



Impacting Grid Resilience with HVDC

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- Global Manager HVDC System Performance

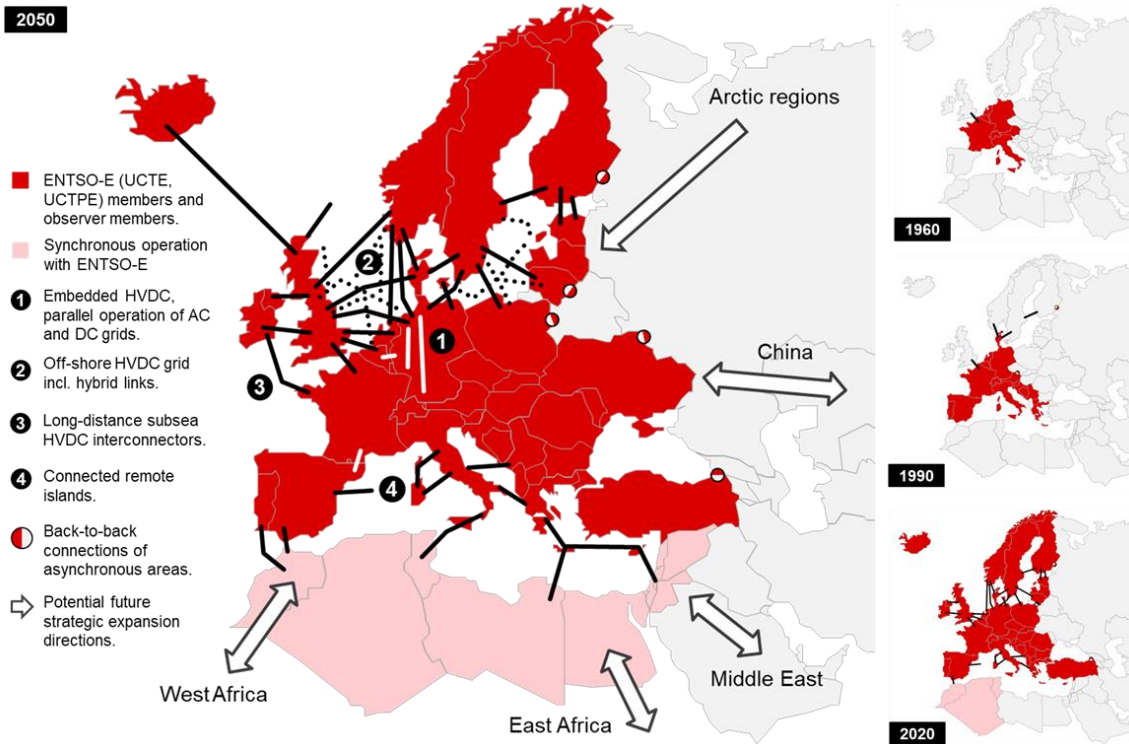
• 2024-08-19

Offshore wind and grid interconnections are interdependent



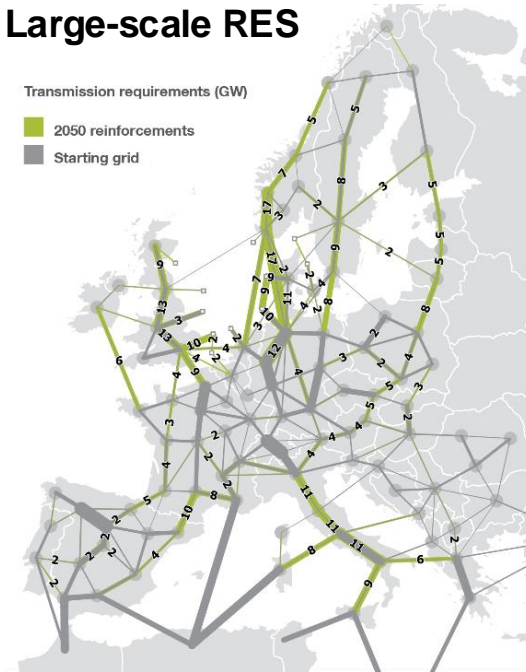
EU interconnections from 1960 to 2050

2050

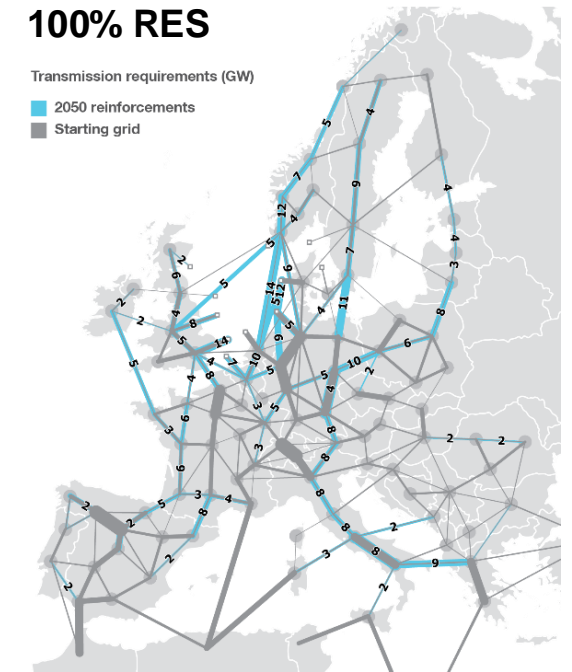


New transmission requirements

Large-scale RES



100% RES

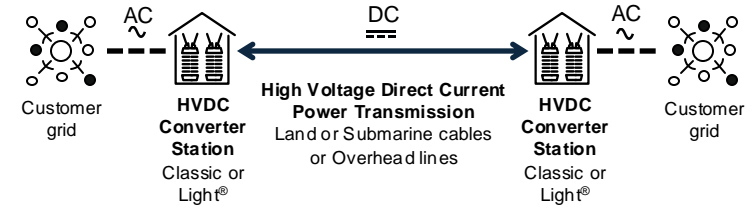


HVDC Interconnecting grids for a sustainable energy system

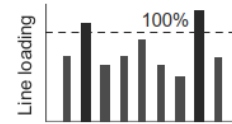
Electrical supply is critical for society resilience

HVDC VSC has unique capabilities to support the grid resilience

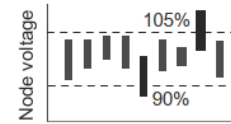
- Grid following control
- Grid forming control
- Black start capability



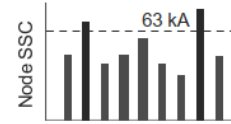
Power system capacity (steady state)



Current limits



Voltage limits

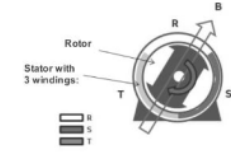


Short-circuit current limits

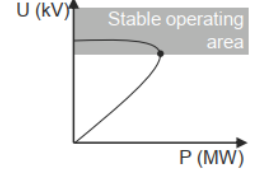
Power system stability (transient state)



Frequency

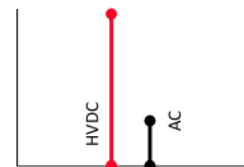


Rotor angle

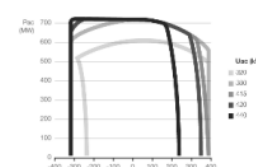


Voltage

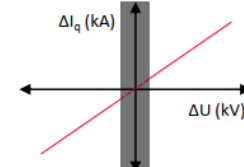
and how HVDC helps



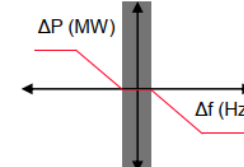
More power
Power flow control



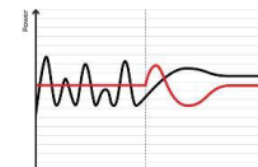
Reactive power control



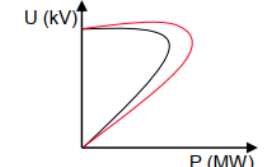
Controlled short-circuit
current



Frequency control



Damping control



Dynamic voltage control



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