

Unlocking the Grid of the Future: Expanding Transmission Infrastructure

Key takeaways

- **Expanding electricity grids is a key step in phasing out coal power and building a clean energy future.** The move away from centralised coal power plants towards decentralised renewables requires urgent investments in transmission infrastructure to connect the new clean energy sources to consumers and to ensure energy security.
- **Grids and transmission infrastructure are complex and expensive systems to develop.** Many challenges remain in deploying transmission grids, such as the large investments required up front, extensive planning and permitting processes, supply chain constraints, and the need for coordination across various jurisdictions.
- **Grid expansion requires planning and collaborative action.** Existing efforts in different jurisdictions to expand transmission infrastructure show that several factors are key to success: political will and vision, mechanisms to de-risk transmission investments, regional planning, updating of regulatory and market design and having a pipeline of bankable projects. Promising developments include the **Competitive Renewable Energy Zones (CREZ) in the Philippines** that incentivise transmission in areas with high renewable energy potential, and advancement of proof-of-concept transmission interconnections such as the **ZiZaBoNA project in southern Africa**. The Powering Past Coal Alliance and Green Grids Initiatives [hosted a webinar](#) on 13 September, 2023 with opening remarks from Denmark, and case studies from the Philippines and southern Africa to showcase these solutions.
- **Sharing of knowledge, expertise and experience is key.** This is critical if we are to build the grid infrastructure needed for the energy transition at the speed and scale required to keep the temperature rise to 1.5oC. **The GGI Electricity Transition Playbook, launching at COP28 in Dubai**, will be an essential resource for all working to transition their power systems from coal to clean.

Why Transmission?

- There will be no transition without transmission. As countries phase out coal and seek to replace it with cleaner sources of power, their grids are fundamentally transforming. Renewable energy sources are not always close to where the power is needed within a country, and at times the renewable energy may need to be imported from other countries.
- Grid infrastructure within countries as well as grid interconnection between countries is necessary to move power from where it is generated to where it is needed locally, regionally, and even continentally.
- In fact, grid interconnections between countries can ensure efficient integration of renewables and a more reliable supply of electricity, reduce dependency on local weather conditions, and create new market opportunities.
- For example, Denmark, which has committed to phasing out coal by 2028, now has the largest interconnector in Europe (relative to domestic consumption). This has helped Denmark achieve

security of electricity supply by allowing it to import power from its neighbours to meet demand that might exceed its power generation at certain times.

- Globally, the task at hand is no small feat: existing electricity grids, which took 130 years to build, need to more than double in length by 2040 and increase by another 25% by 2050.

What are the major barriers to building transmission infrastructure?

- The most significant challenge to building transmission infrastructure is the substantial capital required. Globally, we need the annual investment in grids to more than double by 2030 to USD \$750 billion and reach over USD \$1 trillion by 2040 to get on track for a 1.5°C pathway. To incentivise these investments and to bring down the cost of capital, it is necessary to de-risk transmission projects.
- Transmission projects also have a long lead time. While most wind and solar projects can be developed in a couple of years, transmission lines often take about a decade to be built.
- Transmission deployment is also impacted by supply chain constraints. This includes a lack of manufacturing capacity for components like cables and transformers, inadequate supply of key minerals such as copper and aluminium, and shortage of skilled labour.
- Interconnection projects that connect grids from different countries and regions require coordination between different jurisdictions and mechanisms to integrate potentially different types of electricity markets.

Country Case Study: Competitive Renewable Energy Zones (CREZ) in the Philippines

The Philippines is an archipelago comprising more than 7000 islands. In 2022, 60% of its energy came from coal. However, the Philippines has huge wind and solar potential, and the country aims to increase the share of renewable energy in the generation mix to 35% by 2030 and 50% by 2040.

The CREZ process identifies areas with the most economically viable renewable energy resource and with high levels of private sector developer interest, and conducts transmission planning and development in those areas. The Department of Energy of the government of the Philippines engaged key stakeholders including the Philippines National Transmission Corporation, the National Grid Corporation of the Philippines, grid and off-grid distribution utilities, market operator, regulator, and private sector representatives from different groups related to renewable energy. As a result of this consultation, 25 renewable energy zones and about 1.5 TW of renewable energy potential have been identified. Meanwhile, national coordination for power system planning has been improved, and the risk for private sector investment has been reduced.

Regional Case Study: ZiZaBoNa Transmission Interconnector with the African Development Bank

The IEA's 2022 Africa Energy Outlook estimates that USD \$10 bn of investments are needed annually in the transmission grid between 2026 and 2030 – more than three times the level from between 2016 and 2020. Currently, the continent has five major power pools that are at different levels of integration. However, for Africa to meet its decarbonization goals – including phasing out coal and for some countries, avoiding building their first coal plant - there is a need for much greater integration of grids across the continent. The Green Grids Initiative Africa Working Group, under the auspices of the African Union, is undertaking a proof-of-concept transmission initiative that includes transmission projects connecting Botswana, Zimbabwe, Zambia, and Namibia - ZiZaBoNa.

The initiative is putting into practice several innovative solutions. The lessons learnt from this initiative can be applied more broadly in the region for future transmission projects. These include consolidating the review of existing feasibility, environmental and social impact studies, and aiming for a regional review as opposed to a project-by-project approval process. The initiative was designed to assist in accelerating the pace of the project development while maintaining important environmental oversight. It is also mobilizing climate finance to help de-risk investment in transmission. This is particularly important as most public entities in developing countries do not have the capacity to finance large-scale transmission projects and need to establish policies to encourage private sector investment.

What is next?

The Powering Past Coal Alliance is looking forward to continuing to work with partners, members, and other stakeholders to advance dialogue and cooperation on the enablers and practical solutions to grid transformation. Visit the PPCA website, to find out more about our next event on grids at COP28 with GGI, Renewable Grids Initiative and the Global Renewables Alliance on 6 December.

www.poweringpastcoal.org

The Green Grids Initiative is also working across political, finance and technical spheres to make this happen, and to accelerate the delivery of transformational projects to flow clean energy across borders, enhance energy access and increase security of supply. Watch for the release of their playbook and other tools at COP28: www.greengridsinitiative.net.

Watch the webinar [here](#)