



Member of the NKT Group

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We connect  
renewable energy sources  
Onshore, offshore and photovoltaic



## We connect renewable energy sources

These days, renewable and clean energies are becoming increasingly important. For **nkt cables** it goes without saying that we are keen to do our bit. At **nkt cables** we have successfully expanded our activities in this field helping our customers to save natural resources and reduce CO<sub>2</sub> emissions. And it is above all submarine cables, which are essential for making use of the advantages offered by offshore wind farms.

Also, **nkt cables'** surveillance and control systems for high and medium voltage make an important contribution to improving the capacity and reducing transmission and distribution losses in the power grids.

**nkt cables** develop cable systems for technologies focused on renewable energies and connect renewable energy sources, of which on and offshore wind farms are important examples.

## nkt cables – Pace setter for state-of-the-art energy transfer

**nkt cables** is a global front-line supplier to the energy sector and as such **nkt cables** develop, manufacture and market high-quality cables and solutions for power grid infrastructure, construction sites, railways and the automotive industry. **nkt cables** supply creative, high-tech and sustainable products.

**nkt cables'** manufacturing plants are among the most modern, flexible and cost-effective facilities worldwide. At **nkt cables** we work tirelessly to reduce our carbon footprint; neutral production and waste prevention are high priorities and **nkt cables** invest heavily to ensure that the company maintains leading-edge capability.

Our state-of-the-art factory in Cologne is an example of this commitment. Being among the most modern factories in the world it is at the forefront of technological developments.

In 2013 **nkt cables** had a headcount of about 3,500 employees and achieved a turnover of around 1.2 billion euros. **nkt cables** is part of NKT Holding A/S, which is quoted at the Danish Stock Exchange. NKT Holding owns a number of companies, which are active in different industries and has production facilities on four continents. NKT Holding employs around 9,000 people.



→ Turntable



→ Photovoltaic farm



## Submarine cables and accessories

What began for **nkt cables** more than 130 years ago with submarine communication cables has been consistently continued with the development of paper-insulated energy cables and XLPE cables. It is this mixture of mature competence and innovative potential oriented

towards the requirements of the future, which makes it that our company excels. The result: A product portfolio of onshore and offshore energy transfer technology and services developed and produced to the highest technical standards at our f2c factory in Cologne.

### Everything from a single source:

- Comprehensive product portfolio, optional turnkey solutions
- Cable production with long lengths
- Product-specific connection technologies
- Project-specific logistics solutions involving our own transport systems
- Experienced and highly-trained installation teams worldwide
- Mobile high voltage test units on **nkt cables**-owned test trailers
- VALCAP® intelligent management systems for monitoring and controlling submarine cable installations
- In-house optical-fibre cable technology

**nkt cables** supply submarine accessories tailored for medium and high voltage offshore cable systems. With a focus on new developments in connection technology products, **nkt cables** offer modern offshore cable distribution cabinets for the transfer interface, for example at the foot of a wind turbine. These innovative products make

it that cable connecting and testing can also take place while the wind farm is under construction. Using these cabinets means that the medium voltage submarine cables of the internal wind farm cabling can be safely connected to the turbine cable by help of connector technology.

## Our engineering and project management

**nkt cables** offer customised system solutions ranging from simple product delivery to turnkey solutions that include installation and service supported by project-

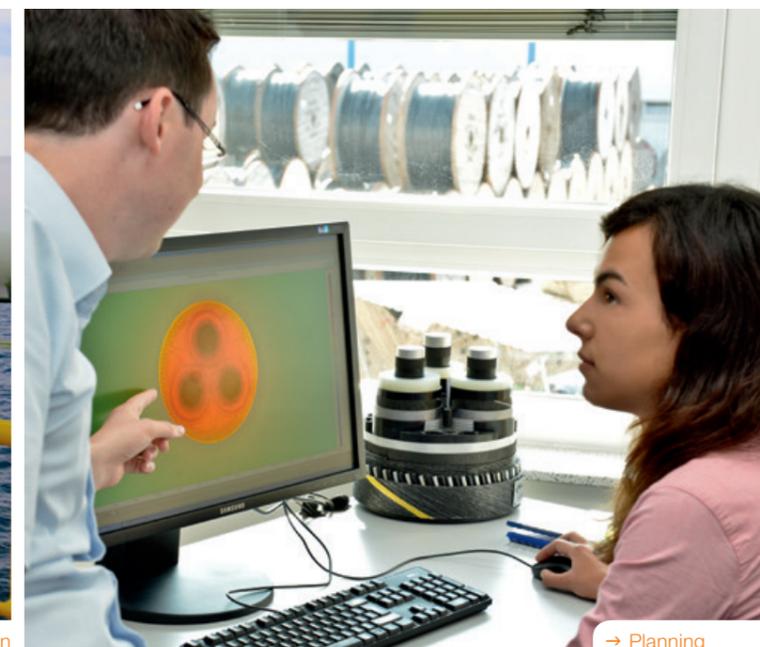
specific engineering, project management and logistics. The highest quality standards in planning and realisation of your projects take a front seat with **nkt cables**.

### The portfolio:

- Interface solutions with other trades
- Detailed planning and calculations for system components
- Technical know-how support for our Sales Department in preparing offers and during negotiations
- Support for the Head of Project during project management
- Testing subcontractors' methodology descriptions and interface coordination
- Supervision of special installation operations

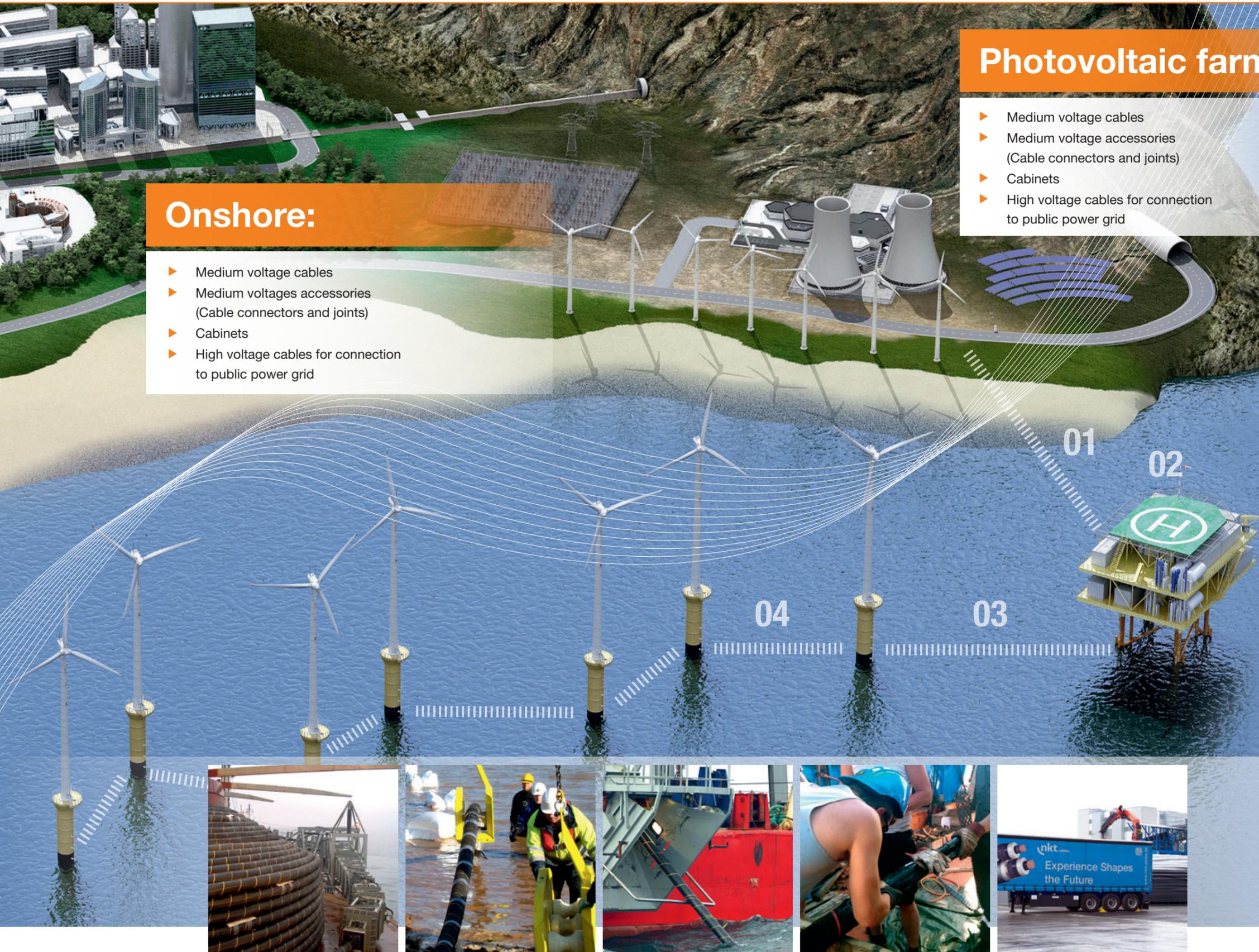


→ Offshore Supervision



→ Planning

# Solutions for renewable energy sources



## Onshore:

- ▶ Medium voltage cables
- ▶ Medium voltages accessories (Cable connectors and joints)
- ▶ Cabinets
- ▶ High voltage cables for connection to public power grid

## Photovoltaic farm:

- ▶ Medium voltage cables
- ▶ Medium voltage accessories (Cable connectors and joints)
- ▶ Cabinets
- ▶ High voltage cables for connection to public power grid

## Offshore:

### 01 From onshore transformer station to platform:

- ▶ High voltage onshore cable, Export high voltage submarine cable
- ▶ Onshore and offshore transition joint

### 02 Platform:

- ▶ High voltage accessories
- ▶ Medium voltage accessories
- ▶ Cabinets
- ▶ VALCAP® and AdapPro®

### 03 Platform to wind turbine:

- ▶ Infield medium voltage submarine cable

### 04 Wind turbines:

- ▶ Medium voltage accessories (cable connectors)
- ▶ Offshore Cabinets

### Island connections:

- ▶ High voltage and medium voltage onshore cables
- ▶ High voltage and medium voltage submarine cables
- ▶ Accessories
- ▶ VALCAP® and AdapPro®

### Turnkey solutions include:

- ▶ Engineering
- ▶ Project Management
- ▶ Logistics concepts
- ▶ Cable laying
- ▶ Electrical and mechanical installations
- ▶ System tests and control
- ▶ Service concepts



## Flexible and sophisticated concepts and the highest standards of precision in executing projects. Transport and logistics

The latest and most modern devices, product-specific production processes and efficient logistics concepts – equipped to the highest standards, in our f2c factory **nkt cables** are setting new standards in every respect. **nkt cables** dispose over sophisticated logistics and transport systems offering you a maximum of flexibility for planning your projects. The production flow of our submarine cables ends in our state-of-the-art f2c Logistics

Centre in Rotterdam, Europe's biggest deep-sea port. This Logistics Centre enables **nkt cables** to store long individual lengths of cables and combine them into big submarine cable volumes for high and medium voltage while, at the same time, guaranteeing their timely loading onto transport and cable-laying vessels for successful cabling operations and connections to the grids of European windfarms.



→ Logistics Centre



→ Turntable

## On schedule and reliable installation and testing

For laying and installing your submarine cable system **nkt cables** cooperate with a network of strong, experienced and well-established partners. **nkt cables'** own specialist teams are also available on site to deal with disruptions or emergencies and to guarantee both reliable operations at any time and a long lifespan of your cable system. **nkt cables'** assembly department benefits from more than 100 years of experience and can provide

support for all kinds of assembly work. **nkt cables** check cables and accessories at our own factory and in line with customer requirements and international standards. We can provide both DC and AC voltage testing. Thanks to our test vehicles **nkt cables** can also handle such tests on site and disposes furthermore over four test units for long-cable systems.

### Installation of wind farm cabling:

- Project management
- Geotechnical investigations
- Preparatory measures for submarine-cable laying
- Transport logistics
- Cable laying
- Embedding cables
- Building route-crossings
- Cable-pulling and landing on platforms
- Electrical installation of accessories both onshore and offshore
- System testing on site
- Integration of operation-monitoring systems



→ Testing in factory



→ Testing on site



## Our environmental responsibility – f2c

When building new factories or refurbishing existing ones, **nkt cables** go to great lengths to strictly adhere to a maximum of environmental criteria. Our f2c factory in Cologne is the embodiment of our customers' requirements down to the very last detail. That is why we have given the new factory the name "f2c", which stands for "flow2customer". Nobody in the cable industry has ever before made such an enormous investment into the future. Since 2010 the new f2c factory in Cologne

has made a significant contribution to reducing energy consumption. All processes and energy consumption patterns have been optimised to such an extent that it is one of the most modern factories worldwide.

f2c stands for the sustained use of natural resources. Because of its innovative technologies it offers our customers future-proof and decisive efficiency gains.



→ Turntable



→ Rewinding



→ Transport



→ Offshore wind farm



→ Onshore wind farm

## nkt cables – a competent partner with far-reaching international references

**nkt cables'** history tells the story of a long tradition in the international submarine cable business. Since production in the new f2c factory in Cologne started, **nkt cables** have been able to add an impressive number of European offshore-wind-farm projects to their reference list:

- 2010** **Walney I** offshore wind farm in the Irish Sea, England | 33 kV Infield Cable
- 2011** **Baltic 1** the first commercial offshore wind farm in the Baltic Sea, Germany | 150 kV Export Cable and 33 kV Infield Cable
- 2011** **Cork Harbour II** port crossing in Ireland | 220 kV Cable
- 2012** **Anholt** offshore wind farm in Denmark | 245 kV Export Cable
- 2012** **Gwynt y Môr** offshore wind farm in the Irish Sea, England | 132 kV Export Cable
- 2012** **Riffgat** offshore wind farm in Germany | 150 kV Export Cable
- 2013** **Baltic 2** offshore wind farm in Germany | 150 kV Export Cable
- 2013** **West of Duddon Sands** offshore wind farm in the Irish Sea, England | 150 kV Export Cable
- 2014** **Amrumbank West** offshore wind farm in Germany | 33 kV Infield Cable
- 2014** **Q 10** Offshore wind farm in the Netherlands | 33 kV Infield Cable
- 2014** **Solent Crossing Isle of Wight** in England | 132 kV Cable
- 2015** **Gemini** Offshore wind farm in the Netherlands | 220 kV Export Cable