

Executive summary

Energy generation infrastructure has long been identified by Aid for Trade stakeholders as requiring additional, predictable and sustainable financing to enable developing economies and LDCs to participate more fully in international trade. The energy sector is one of the largest recipients of Aid for Trade support, accounting for nearly 25 per cent of all disbursements (US\$ 116 billion) over the 2010-21 period.

Aid for Trade already supports the clean energy transition. Over the period 2011-21, nearly 30 per cent of all Aid for Trade commitments with climate objectives were related to the energy sector. Aid for Trade helps to provide developing economies and LDCs with the necessary supply-side capacity-building support to adopt clean energy technologies. It is also helping to support policy reforms and facilitating the integration of micro, small and medium-sized enterprises (MSMEs) in developing and LDC economies into international value chains for clean energy technologies.

Furthermore, Aid for Trade stakeholders recognize the importance of aligning Aid for Trade with climate objectives. The 2022 Aid for Trade Monitoring and Evaluation (M&E) exercise revealed that donors and partner economies reference environmental objectives, including those relating to clean energy and electricity, in their national development strategies. There has also been a steady increase in the value and number of projects with climate objectives.

Yet Aid for Trade flows remain small in comparison to what is required to capitalize on the economic development opportunities. More is required to ensure that developing-economy firms benefit from the trade opportunities that will emerge as a result of the clean energy transition. The catalytic role that Aid for Trade can play in mobilizing additional financial resources needs to be further explored to ensure that all avenues for delivering targeted assistance are considered.

The clean energy transition is a trade and sustainable development opportunity.

The clean energy transition is an opportunity for developing economies to benefit more fully from trade and to promote sustainable development. According to the International Energy Agency (2024), clean energy (e.g., wind, solar, hydro, hydrogen and nuclear power) accounts for nearly 40 per cent of global electricity production, and it is predicted that this will expand to between 75 and 80 per cent of production by 2050, as net zero greenhouse gas (GHG) targets gain traction. Nearly 110 economies have already incorporated clean energy growth targets into their nationally determined contributions – the efforts made by each economy to reduce national emissions and adapt to the impacts of climate change under the Paris Agreement.

Accelerating this energy transition could provide an opportunity to advance industrial development in developing economies and least-developed countries (LDCs), and to address long-standing constraints in their energy generation capacity.

The falling costs of clean energy deployment in comparison to GHG-emitting alternatives, such as fossil fuels, should help to improve energy affordability, accessibility, and reliability – vital targets under Goal 7 of the United Nations Sustainable Development Goals (SDGs). Improving affordable access to electricity could help to accelerate economic growth by helping to bridge the digital divide between developed and developing economies and enabling less developed communities to play a greater part in the digital services economy.

Most developing economies and LDCs depend heavily on imported fossil fuels for energy generation, but this

dependency can create fiscal imbalances and volatility risks. Transitioning to clean energy practices could help to reduce volatility and promote energy security. A progressive reduction in fossil fuel energy imports could positively affect balance-of-payments outlooks and currency stability, leading to better perspectives for export performance.

At the heart of realizing transition opportunities is investment.

In 2022, over US\$ 600 billion was invested in renewable electricity generation, a 70 per cent increase compared to 2017. Solar and wind capacity doubled between 2018 and 2022, with renewable power accounting for 78 per cent of new generation capacity in 2022. Clean energy investment is projected to exceed US\$ 1.7 trillion in 2022, and renewable electricity capacity is expected to increase by over 60 per cent between 2020 and 2026.

Yet there is a disparity in clean energy investments between developing and developed economies. Developing economies receive less than one-fifth of global clean energy investments, despite representing two-thirds of the global population. This disparity coincides with a pivotal phase in their socio-economic advancement: driven by growing populations, urbanization and rising living standards, the collective electricity demand of developing economies and LDCs is expected to increase by as much as 300 per cent by 2050. There is significant scope for further growth in clean energy adoption, if the necessary development finance can be mobilized.

International trade can play a critical role in a clean energy transition. As highlighted in this report, developing economies and LDCs could leverage the clean energy transition to achieve trade growth and export diversification objectives. This could be achieved through an increased participation in the value chains associated with clean energy production. Ensuring that

economies can use the opportunities generated during this process is critical to enable a just transition.

This report highlights that significantly more can be done to seize trade opportunities arising from participation in clean energy global value chains. Shortfalls in the existing energy infrastructure and a gap in technology capacity also continue to constrain a clean energy transition, as does the deficit in the flow of clean energy-related financing toward developing economies and LDCs. These are areas in which Aid for Trade can play a positive role.

RENEWABLE ELECTRICITY GENERATION

over
US\$ 600 billion
was invested
+70% increase on 2017 levels
in 2022

RENEWABLE ELECTRICITY CAPACITY

expected to increase by over
60%
between 2020 and 2026

ELECTRICITY DEMAND OF DEVELOPING ECONOMIES AND LDCS

expected to increase by as much as
300%
by 2050

The clean energy value chain offers opportunities for trade integration.

This report examines opportunities for developing economies to integrate more fully into global trade in three segments of the value chain – minerals and metals, machinery and equipment manufacturing, and services. It also provides examples of how Aid for Trade is supporting these energy transition opportunities in developing economies and LDCs.

In terms of the expansion of mineral exports, the clean energy transition is driving a significant increase in mineral extraction worldwide. Over 3 billion tons of minerals and metals will be needed to achieve a net zero transition by 2050. Clean energy technologies, such as wind and solar power, require large quantities of minerals which are available in limited quantities in nature. Developing economies and LDCs with favourable mineral endowments are already benefitting from the increased demand stemming from the development of clean energy technologies by attracting investment in mineral extraction, processing and manufacturing capabilities. This, in turn, could create employment opportunities, increase domestic income and foster economic development in these economies.

Developing economies and LDCs can also seize opportunities arising from rising momentum in the manufacture of clean energy technologies. The value of manufacturing clean energy equipment is expected to exceed US\$ 1 trillion by 2050. Many developing economies and LDCs could leverage their comparative advantages (such as natural resource endowments), market size and locational advantages to become nodes in manufacturing value chains. This would potentially increase their exports and create positive spillovers in terms of generating employment, income gains and economic growth. As competition to attract clean energy manufacturing is fierce, and the development of industrial policies is on the rise, identifying the appropriate policy mix – both domestic and international – is a significant challenge for these economies.

The development of services sector operations is also essential for a successful clean energy transition. As this report notes, developing economies and LDCs can

enhance growth prospects and generate employment by prioritizing value-added services associated with clean energy generation. For instance, by providing adequate workforce training, domestic labour markets can gain sufficient technological expertise to perform renewable energy services such as grid installations, administration and maintenance operations. This would help to enhance the domestic use of clean energy, and strengthen labour competitiveness. Overall, less attention has been devoted to the services segment of the clean energy value chain – even though the barriers to entry may be less onerous for developing economies and LDCs than for other segments of the clean energy value chain.

This report highlights the opportunities in the value chains for five sources of clean energy:



Wind energy, which has witnessed accelerated adoption over recent years, with expansions in both onshore and offshore installations.



Solar photovoltaic (PV), which has also experienced a rapid increase in deployment, with growth driven by falling costs and technological advancements that have improved production efficiency.



Green hydrogen, an energy source increasingly viewed as an effective energy carrier to decarbonize hard-to-abate (i.e., for which the transition to net zero is difficult either in terms of technology or cost) sectors, for which direct electrification is not possible.



Hydropower, which remains a major source of renewable power globally, and one in which developing economies are already significant participants. However, it has come to be perceived as less “reliable” as a result of unpredictable rainfall patterns due to climate change.



Nuclear power, a technology that is expected to grow, mainly in developing economies, but which faces sustainability and cost challenges due to the limited availability of existing technologies.

Each of the clean energy segments indicated above has unique characteristics and advantages, and their deployment within economies varies based on geographical, economic and technological factors. However, challenges such as high adoption costs, limited access to finance and trade barriers continue to hinder widespread adoption.

Moving forward, far greater emphasis must be given to the participation of developing economies and LDCs in clean energy value chains. This is an area on which Aid for Trade has been focused in recent years – and one which requires more concerted action.

The first section of this report examines the support provided by development finance partners to help developing economies access clean energy opportunities through Aid for Trade financing. The second section

explores trade and market opportunities for developing economies that could be created by a transition to clean energy. It also explores the possibility of leveraging carbon market opportunities and using carbon capture, utilization and storage (CCUS) technologies to enhance development opportunities. The third section examines some of the challenges faced by developing economies in achieving this change. The fourth and final section takes a deep dive into the trade opportunities associated with major clean energy technologies, and reviews how development finance partners are supporting projects in each of these technology areas.

Each section includes examples of Aid for Trade in action – projects where Aid for Trade financing is supporting the transition to clean energy. The report concludes with the recommendation to further align Aid for Trade with clean energy opportunities.