

Scaling up Private Finance for Clean Energy in Emerging and Developing Economies

Executive summary

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How Emerging Market and Developing Economies (EMDEs) meet their rising energy needs will be pivotal to their and the world's energy and climate future. This country grouping covers a wide variety of low-income and middle-income economies, many of whom have severe deficits of reliable, affordable energy. All of the 775 million people that lack access to electricity and the 2.4 billion people that lack access to clean cooking fuels live in EMDEs. Cost-effective, clean technologies offer a compelling way forward and their use is growing, but, in most cases, energy demand is growing even faster. In a scenario based on today's policy settings, one-third of the rise in EMDE energy use over the next ten years would be met by fossil fuels. Much more needs to be done to ensure that all countries, and all parts of societies, benefit from clean energy technologies.

At present, some USD 770 billion is invested each year in clean energy in EMDEs, but most of this is in a handful of large economies. China accounts for two-thirds of this total and the top three countries – China, India and Brazil – for more than three-quarters. The concentration of investment is striking: China installed 100 GW of new solar PV capacity in 2022, adding, in a single year, ten times as much as the 11 GW of operating solar PV capacity in the whole of Africa. Growth in clean energy investment is a precondition not only for tackling climate change, but also to help reach a range of other sustainable development goals (SDGs), such as poverty reduction, health and education.

Quantifying clean energy investment needs

To meet rising energy needs in ways that align with the Paris Agreement, annual investment, public and private, in clean energy in EMDEs will need to more than triple from USD 770 billion in 2022 to USD 2.2-2.8 trillion per year by the early 2030s, remaining around these levels to 2050. If China is excluded, the increase is even steeper, amounting to as much as a seven-fold rise in annual investment from USD 260 billion to between USD 1.4-1.9 trillion. This surge in investment provides a powerful opportunity to underpin sustainable economic growth, create jobs and provide full energy access.

Investments in clean electrification, grid infrastructure and efficiency are the main components of the increase in spending. In scenarios that meet climate and sustainable development goals, by the early 2030s just over one-third of total EMDE clean energy investment goes into low-emissions generation, mainly to renewables. Another one-third is needed for improvements in efficiency and spending in end-use sectors, for example to boost efficient cooling and electric mobility. Just under one-quarter is needed for electricity grids and storage. Around 8% goes to low-emission fuels, such as biofuels, low-emission hydrogen, and carbon capture, utilisation and storage (CCUS). These investments build up a new clean energy system while aiding the adjustment of existing high-emitting sectors.

The cost of achieving universal access to electricity and clean cooking fuels by 2030 (SDG 7) is around USD 45 billion per year, less than 2% of overall spending on clean energy. The bulk of this is needed to expand access to electricity, via grid extensions, mini-grids, and

stand-alone generation systems. Two-thirds of the electricity access investment is required in Africa. Some 60% of clean cooking investment, in biogases, LPG, electricity and modern bioenergy via clean cookstoves, is needed in Asia.

Table 1 ▶ Annual clean energy investments in EMDEs to align with sustainable development and climate goals (USD billion)

	Historical		Annual average required	
	2015	2022	2026-30	2031-35
Total EMDEs	538	773	1 784-2 222	2 219-2 805
By country / region				
China	287	511	730-853	850-947
Southeast Asia	28	30	171-185	208-244
India and Other Asia	76	82	321-348	418-467
Africa	26	32	160-203	207-265
Latin America	63	66	150-243	209-332
Middle East and Eurasia	57	52	233-390	303-550
Share by sector in NZE Scenario				
Low-emission power	33%	50%	41%	36%
Grids and storage	35%	21%	20%	23%
Low-emission fuels	1%	1%	7%	8%
Efficiency and end-use	31%	29%	32%	34%

Source: IEA. Notes: The range is derived from two IEA scenarios that meet energy-related SDGs but achieve a different pace of emissions reductions, aligned with the Paris Agreement. The higher bound comes from the Net Zero Emissions (NZE) by 2050 scenario, which reaches global NZE by 2050 and limits global warming to 1.5 degrees; the lower bound is from the Sustainable Development Scenario, which achieves global NZE in the 2060s. The sum of sector shares may not add up 100% due to rounding.

Both public and private investment need to increase to deliver clean energy at the scale required, but public resources alone will not suffice. In 2022 finance by public entities accounted for about half of EMDE clean energy spending, compared with less than 20% in advanced economies. We estimate that around 60% of the finance for EMDE clean energy investment (outside China) will need to come from the private sector: this requirement for private sector financing amounts to USD 0.9-1.1 trillion annually by the early 2030s, up from only USD 135 billion today.

Bringing in private capital at the scale and pace needed will require developing a much larger flow of clean energy projects that match investors' risk and return expectations. For the moment, the cost of capital for a typical utility-scale solar project can be two or three times higher in key emerging economies than in advanced economies or China, reflecting real and perceived risks at the country, sectoral and project levels. Tackling these risks and bringing down the cost of capital will require new and better ways of working between the public and private sectors.

Strategies to accelerate EMDE energy transitions have to be grounded in specific country starting points and circumstances. The low- and lower-middle-income countries, for instance, are home to more than 40% of the world's population but account for only 7% of global spending on clean energy. Some EMDE economies are highly dependent on coal; Indonesia, Mongolia, China, Viet Nam, India and South Africa stand out in this regard. Innovative strategies are needed to clear the way for cost-effective and cleaner options to enter the energy system and address the social dislocation associated with moving away from coal. Other EMDEs are major resource-owners, including oil and gas producers and exporters, and will need to transition away from high dependence on hydrocarbon revenues. Yet others stand to benefit from the clean energy transition, as they are rich in the critical metals and minerals that it demands.

The current international context presents additional complexities for the clean energy transition in EMDEs. New policies in Europe, the United States and other advanced economies are attracting significant new investments in clean energy, spurring technology learning and innovation but making it more challenging for EMDEs to compete for private capital. Rising global interest rates add to EMDE government debt burdens and also raise investors' required returns for clean energy projects. The commitment by advanced economies to mobilise USD 100 billion per year in finance for climate mitigation and adaptation in EMDEs was due to have been met in 2020, but is likely to be met only in 2023.

Scaling up private finance for the clean energy transition

Coordinated action on four fronts is needed to mobilise private finance in the scale and timeframe required. (i) EMDE governments will need to create the enabling environment for private investment and strengthen the institutions that are responsible for energy sector operation and governance; (ii) Significantly larger quantities of concessional finance will be needed to mitigate country and project risks, enhance credit quality, and improve financing terms to attract private investors to many clean energy projects; (iii) New green financing instruments and platforms, such as green bonds, sustainability-linked loans, project aggregation platforms, and voluntary carbon markets will need to be enhanced/redesigned to attract international investment capital at scale in support of credible and robust transition plans; and (iv) Deeper capital markets and financial systems in EMDEs will be necessary to scale domestic private investment in clean energy.

The key role of concessional finance

Concessional finance must be significantly scaled up and used strategically to mobilise the largest possible amounts of private capital in support of EMDE development and climate goals. Concessional funds (guarantees, senior or subordinated debt or equity, performance-based incentives, interest rate or swap cost buydowns, viability gap funding or other investment grants) are not a substitute for needed policy action or institutional reforms, but when used judiciously can mobilise private capital for clean energy projects that otherwise would not be financed. This includes projects: that involve newer technologies that have yet to scale and are not yet cost-competitive in many markets, such as battery storage, offshore wind, renewable-powered desalination, or low-emission hydrogen; that are in frontier

markets with higher levels of country and political risk; or that involve macroeconomic risks, such as foreign exchange risk, that raises the cost of the project.

To enable the amount of private finance required for the energy transition in EMDEs outside China (USD 0.9-1.1 trillion annually), we estimate that some USD 80-100 billion of concessional finance per year will be needed by the early 2030s. These figures are estimated considering the varied shares of public and private financing in different geographies and sectors, the specific types of clean energy technologies that may require concessional finance to be viable, and variations in the amount of concessional finance needed to attract private finance in different types of projects and country contexts. These figures exclude China.

Table 2 ▷ Estimated need for concessional finance in blended finance structures in the NZE Scenario (USD billion)

	Annual average required	
	2026-30	2031-35
Total EMDEs (without China)	83	101
By country / region		
Southeast Asia	7	9
India and other Asia	16	20
Africa	37	46
Latin America	13	15
Middle East and Eurasia	10	11
By sector		
Low-emission power, grids and storage	44	53
Low-emission fuels	10	12
Efficiency and end-use	29	36

Notes: These figures cover only the concessional finance that mobilises private capital. They do not cover other potential needs for concessional funding, e.g., to SOEs that rely on public financing.

Source: IFC estimates based on IEA NZE Scenario investment requirements.

New financing instruments

Financing instruments such as green, social, sustainable and sustainability-linked (GSSS) bonds have the potential to mobilize private capital at scale by attracting institutional investors that do not typically invest in individual projects. Today there is more than USD 2.5 trillion in ESG-related investment funds, but almost none of that capital flows to EMDEs. GSSS bonds offer one opportunity to attract some of that capital, but issuances remain heavily concentrated in advanced economies. In 2022, USD 136 billion of GSSS bonds were issued by EMDEs, with more than half of those issued in China. Growing this market will require robust third-party certification and monitoring, standardised industry guidelines, harmonised taxonomies, cost-effective regulation, and better instrument design.

Project aggregation platforms and securitisation vehicles can overcome the asymmetry between the relatively small size of most energy transition projects in EMDEs and the

relatively large minimum investment size that major institutional investors require. These platforms, such as the Managed Co-Lending Portfolio Program (MCP) One Planet, aggregate large numbers of smaller projects and may use concessional finance to mitigate some of the credit risk. The result is a standardised, investment-grade, multi-asset portfolio that can attract the largest institutional investors. However, regulatory provisions in advanced economies affecting some institutional investors, such as public pensions and insurance companies, limit investments and/or portfolio exposure to EMDEs.

Voluntary carbon markets have the potential to attract private capital, including from corporations, to the EMDE energy transition, but need strong oversight to grow from today's low base. Carbon credits linked to real, verifiable emissions reductions and removals could be a valuable revenue stream for EMDEs. These have the potential to attract not only financial investors, but also to mobilise capital from large companies seeking to offset the portion of their corporate emissions that cannot immediately be eliminated. But much work still needs to be done on standards and monitoring, reporting, and verification processes. Moreover, companies must commit to and embark upon credible emissions reductions plans to avoid the perception that carbon credits merely enable them to continue polluting.

Better data is also essential to enable private investors to assess the true risks associated with EMDE investments. Poor information feeds high risk perceptions that push up the cost of capital in EMDEs. One step to improve this situation is through the database of the Global Emerging Markets Risk Database (GEMs) consortium, started in 2009. It pools credit information between multilateral development banks (MDBs) and development finance institutions (DFIs) to provide aggregate risk statistics. Efforts are currently underway to expand access to these data to other investors. Country efforts to improve data and its availability will be important in attracting investors.

Deepening local capital markets and financial systems

Deeper local capital markets and financial systems are necessary to scale up domestic private investment in the clean energy transition. In some EMDEs, such as China and India, domestic capital -- rather than foreign capital -- has been the major source of private capital for the clean energy transition thus far. Developing domestic bond, equity, and derivatives markets (e.g., currency swaps) can enable domestic funding of climate projects. Project-related revenue streams from energy transition projects in EMDEs are typically denominated in local currency. International investors who bring foreign currency therefore create foreign exchange risk for either themselves or for EMDE borrowers. Whilst swaps are needed to hedge currency risk, this can be expensive and a range of options may be needed to defray the costs of foreign currency hedging, including use of concessional finance.

Credible transition planning

Financing for clean energy projects will not flow without credible climate transition commitments and planning by governments: a point of departure is country commitment to ambitious Paris-aligned goals, converted into clean energy transition plans and targets. This vision for the energy sector, including universal access to modern energy where this

remains to be achieved, needs to be consistent with energy sector reform and planning so that it provides meaningful signals to private markets. A regional perspective can reduce costs, especially in the power sector where cross-border trade creates a wider balancing market for renewable-rich systems.

Integrated planning, policy and regulatory reform, and capacity building can turn high-level commitments into a pipeline of bankable clean energy projects. Strong pricing signals are crucial: a price on carbon, or regulatory and policy measures with equivalent effect, are needed to help steer investment decisions towards cleaner and more efficient technologies. Among issues deterring investors are subsidies that tilt the playing field against clean energy investments, unpredictable procurement practices, lengthy procedures for licensing and unclear land rights; arbitrary or weak contract enforcement; restrictions on private or foreign ownership; and poor creditworthiness of counterparties. Support for capacity and institution-building is vital to improve energy sector governance and to enhance clean energy knowledge and relevant skills.

Good policies provide the signal to investors

With the right policy environment, the cost-competitiveness and maturity of renewable technologies for electricity generation mark them out as a major opportunity for scaling up private sector investment. For utility-scale renewables, the key success factors have included competitive auctions for new capacity, combined with long-term power purchase agreements (PPAs) with a creditworthy off-taker and reliable land and grid access. Removing barriers to corporate PPAs, through which companies contract directly with renewable power producers, is another way to unlock strong incentives for privately driven investments. Public financial support can be justified to develop confidence in new markets or to mitigate specific risks, for example, guarantees that limit the risk of non-payment. In coal-dependent power systems, innovative financing mechanisms with international backing that refit, repurpose or retire existing coal plants create room for the beneficial expansion of low-emissions generation. Mini-grids or distributed generation such as residential rooftop solar are likewise a channel for private investment.

Investments in clean energy generation are dependent on the timely expansion of grids, alongside energy storage and other options to allow for the integration of variable renewables. In many EMDEs, weak electricity infrastructure results in unreliable access for users and is a major risk for investors. More than 90% of investments in EMDE grids are the responsibility of SOEs, many of which are facing severe financial strains and lack access to capital. Private sector participation in electrical grids is limited in most cases to the distribution sector, although private sector financing for energy storage projects is on the rise. Early network investment planning, public support and public-private partnerships, and measures to strengthen the operational and financial performance of utilities can ensure that grid infrastructure becomes an enabler, rather than a bottleneck, for expanding renewables.

Low-emissions fuels are important in the clean energy transition, especially in sectors where direct electrification is not feasible or cost-effective. There is burgeoning investor interest in low-emission hydrogen, especially for production via electrolysis in countries with low-cost solar or wind potential. Commercial viability is in its early stages and, for the moment, supply-side initiatives in Africa, Latin America, and the Middle East are not matched by a comparable level of commitments from buyers, putting a premium on secure offtake arrangements to underpin investments. Sustainable biofuels and CCUS are the other main investment avenues. Policy incentives and mandates in Brazil, China, India, and Indonesia have underpinned a strong rise in EMDE biofuels production, encompassing both liquid biofuels and biogases.

Investment in more efficient and electrified technologies in buildings, transportation and industry is a crucial component of energy transitions. Almost 70% of EMDEs have set specific targets for deploying electric vehicles. Regulatory policies such as building codes, minimum energy performance standards (MEPS), fuel efficiency and quality standards, alongside non-regulatory policies such as labels and information campaigns, and financial incentives are important to enable sustainable choices by consumers. Efficient cooling needs to be a particular focus, given rising global temperatures and the huge scope for increased cooling demand as EMDE incomes rise. Many of the investments in this area are relatively small and bespoke; standardisation and aggregation are important to bring in private capital.

Clean energy supply chains, including batteries, solar panels and wind turbines, represent a growing opportunity for private sector investors in EMDEs. While most countries rely on imports, China manufactures three-quarters of the world's batteries and solar PV modules and has an exceptionally strong position in processing and refining of critical minerals. Other major EMDE markets for clean energy, such as India, are now providing incentives for domestic clean energy manufacturing. Countries in Africa, Latin America, and Southeast Asia are leading resource holders of battery metals, copper and rare earth minerals, and are seeking ways to move beyond primary production.

A call to action

A redoubled effort is needed to put EMDEs on a pathway to higher clean energy investment and full participation in what the Independent High-Level Expert Group on Climate Finance rightly called the “growth story of the 21st century: sustainable, resilient and inclusive”. The urgency of tackling climate change demands it, but it is far from the only reason to move faster. Other benefits include improved air quality and sharp reductions in pollution-related healthcare costs and premature deaths. This report's analysis highlights why private initiative is an essential part of the solution – but the report is also clear-eyed on what it takes for private investors to commit capital. Sound regulations and public policies strengthened institutions and greatly expanded international support are the keys to unlock private financing for clean energy in EMDEs at scale.

International Energy Agency (IEA)

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Scaling up Private Finance for Clean Energy in Emerging and Developing Economies

A massive scaling up of investment is essential in emerging and developing economies to sustainably meet rising demand for energy, as well as to ensure that climate targets are met. Getting on track for net zero emissions by 2050 will require clean energy spending in emerging and developing economies to more than triple by 2030 – far beyond the capacity of public financing alone and therefore demanding an unprecedented mobilization of private capital.

This special report by the International Energy Agency (IEA) and International Finance Corporation (IFC) examines how to scale up private finance for clean energy transitions by quantifying the investments required in different regions and sectors to build modern, clean energy systems, including achieving universal access. The new global energy economy represents a huge opportunity for growth and employment in emerging and developing economies. This report's analysis identifies key barriers and how to remove them – and sets out the policy actions and financial instruments that can deliver a major acceleration in private capital flows for the energy transition.

