



CTF CONTRIBUTIONS TO AFFORDABLE AND CLEAN ENERGY

*An in-depth analysis of benefits related to access to
affordable and clean energy in the CTF portfolio*

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RESULTS DEEP DIVE SERIES//

CIF Program: Clean Technology Fund (CTF)

TOPICS

- Results and Impact
- Renewable Energy
- Access to Energy

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RESULTS DEEP DIVE SERIES

The Climate Investment Funds (CIF) is committed to rigorous and inclusive monitoring and reporting (M&R) on investments' contributions toward net-zero emissions and adaptive, climate-resilient, just, and socially inclusive development pathways. The M&R Results Deep Dive series is a supplement to CIF's annual results reports — while annual M&R provides a systematic synthesis of portfolio performance against each program's core indicators, the Deep Dives provide in-depth reviews of these results within specific thematic or developmental dimensions of climate change. As such, they offer greater granularity on the drivers and implications of various performance characteristics.

1. INTRODUCTION

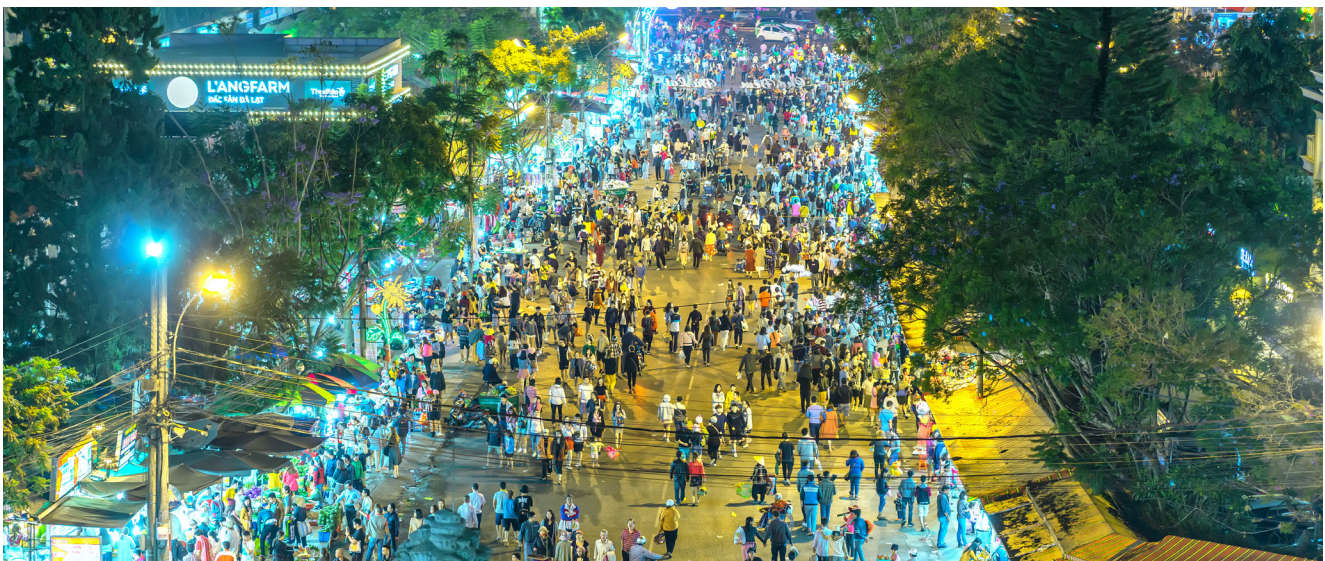
Access to affordable and reliable electricity—one of the 17 United Nations Sustainable Development Goals (SDGs), as *SDG 7: Affordable and Clean Energy*¹—remains a major development challenge. In 2022, the number of people without electricity stood at around 760 million.² The threat of climate change entails the need for clean energy sources for electrification projects in lieu of relying on traditional fossil fuels, given that electricity and heat production is one of the largest emitters of greenhouse gases (GHG).³

Renewable energy (RE) can provide an alternative source of electricity generation, as it is clean and reliable. The levelized cost for electricity (LCOE) for mainstream RE technologies has fallen substantially over time, and these technologies have proven to be more worthwhile investments in comparison to conventional fossil fuels.^{4,5,6} While RE technologies have high upfront investment costs, in the long run they are cheaper than using fossil fuels, which many countries have to import, and which contribute

to trade imbalance and budget deficits.⁷ With hundreds of millions of people still lacking access to energy in 2023,⁸ RE will be crucial in providing these communities and businesses with cheap and reliable electricity from a sustainable source.

The Clean Technology Fund (CTF) is focused on the demonstration of clean frontier technologies to spur further investment, and increased energy access is one of the benefits that can be achieved from the deployment of RE, directly contributing to SDG 7.⁹ Due to the large-scale capacity of CTF projects, the program has provided energy access to millions of people in middle-income countries, while successfully demonstrating the investment viability of such technologies.

This Results Deep Dive examines how CTF investments have contributed to SDG 7, focusing on specific cases from completed and ongoing CTF projects.



Da Lat Market night view with lights, Vietnam

2. DEEP DIVE RESULTS: CTF PROJECTS' CONTRIBUTION TO AFFORDABLE AND CLEAN ENERGY

CTF projects achieve large reductions in GHG emissions at scale, thanks to their investments in renewable energy generation projects, which account for the largest financing totals and the highest project count in the portfolio, and in the demonstration effect of frontier technologies. As of December 2022, CTF projects have led to a cumulative total of 12.4 gigawatts (GW) of renewable energy installed capacity.

To achieve these goals, CTF projects provide concessional financing. In doing so, these projects also have the benefits of making energy more affordable for consumers and providing new or improved electricity access for millions of people from renewable energy sources. For example, the first phase of the Ouarzazate-Noor concentrated solar power project (AfDB-World Bank) in Morocco provided improved electricity to the 334,000 people living in the Ouarzazate area while adding 160 megawatts (MW) of clean electricity into the main grid.

One case study that illustrates how CTF investments benefited local populations with affordable energy access is the Wind Power Development Project (World Bank) in Egypt. The project added 250 MW of wind capacity to the grid. While energy access was not one of the project development objectives, the project provided improved electricity access at a lower cost for over 1.4 million people in the Gulf

of Suez area. At the end of the investment period, the price for wind power paid by customers was 3.8 US\$ cents per kilowatt-hour (US\$/kWh). This is significantly lower than the expected cost at project appraisal, which was 8 US\$/kWh. Besides the new RE capacity addition, the project also led to the displacement of 87.6 gigawatt hours (GWh) of diesel generation, which in turn led to significant savings in fuel costs and annual GHG emission reductions of over 1.3 million tons of CO₂ equivalent (tCO₂eq.).



The Wind Power Development Project in Egypt also developed the necessary infrastructure to welcome future private sector investment in wind energy in the Suez region. It built over 430 kilometers (km) of transmission lines and rehabilitated and constructed power substations. These works will allow the transmission capacity to evacuate 3 GW of wind power capacity from future investments. The improvement of the transmission network is also beneficial to local populations, which will benefit from a higher electricity service quality through improved system reliability.

In addition to the projects discussed above that focus on increased installed capacity, other CTF projects on energy efficiency have also contributed to improving access to electricity. For example, the Vietnam Distribution Efficiency Project (World

Bank), which modernized the country's grids and transmission systems, has improved the livelihoods of people residing in rural communities. Project beneficiaries surveyed by the World Bank noted improvements in the quality of electricity access, which allowed them to extend their working hours, which in turn led to increased incomes. The project overachieved most of its objectives. It successfully improved the resilience of the grid and reduced power losses in Vietnamese cities, including Hanoi and Ho Chi Minh City, and reduced power consumption, thanks to more efficient transmission systems. Overall, the project contributed to 449 GWh of annual energy savings, amounting to 365,000 tCO₂eq of annual GHG emission reductions. The project surpassed its targets for these measures by 8 and 35 percent, respectively.



Rural girl studying under bulb light at night, India

3. CONCLUSIONS AND FUTURE CONSIDERATIONS

Although not monitored in the CTF results framework, new and improved energy access from renewable energy sources is a major outcome for many CTF projects. As the program's emphasis has shifted to support new areas, such as grid modernization and small-scale distributed energy resources (DERS), access to affordable energy will continue to be an important outcome of the program. For example, the recently approved DPSP III: Electricity Access Scale-up Project (EASP) (World Bank) in Uganda¹⁰ is expected to provide electricity to over 5 million people once the project is completed. Many more-recently approved projects tend to have twin goals of promoting clean energy sources while providing energy access to communities, thereby moving forward increased access and climate mitigation in tandem.

As the cost of RE technologies continues to fall, more energy access projects will switch from fossil-fuel-based generation to clean energy generation.¹¹ Energy access promoted through RE generation faces challenges, such as how to store electricity produced from variable RE to allow greater system flexibility. For example, many RE access projects are generated from variable renewable energy sources, such as solar or wind. Their variability means that the electricity produced is dependent on external conditions, such as wind speed or sunlight penetration. The energy produced from these resources must be used as it is generated, and faces situations in which insufficient electricity is produced at a time of higher demand (such as at night or during low wind velocity). Additional

components are therefore required to ensure that the electricity produced meets demand.

The Climate Investment Fund's (CIF) new generation of programs focuses on taking further steps to address these challenges, with specific focuses on storage of renewable energy for later use via the Global Energy Storage Program (GESP), and on integrating renewable energy into the grid via the Renewable Energy integration Program (REI). These two new CIF programs highlight the CIF's continuously evolving role in contributing to SDG 7 as one of the many pathways to combat climate change.

The importance and interconnection of SDG 7 in the scope of global climate action has therefore led to further expansion of the CIF mandate to support energy access. This was seen with the launch of the Scaling Up Renewable Energy Program in Low Income Countries (SREP) to support the deployment of renewable energy in a group of middle- and lower-income countries. Moreover, newer programs, such as the REI, have indicators that monitor new or improved energy access for households, businesses, and other community services, as well as additional grid connections.

Access to affordable, sustainable, and reliable electricity is and will continue to be a crucial development challenge. The CTF's track record and experience in supporting such activities through deployment of RE technologies have placed the fund in a strong position to continue to contribute to global access to affordable and clean energy.

ENDNOTES

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THE CLIMATE INVESTMENT FUNDS

The Climate Investment Funds (CIF) is one of the largest multilateral climate funds in the world. It was established in 2008 to mobilize finance for low-carbon, climate-resilient development at scale in developing countries. Fifteen contributor countries have pledged over US\$11 billion to the funds. To date CIF committed capital has mobilized more than \$64 billion in additional financing, particularly from the private sector, over 70 countries. CIF's large-scale, low-cost, long-term financing lowers the risk and cost of climate financing. It tests new business models, builds track records in unproven markets, and boosts investor confidence to unlock additional sources of finance. Recognizing the urgency of CIF's mission, the G7 confirmed its commitment to provide up to \$2 billion in additional resources for CIF in 2021.



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