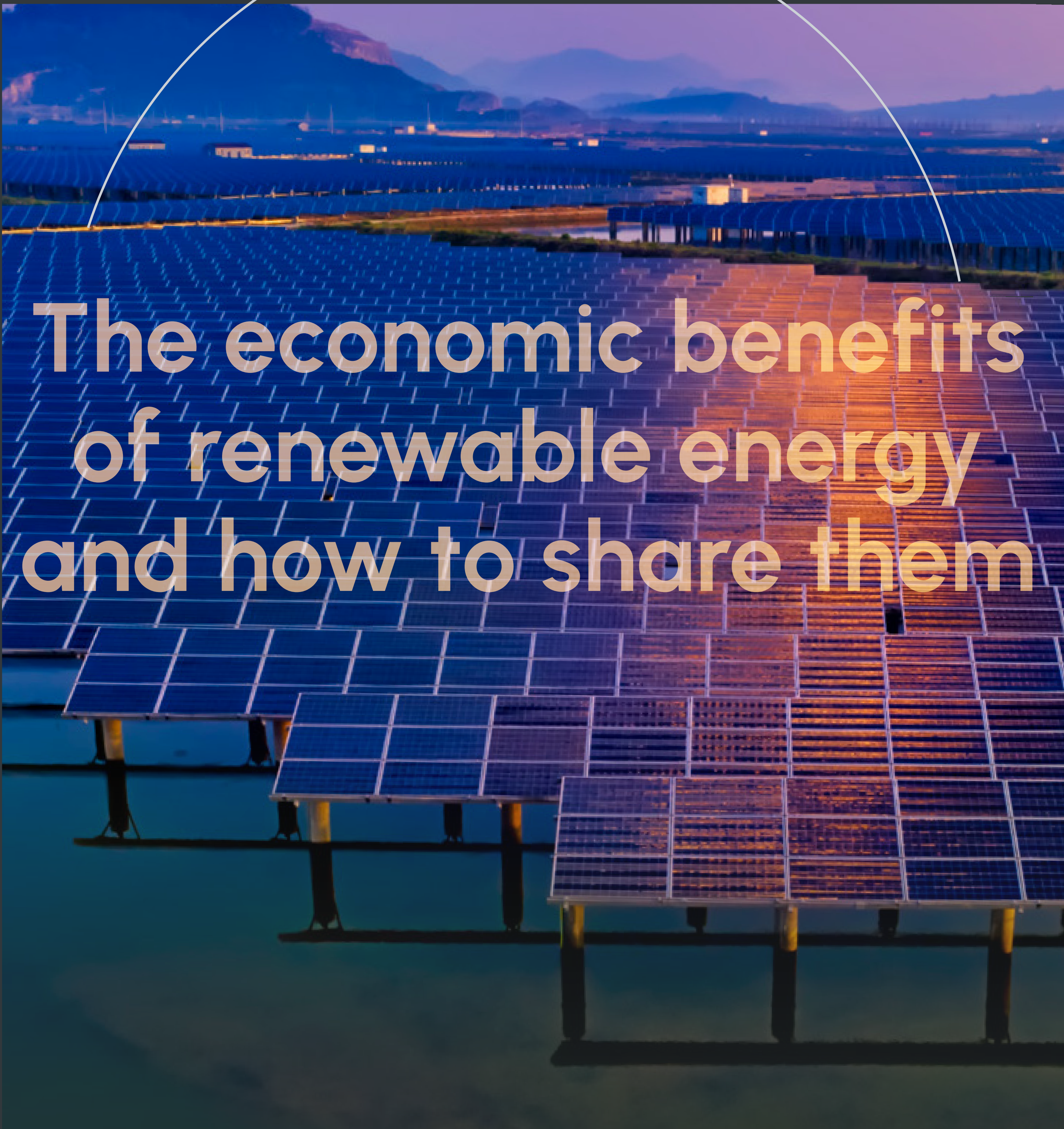

The economic benefits of renewable energy and how to share them

November 2025

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About the Oxford Smith School

The Smith School of Enterprise and the Environment at the University of Oxford was established with a benefaction by the Smith family in 2008 to tackle major environmental challenges by bringing public and private enterprise together with world-leading teaching and research. Research at the Smith School shapes business practices, government policy and strategies to achieve net zero emissions and sustainable development. We offer innovative evidence-based solutions to the environmental challenges facing humanity over the coming decades. We apply expertise in economics, finance, business and law to tackle environmental and social challenges in six areas: water, climate, energy, biodiversity, food and the circular economy.

About this report

This report is Part 3 of a three-year research project to consider the renewable energy transition in low and middle-income countries through the lens of renewable energy operators and project developers.

The three reports showcase the diversity and dynamism of renewable energy entrepreneurs and the challenges they face in reaching scale. This third report analyses how renewable energy firms interact with the local economy and how the economic benefits of renewables can be shared with local communities.

The views expressed in the report represent those of the authors and do not necessarily represent those of the participating institutions or funders. The report is intended to promote discussion and to provide public access to the results emerging from our research. It has been peer reviewed internally before publication.

About our partners and funders

Funding for this project was provided by SSE plc, a UK-listed business focussed on developing, building, operating and investing in the electricity infrastructure needed in the transition to net zero. SSE has a long-held vision to be a leading energy company in a net zero world. It understands that the achievement of a just energy transition in the developing world faces a set of challenges that are wholly different to those faced in its own developed world context. SSE hopes that this project will help aid understanding of those challenges and the associated solutions in order to accelerate the clean energy transition globally.

The project was carried out in collaboration with the Climate Compatible Growth (CCG) programme, which is sponsored by the UK Foreign, Commonwealth and Development Office. Section 5 draws on research funded by the UK Economic and Social Research Council under the Productive and Inclusive Net Zero (PRINZ) project.

Acknowledgements

We are grateful to Nicoletta Batini, Lindsay Doughan, Martha Selwyn, Morven Smith and Dimitri Zenghelis for their comments and guidance. The climate finance data in chapter 3 were provided by Climate Policy Initiative; we are grateful to Jake Connolly, Baysa Naran and Costanza Strinati. The peer reviewers were Cameron Hepburn and Anupama Sen. The steering group for the project consisted of Mia McCarthy, Rachel McEwen, Sana Nabi, Sam Peacock (SSE), Lucy Erickson and Cheryl Song (Oxford Smith School). Graphic design by Liliana Resende (Oxford Smith School).

Suggested citation

S. Fankhauser, L. Agnelli, M. Collins-Tobin, F. Khushnud, H. Luscombe, J. Omukuti, E. Ravigné, S. Srivastav and M. Weidinger. 2025. The Economic Benefits of Renewables and How to Share Them, Smith School of Enterprise and the Environment, University of Oxford.

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Community-owed hydro power station MHP Madaklasht, first day of operation. Credit: Pakhtunkhwa Energy Development Organization

Executive Summary

Renewable energy can power economies and empower communities, but these benefits need to be shared fairly. This report highlights the economic benefits of renewables and shows how community funds, co-ownership and inclusive consultation can transform the clean energy transition into a just transition.

The economic benefits of renewable energy

Renewable energy drives prosperity. Done well, it can expand affordable energy access, attract investment, create new jobs and increase productivity for the entire economy:

- Inclusive access to affordable energy. Solar and wind are now the lowest-cost energy option in most contexts. Modular and scalable, they can reach rural and underserved communities where traditional solutions fall short. To make access truly inclusive, governments must provide de-risking instruments for investors and affordable access to finance for low-income consumers.

- Growth through inward investment. Clean energy delivers a much stronger investment boost to the economy than fossil fuels. Between 2017 and 2022, climate finance flows have increased GDP in the 100 largest low- and middle-income countries by US$1.2 trillion on aggregate, or 2.2 - 5.3% for most countries. The example of the Dominican Republic shows how clear policy frameworks and blended finance can unlock billions in investment.

- New job opportunities. The clean energy transition is generating more jobs than it displaces. The new jobs have high skills requirements and are correspondingly well paid. In South Africa, for instance, clean energy salaries are 16% higher than those in other occupations. To maximise these gains, governments and industry must collaborate on robust labour standards, training and workforce development tailored to industry needs.

- A boost to productivity. A rapid switch to renewables would double energy-sector productivity in low and middle-income countries, translating into economy-wide GDP gains as high as 9–12% for some countries. These productivity gains are much higher than those in the Global North, giving the Global South an important structural advantage in the global net zero economy.

Sharing benefits locally

The economic benefits of renewables do not automatically flow to host communities. Deliberate benefit-sharing mechanisms are needed to lock in long-term development gains and strengthen local support. Two models stand out:

- Community benefit funds. Through dedicated funds, project developers can contribute to local priorities without exposing communities to undue risks. Well-designed funds are transparent, flexible and responsive to local needs. In the UK and Ireland, they have supported over 12,000 projects. Policy makers can strengthen them by setting minimum contribution thresholds and standardising benefit-sharing agreements.
- Community (co-) ownership. Offering deeper engagement and agency, shared ownership builds local buy-in, but also carries higher risks. Targeted support—concessional finance, capacity building and legal frameworks—can expand access, particularly in the Global South.

Across all approaches, meaningful consultation is essential and successful models go beyond mandated minimum standards. Community engagement is inherently context-specific and driven by local needs, but international knowledge exchange can help to identify best practice.

Sloy Dam. Credit: Hamza Anwar

Introduction

By 2030, half of global electricity demand could be met by renewable energy, chiefly solar and wind.[1] This rapid transition is driven by a cohort of renewable energy developers, operators and retailers – the renewable energy entrepreneurs – who have the vision, business models, skills and persistence to scale up renewable energy investment and transform their sector in the process.

This report is the third in a series that analyses the clean energy transition in low and middle-income countries through the lens of these entrepreneurs. The first two reports, in 2023 and 2024, showcased the diversity and dynamism of renewable energy entrepreneurs, their business strategies and the challenges they face in reaching scale.[2] [3] The third report explores the economic benefits that renewables generate for the host economy and asks how they can be shared with local communities.

The economic benefits of renewable energy are increasingly clear, and we highlight their significance particularly, but not only, for the Global South. Renewables materially enhance energy provision by offering more equitable access to more affordable energy. They are an important source of inward investment, boosting the local economy through increased activity along the supply chain. As the sector grows, it is becoming an increasingly important employer. Last but not least, progressively cheap renewables boost economic productivity and create new areas of comparative advantage for the solar-rich countries of the Global South.

It matters how these benefits are shared with the communities that host the facilities. We explore how renewable energy firms should interact with host communities to maximise local benefits.

We document the potential for local benefits through case studies from both the Global South and the Global North and new evidence gathered for this report, including:

- Estimates of climate finance flows into renewables and their impact on GDP in the 100 largest low and middle-income countries.
- New data and analysis on renewable energy jobs in South Africa.
- New analysis on the productivity benefit of renewable energy in low and middle-income countries.
- Case studies from the Dominican Republic, Kenya, Pakistan and the United Kingdom.

Floating solar panels. Credit: Guanghi Gu

Part 1: The Economic Benefits of Renewables

Access to clean and affordable energy is an important sustainable development goal. Affordable electricity has important social benefits related to education, health and well-being, not least for women, children and the elderly. Renewable energy is our best chance yet to provide affordable energy to all.

But renewables are not just a more effective way of achieving energy access goals. Cheap and reliable energy is also key to sustained economic development. Renewables have powerful economic benefits, over and above those of traditional energy sources, in terms of investment, employment and productivity growth.

We review these benefits in turn.

Inclusive access to affordable energy

Renewable energy is rapidly becoming more affordable[4], but affordability is not even across all socio-economic groups. Poor households still struggle to pay the high upfront costs associated with acquiring these technologies. Achieving universal energy access requires that the development of renewable energy generates inclusive outcomes, especially for those who are poor and marginalised such as rural communities and women.

Renewable energy firms play a critical role in enabling inclusive access to energy for these groups. As we documented in last year's report, many firms intentionally target this market segment, combining the inherent technological advantages of renewables with business models that respond to the specific needs and constraints of local communities.

Renewable energy firms enable access to electricity through distributed renewable energy technologies which are more effective in reaching rural and sparsely populated areas. Small scale units like solar home systems and mini grids are deployed to these locations where grid connections are costly or impractical. Distributed energy also offers more reliable access to power that is easier and cheaper to maintain than grid-based infrastructure.

In Africa, PowerGen Renewable Energy, an off-grid energy provider, has connected rural communities to renewable energy in countries including Nigeria and the Democratic Republic of Congo. In Latin America, Revolusolar is working to provide solar solutions to rural communities in the Amazon that have not been reached by grid infrastructure. In the United Kingdom, SSE Renewables is developing energy infrastructure in rural and coastal areas to ensure that rural communities are not left out of the transition to low-carbon energy.

Although deployment of energy to these regions generates local and national economic benefits, there still exist barriers associated with these investments. Governments and their development partners should identify these risks and leverage de-risking instruments to incentivise investment. To overcome affordability constraints, they can deploy lifeline tariffs where energy consumption below a certain threshold is supplied at a base price.

In Sierra Leone, mini-grid developers are working with the national government to integrate lifeline tariffs into the provision of renewable energy to benefit poor households.[5] Developers who operate small mini-grids in Sierra Leone also negotiate the price of electricity with customers, thus ensuring that affordability is integrated into the final price of electricity.

In short, renewable energy firms have become critical in enabling inclusive access by local communities and poor and marginalised households in both the Global South and the Global North. However, expanding inclusive access will require collaboration and partnerships across the renewable energy space to ensure that firms can manage the risks associated with these investments, for example through policies for the aggregation of renewable energy projects and integrating productive use of energy into projects.

Box 2.1: Improved health outcomes for women and children

Renewable energy can dramatically improve health outcomes by reducing indoor and outdoor air pollution.[6] The benefits are particularly pronounced for women and children, who are most exposed to harmful emissions from traditional cooking fuels. For example, Sistema.bio, a renewable energy firm operating in Mexico, Kenya and India, installs biodigesters that enable clean cooking. This has substantially lowered the concentration of household air pollutants, reducing women's exposure and improving respiratory health.

Renewable energy with battery storage also strengthens health systems by providing reliable electricity for critical services. In rural areas of low and middle-income countries, intermittent power supply often constrains vaccine storage, maternal care and emergency treatment. Decentralised renewable energy offers a sustainable alternative. Enel Green Power installed a 160 kW hybrid solar photovoltaic system with batteries at St. Luke's Hospital in Wolisso, Ethiopia, ensuring continuity of care despite frequent blackouts. Similarly, the SELCO Foundation in India has deployed solar solutions to over 25,000 healthcare facilities across 12 states.[7]

These initiatives illustrate how renewable energy improves both environmental quality and health resilience, while advancing gender and social equity.

Growth through inward investment

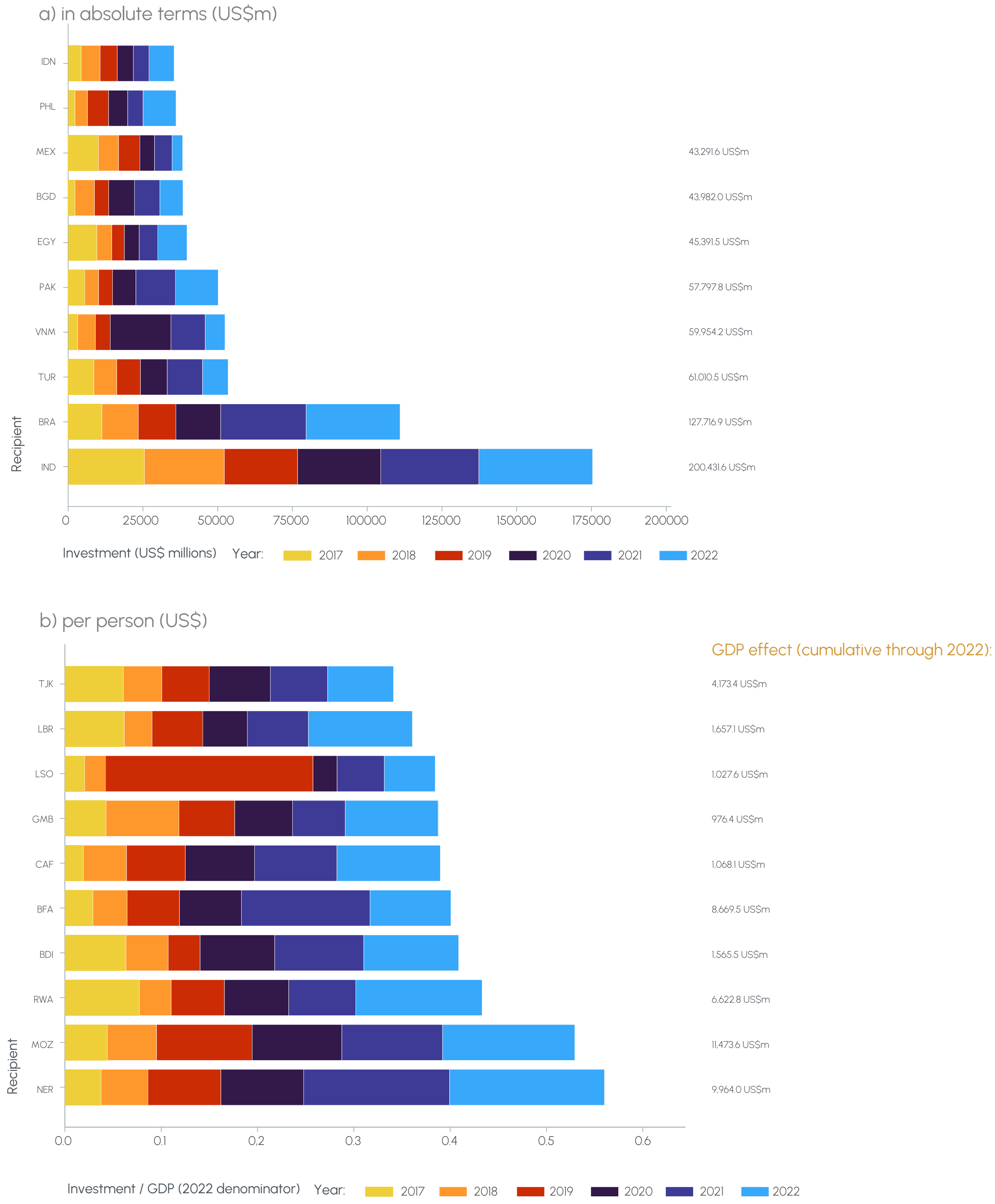
The insufficient flow of climate finance to low and middle-income countries is a central concern in the international climate change negotiations. However, where climate finance does flow, it is generating significant benefits and investment-led growth.

Clean energy delivers a much stronger boost to the economy than fossil fuels per dollar invested. This is particularly the case if expenditures can be localised, as the power utility KenGen is doing in Kenya (see Chapter 6). There is a stronger multiplier effect from the demand for local goods and services – equipment, civil works, engineering skills, transport services and so on – which recycle capital back into the local economy. Wages earned by renewable energy workers are also largely spent locally, reinforcing the growth impact.

The IMF estimates that each dollar of renewable energy spending generates 1.2–1.4 times as much in economic activity in the short term and 1.4 – 1.5 as much over the medium term.[8] In contrast, fossil fuel investment has a multiplier of less than one, as it tends to crowd out other activities. This is one reason renewable energy investment was promoted as a stimulus measure during the COVID-19 pandemic.[9]

Even at current modest levels, climate finance is therefore significant economically. In 2022, US$284 billion flowed into low- and middle-income countries (excluding China), 85% of which from public sources. The largest recipients of renewable energy finance in absolute terms are big emerging economies—India, Brazil, Turkey and Vietnam, which secured more than US$50 billion each between 2017 and 2022. Relative to GDP, the most notable recipients are African countries like Niger, Mozambique and Rwanda (Figure 3.1).

Figure 3.1: Biggest recipients of climate finance (2017-22)

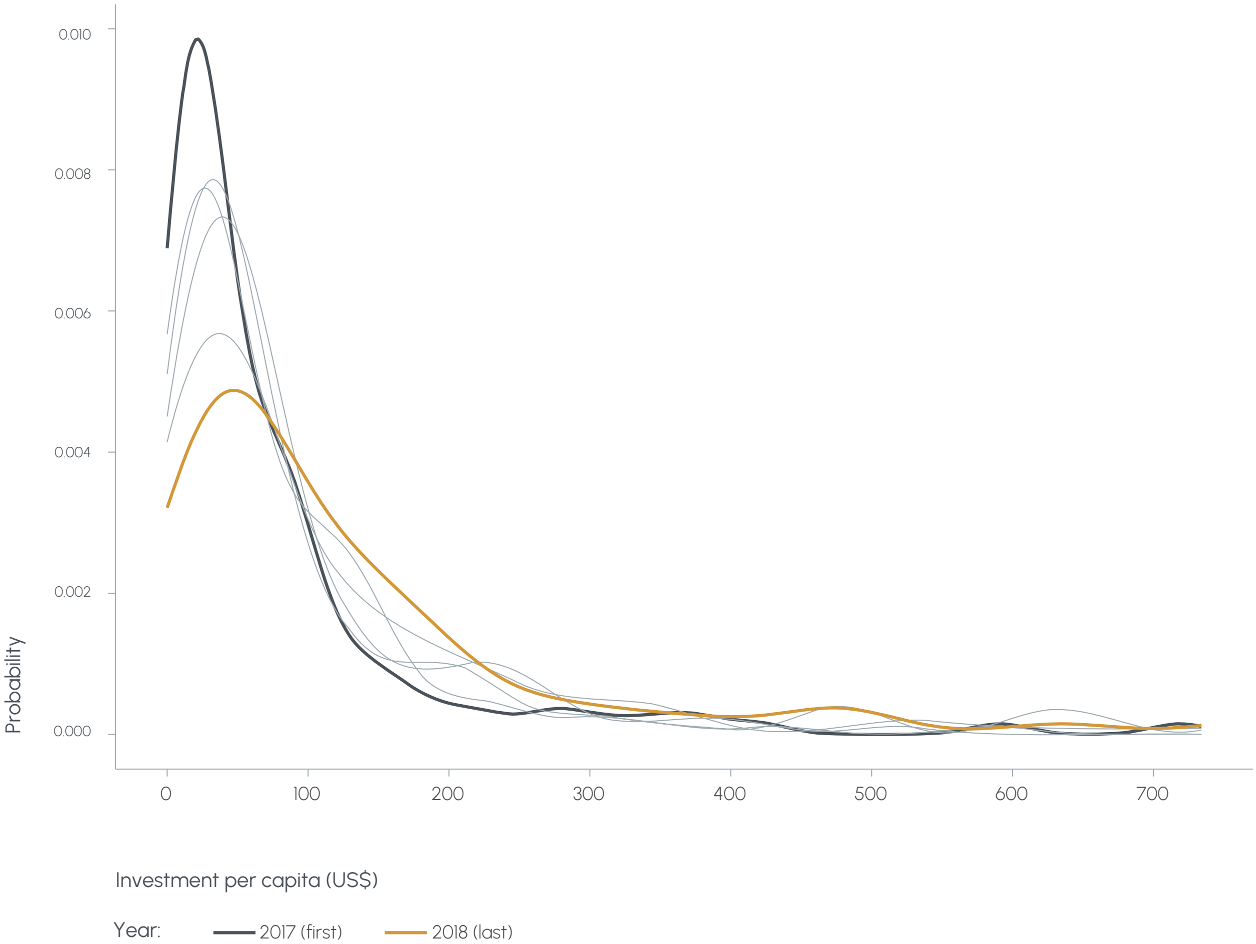


Note: Data for the 100 largest low and middle-income countries (excluding China) from Climate Policy Initiative, covering both international and domestic investment.

Leading investee countries share certain features, including abundant renewable resources, strong policy support and growing energy demand. Many also benefit from a thriving community of renewable energy entrepreneurs, as we documented in last year's report. Vietnam is a prime example: its installed solar capacity grew by a factor of 4,000 from just 4 MW in 2015 to over 16 GW today, thanks to attractive feed-in tariffs, tax breaks, reduced land fees and widespread public support.10

However, the distribution of finance is uneven. A handful of countries attract a disproportionate share, while many others receive little, and over time this pattern has become more pronounced. Average renewable energy finance per unit of GDP has doubled since 2017, driven mainly by gains at the top end, while flows to median and below-median countries have remained stagnant. In statistical terms, the distribution of finance has become increasingly skewed (Figure 3.2). The countries at the bottom end of the distribution urgently need support from donors and policy makers.

Figure 3.2: Distribution of climate finance by country (2017-22, US$ mn)

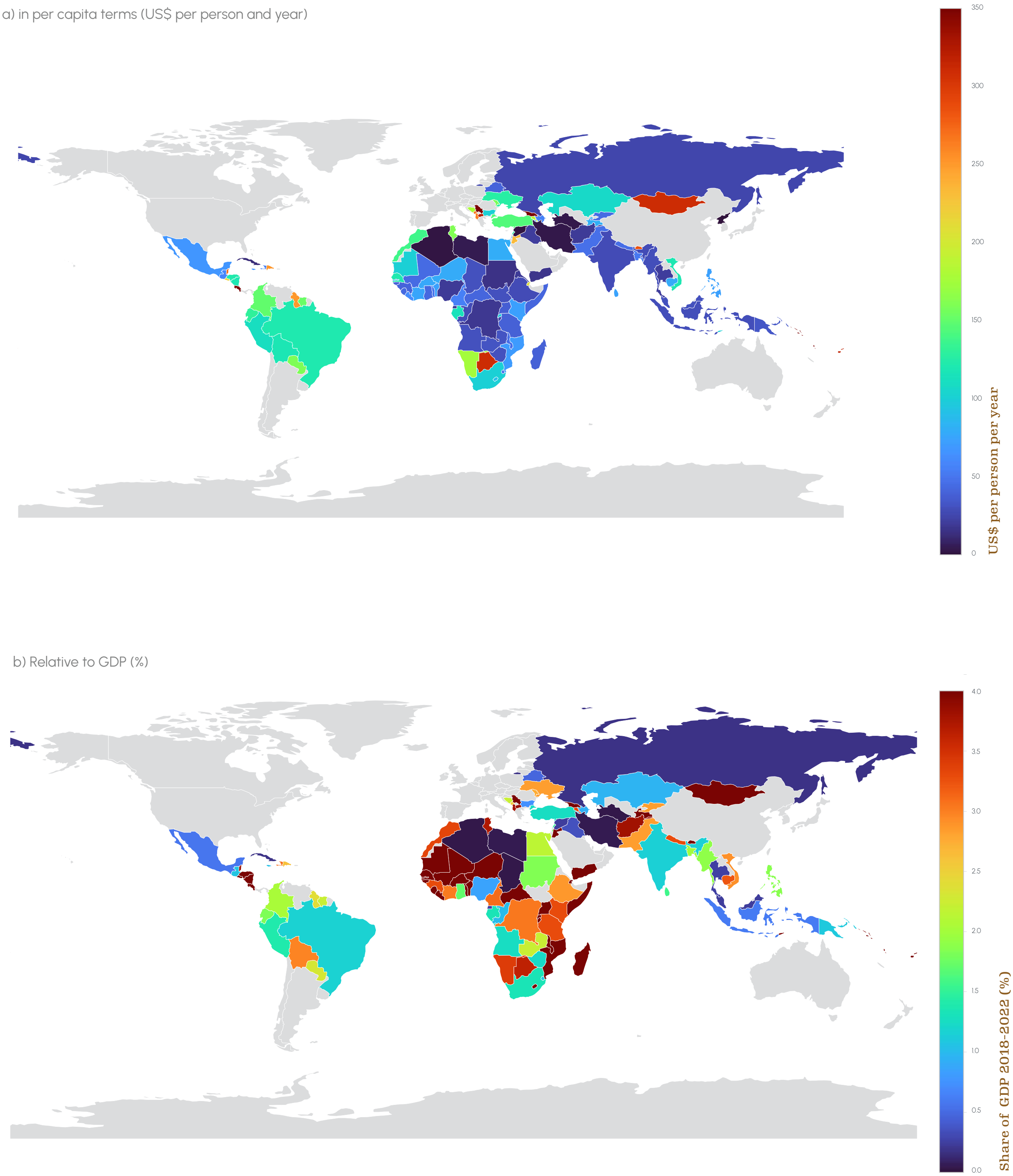


Note: The chart shows a fitted probability density function of climate finance flows by country. That is, we have identified the mathematical function and parameter values that best fit the distribution of observed data. Climate finance data from Climate Policy Initiative.

In Brazil, renewable energy investments has raised GDP by US$128 billion between 2017 and 2022

The uneven distribution of finance flows is reflected in the way the economic benefits of investment are shared (Figure 3.3). Climate finance flows between 2017 and 2022 increased GDP in the 100 largest low- and middle-income countries (excluding China) by about US$1.2 trillion. However, the national impact varies, ranging from 2.2 to 5.3% of GDP for most countries (35th–75th percentile). In per capita terms, this equates to US$40–147 per person per year. In Brazil, the host of COP30, renewable energy investments between 2017 and 2022 raised GDP by US$128 billion, or 1.17%, over that period.

Figure 3.3: The impact of climate finance on GDP (2017-22)



Note: The figure displays the cumulative impact of climate finance flows between 2017 and 2022 on gross domestic product (GDP) over the same period. Climate finance data are from Climate Policy Initiative. Annual finance flows were multiplied by economic multipliers from the IMF (ref. 8), which measure the cumulated economic impact of an investment over multiple years.

Unlocking further investment—and the growth benefits that come with it—would benefit from a supportive business environment and close collaboration between entrepreneurs, policy makers and communities. In previous reports, we have identified the main issues renewable energy entrepreneurs are concerned about and the support mechanisms they are looking for.

They include measures to mitigate currency, country and regulatory risks, transparent energy auctions, effective and fair planning regimes and access to blended finance to improve affordability.[11] An example of where this has happened successfully is the Dominican Republic (see case study in Chapter 6).

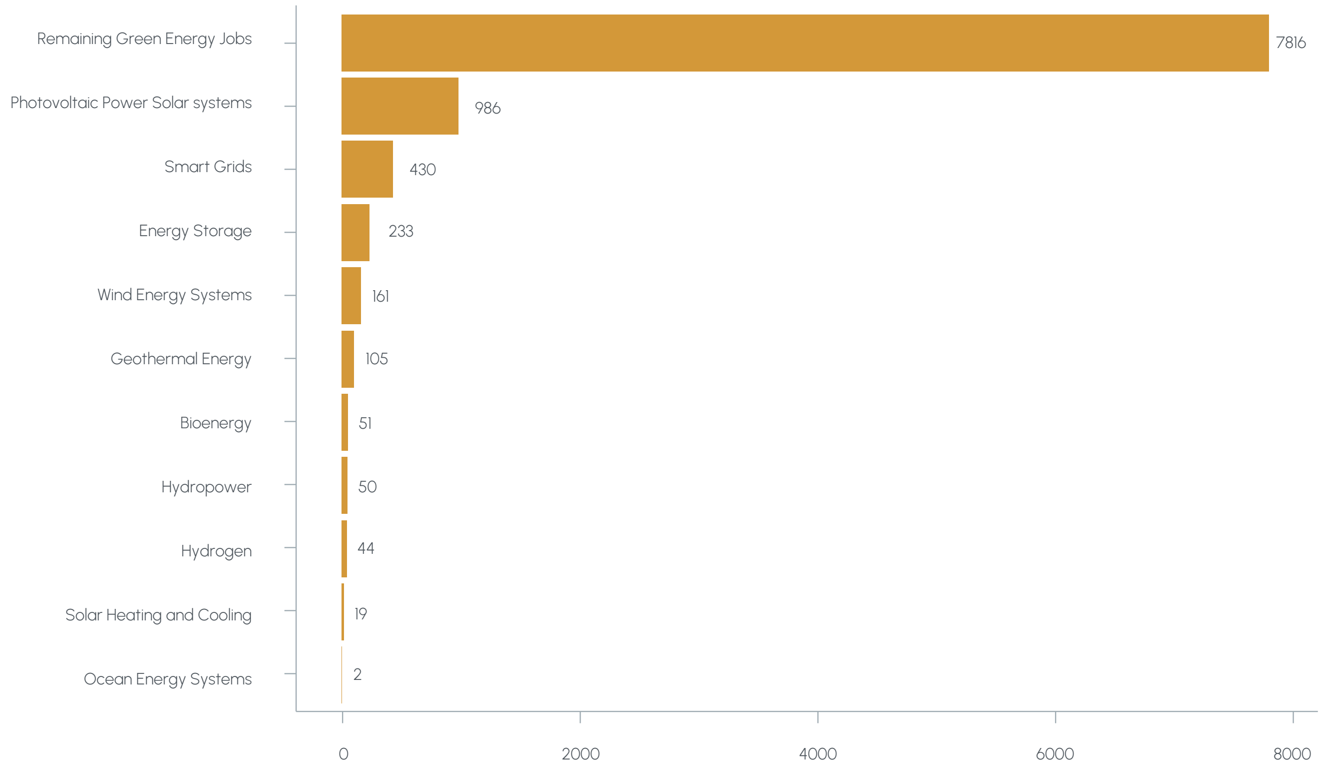
New job opportunities

There is worry about the impact of the energy transition on employment. Yet, renewable energy firms are increasingly important employers, and the overall number of energy jobs is steadily going up. In 2023 there were 16.2 million global renewable energy jobs, up from 13.7 million in 2022.[12] Almost half of them were in China, followed by the European Union, Brazil, the United States and India, which had between one and two million renewable energy jobs each.

There could be 43 million jobs in the renewable energy sector by 2050, more than the current levels of employment related directly to fossil fuels[13] and outweighing expected job losses across all net zero scenarios.[14] While these numbers do not address important distributional aspects of a just transition, they are nonetheless clear. Renewable energy jobs in a zero-carbon economy will be more abundant than fossil fuel jobs are under business as usual.

Figure 4.1 shows how renewable energy jobs are taking hold in South Africa. Data collected for this report suggest that between August 2024 and August 2025 some 3% of jobs advertised on a major South African online platform were linked to green energy, which we define to include jobs related to renewables as well as energy efficiency, e-mobility and cross-cutting technology like energy storage, smart grids or co-generation. South Africa is still in the beginning stages of the transition, and we find that most green energy jobs are not yet in renewables, but in cross-cutting technologies that more readily allow workers to use their existing skills. This pattern is typical of the heterogeneity in green jobs across developing countries more broadly.[15]

Figure 4.1 Clean energy job opportunities in South Africa (2024 / 25)



Note: Data were collected from the website Careerjet.co.za between August 2024 and August 2025. Vacancies were classified into clean and conventional jobs using a set of 700+ pertinent keywords. The category "remaining clean energy jobs" includes all clean energy jobs that do not fit the nine renewable energy technology categories of the IEA Technology Collaboration Programme, including those linked primarily to energy efficiency, e-mobility and cross-cutting technologies like co-generation and heating / air conditioning.

Much like fossil fuel jobs today, clean energy jobs may be unevenly distributed within and between regions. For example, local employment from clean energy projects might mainly comprise construction while engineering, legal and other professional tasks are performed elsewhere, potentially reducing the benefits to local communities. In other cases, there may be mismatches between regions where jobs are lost and new ones are gained.

Job disparities also remain along clean energy supply chains and manufacturing, not least in low and middle-income countries. However, there are some success stories, such as in India and Indonesia which have each seen a 35% rise in clean energy manufacturing since 2019.[16]

Another potential complication stems from the fact that not all newly created jobs will persist in the long term or across contexts. For example, constructing new clean energy infrastructure will likely create more jobs than its subsequent operation and maintenance can sustain. On a path to net zero, the International Energy Agency estimates that nearly half of new energy-jobs by 2030 will be construction related.[17] Rapid roll out of clean energy related projects is poised to prolong job growth for several years, but further into the future the rate of job creation is likely to level off.[18]

Perhaps the largest job market challenge is the shift in skill requirements. The types of jobs demanded, and the skills necessary to do them well, are set to change.

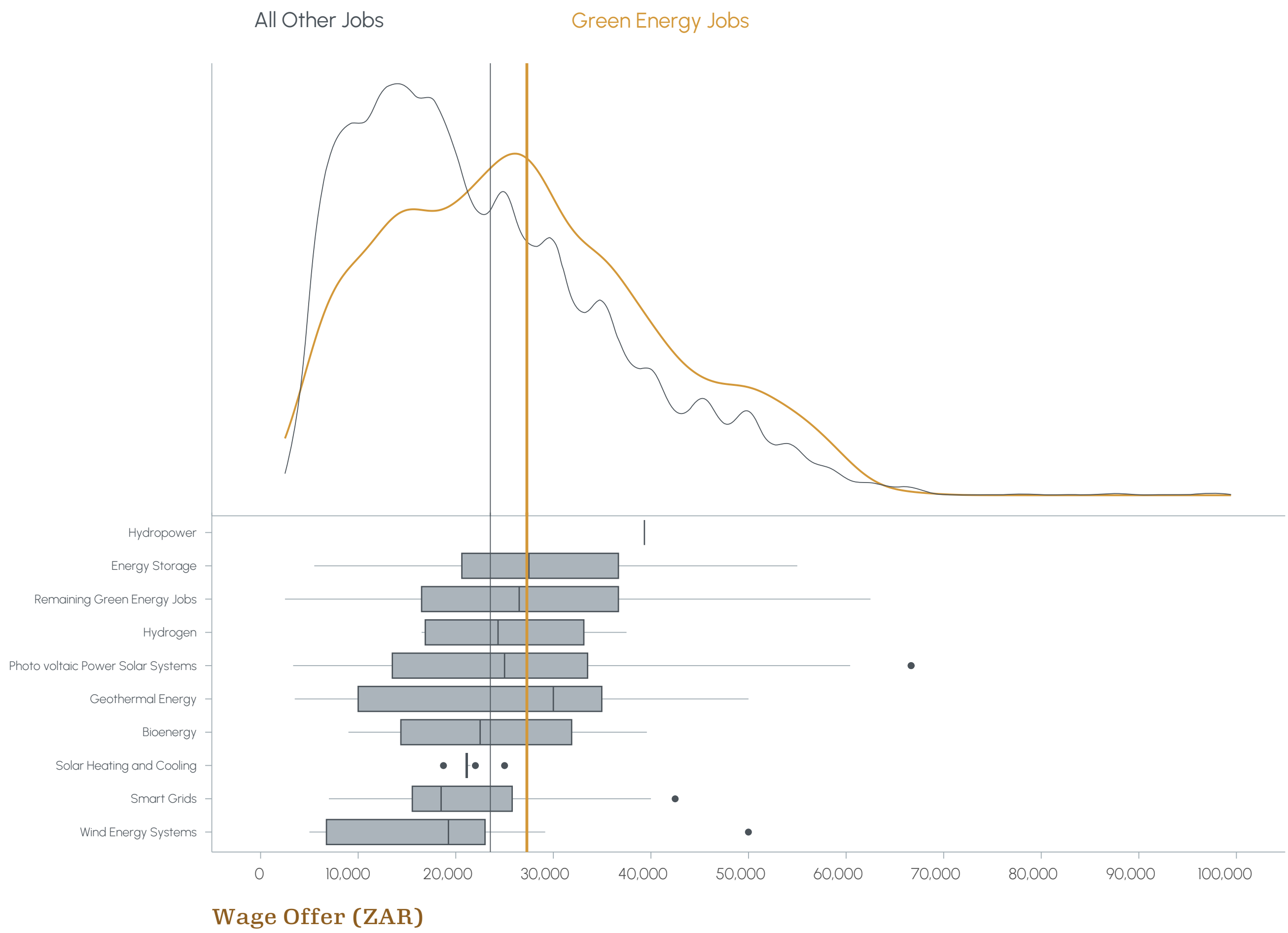
Energy sector employees, both new and conventional, are highly skilled on average; 36 percent of energy jobs fall within high-skilled occupations, compared with 27% in the broader economy.[19] As a result, the predicted increase in the number of energy jobs will necessitate substantive training, education and transitioning programmes to avoid labour shortages and effectively support workers at different career stages, whether they enter the labour market for the first time or transition into the energy sector.

Clean energy jobs promise higher wages and less hazardous working conditions

On the upside, clean energy jobs are often high quality, with better wages and working conditions. Such a "green premium" has been found in multiple contexts,[20] [21] and it is also evident in the South African data. Figure 4-2 shows the empirical distribution of wage offers in the South Africa data for green energy jobs (in gold) and all other jobs (in grey). On average, the former pay ZAR 3,745 (US$ 215) more per month than the latter, a statistically significant difference of almost 16%. We should expect that a large part of the difference is due to skill differentials, though, and the true green premium is likely smaller.

The skill gaps may well grow over time. Like in many emerging sectors, technology development in renewable energy tends to increase the need for skilled workers, and the current rate of renewables deployment is already outpacing skills training in several areas.[22] Ramping up efforts to anticipate skill gaps and adapt education and occupational policies accordingly is therefore central to preparing workers for the global energy transition. This requires a social dialogue between governments, workers and firms. Tangible steps to make this labour market transition more equitable and just could include establishing a national green skills taxonomy, assessing green skills as part of national workforce planning, promoting wage parity, gender diversity, and robust labour standards across green jobs, and realigning educational curricula with current and future labour market demands.[23]

Figure 4.2 Wages in traditional and green energy jobs (South Africa, 2024 / 25)



Note: Data were collected from the website Careerjet.co.za between August 2024 and August 2025. Vacancies were classified into clean and conventional jobs as described in Figure 4.1. The grey and gold lines indicate the mean wage for other and clean energy jobs, respectively. The grey box plots show the distribution of wages across ten categories of clean energy jobs.

A boost to economic productivity

Access to modern energy has always been central to economic growth. The advent of renewables is strengthening and extending this connection. Far from being a drag on the economy, the falling costs of renewables means they are now driving future productivity growth. For the solar-rich countries of the Global South, renewables can be the source of important new cost advantages.

Cheap renewables raise productivity in two main ways. First, they make energy production itself more efficient: more electricity is generated for every dollar invested, with fewer losses compared to fossil fuels or biomass. Second, they spill over into the wider economy, lowering energy costs for households, businesses and industries that depend on affordable power. When factories can run longer hours at lower costs, the entire economy benefits.

Economists use the concept of total factor productivity (TFP) to summarise how efficiently an economy (or sector) turns inputs (such as labour and capital) into output. Figure 5.1 reports projected changes in energy-sector TFP (on a useful-energy basis) from 2024 to 2050 under a rapid transition scenario.

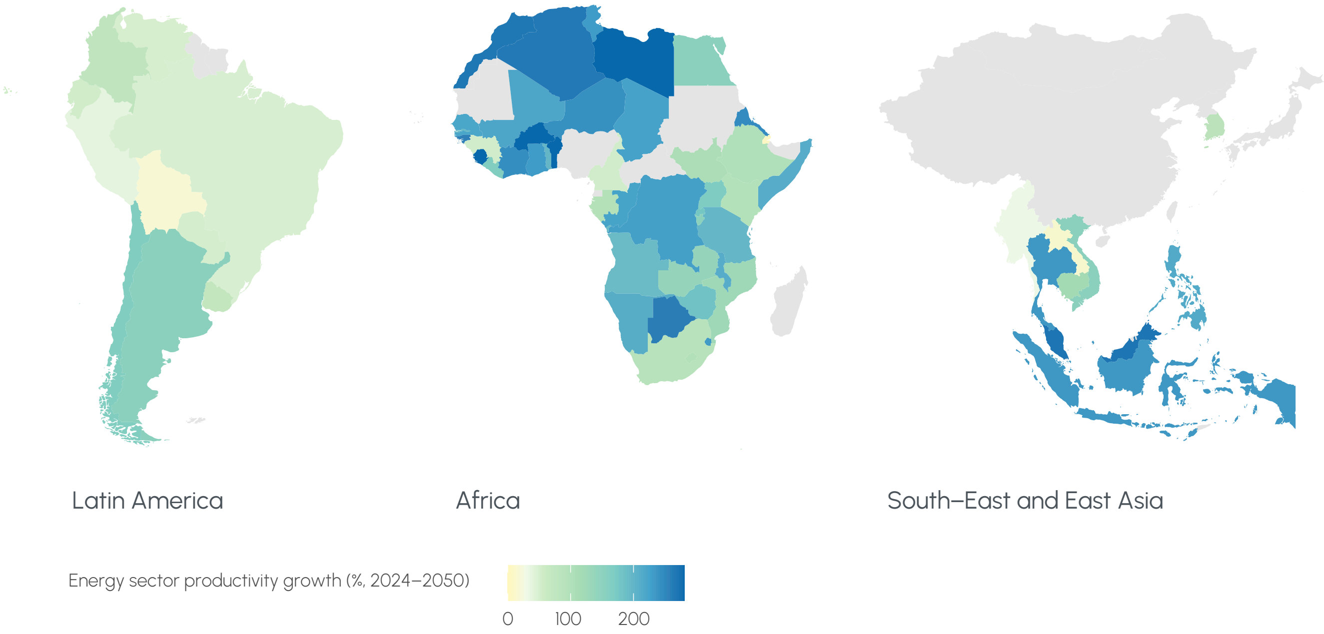
The results are striking. For most countries, the gains in energy sector productivity are close to or in excess of 100%. That is, under a rapid transition to renewables, TFP in the energy sector could double within 25 years. Productivity gains are particularly dramatic in Sub-Saharan Africa, which still relies heavily on traditional energy sources.

Switching to clean electricity has an immediate impact on energy productivity when measured on a useful-energy basis. For heating, for example, biomass and electricity offer the same service, that is useful energy, but electricity requires much less primary energy to provide it because there are fewer losses in combustion and fuel extraction.

But electrification has wider benefits. In East Africa, for example, solar-powered cold storage, water pumps and irrigation systems are lifting agribusiness productivity.[24]

Under a rapid transition to renewables, energy sector productivity could double

Figure 5.1: Projected change in energy-sector productivity (useful-energy basis), 2024–2050.

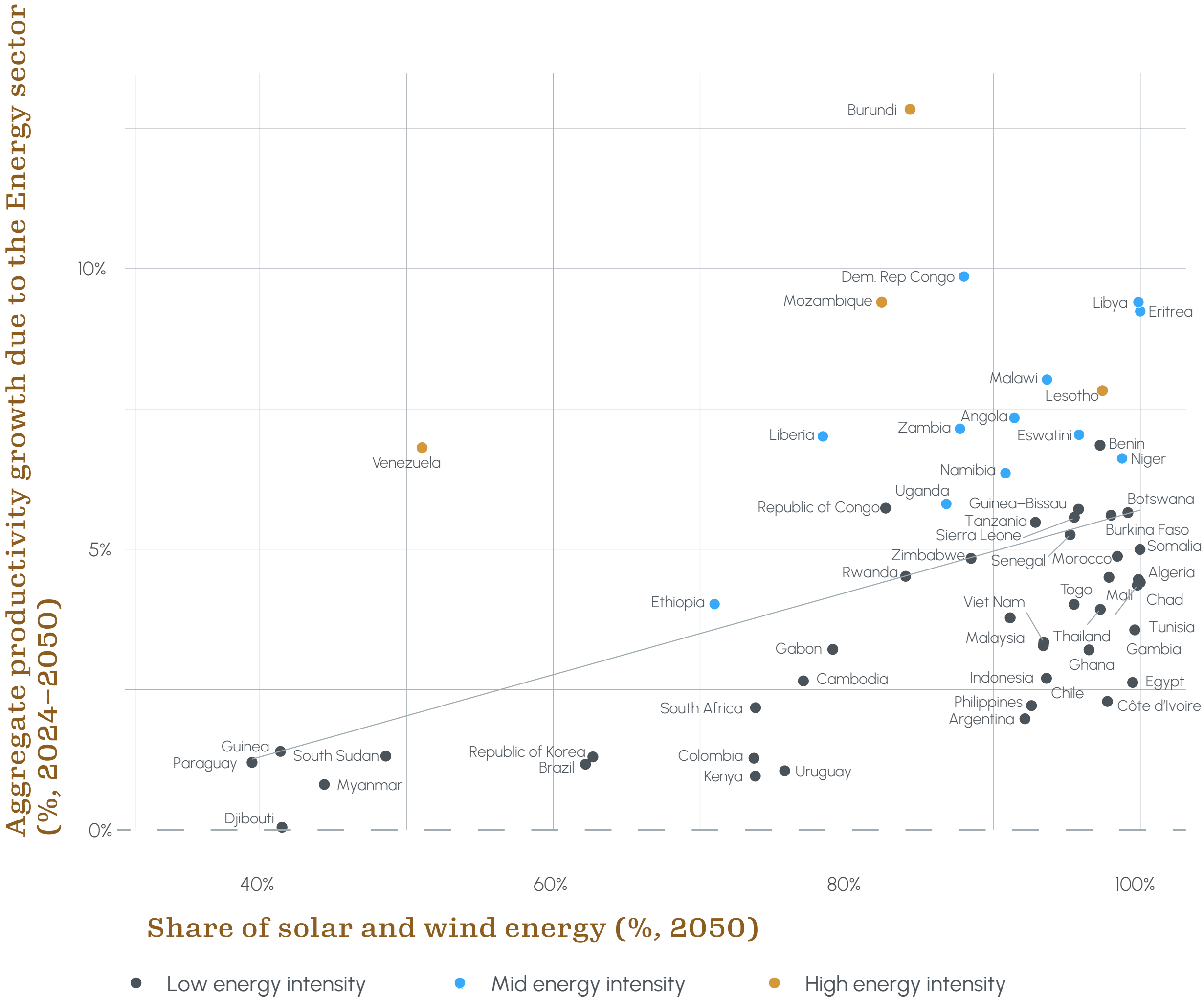


Note: Darker blue = bigger gains; yellow = limited gains. Based on a methodology developed by Ravigné and Lafond[25] and using the open-source energy model OSeMOSIS[26] with data from the CCG Starter Data Kit .[27]

The potential for energy productivity growth from renewables depends on two factors: how much total energy output grows, and how large the renewables share is in the useful-energy mix. The extent to which energy productivity gains translate into economy-wide (or aggregate) productivity gains depend on a further factor: the country's energy intensity, that is, how big the energy sector is as a share of the economy.

Figure 5.2 shows the relationship. Aggregate productivity growth rises in proportion to the share of renewables (solar and wind) in the energy mix, as shown by the upward sloping trend line. Countries with a high renewables share in 2050 see bigger aggregate productivity gains.

Figure 5.2: Economy wide productivity due to the energy transition



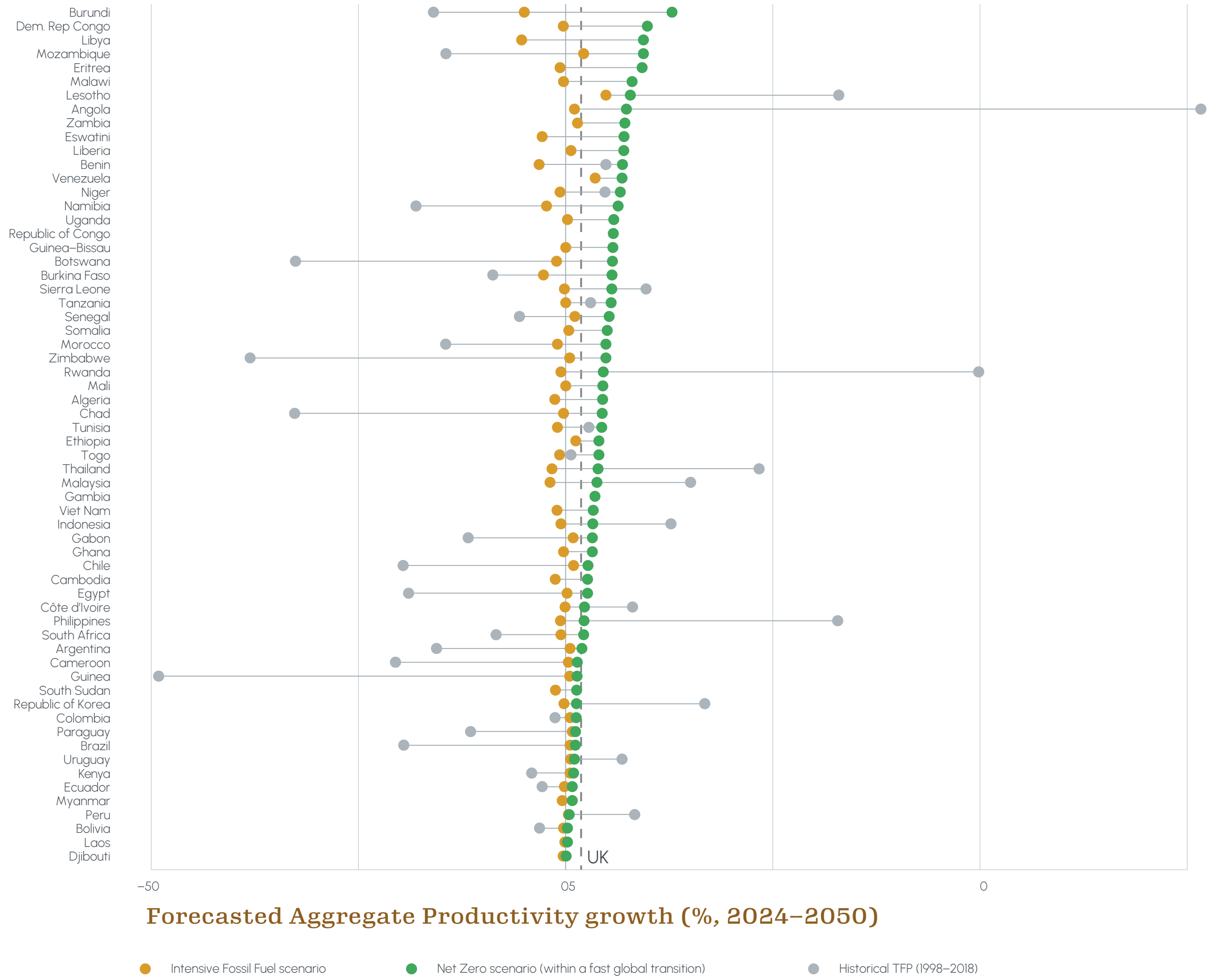
Note: The y axis depicts aggregate (economy-wide) change in TFP between 2024 and 2050 (useful energy basis) under the OSeMOSIS fast transition pathway. Each dot is a country; colour indicates energy intensity (low/mid/high). Based on a methodology developed by Ravigné and Lafond (see note to Figure 5.1).

The colour coding highlights how this positive relationship is amplified in energy-intensive economies. In countries where energy is a major input or demand is rising, energy productivity growth is translated into above-average aggregate productivity growth. In contrast, countries where the energy sector carries relatively less weight may enjoy strong energy productivity growth, but this does not translate into equally large economy-wide gains.

Figure 5.3 compares the aggregate (economy-wide) productivity gains from a fast transition to renewables with those under a fossil-fuel intensive pathway. Under a fossil fuel scenario, aggregate productivity growth out to 2050 is broadly flat. Economic growth would have to come from non-energy intensive sectors or be driven by increased capital accumulation.

In contrast, under the renewables pathways almost all countries, but particularly those with a high energy intensity, enjoy substantial aggregate productivity growth. The productivity boost is typically larger than the historical performance over the past 20 years. In the case of Burundi, DR Congo, Libya and Mozambique total factor productivity could rise by as much as 9-12%. An increase in TFP directly translates into an equivalent rise in economic growth, that is, GDP will grow by the same amount.

Figure 5.3: Aggregate (economy-wide) productivity under a fossil fuel and renewable energy scenario



Note: The chart depicts TFP growth (useful energy basis) between 2024 and 2050 under the OSeMOSIS fossil fuel scenario (gold) and fast transition scenario (green). Grey markers show historical productivity growth (1998–2018), with the UK's fast transition case shown as a benchmark (dotted line). Based on a methodology developed by Ravigné and Lafond (see note to Figure 5.1).

The productivity gains in most countries also far exceed those of the UK (and other developed countries) under the same scenario, which are around 2% out to 2050. See dotted vertical line in Figure 5.3. In other words, comparative advantages could shift in favour of the Global South. Compared to energy productivity in a fossil fuel world, the renewables-rich countries of the Global South can expect to have a distinct cost advantage in the net zero-economy. To secure it, they have to exploit four factors:

- Abundant solar resources – solar is already the cheapest form of power generation and costs continue to fall.
- Leapfrogging potential – rising demand can be met directly with clean energy, without having to replace an entrenched fossil infrastructure.
- Energy intensity – in countries where energy makes up a large share of total output productivity improvements will ripple through the economy more strongly.
- Replacing inefficient fuels – transitioning from biomass and coal to clean electricity eliminates wasteful and polluting energy use, reducing costs and yielding major productivity gains.

Countries that pursue these avenues can lock in a productivity dividend on a par with that of past industrial revolutions.

Local community meeting. Credit: Pakhtunkhwa Energy Development Organization

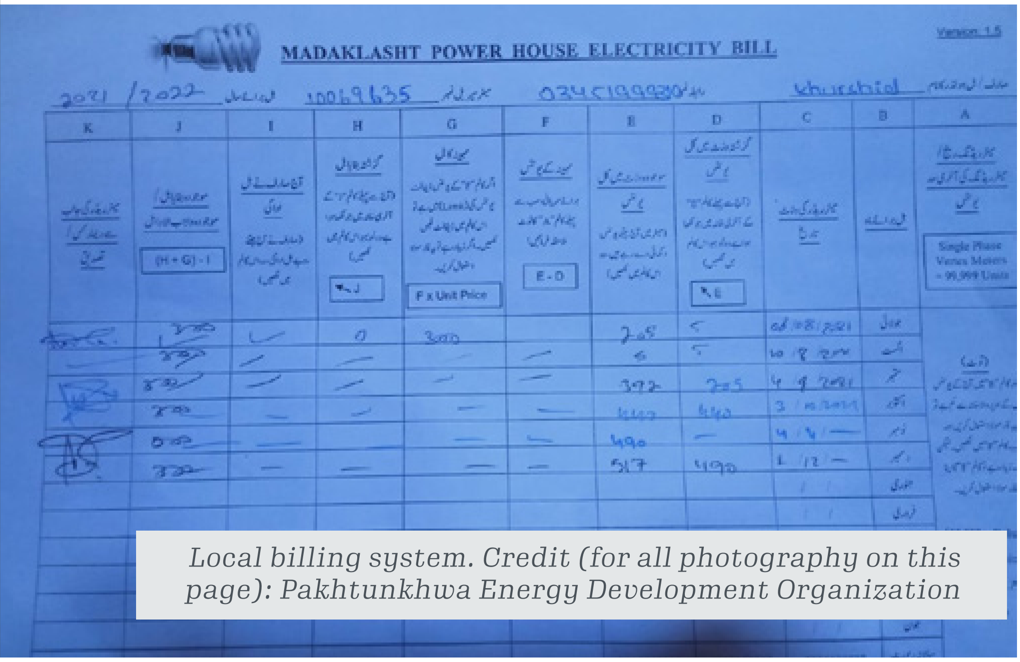
Case studies

Unlocking clean investment in the Dominican Republic

The Dominican Republic demonstrates how targeted reforms and public–private collaboration can unlock inward investment in renewable energy.[28] Despite persistent challenges in the power sector, recent years have seen a surge in clean energy development, driven by clear policy direction, regulatory incentives and strategic use of climate finance.

This case study examines how the country mobilised over US$6.5 billion in investment, demonstrating how climate ambition can be matched with investor readiness to deliver tangible development outcomes. Between 2020 and 2023, renewable energy capacity more than doubled, from 555 MW to 1,126 MW. The clean energy sector attracted US$3.3 billion in private capital alongside US$3.2 billion in public funding. Clean energy became one of the fastest-growing sectors in the economy, alongside tourism.

Community enjoying electricity during snow.



Local billing system. Credit (for all photography on this page): Pakhtunkhwa Energy Development Organization

Local community getting clean energy.

Between 2020 and 2023, the Dominican Republic attracted US$3.3 billion in private capital alongside US$3.2 billion in public funding

A good example is the Santanasol solar project, which secured US$36 million in commercial debt financing from Scotiabank, a Canadian bank, and included 20% domestic equity participation from AES Dominicana, a local energy company. This combination of international and local capital reflects growing investor confidence and demonstrates how domestic anchor investors can play a catalytic role in attracting foreign finance by lowering perceived risks. Santanasol benefitted from streamlined permitting, a stable regulatory framework, and access to a standardised power purchase agreement, conditions that enabled it to close on fully commercial terms. The project is part of a growing pipeline of utility-scale and hybrid renewable energy systems now attracting inward investment across the country.

Progress has been enabled by a combination of upstream and downstream measures designed to improve the overall investment environment. The Dominican Republic's ability to attract investment into renewables is underpinned by a clear, long-term policy vision. The government's commitment to carbon neutrality by 2050 and a 27% reduction in greenhouse gas emissions by 2030, outlined in its updated Nationally Determined Contribution (NDC), sent a strong signal to investors. This vision was institutionalised through the National Energy Plan 2021–2036, which prioritised renewables as a cornerstone of the country's energy future.

Supporting this ambition is a robust legal framework, including the *General Electricity Law*, the *General Law on the Environment*, and the *Renewable Energy Incentives Law*. Together, these laws provide a mix of fiscal incentives and regulatory stability, including 100% tariff exemptions on equipment imports and tax credits for investors. In 2023, the government took further steps to enhance regulatory transparency through Decree 65-23, which streamlined procurement processes and standardised permitting, critical for improving bankability and reducing entry barriers for private capital.

Alongside legal and policy reform, affordable and de-risked finance has been central to scaling investment. The government worked closely with partners such as the Inter-American Development Bank (IDB) and the Green Climate Fund (GCF) to mobilise concessional capital for early-stage projects, grid modernisation, and technical assistance. These actors provided blended finance structures that absorbed currency and political risk, making projects more attractive to commercial financiers.

Importantly, the government retained ownership of the investment agenda, aligning external finance with national priorities and sequencing projects within a broader institutional framework. This prevented fragmentation, built public capacity, and created an investable pipeline that reflected country-led development goals, rather than donor preferences. In this way, blended finance helped not only fund individual projects but also catalysed market development.

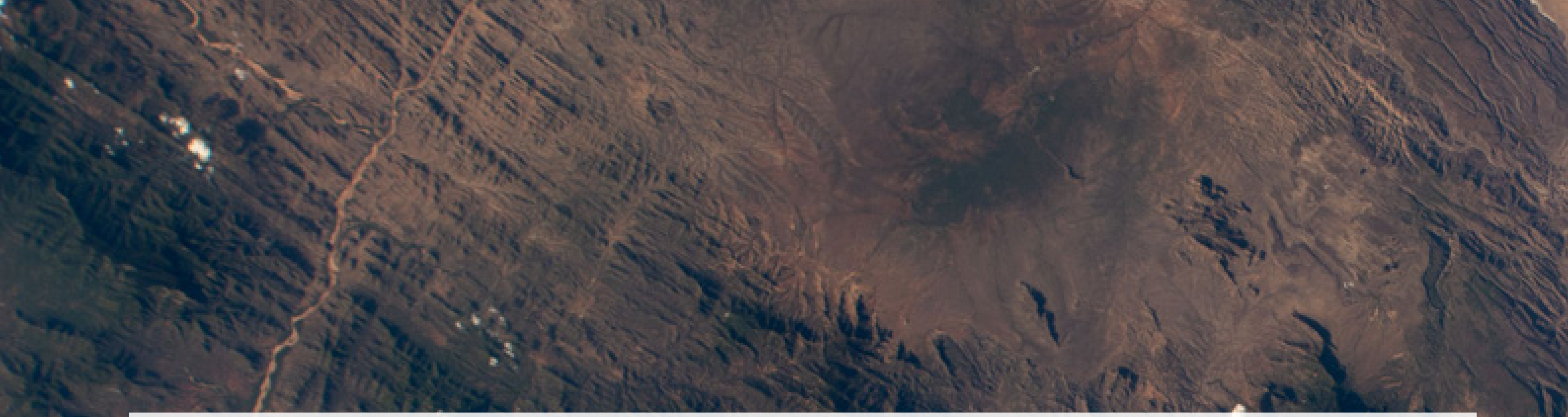
Downstream, the government has prioritised investment in grid infrastructure to match rising generation with system readiness. Between 2025 and 2028, the government plans to channel US$450 million into expanding transmission lines and substations, modernising dispatch systems, and enhancing distribution efficiency. These infrastructure upgrades have been supported by development finance institutions and guided by the grid-readiness priorities.

In addition to physical upgrades, regulatory measures have improved the grid code and incentivised the integration of variable renewables. Pilot energy storage projects and curtailment mitigation strategies have further increased the grid's absorptive capacity. For investors, these reforms reduced technical and operational risk, allowing developers to move forward with greater confidence that their projects would be reliably connected, dispatched, and compensated.

Finally, stakeholder engagement has helped secure the social license and institutional alignment needed to sustain investor interest. Institutional reforms clarified roles across the Ministry of Energy, the national utility (CDEEE) and the electricity regulator (SIE), reducing transaction costs and aligning procurement and permitting procedures. This improved institutional coherence addressed a common investor concern in emerging markets, how to navigate bureaucratic complexity without incurring excess risk.

At the community level, the government supported training in solar PV installation and operations, helping to build a domestic workforce and embed local value in supply chains. Procurement strategies promoted local content, and early-stage consultations helped secure buy-in for large-scale infrastructure. These initiatives helped shift perceptions of renewable energy, from top-down interventions to tangible investments that deliver jobs, skills, and services in host communities. For investors, this translated into greater project stability and public support.

Important challenges remain, including the need to reduce transmission and distribution losses, improve cost recovery and strengthen institutional capacity, but the country's coordinated approach has yielded tangible results. However, the Dominican Republic's experience offers practical lessons for countries seeking to mobilise climate finance and attract private capital as part of a just and sustainable energy transition.



A clean energy champion for Kenya

The Great Rift Valley system in East Africa is known for its volcanic activity. As tectonic plates shift, magma rises closer to the Earth's surface, heating rocks. When existing underground or human-injected water meets these rocks, it forms superheated water or steam. This steam can be used to move turbines, generating emissions-free, 24/7, geothermal energy. The East African Great Rift Valley has the potential to produce an estimated 15,000 MWe from geothermal resources. Kenya, which sits atop the Rift, is estimated to have a capacity of producing over 10,000 MWe. [29]

Kenya has harnessed this vast underground resource to become a global leader in geothermal - at 989MW, it ranks sixth in the world and first in Africa for installed geothermal capacity.[30] Kenya's geothermal generation first emerged in 1981, after the oil price shocks of the 1970s prompted renewed interest in exploration due to the stable and geopolitical-risk-free energy that geothermal resources provided. By 1985, 45MW had been installed, and geothermal expansion has grown steadily ever since.

Today, nearly half of Kenya's electricity, and most of its baseload power, comes from geothermal, followed by hydro and new renewables (wind and solar), which account for about 20% each. Only 10% of Kenya's electricity comes from fossil fuels, making Kenya's power system one of the cleanest in the world in percentage terms.[31] The government of Kenya aims to achieve 100% renewable power by 2030 and has plans to continue geothermal expansion.

Kenya has a liberalized power market, but suffers from weak transmission and distribution networks and barriers to private sector participation. The development of clean energy resources has and continues to be overwhelmingly undertaken by Kenya Electricity Generating Company PLC (KenGen), which is today a 70% state-owned and 30% publicly traded company on the Nairobi Securities Exchange (NSE). KenGen produces around 70% of the country's electricity, through a mix of predominantly geothermal and hydro, as well as solar, wind and some fossil fuels, and produces 85% of Kenya's geothermal energy.[32]

KenGen is not only the backbone of Kenyan power generation, but also a major contributor to the national economy. The company employs over 2,500 people and supports many more through indirect jobs in its supply chains. It reported revenues of KSh 56.3 billion (US$435 million) in 2024 and a profit after tax of KSh 6.8 billion (US$ 55 million) —a 35% increase from the previous year, driven by strong geothermal and hydropower growth.

KenGen's economic footprint extends beyond energy production. It has recently ventured into solar module manufacturing, aiming to localise supply chains and reduce reliance on imports. This initiative is expected to stimulate domestic industry, create new jobs and enhance Kenya's energy resilience. Additionally, KenGen is developing an Eco-Industrial Park that will use geothermal energy to support industries such as steel, glass, textiles, and food processing, fostering industrial symbiosis and circular economy practices.

Lake Turkana and Mount Kulal Biosphere Reserve in Kenya. Credit: NASA

KenGen's role as a driver of Kenya's clean energy transition and broader economic development is likely to grow as the company implements its expansion plans, both nationally and regionally. KenGen aspires to leverage its geothermal expertise across the continent and is currently drilling geothermal wells in Ethiopia, Djibouti and Tanzania, while assessing geothermal potential in Rwanda, Eswatini and Comoros. However, access to capital may be a limiting factor.

KenGen's drive towards renewables is expected to lead to a sharp increase in energy sector productivity, which could rise by 80% by 2050 (Figure 5.1 above). However, the economy-wide impact of these efficiency gains is muted by the relatively small role of energy in overall economic activity (Figure 5.3).

Part 2: Sharing Benefits Locally

The local communities that host renewable energy projects play a crucial role in facilitating the clean energy transition. A just energy transition requires that the economic benefits of renewables are shared equitably. Communities, policymakers and renewables entrepreneurs are therefore exploring ways to move beyond traditional top-down approaches and towards project structures that are led by local communities, share benefits with them, and adapt projects to their needs.

Consulting local communities on new projects is a fundamental right of the peoples affected. The establishment of strong cross-sectoral stakeholder relationships is one of the 10 key measures to accelerate renewable energy deployment identified in our first report in this series.

However, successful renewable projects require consultation beyond the legally required minimum, with intentional planning and intensive participation by local communities. Deep consultation decreases the likelihood of conflict, protest, and resistance - avoiding costly delays, reputational damage, permitting issues or even project cancellation.[33 34] At the same

Local community meeting. Credit: Pakhtunkhwa Energy Development Organization

time, deep consultation offers opportunities to understand community needs and incorporate them into project design to achieve the highest mutually beneficial outcomes.[35] [36]

Community benefits are one approach gaining prominence – where renewable developers share monetary or nonmonetary benefits with host communities, with a view to enhance the economy, society and/or environment in a local area.[37] Communities are also getting involved more directly in projects through fully-fledged community ownership models, where projects are jointly owned, operated and controlled by communities and project developers and communities benefit collectively from project outcomes.[38] [39] This may include shared ownership of projects between communities and companies or full community ownership.

While most initiatives remain voluntary or community-led, governments in the Global North have begun to take a more active role in guiding the ambition and direction of community benefits and ownership. This ensures a clear direction of travel and can help address potential power imbalances between project developers, governments and host communities.

The priorities, aims and structures of community benefits or community energy models differ by community, and within Global South and Global North settings, but community benefit and co-ownership offers opportunities across contexts to democratise energy, empower communities and foster economic benefits.[40]

Addressing local needs through community funds

Community benefits are increasingly becoming part of renewable energy development in countries such as France, Germany, Italy, Spain and the United States. Some jurisdictions are also moving towards mandating community benefits. In Ireland, renewable energy developers are required to contribute to community funds at a minimum rate of €2 per MWh generated.[41] In the UK consultations are ongoing for the potential introduction of a mandatory community benefits scheme for low carbon energy infrastructure.[42]

The benefits communities receive from projects can take many forms, such as company contributions to a community fund, direct financial payments to municipalities or locals, or in-kind payments such as support for local facilities or services.[43] Outcomes may include improved social acceptance of projects, increased socio-economic prosperity, local energy security and long-term project resilience[44].

A common approach to community benefits is a community investment fund, where companies contribute lump sums or regular contributions to pooled funds for communities. Communities can then decide, based on specific arrangements, how they wish to distribute funds – such as through the creation of a local trust to allocate funding, participatory voting on the use of funds by community members, or other arrangements. Chapter 9 contains a case study on the experience with community funds by project developers in Scotland, which have spearheaded community funds within the UK.

While most examples of community funds tend to be voluntary initiatives in Global North settings, the approach has significant potential to distribute project revenue towards advancing sustainable development and may serve as a useful model in many Global South contexts.

Benefits sharing leads to improved social acceptance, increased socio-economic prosperity, local energy security and long-term project resilience

Energy sovereignty through community (co-)ownership

Renewable energy firms and communities worldwide are also experimenting with different ownership structures (Table 8.1). One approach is shared ownership, where communities become financial partners in a project. Shared projects are typically led by a private developer, with communities offered an investment stake.[45] Under a joint venture model commercial operators and community organisations co-develop and manage the project from the start. Shared ownership approaches are well established in some European countries, such as Denmark, where new wind projects are mandated to be at least 20% community owned.

Under full ownership models, energy facilities are controlled either by a local municipality or a community trust. Communities may partner with a renewable energy firm to develop and / or operate a project that the community owns, or renewable energy firms could themselves be local organisations, which represent local communities and finance and operate the project. The returns from community-owned projects can be invested into community social development projects or distributed to community members. Community ownership has seen successful examples across both Global North and Global South contexts. In the United States, Cooperative Energy Futures, a local cooperative in Minnesota, financed and developed 13MW of solar projects that are managed and owned by cooperative.[46]

Table 8.1: Renewable energy ownership models that involve local communities

Renewable energy ownership model	Description of model	Level of community ownership	Local community control
Community investment	Community members invest in a project through an equity stake	Partial	Low–Medium
Joint Venture	A community group co-owns the project with a private developer or government institution.	Shared, <100% community ownership	Medium
Municipal Ownership	Local authorities or municipal utilities own and operate projects, often with community input.	Via public governance	Medium–High
Full Community Ownership	Communities own the whole of the renewable energy assets either directly or through a foundation or trust.	100%	High

Source: Authors

An important trend in community ownership is the rise of community mini-grid projects, which are increasingly recognised as a low-cost solution to advance energy access for the hundreds of millions of people unconnected to the power grid.[47] Renewables are eminently suited to cooperative models as the technology is modular and technological entry barriers are comparatively low. Chapter 9 introduces a community-owned hydro-electric facility in Pakistan.

Renewables are eminently suited to cooperative models. While community (co) ownership offers empowering opportunities for communities to control projects and design them to their needs, the model is not without challenges. In many cases, financial and technical knowledge barriers are high, and equitable community (co)ownership may be contingent on community capacity building or government support. High financial barriers may create a two-tiered system where only those with the financial capital to invest receive the benefits of the projects.

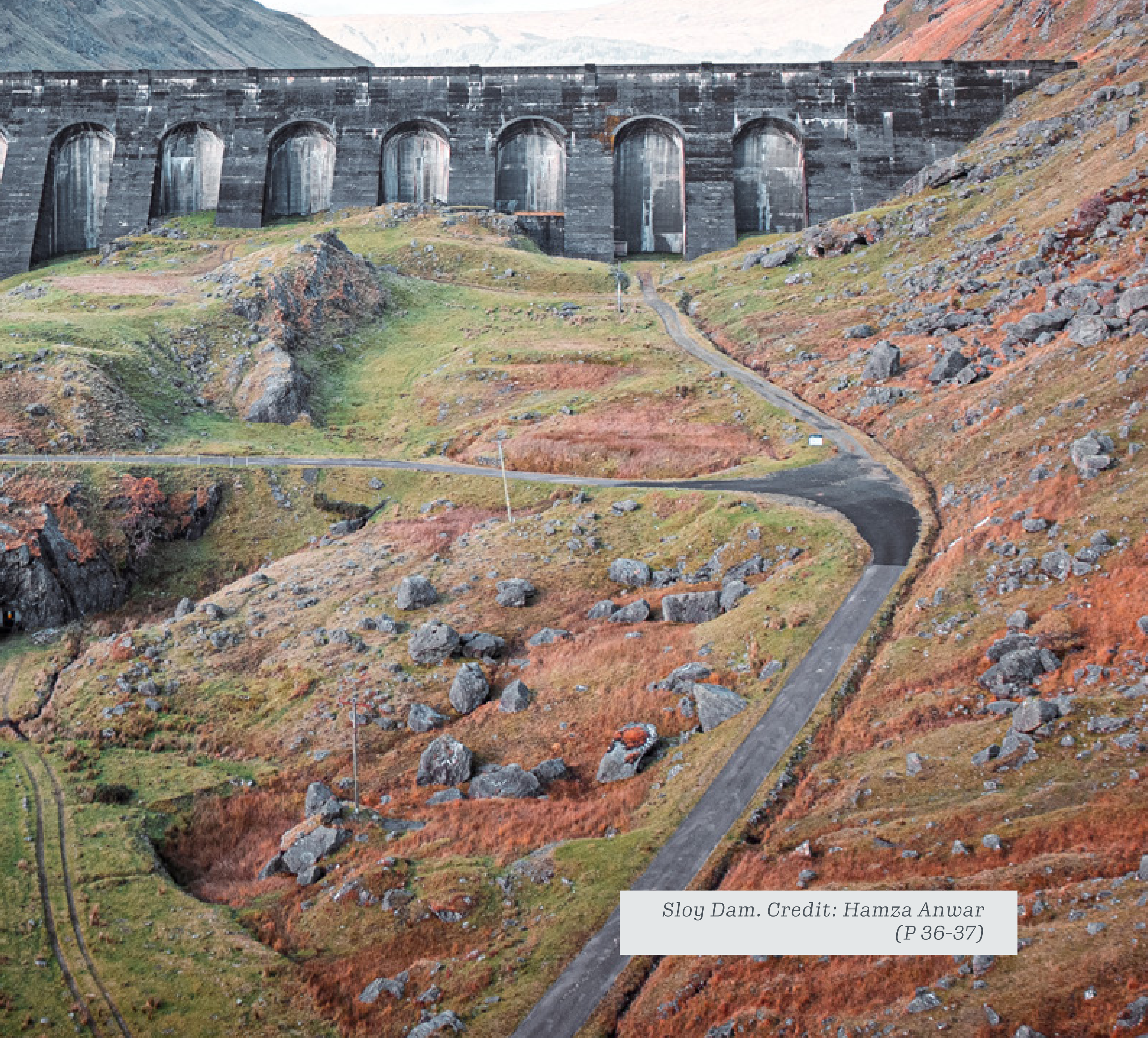
However, carefully planned and with the requisite government support, community ownership models across approaches offer opportunities for direct financial benefits to communities and local democratic decision-making.

Case studies

Benefit sharing through community funds in Scotland

SSE plc is one of the UK's largest developers of renewable energy, which regularly sets up community investment funds. Since 2003, the company has invested over £100 million in more than 12,000 community projects across the UK and Ireland[48]. SSE's community investments take a wide range of structures, seeking to respond to local needs and aspirations.

A frequent solution are community funds, where local non-profit groups can apply for grants, with decisions made by a panel of local representatives to identify community priorities. Regional funds may support larger transformation projects across regions, while enterprise funds specifically support local businesses. Some communities have created a local Development Trust to administer their



Sloy Dam. Credit: Hamza Anwar (P 36-37)

Community-owned housing in Scottish Highlands supported by SSE Renewables. Credit: SSE

community investment and drive specific local projects, while others have allocated funding through participatory grant making, where community members vote on how investments from the renewable project should be directed.

Across all projects, SSE's community investment funds are guided by six principles that put communities' priorities at the core:[49]

- Sharing value - ensuring that benefits from community investment funds are distributed fairly and equitably with communities;
- Co-creation - ensuring the structure and objectives of a CIF are designed in collaboration with communities to understand local needs;
- Maximising impact - delivering maximum positive impact through CIFs;
- Flexibility - adopting a flexible approach to respond to community needs;
- Good governance - maintaining high standards of good governance, ethics and accountability;
- Transparency - communicating openly and transparently with communities.

One example of an SSE community investment fund concerns the 84-turbine Beatrice Offshore Windfarm in Scotland, a joint venture between SSE, Red Rock

Power, the Renewable Energy Infrastructure Group and Equitiz. The project involved a community benefit package valued at £6 million, aimed at communities and organisations in the Highlands and Moray, which followed extensive consultation with local stakeholders.

Funding was distributed through three community funds supporting various local development initiatives such as apprenticeship programs, local jobs, and investing in local assets and community programs. SSE reported that the fund supported 361 projects and enhanced 64 community assets.

SSE's experience with community funds highlights the importance of context specific arrangements guided by communities' needs and aspirations. In practice, community funds involve lengthy and sometimes difficult decisions on the ground surrounding what the level of community benefit should be, how to ensure the benefits are shared equitably and how to involve communities in decision-making about the investments they receive.

Community-owned micro-hydropower in Pakistan

In remote regions of low and middle-income countries, where the national power grid is often inaccessible, decentralised mini-grids can provide a cost-effective and sustainable solution. Mini grids also offer an opportunity for local communities to get directly involved in the business of local energy provision.

This case study examines the Madaklasht micro-hydropower (MHP) project, a community-led development in rural Pakistan.[50] Madaklasht is a remote village in Lower Chitral, Khyber Pakhtunkhwa, home to approximately 4,000 residents (See photographs on pages 26-27).

Prior to the introduction of the 300 kW MHP, the community faced significant energy challenges. With no access to the national power grid, residents relied heavily on inefficient and polluting energy sources like wood-burning stoves and kerosene lamps. This dependence led to environmental degradation, including deforestation and increased greenhouse gas emissions. The absence of reliable electricity hindered economic activities, limited educational opportunities, and restricted access to healthcare services. Women and children often spent considerable time collecting firewood, reducing their opportunities for education and leisure.

The introduction of the micro-hydropower project marked a transformative shift, providing sustainable and reliable energy that has significantly improved the community's quality of life. Benefits include improved educational opportunities, poverty alleviation, strengthened economic activity, enhanced access to information and notable gains in women's entrepreneurship and health outcomes.[51]

The Madaklasht MHP is part of a wider effort by the Pakhtunkhwa Energy Development Organization (PEDO), an autonomous body of the Government of Khyber Pakhtunkhwa, to fast-track energy development by harnessing local resources and provide off-grid electricity solutions to underserved communities.

A distinctive feature of the Madaklasht MHP project is its community ownership and management. Unlike many development projects that rely on external organisations, this initiative was driven and operated by the local community. A community-led Power Committee was established to oversee the MHP's operations. The committee's responsibilities include managing the overall operation and maintenance of the MHP, ensuring proper meter installations and tariff collection, resolving conflicts, maintaining documentation, managing finances, implementing a village development plan funded by surplus revenues, and coordinating with PEDO for technical support and capacity building.

This participatory approach ensured that the project was designed and operated in a way that met the specific needs and priorities of the local population. Community involvement fostered a sense of ownership and responsibility, leading to better maintenance practices, increased willingness to pay for electricity and greater community support for the project.

Community involvement fostered a sense of ownership and responsibility, leading to better project outcomes

Despite its promise, the project faced practical challenges related to technical expertise and financial sustainability. The Aga Khan Rural Support Programme (AKRSP), a private, non-profit organisation established by the Aga Khan Foundation, was brought in to facilitate the construction and operationalisation of the plant and ensure its financial affordability.[52]

The lack of local technical knowledge necessitated the engagement of external experts for plant operations. The community engaged a local firm, Chitral Engineering Services, to manage the plant's operations and maintenance. The firm deployed two trained operators to ensure the plant's efficient functioning, with compensation derived from the revenue generated by the MHP. Ensuring the long-term financial viability of the MHP required effective revenue collection and management practices. Additional support is available from the Micro-Hydro Power Resource and Services Center, which was set up by PEDO to provide ongoing technical support, training and maintenance services to ensure the longevity and efficiency of the region's MHPs.

The Madaklasht MHP became operational in December 2020. Since then, the facility has provided reliable electricity, allowing local businesses to operate more efficiently. Businesses in sectors such as agriculture and small manufacturing can now operate beyond daylight hours, improving productivity. Agricultural processing units can run continuously, increasing output and profitability. Improved energy access has facilitated better healthcare services, enhanced educational opportunities and increased community engagement. The establishment and maintenance of the MHP have created employment opportunities for local residents, including roles for plant operators, technicians, and administrative staff, ensuring that the benefits of these projects stay within the community.

The Madaklasht 300 kW MHP project exemplifies the potential, but also the challenges of community-owned renewable energy initiatives in remote regions. The lessons learned from this initiative can inform future renewable energy projects in similar contexts, contributing to a just and inclusive energy transition

Conclusions

Renewable energy offers multiple economic and social benefits for local communities, They improve inclusive access to affordable energy, attract inward investment, create new and higher-quality jobs, and boost productivity at both the sector and economy-wide level. These benefits are particularly significant for low and middle-income countries, where renewables can reduce energy poverty, catalyse growth along domestic supply chains, and provide a structural cost advantage in the global net zero economy.

However, these outcomes are not automatic—they require deliberate action, inclusive policies, and strong partnerships between governments, project developers and communities.

Emerging good practices—such as community benefit funds, co-ownership models, and inclusive consultation—demonstrate how renewable energy projects can deliver tangible outcomes. These approaches foster public support, reduce risks, and ensure that the energy transition is not only rapid but just.

Challenges remain: benefit-sharing mechanisms must be context-specific, backed by robust policy frameworks, and supported with sufficient financial and institutional capacity. Governments play a critical role in setting minimum standards, leveling the playing field, and guiding voluntary practices toward enforceable norms.

Ultimately, the success of the renewable energy transition will depend not only on technological innovation but on our collective ability to ensure that its benefits are fairly and widely shared, leaving no community behind.

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