

The Hitachi logo is displayed in a bold, black, sans-serif font in the upper right corner of the slide. The background of the slide is a landscape photograph of a forest at sunset or sunrise, with a power line tower visible in the distance.

# HITACHI

T4T Kickoff, 2026-02-17

## Strategic R&D priorities in power transmission

Hitachi Energy

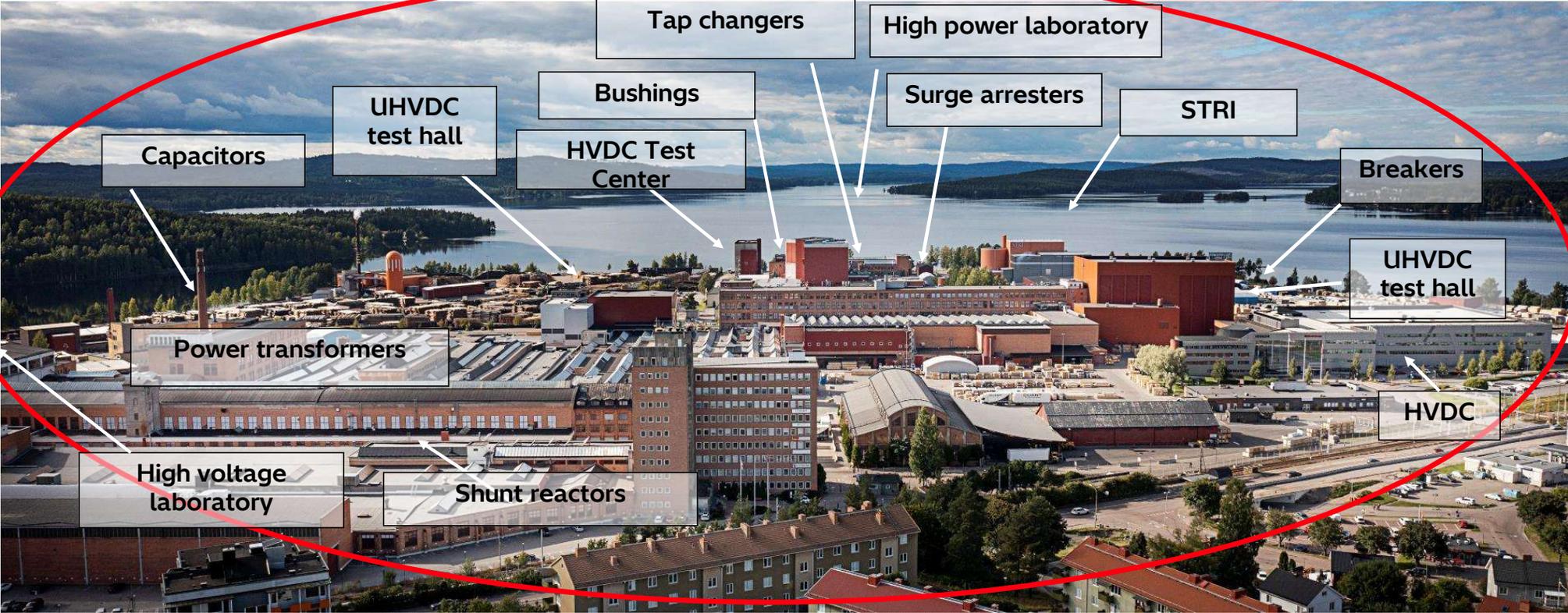
Dr.-Ing. Jürgen Häfner

Company Executive Engineer HVDC

Public

# Hitachi Energy in Ludvika, Sweden - A world center of high voltage

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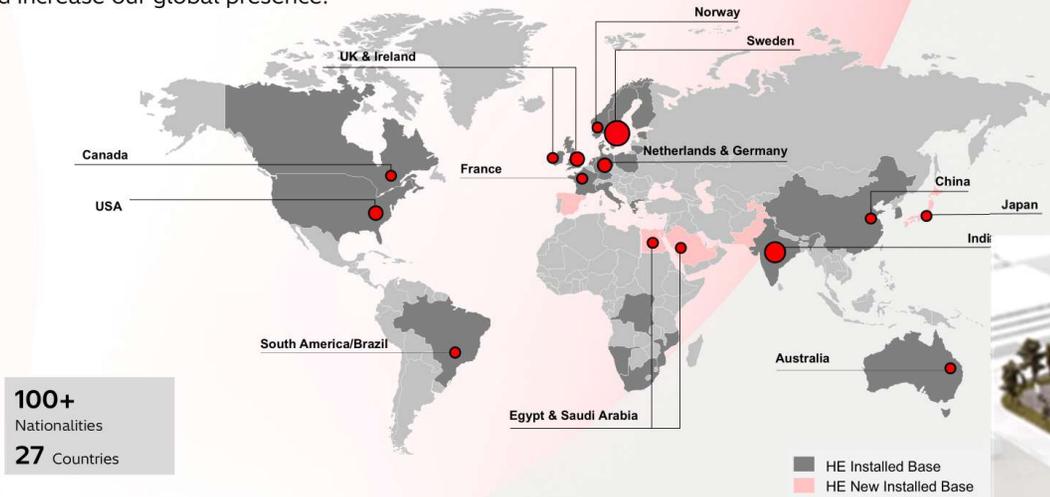


# Hitachi Energy in Ludvika, Sweden - A world center of high voltage

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## HVDC Footprint 2025

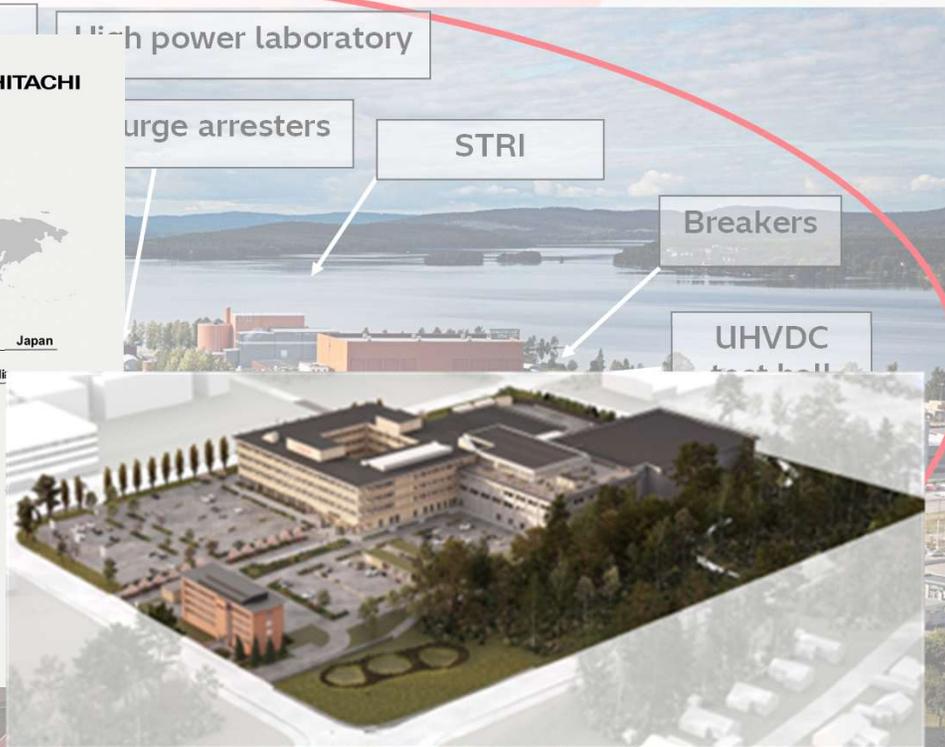
We continue to grow with the market and increase our global presence.



**100+**  
Nationalities  
**27** Countries

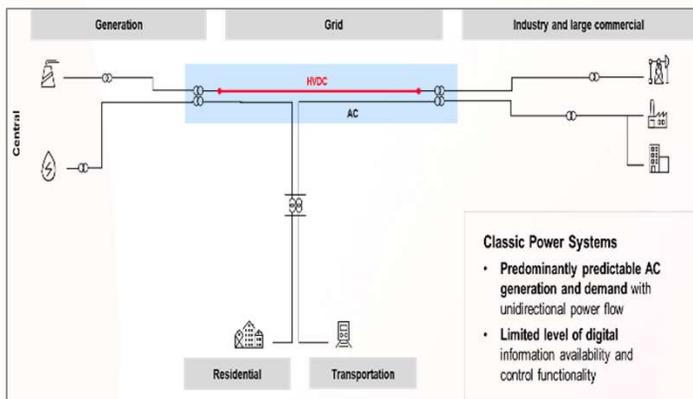
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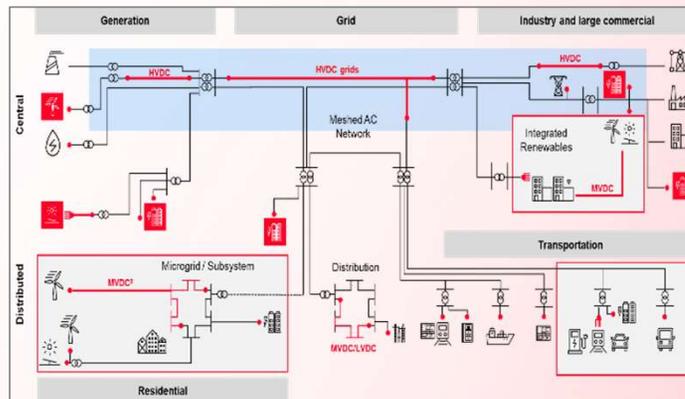


# Power grids are undergoing a fundamental transformation

## The grid in the past ..



## The grid in 2030+ ... dominated by power electronics with HVDC at the top



## Main drivers of future grids

 <b>Stability</b>	 <b>Reliability</b>	 <b>Security</b>
 <b>Availability</b>	 <b>Flexibility</b>	

## .. and it's challenges today

 <b>Access the best renewables</b>	 <b>Integrate remote renewables</b>	 <b>Balance supply and demand</b>	 <b>High dynamic power flow</b>	 <b>Resilience of weakening grids</b>
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**High-Voltage Direct Current transmission (HVDC) will be the backbone of the entire energy system with large amount of renewables**



## Megatrends and Customer Needs

### Megatrends

- Renewables integration
- EVs & EV Infrastructure
- Data Centers with AI
- Digitalization
- Energy Storage
- Energy Islands
- Industrial Decarbonization



# HVDC Light® Technology looking forward – Global trends

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## Last 25 years focusing on

- Voltage (80kV → 525kV)
- Current (300A → 3kA)
- Losses (3% → < 1%)

## HVDC established key technology for enabling energy transition

- Technology shift to VSC for enhanced controllability
- Larger and longer links, aerial and cable transmission
- **Gridforming and blackstart functionality**

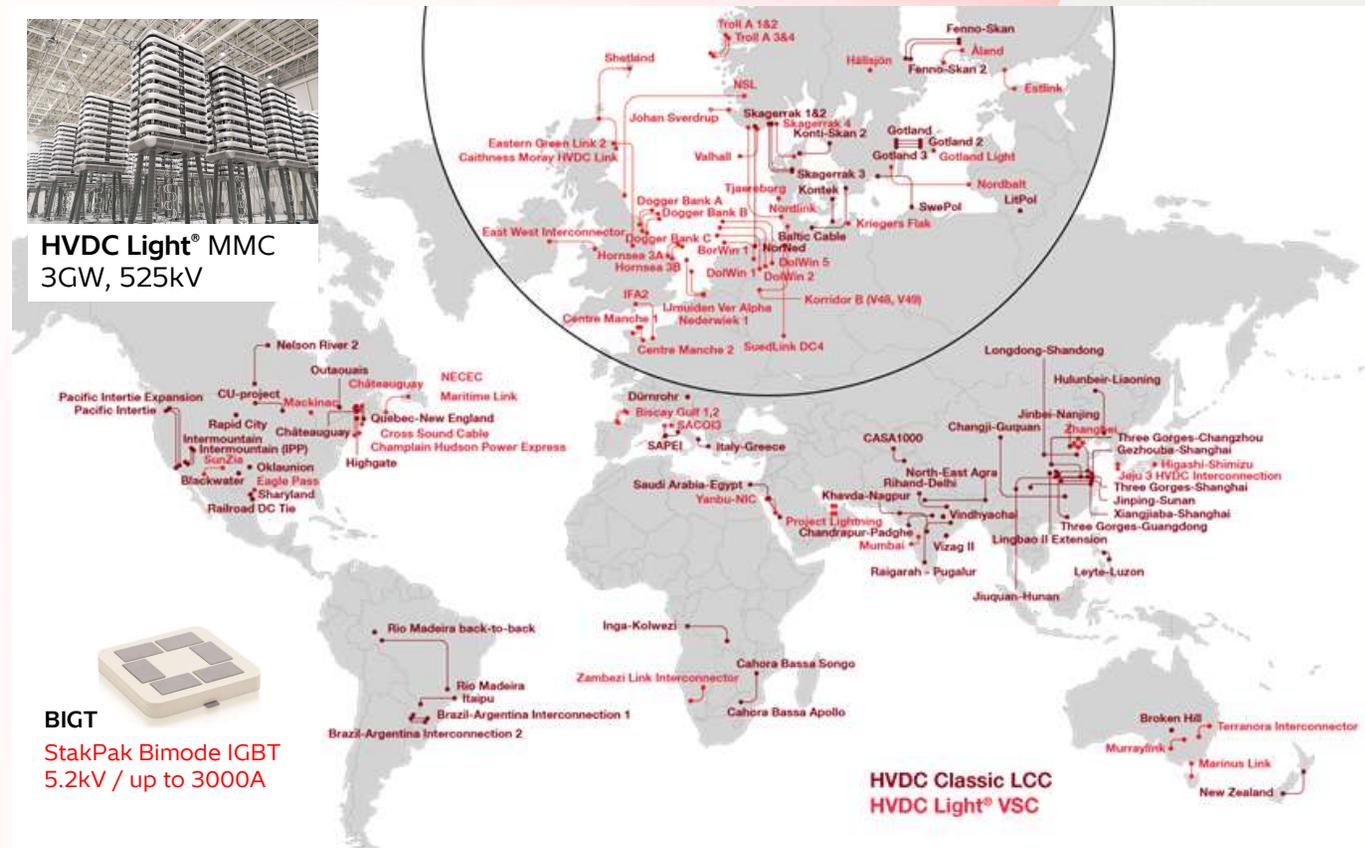
Use cases are constantly increasing ..



HVDC Light® MMC  
3GW, 525kV



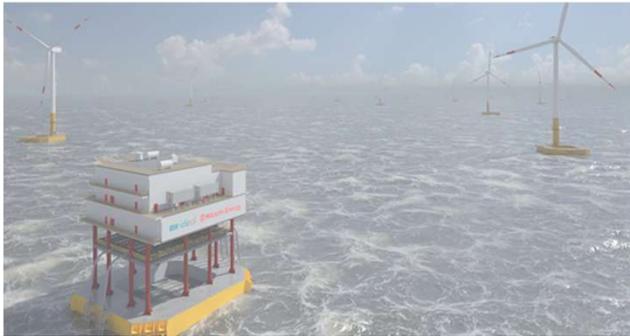
BIGT  
StakPak Bimode IGBT  
5.2kV / up to 3000A



Hitachi Energy installed >150GW, 120 links ~50% of worldwide installed base, up to 12GW capacity per link

# HVDC Technology looking forward – Strategic development areas covering ..

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**New needs in extreme environments –  
Floating, heat, urban locations**



**New needs for enhanced grid support, new  
large-scale generation and loads**



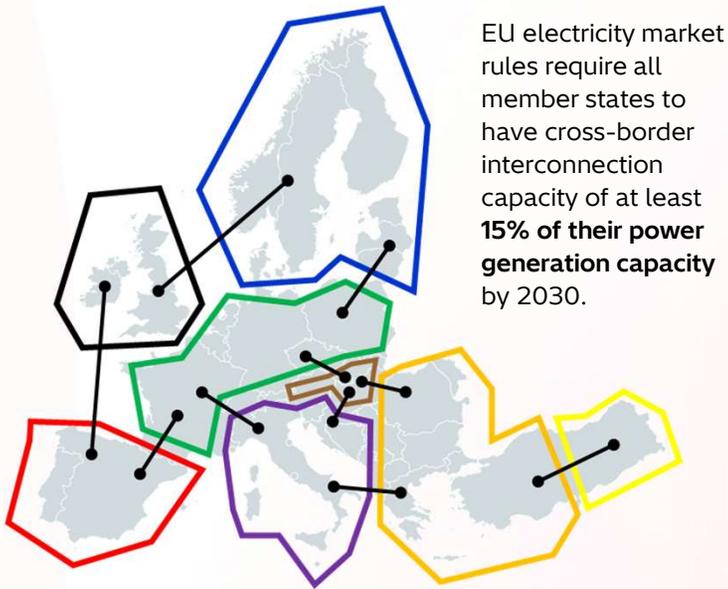
**DC Grid of the future, from talks to planning**



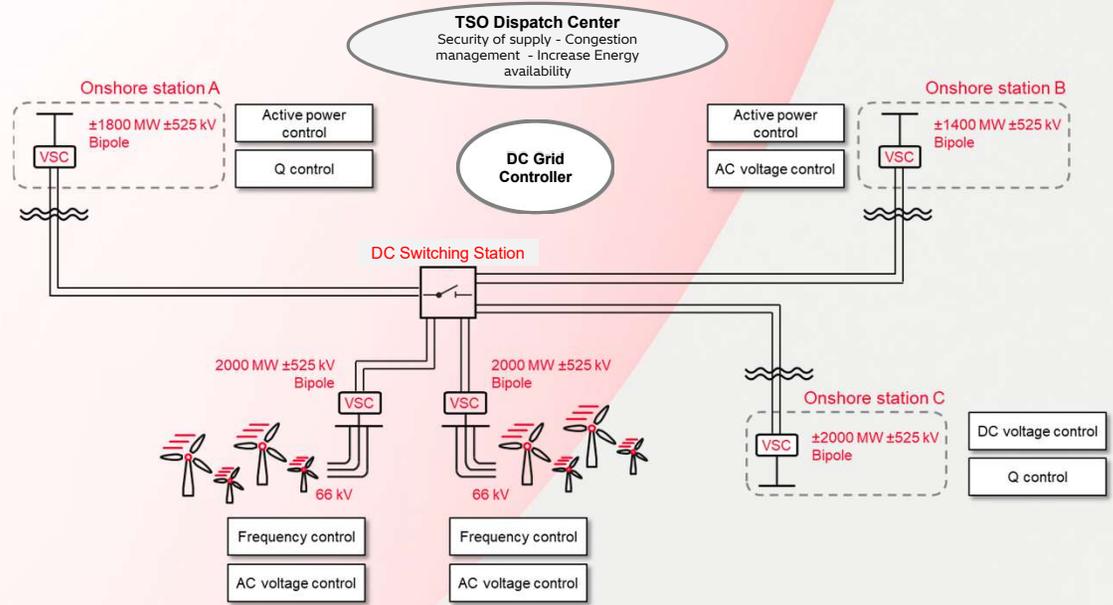
**New digital technologies needs to be applied  
to the whole lifecycle**

# Way forward towards the grid of the future: Experience + enabling technology + industrial cooperation

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Onshore wind profile correlations across Europe

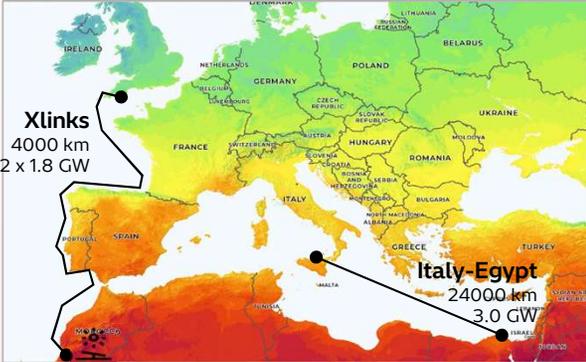
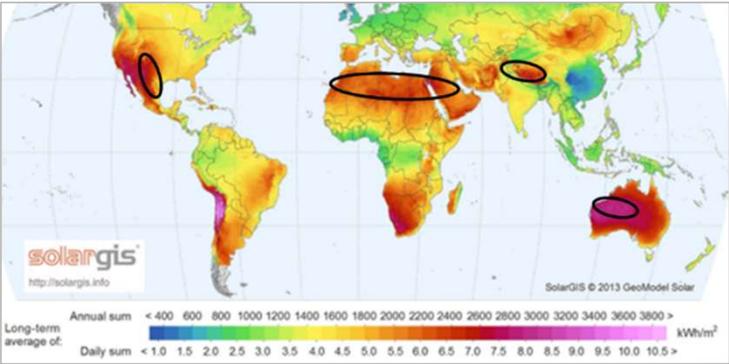


Multipurpose interconnectors (MPIs) connect clusters of renewables to multiple load centers, cross-country or regions

The variability of wind patterns across Europe underscores the need for new transmission interconnectors to enable efficient wind energy exchange

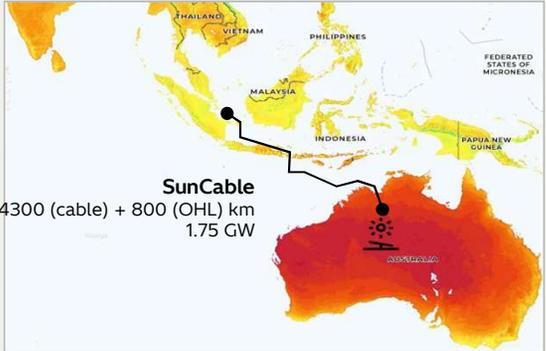
# HVDC Grid Integration - The decarbonized future is based on solar power

Deliver remote solar energy to land constrained and/or low irradiance areas



Solarpark in Ningxia region (CN)

The electricity grids of the future will need to be able to flexibly bridge time zones, climates and seasons

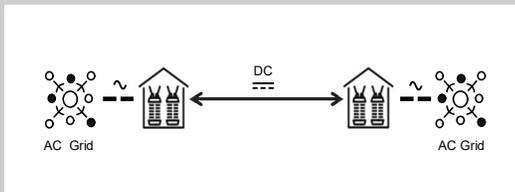


# Energy transition requires highly controllable, flexible grids

## What's next, next?

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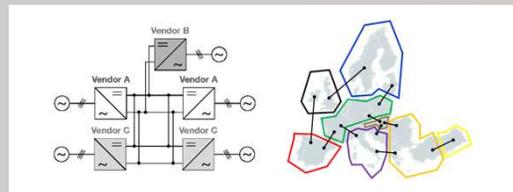
2025



### Pioneering applications .. 375 GW of HVDC worldwide

-  Low losses, more power, higher voltages
-  In air, underground, undersea to connect and dispatch renewables
-  Full controllability to enhance grid flexibility and reliability
-  Compact solutions, high energy density

2035



### Integration of renewables .. security of power supply

-  Even more power with lower losses, reliable and scalable
-  Multi-purpose interconnectors in radial configurations
-  Support grids with high share of power electronics interfaces
-  Affordable and sustainable solutions, digitalization

2050



### Global HVDC energy highways .. adapt to climate change

-  Availability, flexibility with fully digitalized operational models
-  Ultrahigh power transmission between regional DC Grids
-  Balance regional fluctuations together with energy storage
-  Resilient infrastructure, minimal maintenance on demand

**HVDC, a key technology for global energy transmission and distribution**

**To become the backbone of the Power Grid, System availability is of outmost importance**

Q&A

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