FACT SHEET

CLOSING EUROPE'S GRID INVESTMENT GAP TO POWER A NET-ZERO ECONOMY

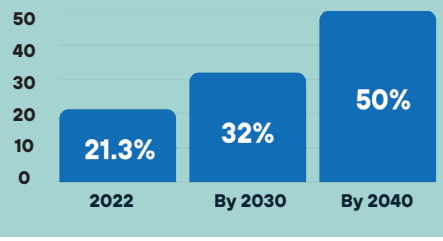
BELLONA EUROPA

Clean electricity is the backbone of Europe's energy transition. Europe's grids must double capacity by 2040.

Electrification will advance fast in the coming years...

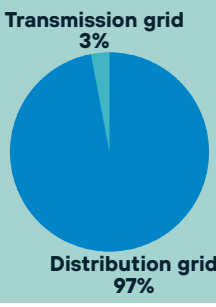
INDICATIVE ELECTRIFICATION TARGETS

Economy-wide electrification rates



GRID LENGTH IN EU

Total grid length in the EU is around 10 million km.



Grid planning and deployment involves multiple actors.

EU LEVEL

- Agency for the Cooperation of Energy Regulators **(ACER)**: oversees and contributes to cross-border grid planning
- European Network of Transmission System Operators of Electricity **(ENTSO-E)**: represents TSOs, organises energy planning
- EU Distribution System Operator **(DSO)** Entity: represents and fosters cooperation among DSOs

NATIONAL LEVEL

- Transmission System Operators **(TSOs)**: deploy transmission (high voltage) grids
  - **30** in the EU
- Distribution System Operators **(DSOs)**: deploy distribution grids
  - **> 2500** in the EU
- National Regulatory Authorities **(NRAs)**: approve and oversee grid investment plans

ESTIMATED GRID INVESTMENT NEEDS

€67bn/year

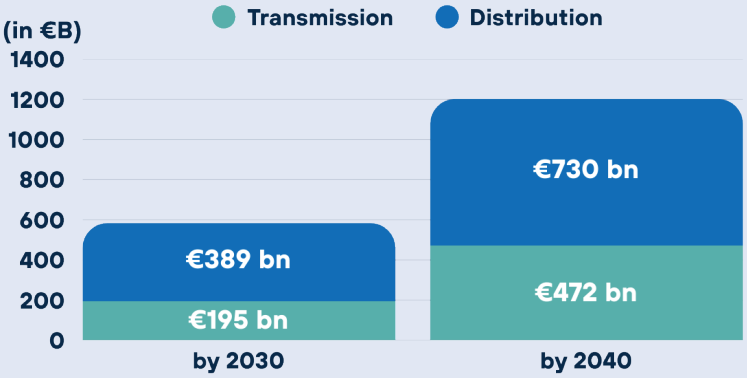
annual **distribution** investment needs

>€30bn/year

annual **transmission** investment needs

€1.99-2.29 trillion

by 2050



Building grids is the fastest way to cut energy costs and unlock renewables.

CURTAILMENT & REDISPATCH COSTS

- Redispatching cost **€5.2 bn in 2022**, more than double than in 2019
- Without faster rollout redispatching will cost **€26 bn by 2030** and **> €100 bn by 2040**
- **310 TWh** of renewables may be curtailed by 2040
- **150 GW** of new renewables capacity await grid connection across Member States

GRID DEPLOYMENT SAVINGS WOULD:

- Avoid **€80–90 bn** in redispatch costs by 2040
- Cut **grid losses (~6 %)**, saving **€4–6 bn/year**
- Enable **150 GW** of renewables → **≈ 250 Mt CO_2/year** reduction → €25–30 bn/year in avoided fossil imports
- **Stronger interconnections** reduce price volatility and improve energy security

Europe cannot deliver electrification or affordable energy without urgent investment in modern grids.

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GRIDS HAVE MULTIPLE FINANCING SOURCES

Tariffs
TSOs & DSOs finance grid investments with their own balance, recovering the cost via energy bills

National Budget
Member States can support grid projects with national funds, subject to State aid control

EU Funds
Connecting Europe Facility, cohesion policy funds, among others

KEY CHALLENGES FOR TIMELY GRID DEPLOYMENT

- **Investment Shortfall:** Funding needs far exceed current investment
- **Regulatory Misalignment:** Inconsistent TSO/DSO coordination, NRAs not required to align with climate targets
- **Permitting Delays:** Grid projects take 8-17 years from planning to commissioning
- **Tariff Divergence:** Large variation between Member States, insufficient incentives for flexibility that would reduce overall grid needs
- **Transparency Gaps:** Lack of open, standardised grid data on capacity, queue hosting potential
- **Skills & Material Shortages:** Lack of electricians & engineers, rising copper/aluminium costs

RECOMMENDATIONS

Governance & Planning

- **Align national regulators** (NRAs) mandates with EU climate and decarbonisation goals
- **Integrate planning frameworks** (NECPs, NDPs, TYNDP, and DSDPs)
- **Improve integration between TSO-DSO planning** to anticipate industrial electrification and flexibility needs
- **Extend planning horizons** to reflect grid project lead times & asset lifecycles
- **Improve public participation** to accelerate permitting

Flexibility & Digitalisation

- **Introduce performance-based incentives** for TSOs and DSOs (curtailment, reduction, connection speed, utilisation)
- **Embed flexibility and non-wire solutions** in planning & cost-benefit assessments
- **Promote shared visibility and data exchange** between TSOs & DSOs for system optimisation
- **Support smart grid deployment** and decentralised digital tools

Finance & Investment

- **Expand and coordinate EU funding instruments** available for grids
- **Adopt a Total Expenditure (TOTEX) approach** — balancing CAPEX and OPEX to support digitalisation and flexibility
- **Enable anticipatory investments** via risk-sharing and early cost recovery
- **Leverage ETS revenues** and reform tariff regulation to promote climate-aligned investment
- **Enhance cross-border cost allocation** to reflect long-term system value

Transparency & Data

- **Require TSOs/DSOs to publish standardised hosting capacity maps,** queue lengths & connection times
- **Mandate Regional Coordination Centres** (RCCs) to publish congestion & curtailment data
- **Promote open-source modelling** & harmonised assumptions across planning tools
- **Empower ACER** to oversee and ensure coherence of transparency frameworks

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