

Policy brief:

# Competitiveness of clean energy technology – High Voltage Direct Current Systems

October 2023

## Headline findings

- High voltage direct current (HVDC) systems are becoming a fundamental enabling technology to connect long distances while reducing energy losses.
- HVDC systems (whose main components are converter stations and point-to-point cables) have been proven at an industrial scale in operational environments.
- As of 2022, HVDC operating capacity in Europe amounted to around **43 GW**, with an additional **63 GW** coming from **51** new projects. Europacable estimates that the EU will lay between **10,000** and **14,000 km** of new HVDC land cables over the next ten years.

## Key (competitiveness) challenges for High Voltage Direct Current Systems

### Challenge 1

HVDC must transport electricity over long distances while keeping losses and costs under control.

### Challenge 2

There is a growing need to move away from vendor-specific technology design and operation concepts to multi-terminal, multi-vendor technology with grid-forming capabilities. This should allow for better grid observability and control, data accessibility, and new energy services.

### Challenge 3

High-power superconductors, which are key components of HVDC systems, are currently procured from highly concentrated markets.

## Key policy recommendations

### Recommendation 1

---

Encourage closer cooperation among policymakers, network planners, and system operators, as well as industry at all EU levels, so that to bring transparency to long-term grid development plans and strengthen HVDC supply chains.



### Recommendation 2

---

Facilitate investments into EU production capacity by adopting standards for HVDC component and improving their interoperability.

### Recommendation 3

---

Invest in innovation (e.g., meshed HVDC offshore Transmission Networks), run 'regulatory sandboxes', and facilitate access to EU funding for demonstrators and innovative projects.



Scan QR code for more information on the Clean Energy Competitiveness Progress Report

