GREEN GRIDS INITIATIVE

Global Renewables Alliance

CARBON TRUST

Financing the future of global energy grids

1. The importance of grids in the global energy transition

Over the next six years additional renewable energy capacity on the grid will **triple** compared to the previous six years.[2]

By 2030, an additional **25 million kilometres** of grid infrastructure needs to be built and modernised. By 2040 an additional **80 million kilometres** — that's the same as the entire existing global grid.[3]

To achieve this, global investment in grids needs to double to **over $600 billion per year by 2030.**[1]

Investments in new grid infrastructure and upgrades to existing systems are critical to the global energy transition as they enable the integration and efficient distribution of renewable energy sources. Modern, smart, and expanded grids are essential to support the rapid growth in electricity demand driven by an increase in electric vehicles, heat pumps, data centres and other electrified technologies.[4] Without these investments, grids can become bottlenecks, delaying the deployment of renewable energy projects and increasing reliance on fossil fuels.

Upgrading grids also increases system flexibility, reliability and affordability, which are vital for accommodating the variable nature of renewable energy sources while maintaining energy security. It is therefore necessary to double grid investment by 2030 (to $600 billion per year) to meet national climate targets and ensure a secure and sustainable energy future.[5]

Call to action – COP29 Global Grids Pledge

The energy transition required to reach to Net Zero is currently threatened by a lack of investment in grids globally. During Climate Week New York 2024, the Green Grids Initiative (GGI) called on all national governments, international institutions, financiers, industry and other key stakeholders to commit to the COP29 Global Grids Pledge, which puts forward a range of metrics to measure progress, and supporting efforts to reach them. Given the scale of investment required there is a need to engage public and private financial institutions to raise awareness, engagement and support for the Global Grids Pledge.

1 IEA, 'Electricity Grids and Secure Energy Transitions', Executive summary, 2023

2 IEA, 'Massive global growth of renewables to 2030 is set to match entire power capacity of major economies today, moving world closer to tripling goal', 2024

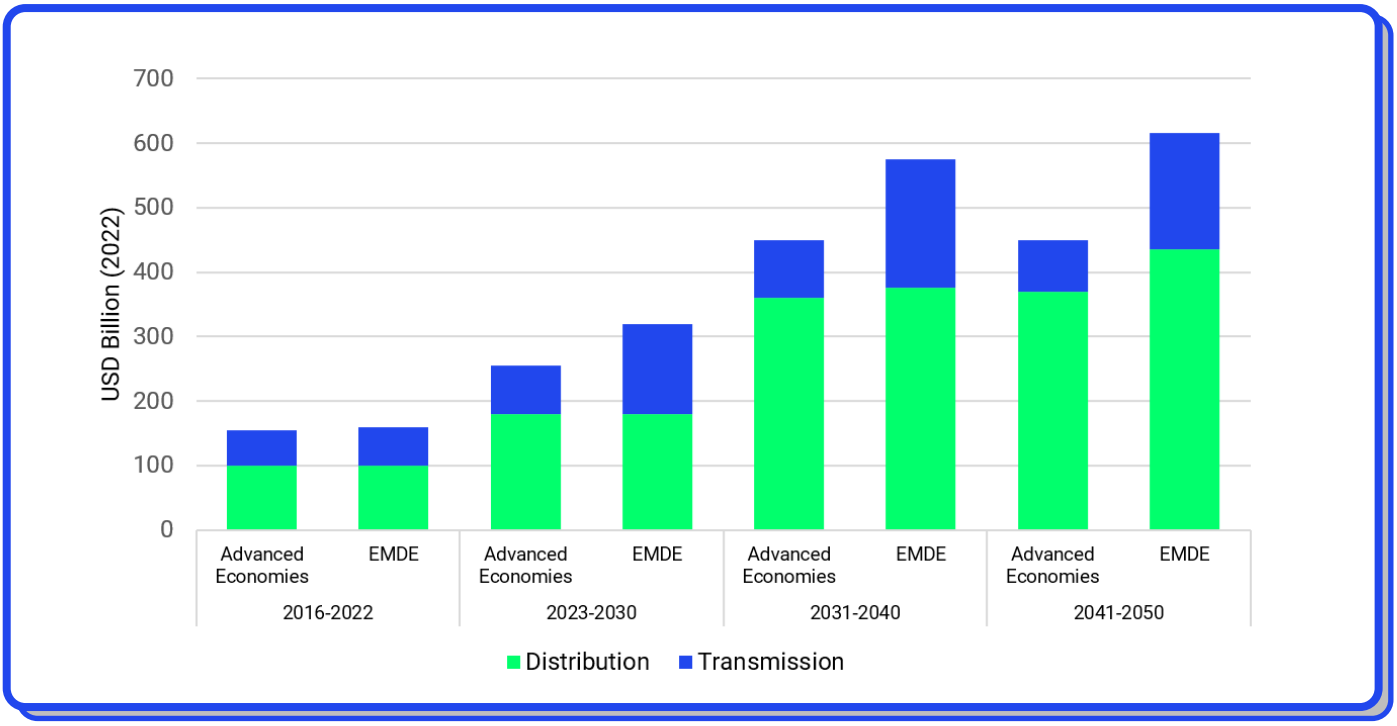
3, 4, 5 IEA, 'Electricity Grids and Secure Energy Transitions', Executive summary, 2023

2. The need for grid investment

To achieve Net Zero, an average annual investment of over $250 billion will be needed to build and modernise transmission and distribution infrastructure in advanced economies, and over $300 billion in emerging markets and developing economies (EMDE) by 2030. This rises to $450bn and over $600bn respectively by 2050.

Investing in grids is vital for ensuring the security, reliability, and affordability of electricity. Modernised grids enhance energy security by incorporating advanced technologies to protect against cyberattacks and other threats, ensuring a stable energy supply.

Improved reliability comes from reducing the frequency and duration of power outages, which is crucial for both daily life and critical infrastructure. Additionally, upgrading grids supports the integration of renewable energy sources and new technologies, leading to more efficient energy distribution and reduced costs. This, in turn, helps keep electricity affordable for consumers while promoting a sustainable energy future.



Average annual transmission and distribution investment required for Net Zero by 2050

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The investment in grids will be needed over a number of key areas,* including but not limited to:

- **New transmission and distribution infrastructure required to connect new renewable energy sources to load centres,** e.g. new transmission lines, upgrades to existing transmission and distribution networks, as well as semiconductors for HVDC converter stations needed for bidirectional load flow control and black-start processes.[6]
- **Technologies to enhance the flexibility and interoperability of grids.** Integration of renewables represents about a quarter of the total investment costs in distribution — at €85-95 billion. This includes investment in smart meters, communication and automation across the low- and medium-voltage grids and integration of digital tools to facilitate remote control.[7]
- **Supporting the development of regional grids and improved energy security,** e.g. interconnectors, plans for SunCable's AAPowerLink aim to connect Australia to Singapore via a 5000 km HVDC system to deliver 1.75 GW power.[8]

6 IEA, 'Electricity Grids and Secure EnergyTransitions', 2023

7 Eurelectric, 'Connecting the dots: Distribution grid investment to power the energy transition', 2021

8 Suncable Energy, 'Australia-Asia Power Link'

*** Investments in energy storage will also be required to support the build out of renewables and grid infrastructure, improving system efficiency and flexibility.**

3. Who needs to be involved

Electricity systems come in a range of different sizes and structures, whether they are vertically integrated, where a single organisation manages generation, transmission, distribution and retail, or unbundled, with private companies operating in generation and retail and regulated monopolies managing transmission and distribution. Each system will, therefore, require a different approach and a different set of funders for their grid development. Key actors include:

- **National governments** are often important for providing funds directly, developing system plans and using regulation to incentivise private investment.
- **Commercial banks and pension funds**, and other forms of private finance provide a vital source of finance and can act to bridge the gap between what government budgets can afford and the requirements of new grid investments and upgrades.
- **Development banks and other institutional funders** provide important technical support and sources of concessional financing that are important for de-risking investments and crowding in private finance.
- **Export Credit Agencies (ECAs)**, like the US Export-Import Bank and UK Export Finance, support financing by providing direct loans or guarantees for exports.

Regardless of the source, a key aim is to create a more predictable and stable environment for grid development. This needs to be effectively communicated and coordinated to be successful. It is not just a 1.5C-aligned pathway that is at stake, but also the safeguarding of critical national infrastructure and affordable, accessible electricity for consumers.

COP29 Global Energy Storage and Grids Pledge

Commit to enhance grid capacity through a global grid deployment goal of adding or refurbishing 25 million kilometres of grids by 2030, recognising analysis from the IEA on the need to add or refurbish an additional 65 million kilometres by 2040 to align with Net Zero emissions by 2050. National governments and other stakeholders can endorse this pledge at:

storageandgrids@cop29.az

Contact the GGI team to learn more about the pledge and how to accelerate ambition on grids.

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Discover more: www.greengridsinitiative.net

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