

# TKH GROUP NV

SITE VISIT EEMSHAVEN



25 JUNE 2024

## Cautionary note regarding forward looking statements

Statements included in this presentation that are not historical facts (including any statements concerning investment objectives, other plans and objectives of management for future operations or economic performance, or assumptions or forecasts related thereto) are forward-looking statements. These statements are only predictions and are not guarantees. Actual events or the results of our operations could differ materially from those expressed or implied in the forward-looking statements. Forward-looking statements are typically identified by the use of terms such as "may", "will", "should", "expect", "could", "intend", "plan", "anticipate", "estimate", "believe", "continue", "predict", "potential" or the negative of such terms and other comparable terminology.

The forward-looking statements are based upon our current expectations, plans, estimates, assumptions and beliefs that involve numerous risks and uncertainties. Assumptions relating to the foregoing involve judgments with respect to, among other things, future economic, competitive and market conditions and future business decisions, all of which are difficult or impossible to predict accurately and many of which are beyond our control. Although we believe that the expectations reflected in such forward-looking statements are based on reasonable assumptions, our actual results and performance could differ materially from those set forth in the forward-looking statements.

# TKH – Technology leader in high growth markets



SMART Technologies built on innovation driven by megatrends electrification, digitalization and automation

Together with our customers, we develop innovative technologies that make the world more efficient and more sustainable



SMART VISION SYSTEMS



SMART MANUFACTURING SYSTEMS



SMART CONNECTIVITY SYSTEMS

## TKH WORLDWIDE

### HEADCOUNT

7,000 FTEs of which 750 in R&D and software development

Entrepreneurial culture

### TURNOVER

2023 € 1,848m (2022: € 1,817m)

16% turnover from innovations

### ESG

70% of turnover linked to SDGs

Frontrunner ambition

### CUSTOMER AND TECHNOLOGY FOCUSED

>1,400 patents

>30% technology proposition is software

Market leadership in majority of activities

### NORTH AMERICA

€ 240m turnover

### EUROPE (OTHER)

€ 717m turnover

### OTHER

€ 84m turnover

### THE NETHERLANDS

€ 454m turnover

### ASIA

€ 353m turnover

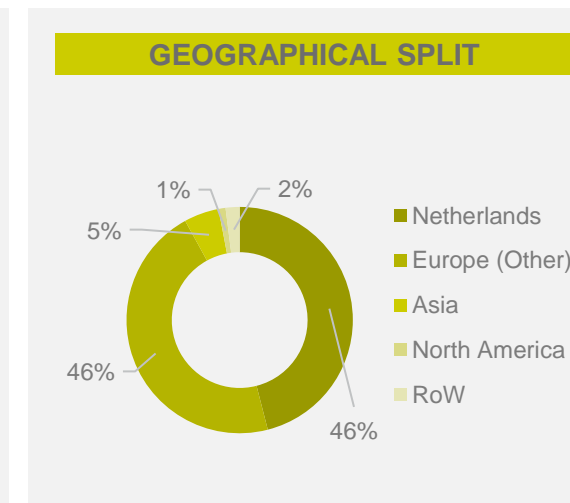
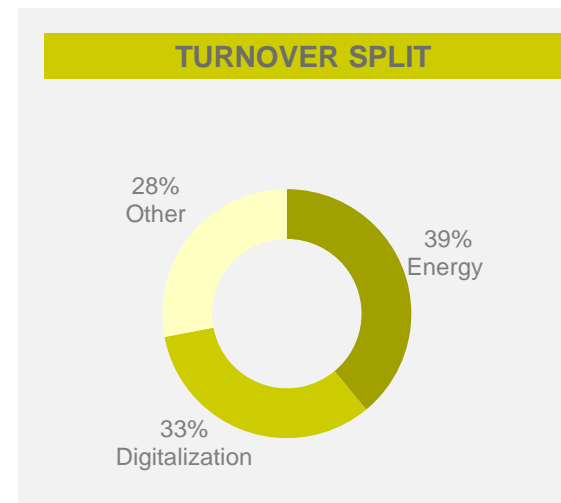
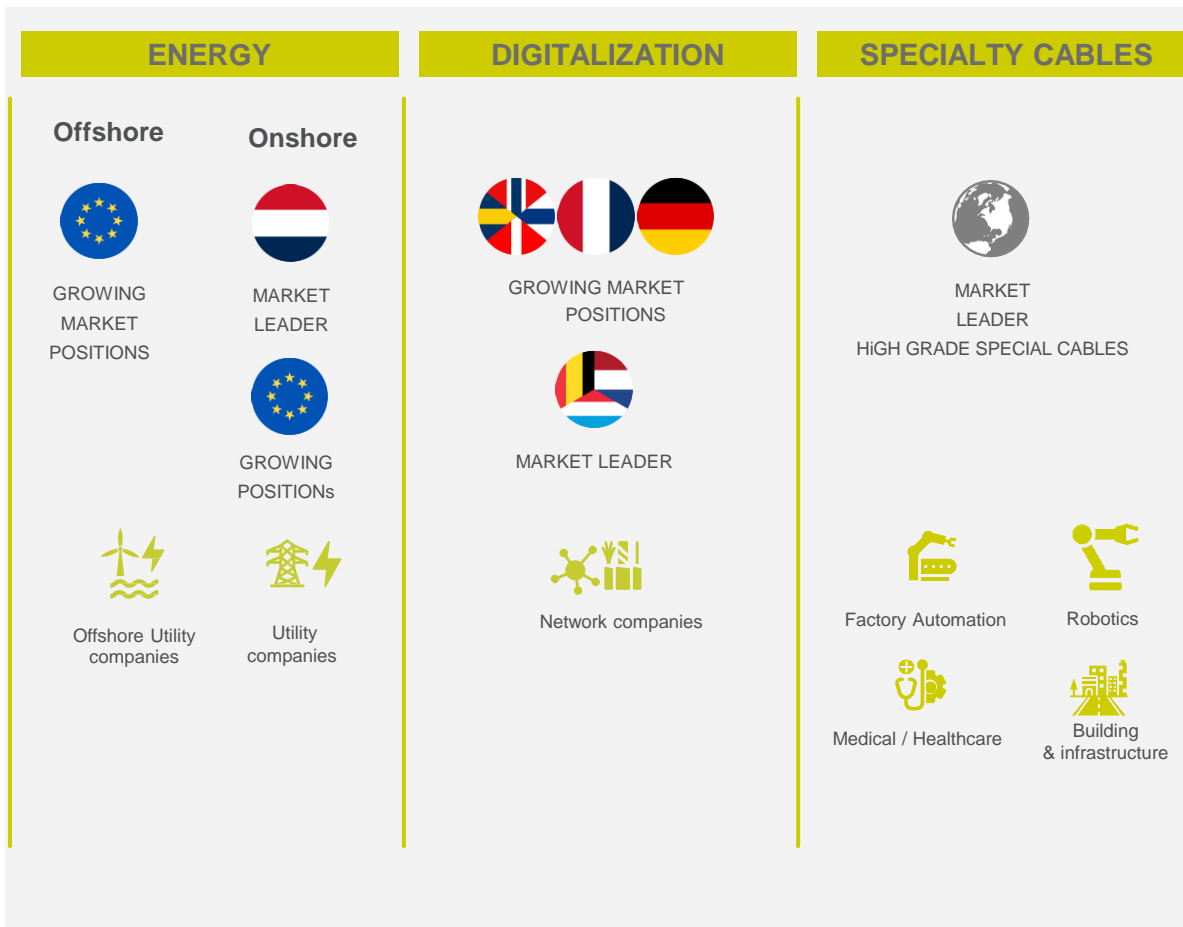




# SMART CONNECTIVITY SYSTEMS



# Smart Connectivity Systems



Benefitting from

**High barriers to entry:** combination of advanced technology levels, patented technologies, expertise and capital required to enter market

# Focus on Megatrend Electrification



## Divestments


ZTC	CCG	CAE
<b>2018</b> Turnover: €67m EBITA: € 5m	<b>2019</b> Turnover: €184m EBITA: € 14.3m	<b>2022</b> Turnover: €129m EBITA: € 19.5m

€ 380m in turnover divested


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Commodity related activities

## Investments



*Eemshaven*  
Capacity expansion new factory Offshore Inter-array cables



*Lochem*  
Expansion factory for Medium & High Voltage cables

€150m Capex in capacity expansions

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Investments into Electrification

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Higher added value, smart technologies

Securing additional capacity to benefit from megatrend electrification resulting in

**additional € 250 - € 300 million turnover** in coming years

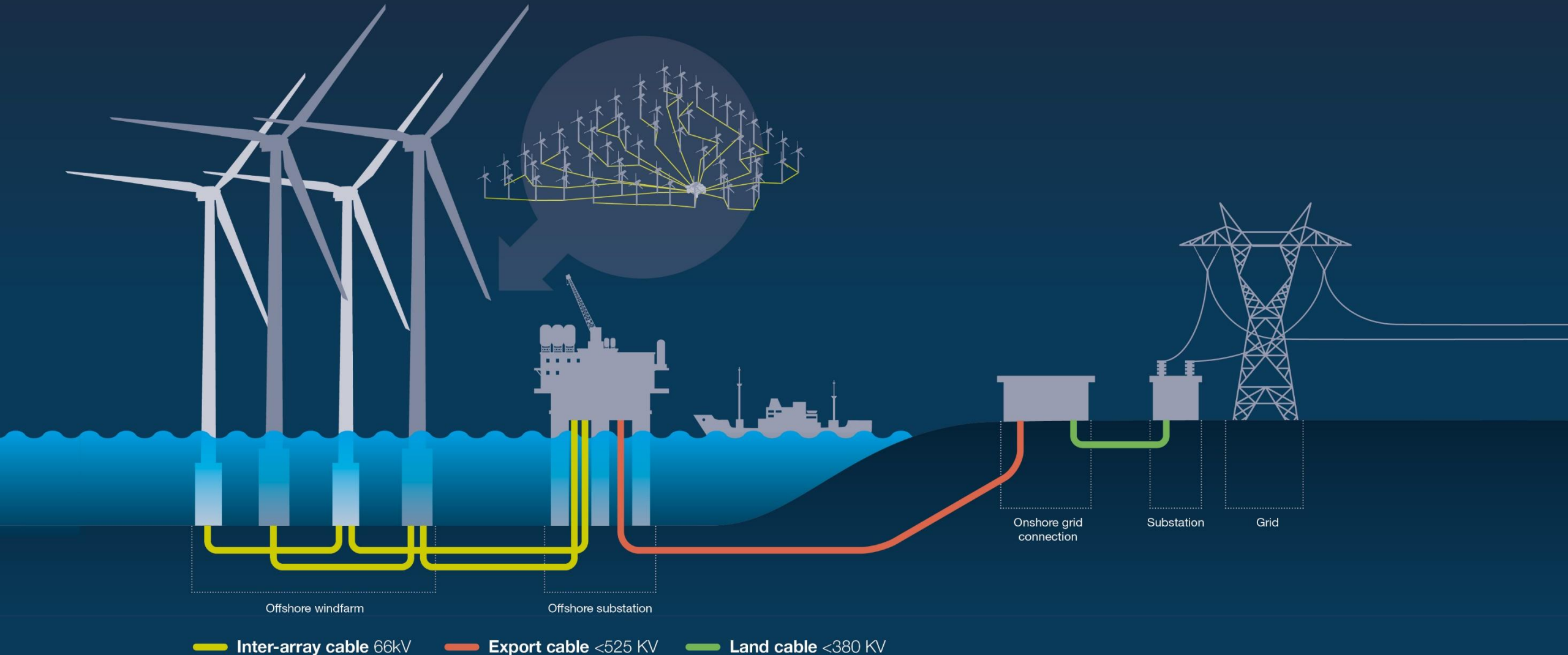
at **≥ 20% ROS**



The image shows an industrial manufacturing environment with a yellow color overlay. In the foreground, a worker in a hard hat and safety glasses is focused on a large, thick cable. Another worker is visible in the background. The scene includes industrial machinery, a crane with a '1000 kg' weight limit, and a sign for 'Van Goid'.

# INTER-ARRAY CABLE MARKET

# Offshore wind and inter-array cables





# TKH Inter-Array Cable Projects



**Projects Completed**

**Hollandse Kust Noord**  
759MW / Van Oord

**Baltic Eagle**  
460MW / Van Oord

**Hollandse Kust Zuid I /II**  
750MW / Vattenfall

**Kaskasi**  
342MW / RWE - DEME

**Albatros**  
112MW / EnBW- Boskalis

**Windpark Fryslan**  
336MW / Van Oord

**Windpark Blauw**  
340MW / Ballast Nedam

**Hohe See**  
497MW / EnBW- Boskalis

**Current Projects  
&  
Projects signed**

**Windanker**  
300MW / Iberdrola

**Greater Changhua**  
960MW / Orsted

**Repair/Spare cables**  
Luchterduinen - Eneco  
Windpark Egmond aZ - Shell/Dof  
Horns Rev 3- Vattenfall

**Hollandse Kust West VI**  
760MW / Ecowende

**Hollandse Kust West VII**  
760MW / RWE

**Projects under  
Vattenfall Framework**

**Nordlicht 1&2**  
1.5GW

**Swedish Krieger Flak**  
640MW

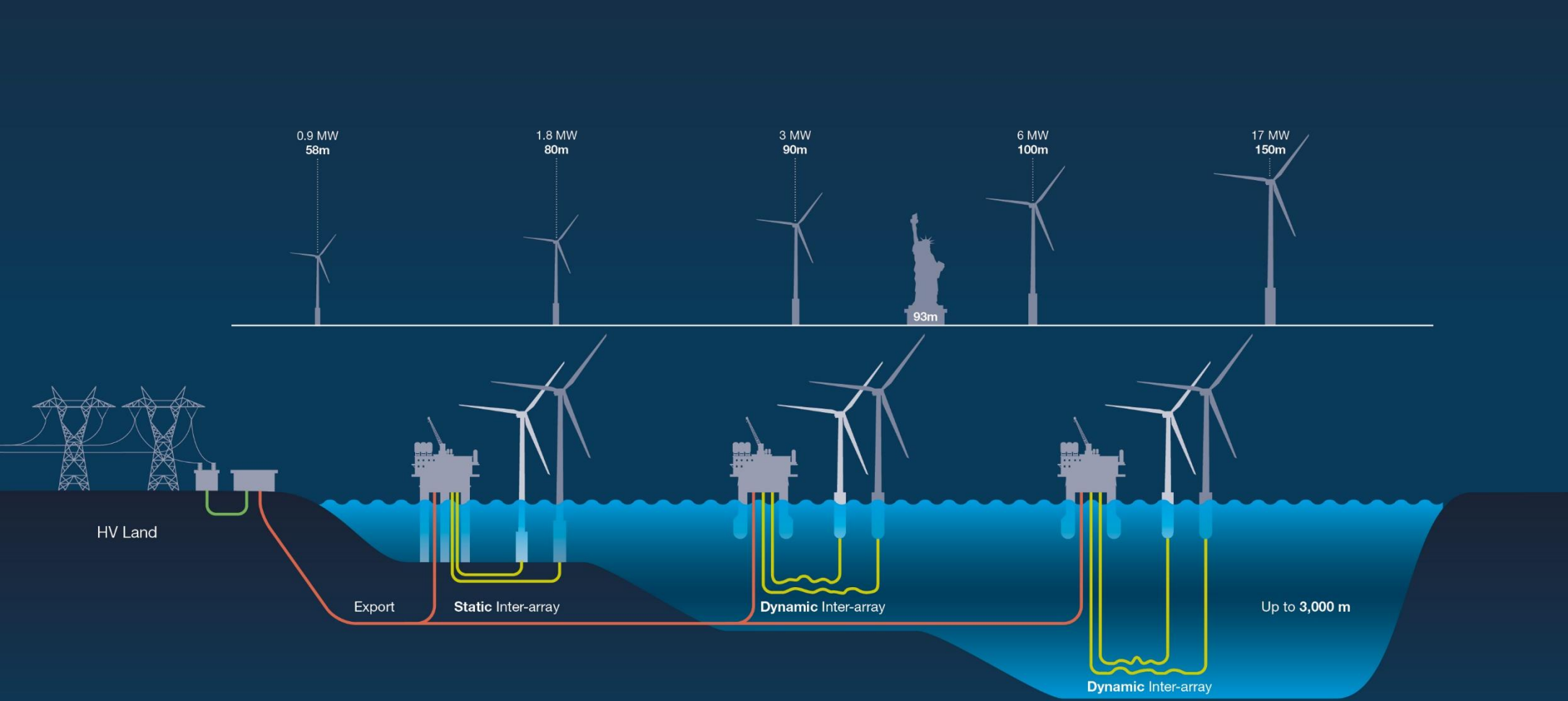
**Ijmuiden Ver Beta**  
2GW

Since commencing production of IAC in 2017, TKH has completed 8 projects (non repair) totalling 850 km in IAC

As an independent IAC supplier, TKH works together with all developers and installers

Current projects under the Vattenfall framework agreement total 4.1 GW.

# Offshore wind and inter-array cables



**IAC Developments**

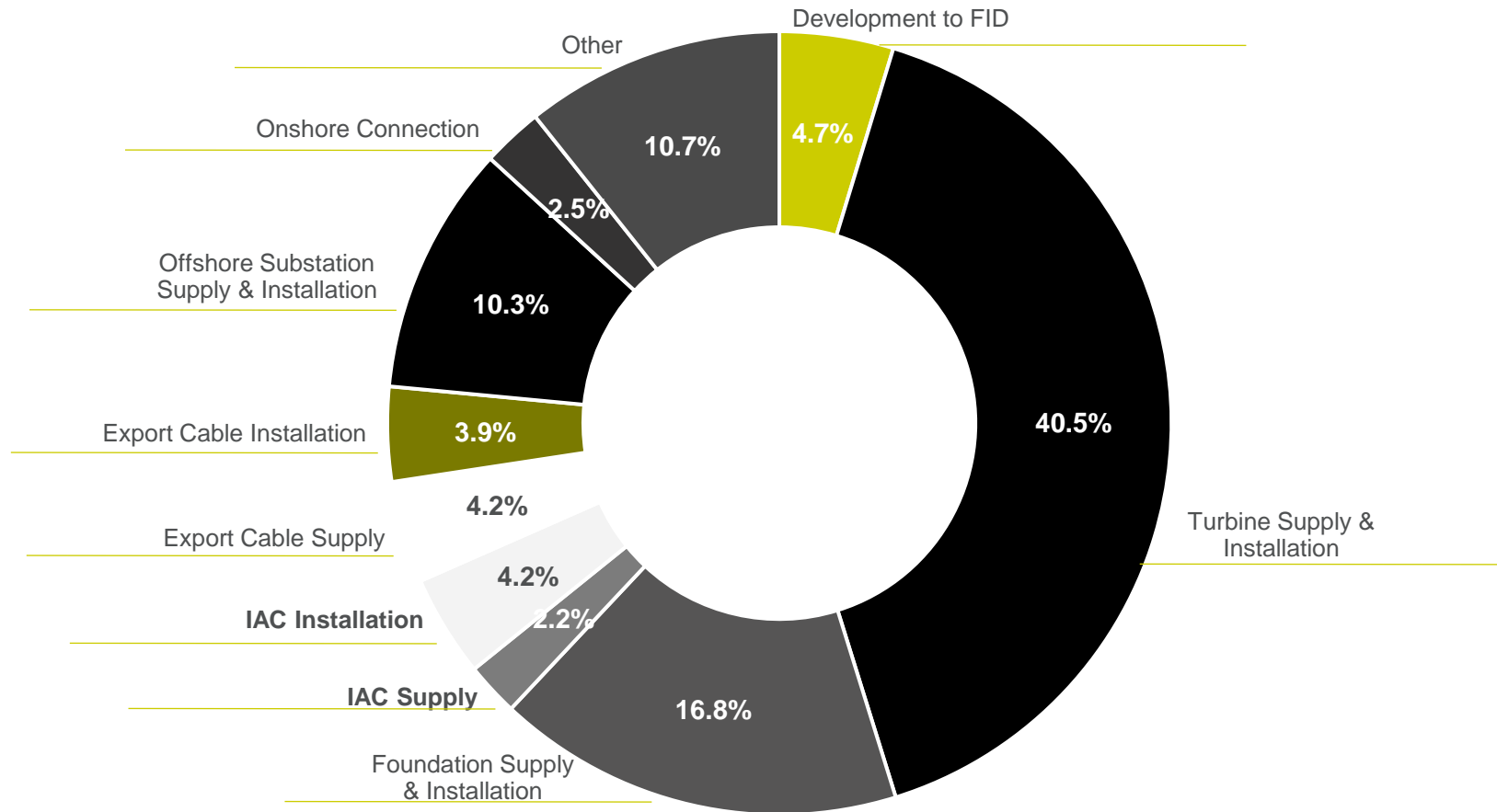
Lengths between windmills to increase

The MW power of the turbines will increase, leading to demand for thicker inter-array cables with higher pricing and higher AV

Trend towards dynamic inter-array cables with substantial higher pricing

Trend towards 132KV cable (vs 66KV now)

# The Costs of Developing an Offshore Windfarm

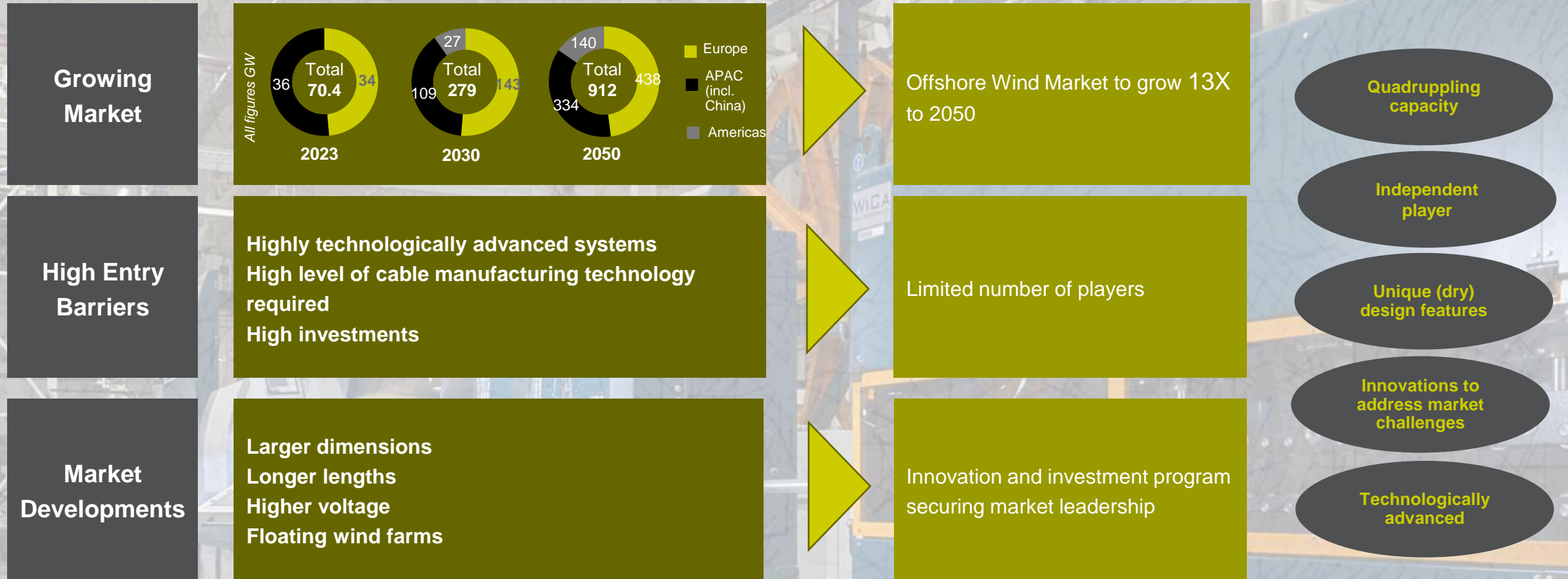


Of the total costs of developing an offshore Wind Farm, **only 2.2%** consists of the **IAC supply**, whereas **IAC installation** amounts to **4.2%** of total costs

Source: TGS | 4cOffshore, average breakdown of costs of windfarms (2008 – 2030)



# TKH well positioned to create leadership position

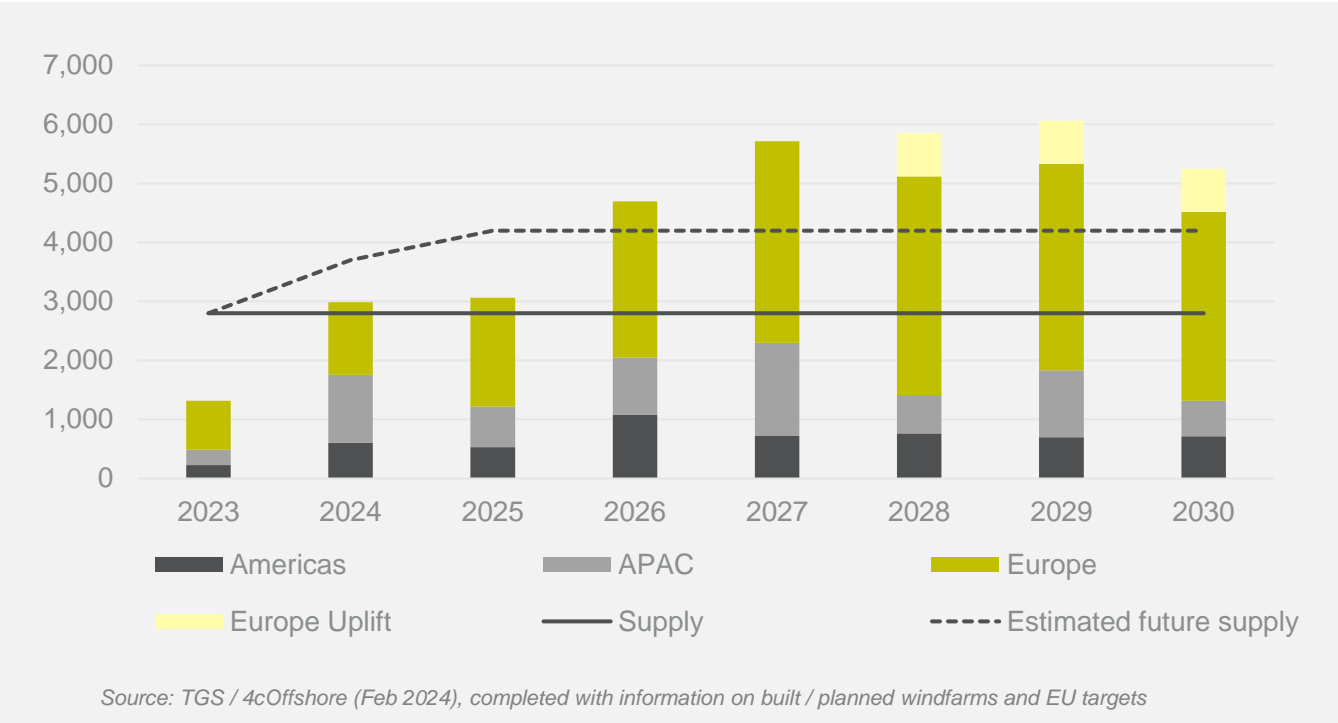


**TKH Core Competencies creates market and technology leadership position in the Inter-Array Cable Market**

# Inter-Array Cable Supply & Demand



## GLOBAL INTER-ARRAY CABLE DEMAND & SUPPLY (KM) (excl. China)



## EU GW TARGETS

	4.5 GW in 2023 21 GW by 2030 70 GW by 2050
	8.5 GW in 2023 40 GW by 2035 70 GW by 2045
	14 GW in 2023 Up to 50 GW by 2030
	1 GW by 2023 18 GW by 2035 40 GW by 2050
	2.6 GW in 2023 22.4 GW by 2040
	2.2GW in 2023 5.8 GW by 2029

- Europe aims a North Sea Offshore wind capacity of 120GW by 2030 and 300GW by 2050
- Ambitious plans for Europe beyond 2030 have not been converted into concrete plans yet

- With its new capacity expansions in Eemshaven, TKH aims for a market share of approx 20% of European market
- Other inter-array cable manufacturers in Europe include Hellenic Cables, JDR and Prysmian

# TKH active in 48 Inter-Array Cable tenders totalling > 8000km up to 2030



In line with market developments, the majority of tenders up to 2030 are in Europe





# OFFSHORE WIND CHALLENGES

A worker in a high-visibility vest and hard hat is seen from behind, operating a large industrial machine in a factory setting. The machine has a control panel with a screen and various buttons. The background shows a complex industrial environment with metal structures and overhead lighting. The entire image has a greenish-yellow tint.

# The challenges of the offshore wind industry



**Subsea array cabling for typical wind farm:**

- High number of cables
- Short cable lengths
- >1000 high voltage terminations
- Terminations work in small wind turbines

**Subsea array cabling power load**

- Cables are installed in non-redundant strings
- Nominal continuous temperature 60 – 90°C
- High content for harmonics as result of power electronics used in VTG's
- High earth screen currents

Translated into an innovative cable design

More than 1000 terminations for an offshore wind farm. High risk of failures during cable installation

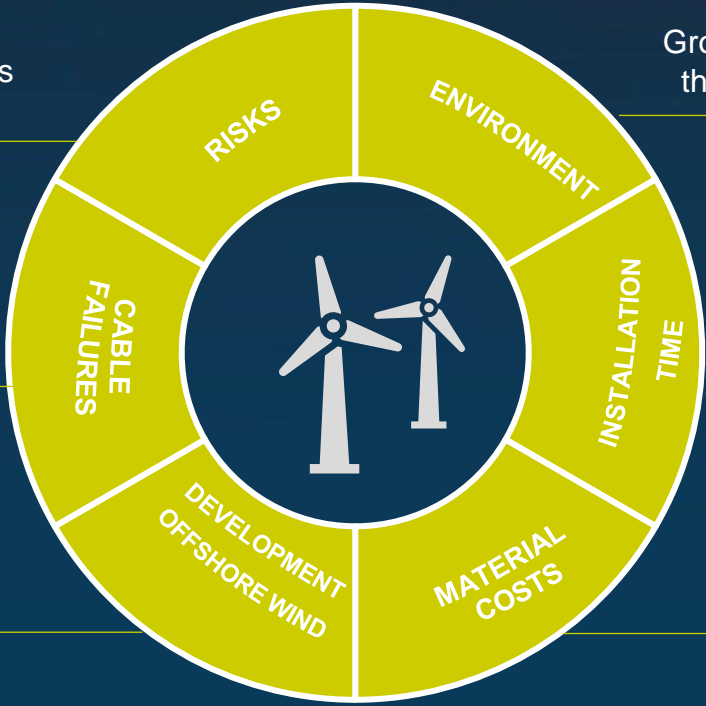
Growing need for solutions that support the sustainable future of offshore wind

Harsh environment create a high risk of cable damage

Pressure on installation costs and time. Need for fail proof solutions

Developments towards floating wind and 132 kV

Pressure on material costs





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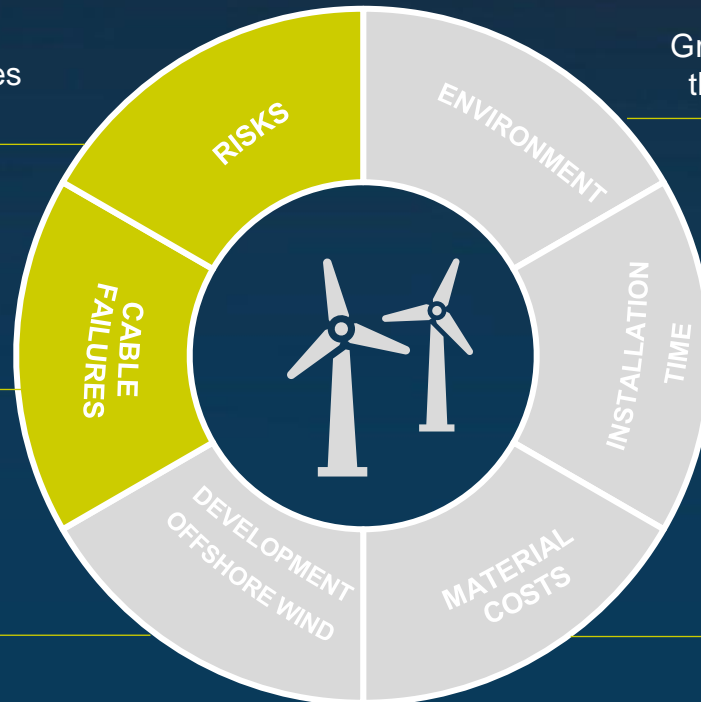
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Translated into an innovative cable design





# The challenges: risk of cable damage

## Typical array cable failures reported

- Armouring damage (bird caging)
- Fatigue break of lead sheath
- Anchor damage
- Broken fiber optic cables
- Power core sheath damage
- Water ingress
- Water treeing of XLPE insulation and break down failures
- Cable protection system damage due to wearing



Need  
for  
a  
robust  
and  
100%  
water tight  
design



# CABLE DESIGN

The image shows an industrial setting, likely a cable manufacturing plant. In the foreground, there are large, heavy-duty spools of cable, with the cable strands visible. The spools are mounted on a metal frame. To the right, there is a large motor connected to a shaft, which is part of the machinery. The background shows more of the factory floor, with various pieces of equipment and safety railings. The entire image has a yellowish-green tint. A semi-transparent dark rectangle is overlaid on the left side of the image, containing the text 'CABLE DESIGN' in white, bold, uppercase letters.



# TKH Inter-array Cable: Innovative & Sustainable

## Unique Features of the dry design



**No use of lead or bitumen**

- Recyclable & environmentally friendly
- Clean installation
- No risk of leaching chemicals or metals into the marine environment
- Easy and clean recoveries possible
- Good recyclability after recoveries

**Aluminium welded sheath**

- Resulting in a 100 % dry design
- Longer durability
- Less materials needed ( copper) – thinner cable and reduction of costs

**Compact & robust**

- Crush and impact resistant – less risks
- Higher pulling forces allowing cable laying in extreme weather conditions
- Easy installation
- Protection of the fibre optic cable

**A differentiating cable, increasing sustainability and improving installation performance**



# INNOVATIONS





# TKH & innovations in the offshore wind



## Environment

- Use of recycled materials in cable design
- Circularity of the design



## Next generation 132 kV

- Innovative dry design, ready for the next generation wind energy



## Floating wind

- Dynamic cable for floating wind



## Monitoring systems

- Optical Strain Sensor
- Cable strain measurements
- AI



## Cable Protection System Free

- CPS-free installation

# Market focus TKH: An integrated solution to power the offshore wind



**ELECTRICAL PERFORMANCE**  
 A 100% dry design based on proven HV-technology, resulting in guaranteed operational lifetime by preventing accelerating aging due to higher harmonics generating power electronics



**RISK REDUCTION**  
 The fail-proof design of the cable and accessories contributes to the reduction of installation failures



**ROBUST DESIGN FOR BEST MECHANICAL PERFORMANCE**  
 No rovings and bitumen, but extruded polymer technology. Resulting in improved mechanical performance like crush load.



**LOGISTIC FLEXIBILITY**  
 Long manufacturing lengths without factory joints result in higher installation flexibility, lowering risks and costs. Unloading ports in the Netherlands, Belgium and Germany.



**ENVIRONMENTAL FRIENDLY**  
 No lead or bitumen make easy and clean recoveries and recyclability possible



**CABLE PERFORMANCE TRACK RECORD**  
 State of the art quality control and data logging during production



**OFFSHORE TIME REDUCTION**  
 Smart accessories are developed due to the unique cable design. The combination reduces installation time drastically



**OUTSTANDING SERVICE**  
 A dedicated support team from the tender phase right through to the operational phase.

# Powering the Sustainable Future of Energy

1

Major Investments  
In Electrification, €150m

2

Unique Features to Support  
Market Leadership

3

Technology Ready to  
Support the Fast Developing  
Offshore Wind Needs

Securing  
additional  
capacity to benefit  
from megatrend  
electrification  
resulting in  
**additional € 250 -  
€ 300 million  
turnover** in  
coming years  
at  
**≥ 20% ROS**

**TKH is well positioned to benefit from the investments made towards the megatrend electrification**



