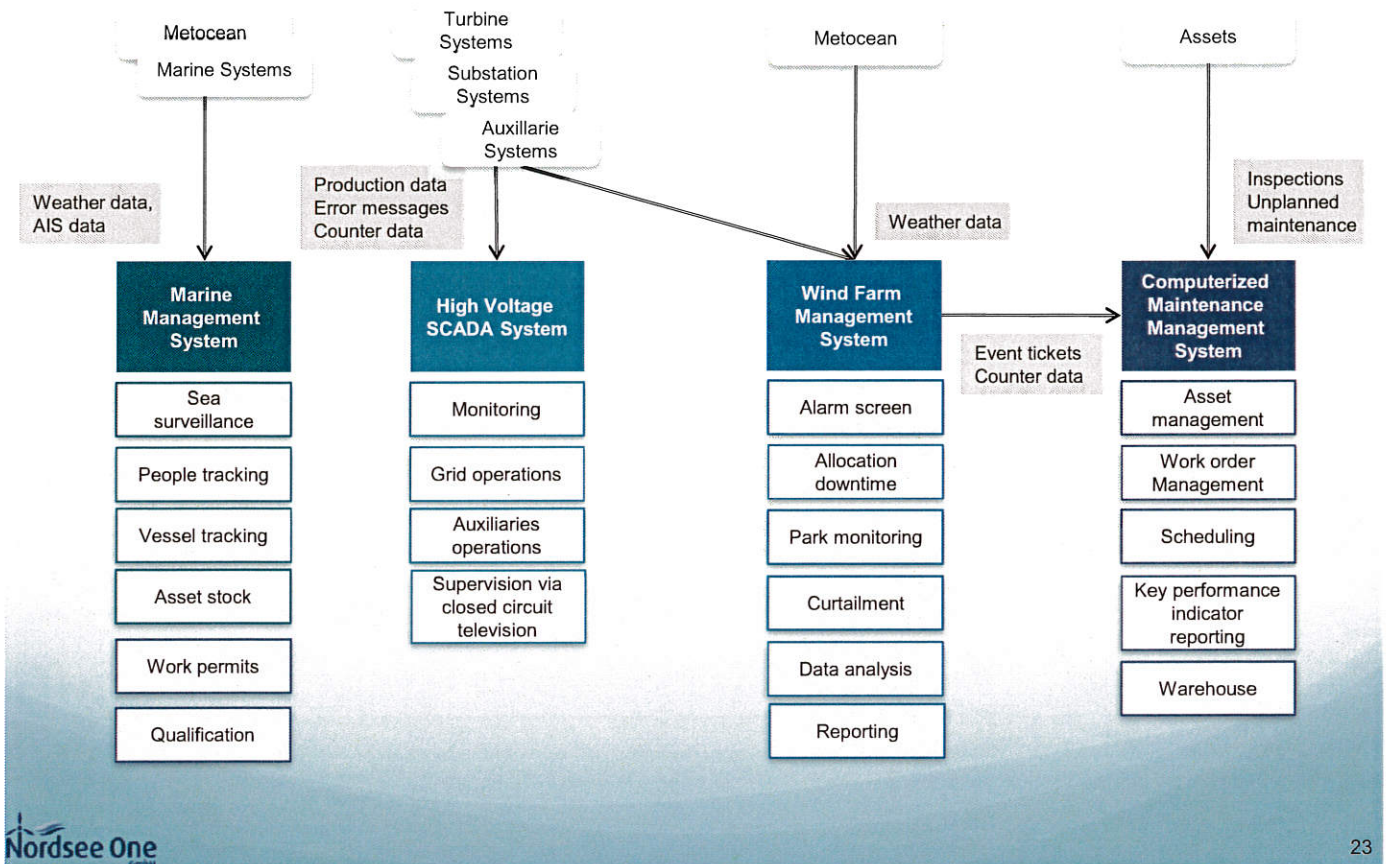
Communication Systems



- High quality communication technology is a key factor in order to ensure a safe working environment and allow a proper emergency coordination
- Mandatory to allow usage of tablets for reporting and allow a proper communication with the onshore site management

Information & Communication Technology, Supervisory Control and Data Acquisition as well as Systems

Control Systems/Reporting Tools



Thanks for your attention. Any question?

附錄(二)：

德國 NKT 海纜廠簡介

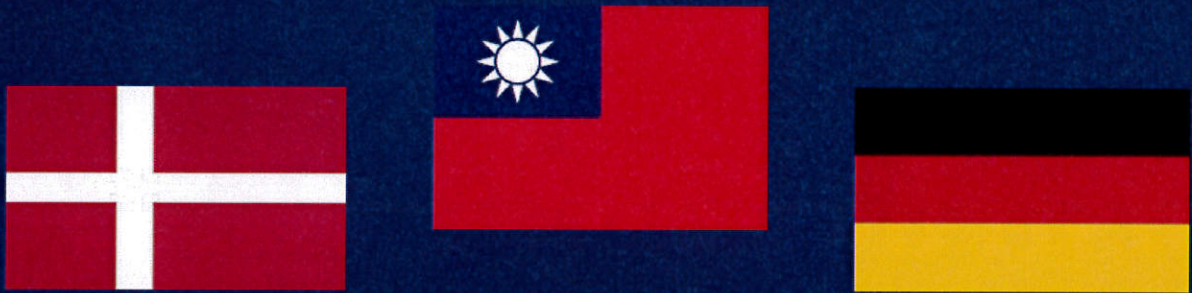
NKT

**Power to life
since 1891**



NKT

Welcome to the Taiwanese Delegation



Agenda

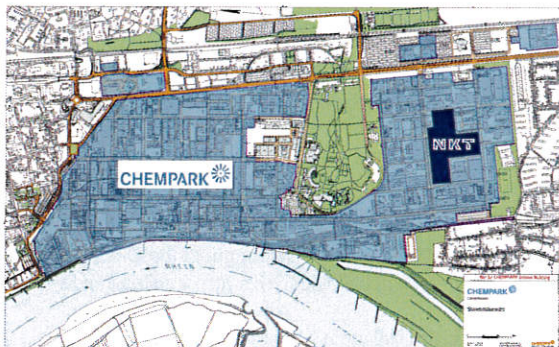
time	action	room/facility	duration	responsible
12:30 p.m.	arrival and welcome of the Taiwanese group incl. exchange of business cards	entrance area	15'	Ercihan Kurt
	photo session with the whole group		15'	Marketing
1:00 p.m.	lunch for the whole group	cantine	45'	
2:00 p.m.	safety instruction	f2c	10'	Ercihan Kurt
2:10 p.m.	Introduction of NKT	f2c	15'	Ercihan Kurt
2:25 p.m.	Introduction of BSMI	f2c	10'	Matt
2:35 p.m.	Introduction of Taya	f2c	10'	Danny
2:45 p.m.	Sign a MoU between TERTEC and NKT	f2c	15'	
3:00 p.m.	Technical presentation about NKT's capabilities	f2c	30'	Ercihan Kurt
	Capabilities incl. development activities of NKT within AC & DC Submarine cables			
	NKT cable laying capabilities & experience			
	Q&A			
3:30 p.m.	National standards incl. third party testing procedures for Submarine cables within Europe	f2c	30'	Volker Waschk
	Are there any national standards for submarine cables in Germany (or European standards)?			
	Which agencies in Europe or Germany can provide submarine cable third-party certification?			
	What are the quality assurance requirements before the construction of submarine cables, such as topographic maps, waves, and walrus climate?			
	Are there specific requirements for accessories such as submarine cable joints?			
	Testing, Inspection & Certification procedure & qualification for submarine cables.			
	Testing equipment and technology for submarine cables.			
	Q&A			
4:00 p.m.	change of shoes and prepare of factory	f2c	15'	all Ercihan Kurt +
4:15 p.m.	factory tour	factory	60'	Holger Schwerdorf
5:15 p.m.	change of shoes	f2c	15'	all
5:30 p.m.	end of tour & good bye			Ercihan Kurt

Safety instruction



Safety guidelines f2c

Information about the CHEMPARK



CHEMPARK area



NKT area (f2c) within CHEMPARK

NKT is located within the CHEMPARK, where special regulations apply

Safety guidelines f2c

General conduct

Traffic regulations

The German road traffic regulations apply in the CHEMPARK

- Maximum speed: 30km/h
- The „right-before-left“ rule applies to the right of way
- Rail traffic has right of way
- Please pay particular attention to special-purpose vehicles
- Seat belts must be fastened at all times
- Traffic accidents must be reported to the safety & security control center

Behavior at the NKT area

Unless prior arrangements have been made, you must be escorted at all times by a NKT employee. Your escort will explain area-specific hazards and will direct you in case of emergency.

Behavior in the event of an emergency or incident

In the event of a fire, incident, environmental pollution, traffic accident, medical emergency or damage resulting from other risk, inform the CHEMPARK safety & security control center immediately.

Internal emergency number: 112
Cell phone: +49 175 30 99 399

Safety guidelines f2c

General behavior (within office building and in the factory)

Expected behavior

- Please make sure you are always accompanied by your host
- Do not access areas of companies other than NKT
- Additional instructions:



Please use existing hand rails in stair cases



The CHEMPARK ID must be visible at all times. The visitor ID must be returned to the site security of the visitor center when leaving the CHEMPARK.

Prohibitions to be considered



Alcohol or narcotics are prohibited



No photographs or filming without upfront permission



Smoking is strictly prohibited throughout the CHEMPARK and within the NKT buildings. This also applies inside vehicles.
(Exception: Special smoking cabins within the NKT building)

Safety guidelines f2c

Additional behavior to be considered within the factory building

Expected behavior



Use existing walkways only
(internal transport takes precedence)



In all production areas you have to wear safety shoes
(sole puncture protection and ankle-high)



As a visitor you have to wear an orange warning vest within the factory

Depending on the activity or the area additional safety equipment (PPE) may be required, e.g.



Cut resistant gloves



Protective helmet



PPE against falling



Protective clothing



Ear protection



Respiratory protection



Safety glasses



Face protection

Prohibitions to be considered



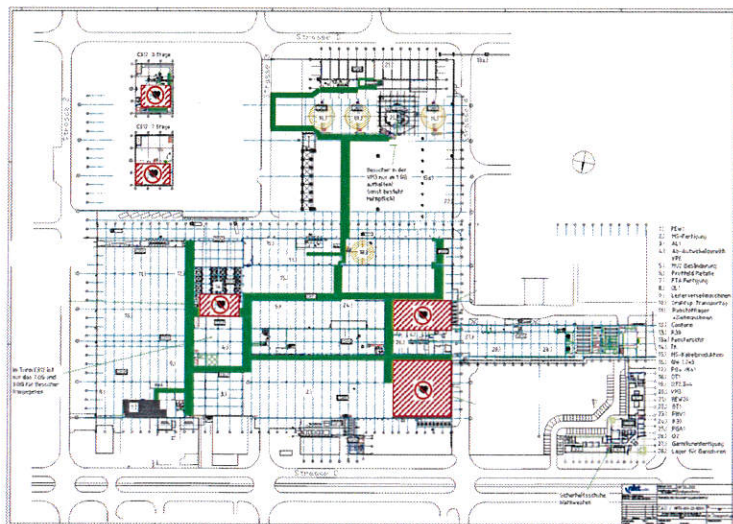
Do not operate machines
Pay attention to restricted areas
(e.g. safety fence, warning tape...)





No access for persons with pacemakers
(in designated areas)

Safety guidelines f2c

Walkways and areas restricted for persons with pacemakers within the factory



-  Walkway
-  Restricted area for persons with pacemakers

Safety guidelines f2c

Behavior in case of (internal) alarm – danger within the building

Triggers of internal alarms

- Fire detectors within the building (automatic triggering)
- Manual call point (manual triggering)

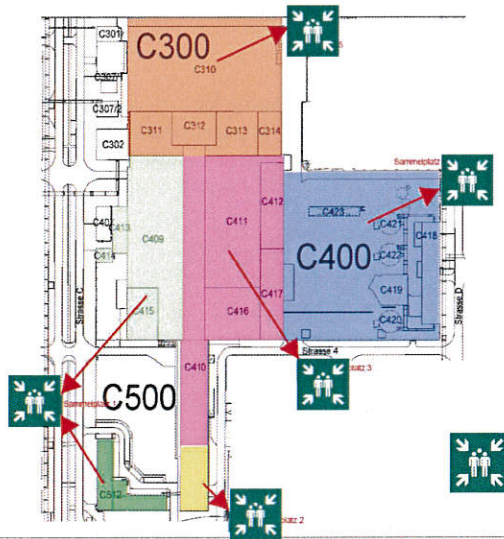


Behavior in case of internal alarm

1. Keep calm
2. Close all doors and windows
3. Leave the site or the building via the signposted escape routes
4. Do not use elevators
5. Look for the designated muster point outside the building and follow the NKT employees
6. Follow the instructions of the fire department / site security / personnel from NKT

Safety guidelines f2c

NKT location with muster points



Safety guidelines f2c

Behavior in case of (external) alarm – danger/incident outside the building

Triggers of external alarms

- Notification by phone from the CHEMPARK safety & security control center
- Manual call point (manual triggering)



Behavior in case of external alarm

1. Keep calm
2. Close all doors and windows
3. Do not leave the building until the all-clear has been given
4. Follow the instructions of the fire department / site security / personnel from NKT



NKT



NKT introduction



NKT

NKT at a glance

**Leading
cable
provider**

NKT is among the leading global, AC/DC power cable providers, with a stronghold in Europe

**All cable
sectors**

NKT covers all major cable sectors from onshore to offshore and from low-voltage to high-voltage plus service and accessories

**> 125
years**

NKT looks back to more than 125 years of proud history with several innovations and acquisitions

3,400

3,400 employees spread over 18 countries, with Sweden and Germany as the biggest locations

EUR 1.4bn

In 2017, NKT expects revenue of EUR 1.4bn

**EXCELLENCE
2020**

The journey towards excellence began in 2013 -now the strategy enters the targeted growth phase

NKT A/S is an industrial conglomerate listed on Nasdaq Copenhagen



NKT A/S¹



- Turnover: EUR 1,004m²⁾
- Employees: 2,800²⁾
- Power cable solutions



- Turnover: EUR 43m
- Employees: 240
- Optical components and solutions

In 2016, the total turnover of the three businesses was EUR 2,105m

1) NKT A/S is listed on the Nasdaq Copenhagen Stock Exchange –
2) For NKT 2016 figures do not include the ABB HV Cables business



A proud history of innovations and acquisitions

1891

The Dane Hans Peter Prior founded Nordisk Elektrisk Ledningstråd og kabelfabrik, later known as NKT



1922

NKT was the first company to make telephone cables

1960

NKT develops the first methods to recycle cable scrap



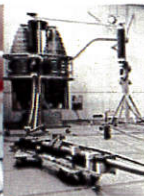
1986

NKT produced the world's first 145 kV XLPE cross-linked cables



1995

Introduction of a new range of PVC and halogen-free cables and cord to meet environmental and safety requirements



1999

Acquisition of Felten & Guillaume Kabelwerke GmbH, Germany



2010

Opening the new state-of-the-art production plant in Cologne, Germany



2011

Introduction of QADDY®, a unique cable drum and trolley in one



2013

Acquisition of Ericsson power cable operations, Sweden



2017

Acquisition of ABB HV Cables

Launch of the world's first tested and qualified 640 DC underground cable

OUR VISION

By driving excellence we will be the best power cable company by 2020 in the eyes of our customers and our people

Market Segments

Leading supplier of high voltage cables

A key enabler for major emerging trends



Offshore Wind farms

Export cables connecting wind farms to land based grid



Offshore Oil and Gas

Power from shore -cables from land electrifying offshore platforms



Undergrounding

Land cables replacing traditional overhead lines, mainly in and around city centers



Interconnector

Land and sea cables between countries or regions

Borwin, Germany integrating the world's most remote offshore wind farm

Troll A, world's first offshore platform connected to shore supply

Randstad380 - The Worldwide Biggest 380 kV Cable Project

BritNed, HVDC submarine power cables between UK and NL

NKT

NKT capabilities

Outstanding product portfolio with best in the class technologies – world’s first 640 kV XLPE HVDC

NKT

Extruded Insulation System

Paper/Oil

	Onshore AC XLPE		Onshore DC XLPE	Offshore AC XLPE		Offshore DC XLPE	On/offshore MI
Maximum voltage	550 kV	245 kV	640 kV	420 kV		525 kV	525 kV
Type	Single core	Three core	Single core	Single core	Three core	Single core	Single core
Prequalification & Type Testing	✓		✓	✓		✓	✓
Relevant product							

Submarine Cable Design



Typical Offshore Export Submarine Cable Design

Conductor:

- Stranded copper wires or solid aluminum
- Swelling material integrated to achieve longitudinal water tightness

Insulation system:

- Semi conductive layers and insulation out of XLPE
- Triple extrusion process

Screen:

- Lead
- Swelling tape for longitudinal water tightness

Sheath:

- Semi conductive PE sheath

Lay up:

- Three power cores
- Up to three optical fibre cables

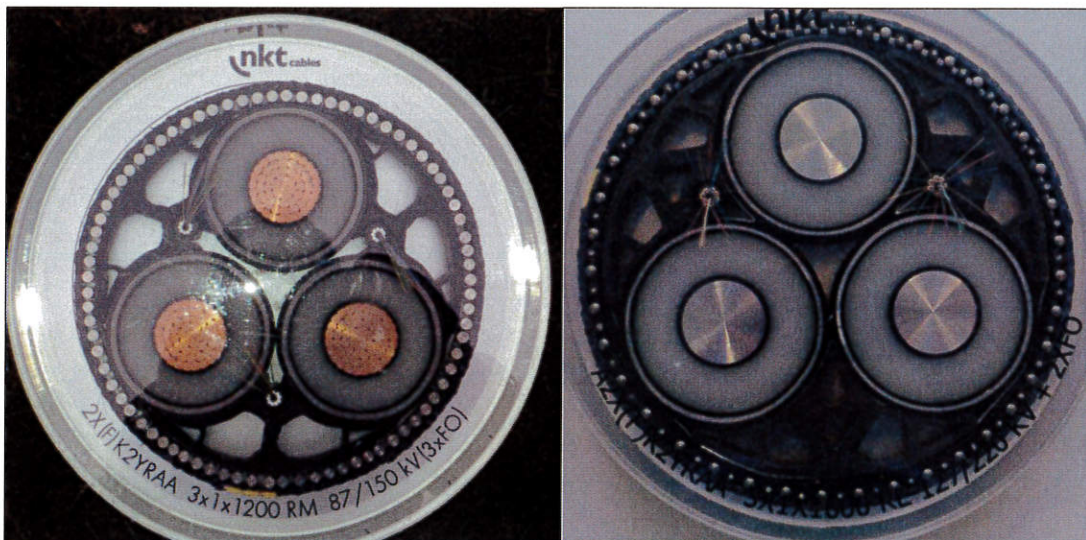
Armouring:

- Zinc coated steel wires
- Optional: integration of PE wires within the armour
- Bitumen and outer PP yarn layers for corrosion protection



2X(F)K2YRAA

Experience of Similar Cable Designs



Two technologically advanced HV cable plants in Sweden and Germany and deep sea harbour in Rotterdam

Rotterdam, Netherlands

- Deep sea harbor
- 2 barges for transport
- Vast turntable capacity
- Jointing facility with clean room environment



Kalrskrona, Sweden

- HVAC and HVDC subsea cable production
- 2 extrusion lines
- XLPE and MI technology
- Own harbour with dual loading facilities and direct Baltic Sea access
- State-of the art testing facilities



Cologne, Germany

- HVAC onshore and offshore cable production
- 3 extrusion lines
- XLPE technology
- Production of HV accessories, grid monitoring systems and other special purpose products (e.g. fibre optic)



Geographical footprint - strategically well placed to cover offshore and large onshore projects

Two strong production units for high-voltage cables

Submarine and underground cable systems

Kalrskrona, Sweden



Cologne, Germany



Enabling flexible production planning

High-voltage cable factory

Karlskrona

- One of NKT's centres for production of high-voltage cable systems is situated in Karlskrona, Sweden
- The main focus of the unit is design, production, testing, installation and service of submarine cables
- With a strategic location right by the sea, the factory is connected with continental Europe and it operates its own harbor as well as the world's most advanced cable laying vessel
- Capability to design and manufacture underground cables up to 640 kV DC
- This facility is a result of power cable expertise dating back to 1883 and today it employs approximately 850 people



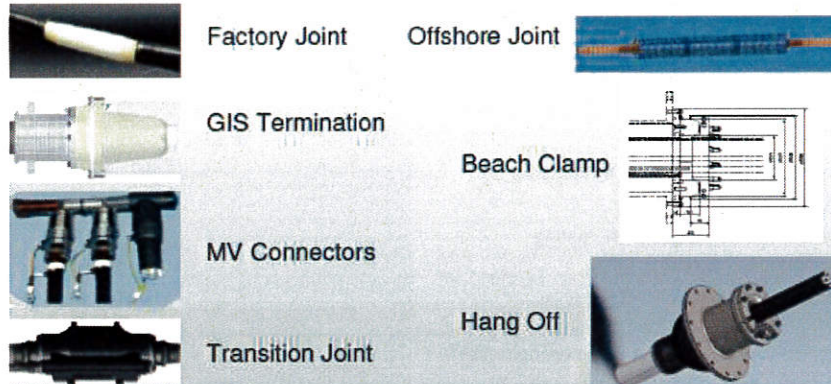
High-voltage cable and accessories factory

Cologne

- The state-of-the-art facility in Cologne is made to meet the customers' requirements, down to the last detail – which gives the facility the name f2c – flow2customer
- The products produced in Cologne are high voltage cables, high voltage accessories, fibre optic products, superconducting cables, submarine cables and VALCAP® Grid monitoring systems.
- The factory has been constructed on the basis of facilitating optimal cable production and an optimum of environmental protection
- Special technical innovations have been integrated into the plant to make production as efficient as possible



NKT accessories



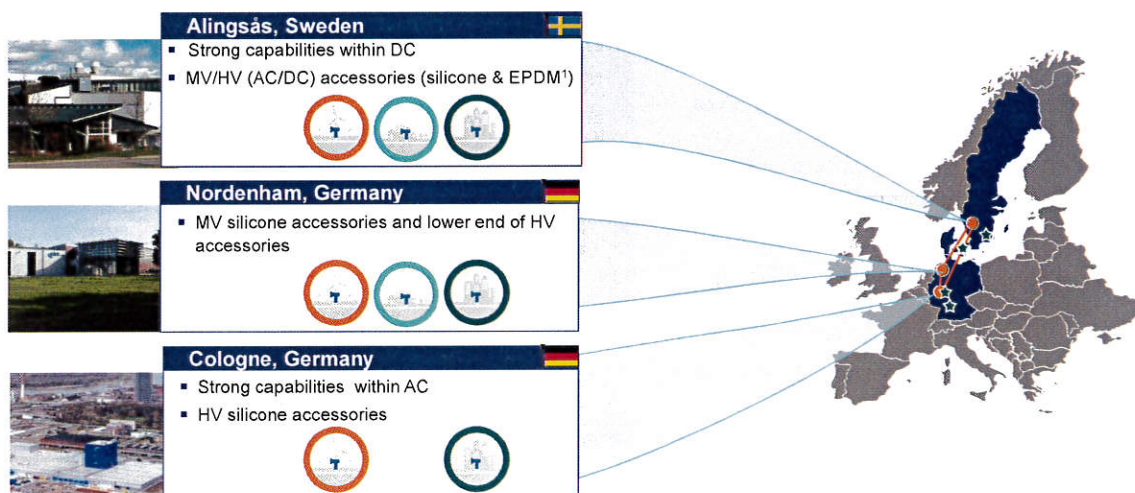
NKT provides the full range of Joints and Terminations including:

- Engineering
- Production
- Development
- Installation



Strong Accessories production

Accessories Centers of Excellence (CoE)



¹ Ethylene Propylene Diene Monomer

NKT VICTORIA



Main 230kV Cable Project, May 2018

DIMENSIONS & CAPACITIES



- LENGTH**
140m
- BREADTH**
29.60m
- DRAUGHT**
7.20m
- PROPULSION**
Diesel-Electric DC grid
Stern Azipods
- DP CLASS**
IMO DP III
- ACCOMMODATION**
100 Pax
- DECK AREA**
1 600 m²
- CABLE LAY EQUIPMENT**
7 000t turntable on main deck
4 500t turntable below deck
500t FO tank below deck
2 x 45t 4-track tensioners
- NEAR-SHORE OPS**
6 point mooring system
Beachable @ 8.25m draught

CAPABILITIES | Cable Laying Features



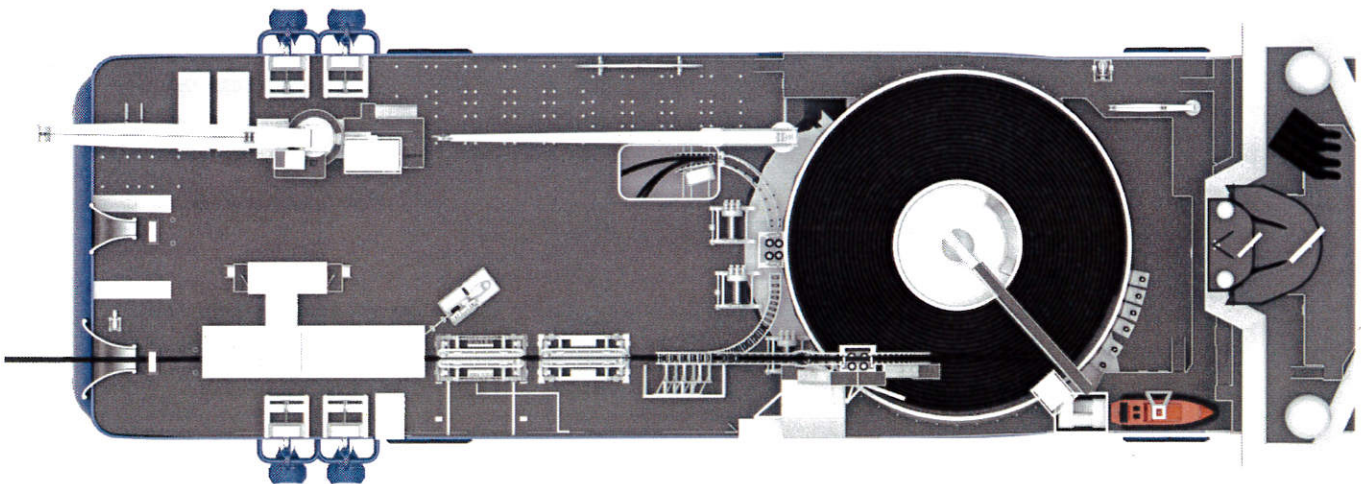
Designed for maximum flexibility, NKT Victoria has 4 principal modes of cable lay:

- Single lay
- Bundled dual HVDC lay with FO
- Cable joint/repair mode
- Ultra-deep water lay with Vertical Lay Tower (VLS)

CAPABILITIES | Cable Laying Features

NKT

Designed with the cable in mind

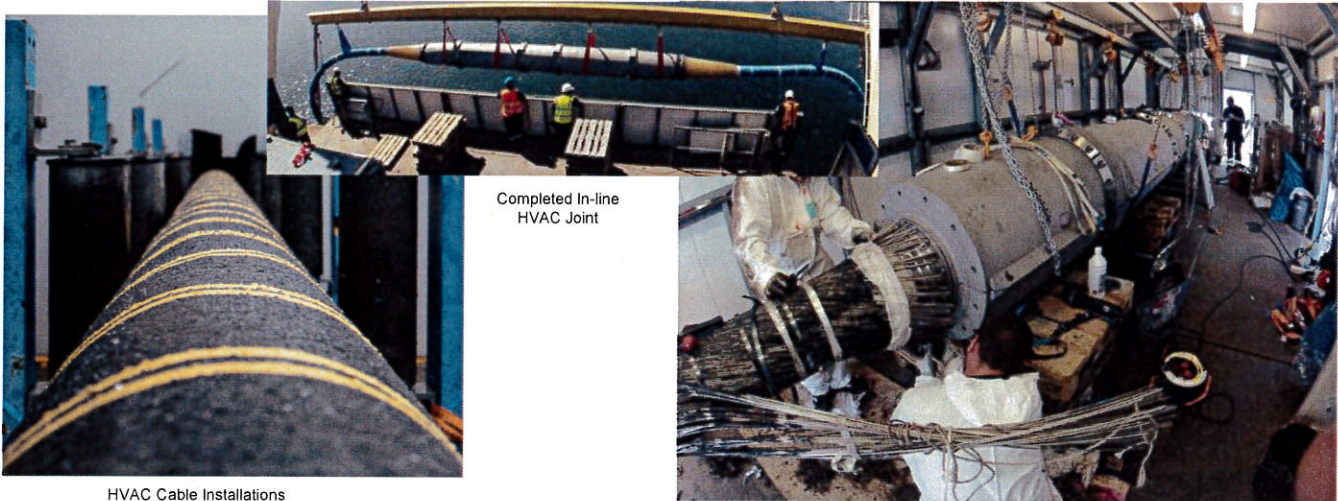


CAPABILITIES | HVAC Cable Laying Features



In **Bundled HVAC lay mode**, NKT Victoria can carry a total of 9000 tonnes in two turntables. The largest turntable can accommodate 7000 tonnes whilst the smaller turntable can carry up to 4500 tonnes. Up to 90000 tonnes of HVAC cable to be installed in one campaign.

In-line jointing of HVAC cable



HVAC Cable Installations

Completed In-line HVAC Joint

CAPABILITIES | HVDC Cable Laying Features



In **Bundled HVDC lay mode**, NKT Victoria can carry 9,000 tonnes of product equally distributed in her two turntables. The two cables are laid simultaneously in a bundled configuration together with a fiber optics cable.

This unique capability is a major cost-saver for large cable projects:

- Reduction of pre-lay works; single corridor UXO and other surveys, route clearance etc
- Reduction of cable lay cost; single cable route for minimum installation time
- Reduced loading time; favourable in areas with high current
- Cable burial; both pre-cut and post-lay burial will benefit from single cable route operation
- Post-lay remedial works; significant reduction of rock-, or mattress installation



Simultaneous In-line jointing of 2 x HVDC cables

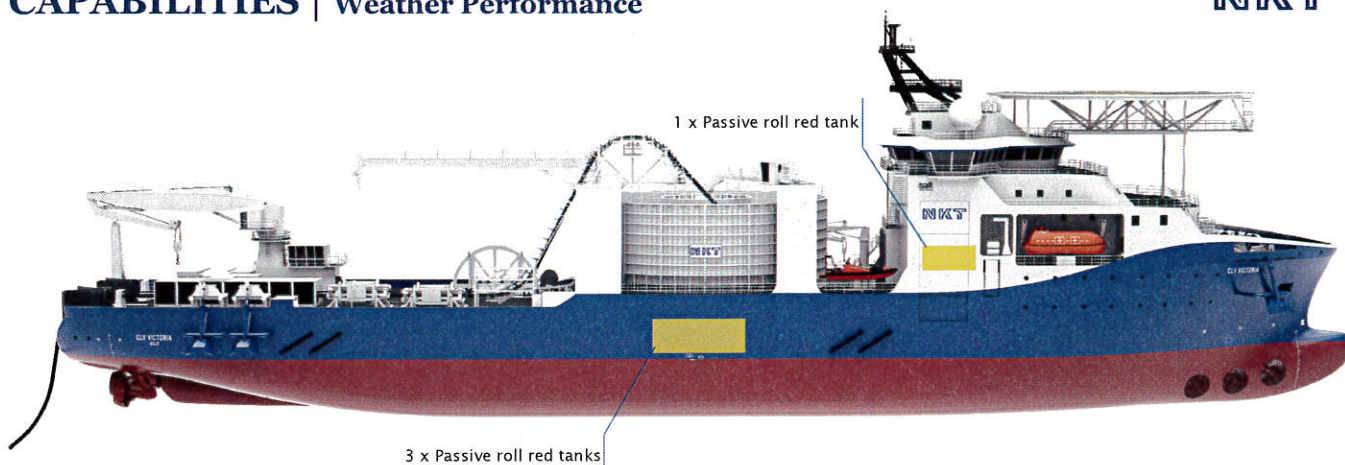


2 x HVDC + FO cables after bundling

Bundled HVDC cable lay – for maximum installation efficiency

CAPABILITIES | Weather Performance

NKT



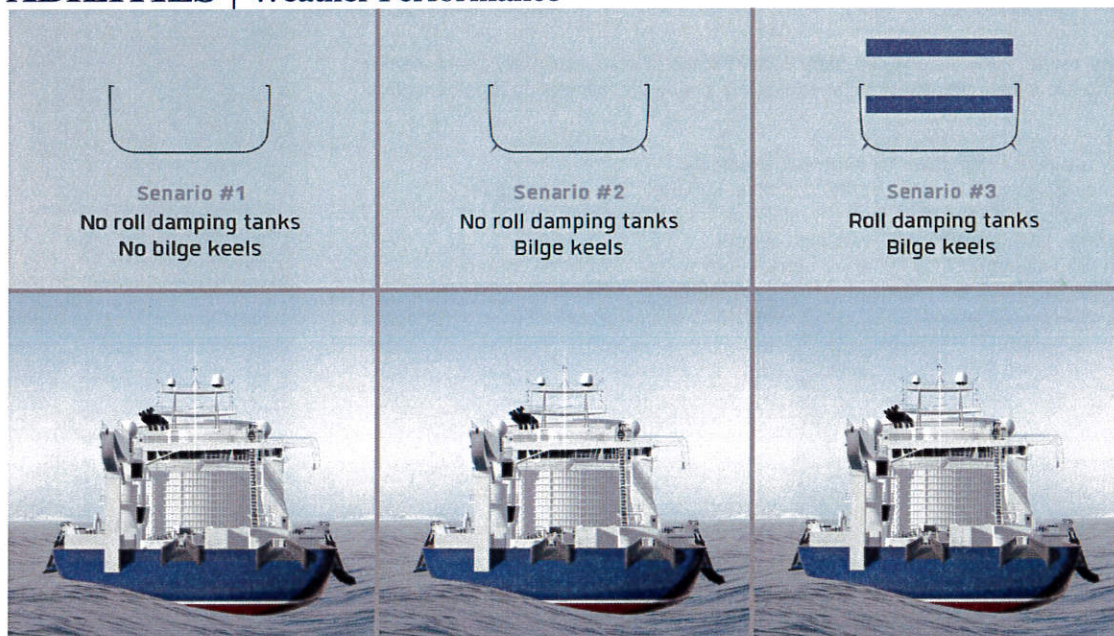
NKT Victoria has been designed to be an exceptionally safe and stable platform for work, also when the weather gets tough.

- High freeboard, to reduce green seas on deck – 3.8 m freeboard aft at normal operational draft
- Protected passageways on main deck, increased bulwark surrounding carousel on main deck
- Stabilizing tanks to reduce roll motions
- Oversized stabilizing fins to increase the roll period, thereby lowering the roll motion in rough seas

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CAPABILITIES | Weather Performance

NKT



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High-voltage cable installation

Resources and Equipment

- CLV Victoria



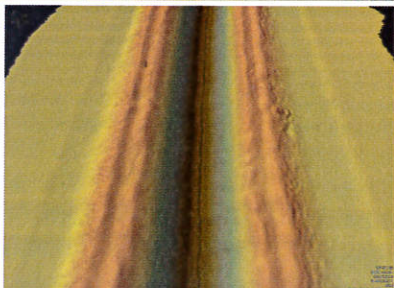
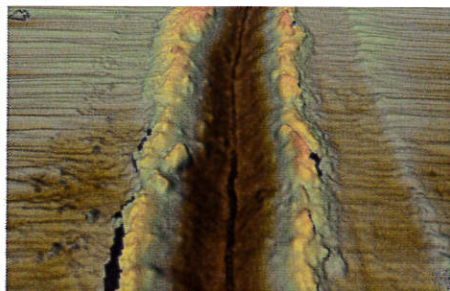
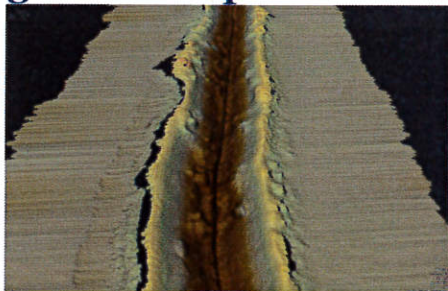
- Vessel: Topaz Installer

- Trenching Asset:
Canyon Equipment
(Co-operation Agreement)



- Trenching Asset:
OJ 200 Jet Sledge

2017 NKT Victoria moments – Laying Cables in pre cut trenches



2017 NKT Victoria moments – floating cables at landfalls

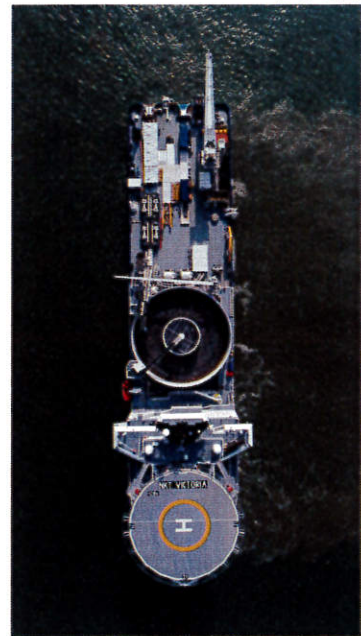
NKT



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2017 NKT Victoria moments – Spooling Cables at sea

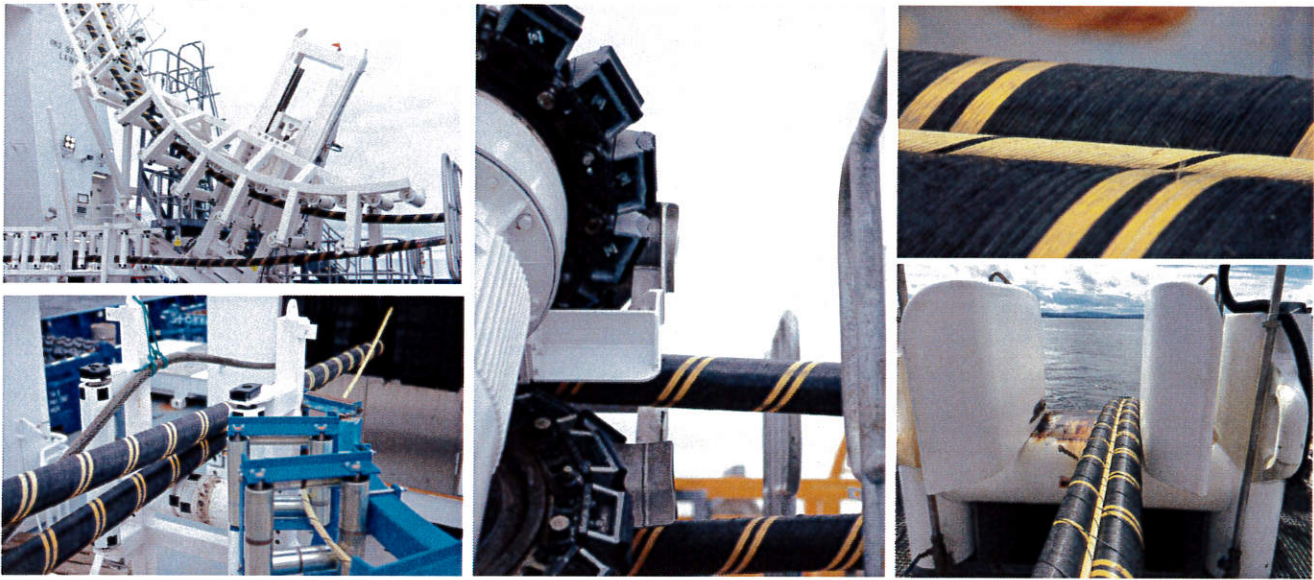
NKT



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2017 NKT Victoria moments – Laying bundled HVDC+FO cables

NKT



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NKT

Offshore wind Overview

- NKT is market leader in offshore transmission systems
- Strong segment for integration of renewable energy to meet global climate targets
- Connection of remotely located green energy sources to the grid
- Infield HVAC cables connects wind turbines to the offshore platforms (generators?)
- Export cable systems bring power from the platforms to shore (HVAC or HVDC)
- Connects remote and near-shore wind farms to mainland grids

| 42

Offshore wind

Achievements

Experience:

- Has been in the wind industry since its beginning
- Awarded about 30 offshore wind projects since 2010
- Extensive track record in turnkey cable system solutions
- Experienced in installations in environmentally sensitive areas

Latest innovations:

- First to launch 320 kV, DolWin 1 (awarded 2010)
- Connecting the first German offshore windfarm Baltic 1 in 2011



Offshore wind

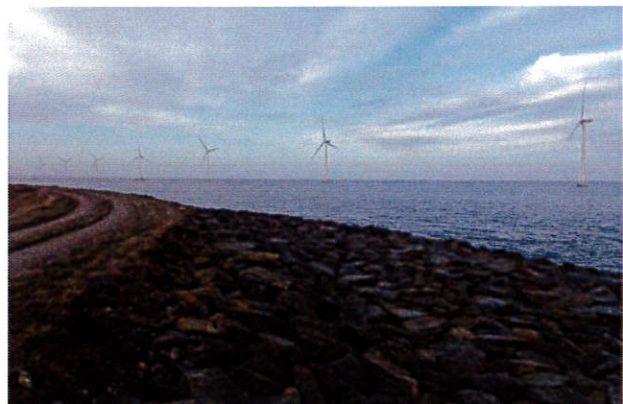
Achievements

Some of the latest projects

- Dolwin 2: 320 kV HVDC, 2x45 km submarine and 2x90 km underground cable system - turnkey
- Burbo Banks ext: 220 kV HVAC, 25 km submarine cable system
- Horns Rev3: 220 kV HVAC, 32 km submarine cable system – turnkey
- Riffgat: 155 kV HVAC, 51 km submarine cable system - turnkey

Why NKT:

- NKT offers turnkey solutions including for complete offshore wind projects
- Turnkey portfolio including infield cables qualified up to 66 kV, export cable systems for AC and DC submarine and underground, installation, Valcap monitoring system and service



NKT offshore wind reference projects

Around 30 awarded projects for offshore wind since 2010



NKT Company Presentation | July 2018 | 45



525 kV was the world record...

.... of a fully qualified and complete extruded DC cable system

Highlights

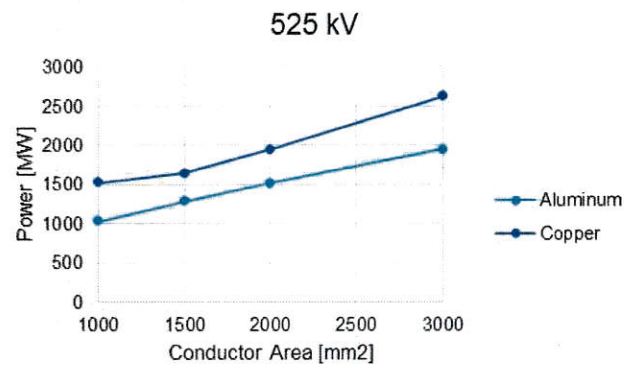
- New extruded cable system reached
 - Operating voltage 525 kV
 - Power up to ~2 GW (aluminum)
 - Power up to ~2.6 GW (copper)
 - Distances > 1500 km *
 - Losses < 5% *



* - loss & distance are strongly related to the specific design chosen

All calculations: 1 m burial depth, 1 Km/W thermal resistance, 15 degr C ground temperature, bundled, with exception of 3000 mm² Cu → 0.5 m separated

Maximum Powers that can be reached

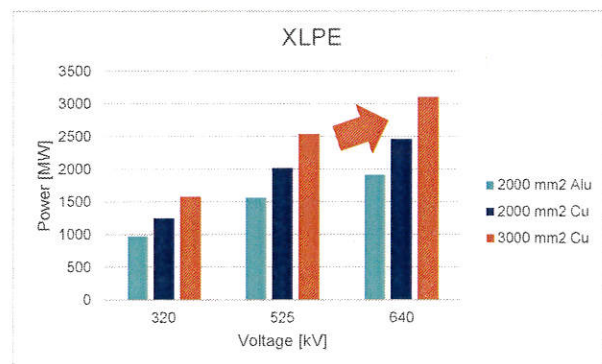


Now 640 kV is the new record

Increases the power transmission over longer distances with even lower losses, by doubling the voltage

Transmission capacity increased with 20% with even lower losses

- Doubled the voltage to 640 kV, compared to installed DC XLPE cable system of 320 kV
- 20% increase of the capacity up to 3.1 GW, compared to 525 kV capacity of 2.6 GW
- Double the capacity up to 3.1 GW, compared to 320 kV capacity of 1.5 GW



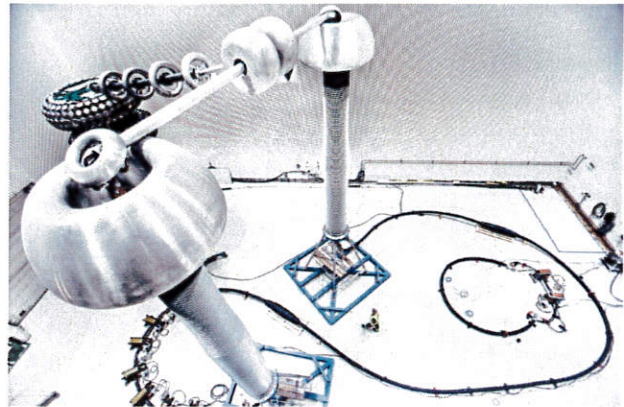
Double the capacity compared to previous installed voltage levels

The world's first 640 kV extruded HVDC land cable system



Complete underground cable system qualified

- Utilizes same DC cross-linked polyethylene (XLPE) insulation material as in 525 kV cable system
- Utilizes same joint and termination technology as in 525 kV XLPE cable system.
- Qualified oil and porcelain-free terminations based on bushing technology and cable joints for efficient installations.
- Improved system availability by advanced technology



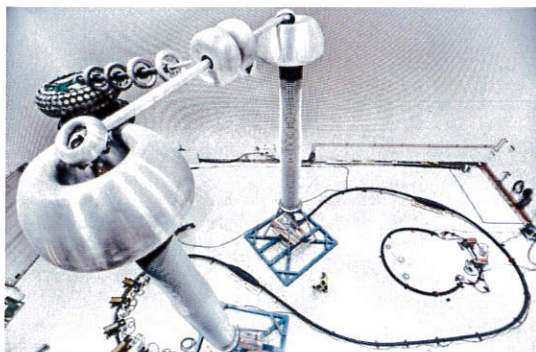
Technically and commercially qualified according to the international recommendation Cigré TB 496



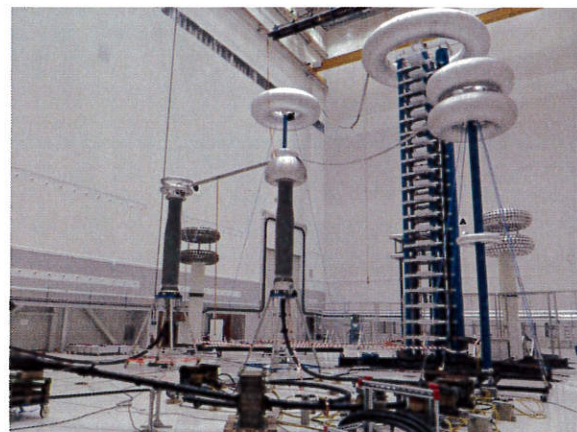
All systems have been Type Tested and PQ tested

According to CIGRE TB496

TT – 1184 kV, 30 days cycling



PQ – 928 kV, 1 year (picture shows surge testing)

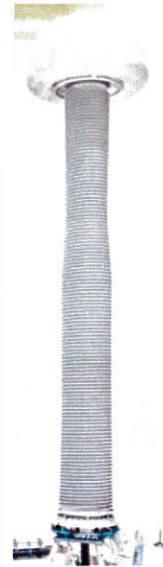
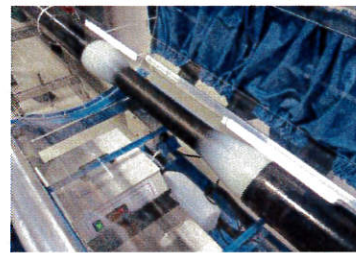


A full set of accessories

Land and submarine

Termination, prefabricated joint & factory joint

- Termination
 - Oil-free and internal arc resistant
 - Composite (no porcelain)
 - Design based on HVDC bushing
 - Lower weight than oil-filled
- Prefabricated joint
 - Patented non-linear field control technology
 - EPDM based insulation
- Factory joint
 - Necessary to joint manufacturing lengths into one long delivery length



17 July 2018

Standards and Recommendations for Submarine cables

Volker Waschk
17.07.2018

Standards and Recommendations for Submarine cables

Selection of IEC Standards

Future IEC 63026 Ed.1.0

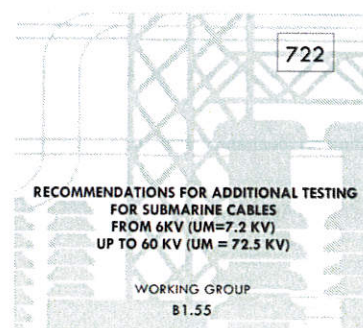
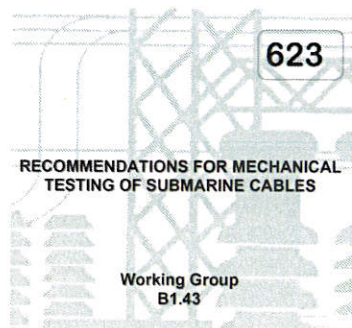
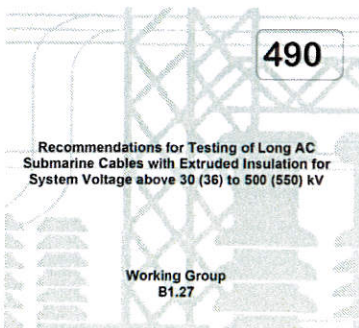
Submarine power cables with extruded insulation and their accessories for rated voltages from 6 kV (Um = 7,2 kV) up to 60 kV (Um = 72,5 kV) - Test methods and requirements



Additionally customer requirements may be considered

Standards and Recommendations for Submarine cables

Selection of CIGRÉ technical brochures



Additionally customer requirements may be considered

Standards and Recommendations for Submarine cables

Summary IEC - selection

Future IEC 63026

Submarine power cables with extruded insulation and their accessories for rated voltages from 6 kV ($U_m = 7,2$ kV) up to 60 kV ($U_m = 72,5$ kV) - Test methods and requirements

IEC 60840

Submarine power cables with extruded insulation and their accessories for rated voltages above 30 kV ($U_m = 36$ kV) up to 150 kV ($U_m = 170$ kV) - Test methods and requirements

IEC 62067

Submarine power cables with extruded insulation and their accessories for rated voltages above 150 kV ($U_m = 170$ kV) up to 500 kV ($U_m = 550$ kV) - Test methods and requirements

Additionally customer requirements may be considered

Standards and Recommendations for Submarine cables

Summary CIGRÉ - selection

TB 490

Recommendations for Testing of Long AC Submarine Cables with Extruded Insulation for System Voltage above 30 (36) to 500 (550) kV

TB 623

Recommendation for Mechanical testing of Submarine Cables

TB 722

Recommendation for Additional Testing of Submarine Cables from 6 kV ($U_m = 7.2$ kV) up to 66 kV ($U_m = 72.5$ kV)

Additionally customer requirements may be considered

NKT

**Thank you very much
for your attention**

