We are a global classification, certification, technical assurance and advisory company

OUR PURPOSE

TO SAFEGUARD LIFE, PROPERTY AND THE ENVIRONMENT

Global reach – local competence

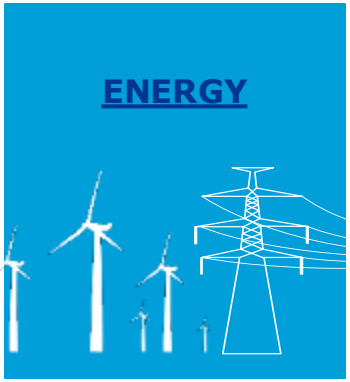
150
years

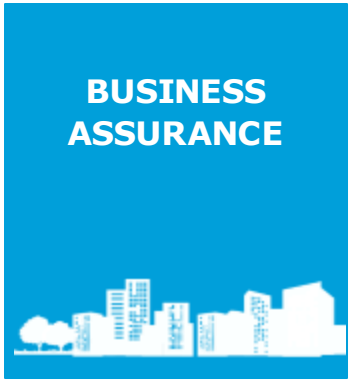
400
offices

100
countries

13,000
employees

Our vision: global impact for a safe and sustainable future





DNV GL – Energy: An Energy Power House

2,500 energy expert help customers throughout the electrical power industry realize efficient, reliable and clean energy for today and the future

TAKING A BROADER VIEW

DNV GL IN ENERGY

Energy advisory

An energy powerhouse, supporting the energy industry across the value chain, from policy to use, with strategic advise, planning, implementation and energy delivery optimisation

- Market and policy development
- Power system planning
- Project management and technical services
- Operational excellence

- Business strategy across all markets
- Power system design and modelling
- Technology implementation services
- Operations and systems optimisation

Innovation accelerators:

- Smart grids and smart energy cities
- Super grids and micro grids
- Energy storage and renewables
- Data analytics and cyber security

Renewables advisory

Analysis, advice, testing, data collection, and trusted expert opinions for the renewables markets

- Project development
- Project engineering
- Asset operations & management
- Measurements
- Turbine engineering support

Core expertise:

- Onshore wind
- Solar PV & CSP
- Offshore and floating wind
- Marine energy
- Energy storage systems
- Renewables policy and markets
- Data analysis
- Testing of key solar components including modules, inverters, and batteries

Services include:

- Energy production assessment
- Technical due diligence
- Short-term forecasting
- Resource and turbine measurements
- Support for engineering and implementation of technology
- Software
- Monitoring, control, asset management
- Qualification, safety, and batch testing

Sustainable energy use

Advice, analysis, and implementation assistance for energy efficiency programmes and measures

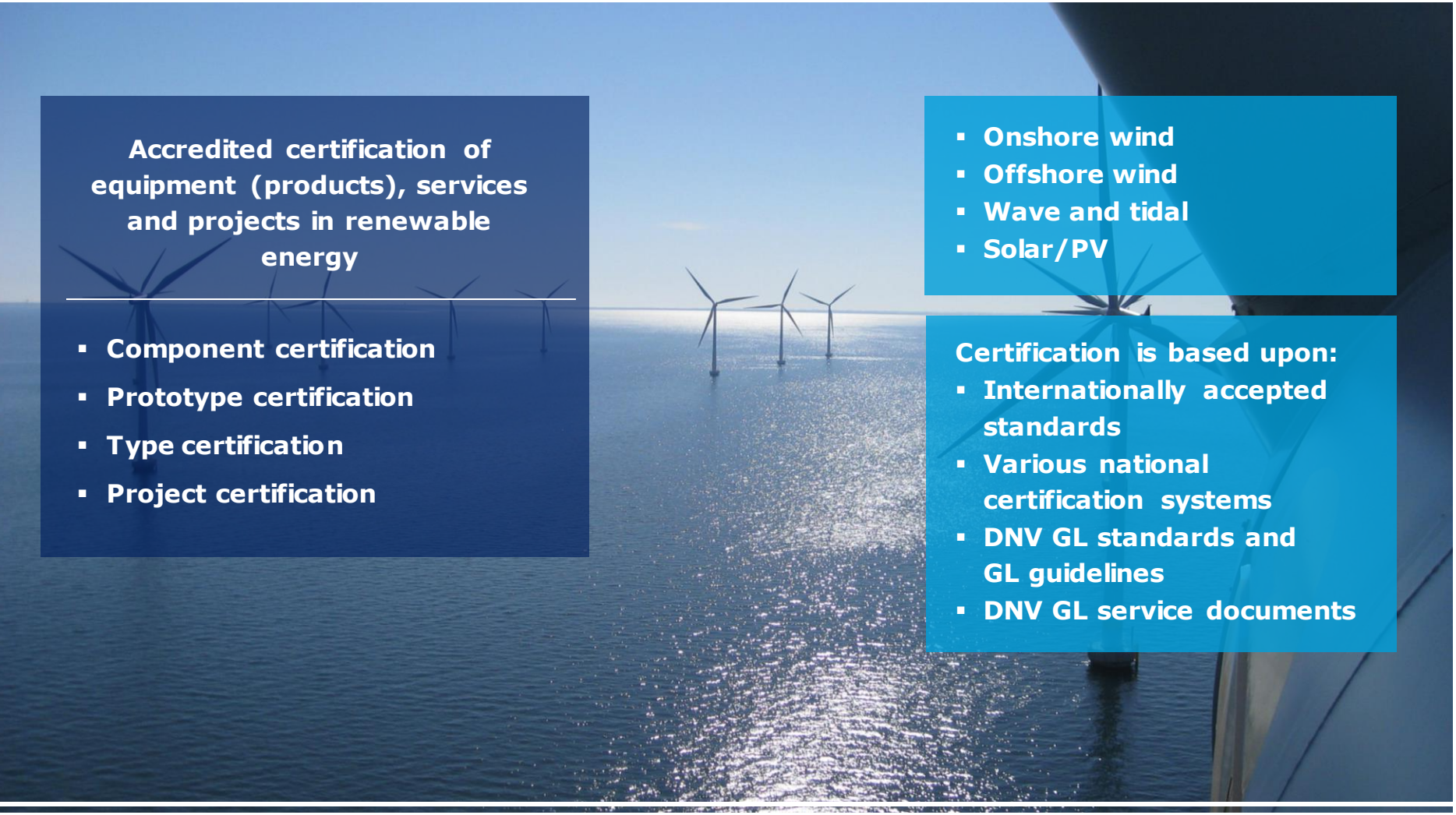
- Policy advisory and research
- Programme development and implementation
- Sustainable buildings and communities
- Industrial energy management

Design and delivery turnkey energy efficiency programmes that produce verifiable savings and meet utility goals

Develop innovative approaches for data collection and analysis that extract more value and support policy decisions

Reduce building operating costs, increase property values, manage risks and meet expectations of investors and customers

Renewables certification



Accredited certification of equipment (products), services and projects in renewable energy

- Component certification
- Prototype certification
- Type certification
- Project certification

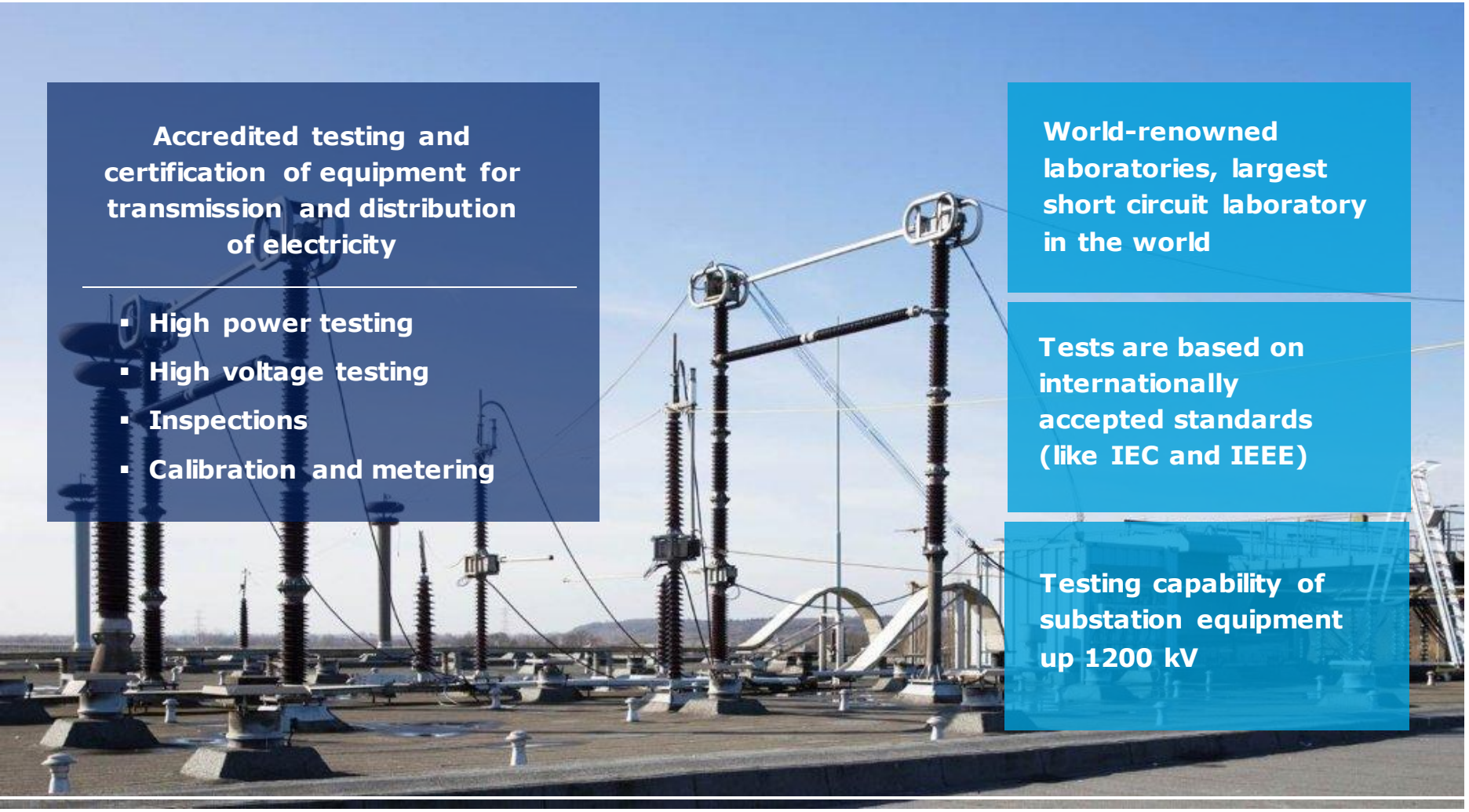
- Onshore wind
- Offshore wind
- Wave and tidal
- Solar/PV

Certification is based upon:

- Internationally accepted standards
- Various national certification systems
- DNV GL standards and GL guidelines
- DNV GL service documents

Power testing, inspections and certification

KEMA Laboratories



Accredited testing and certification of equipment for transmission and distribution of electricity

- High power testing
- High voltage testing
- Inspections
- Calibration and metering

World-renowned laboratories, largest short circuit laboratory in the world

Tests are based on internationally accepted standards (like IEC and IEEE)

Testing capability of substation equipment up 1200 kV

DNV·GL

High power testing

Independent testing and certification of low, medium, high and ultra-high voltage components used in transmission and distribution power networks

- World market leader and operating world's largest high-power laboratory
- Largest High Power Laboratory in the Americas
- After major extension now ready for 800 - 1200 kV market
- Up to 1200 kV circuit breaker testing
- Short-circuit testing of transformers up to 800 kV class
- Complete type test of LV assemblies

High Power Test Laboratories located in the Netherlands, Czech Republic and USA	Fully accredited laboratories	KEMA Type Test Certificate, Report of Performance

High voltage testing

Independent testing and certification of medium and high voltage components used in transmission and distribution power networks

- **Largest commercially operated High Voltage Laboratory in the world**
- **Specialized in high voltage AC and HVDC cable testing**
- **Test bays for PQ tests**
- **Various trailers for on-site commissioning testing**

High voltage test laboratories located in the Netherlands, Czech Republic and USA

Fully accredited laboratories

KEMA Type Test Certificate, Report of Performance

Inspections

Inspection of dielectric tests performed at non-DNV GL laboratories as per international standard

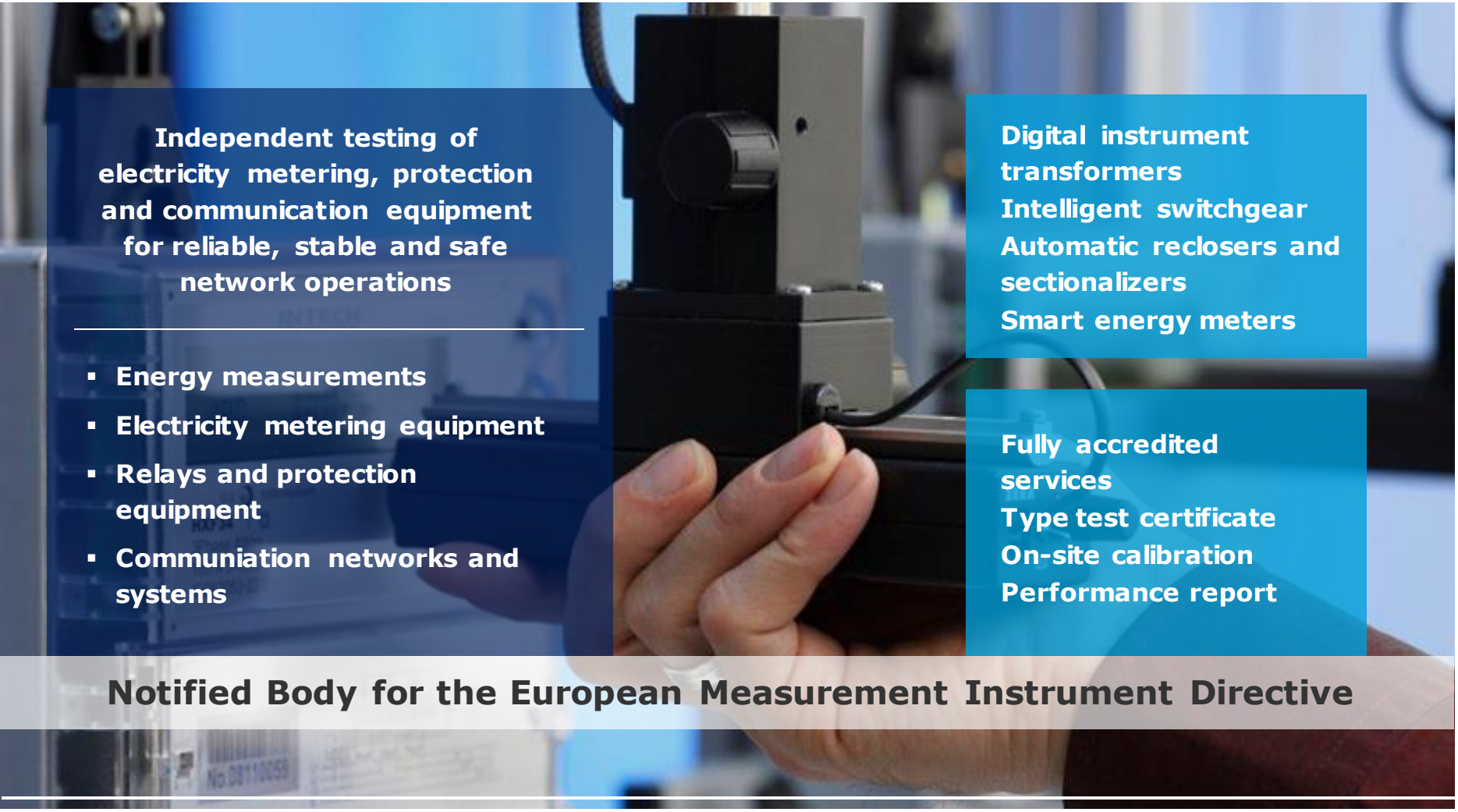
- **Top-technical inspection services**
- **Component and power system verification**

Accredited inspection services based in Arnhem and Shanghai

Fully accredited service Report of Performance

Metering, protection and substation automation testing

KEMA Laboratories



Independent testing of electricity metering, protection and communication equipment for reliable, stable and safe network operations

- Energy measurements
- Electricity metering equipment
- Relays and protection equipment
- Communiation networks and systems

Digital instrument transformers
Intelligent switchgear
Automatic reclosers and sectionalizers
Smart energy meters

Fully accredited services
Type test certificate
On-site calibration
Performance report

Notified Body for the European Measurement Instrument Directive

DNV·GL

PROMOTioN Project

PROMOTioN - New EU project to boost the development of meshed HVDC offshore grids in Europe

PROMOTioN is funded under the EU Horizon2020 research programme, coordinated by DNV GL including 35 partners from 11 countries.

SHARE:

The goal is to develop and demonstrate three key technologies: diode rectifier offshore converters, multi-vendor high-voltage direct current (HVDC) grid protection system, and the full power testing of HVDC circuit breakers.

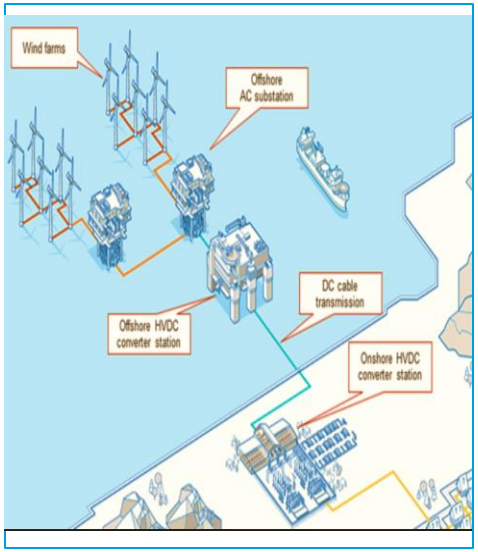
Developments in HVDC

- LCC classical system, long distance point to point, large power transmission to load centers
- Classical system, back-to-back connecting different grids
- VSC system, medium distance point to point, medium power transmission to load centers
- Multi-terminal LCC system
- Distributed sources (e.g. offshore wind) connected to grids
- Next -> Meshed HVDC grids connecting distributed sources and loads

Challenges : cables, power electronics, protection, communication and control system

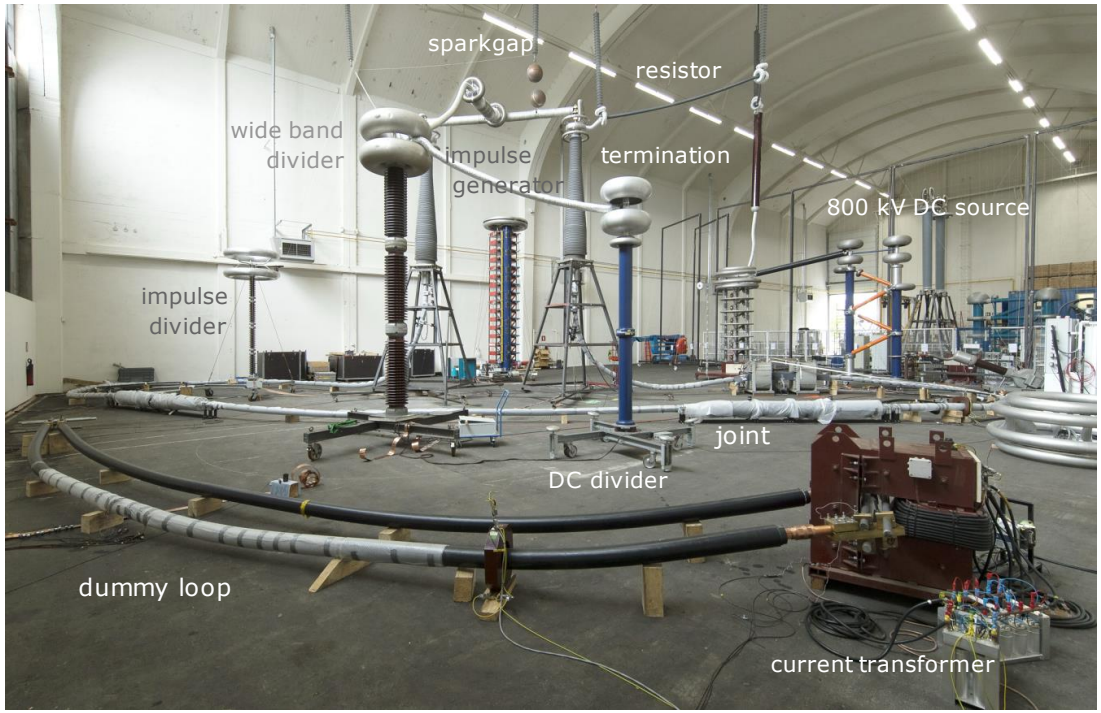
Development of reliable grids

Reliable grid requires reliable components which work together

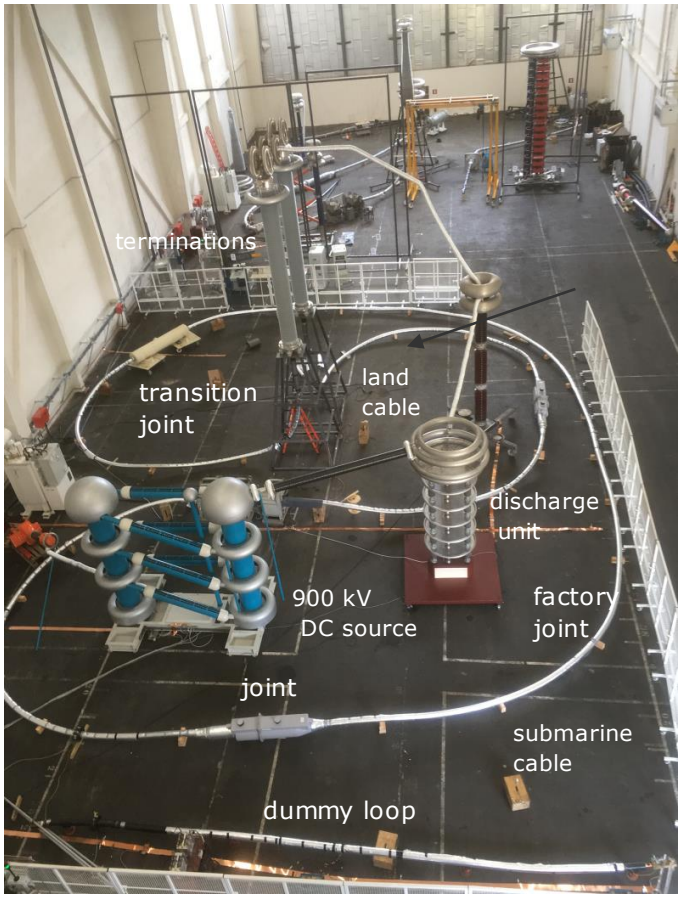
Grid req. & product development	Relevant expertise	Standardisation	Test facilities & Certification
		IEC standardisation activities just initiated – HVDC Circuit Breakers – GIS – Transfer Switches – Disconnectors – HVDC Cables etc.	KEMA Laboratories is testing: HVDC Circuit Breakers GIS Cables and also other HVDC switchgear components

320 kV HVDC cable system testing at KEMA

Type test



Pre-qualification test ->

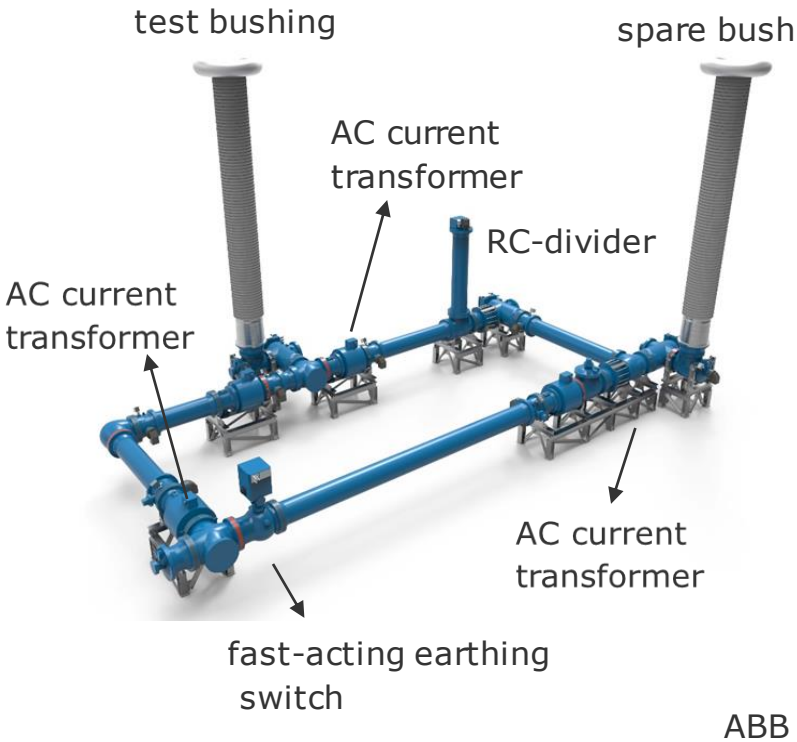


Test-set up in KEMA Laboratories of 320 kV HVDC GIS

KEMA Laboratories

PROMOTioN link

PROMOTioN
PROGRESS ON MESHED HVDC OFFSHORE TRANSMISSION NETWORKS



ABB

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HVDC circuit breaker testing @ KEMA

VSC assisted resonant principle

Active current injection principle ->