Task Force 4
Refuelling Growth: Clean Energy and Green Transitions

UNLOCKING FINANCE TO SCALE DECENTRALISED RENEWABLE ENERGY FOR CLEAN ENERGY TRANSITIONS: LEARNINGS FROM INDIA

July 2023

Divya Gaur, Programme Associate, The Council on Energy, Environment and Water

Saipriya Salla, Program Associate, Aspen Network of Development Entrepreneurs

Priyatam Yasaswi, Research Analyst, The Council on Energy, Environment and Water

Ananya Saini, Program Associate, Aspen Network of Development Entrepreneurs

Simrin Chhachhi, Senior Research Manager, SELCO Foundation

Rachita Misra, Associate Director (Knowledge and Advocacy), SELCO Foundation

वसुधैव कुटुम्बकम्

ONE EARTH • ONE FAMILY • ONE FUTURE

Abstract

Decentralised renewable energy (DRE) technologies play a critical role in enabling an equitable energy transition and ensuring energy security for many emerging and developing economies. These technologies address three of the most pressing challenges faced in developing countries: they support diverse energy needs and, thereby, the livelihoods of large populations; they help in reaching the last mile, specifically in climate-vulnerable geographies with unreliable connectivity to electricity; and finally, they meet rising energy demands in a climate-responsible manner. Unlocking finance, for both users and enterprises, holds the key to mainstreaming these technologies for a just energy transition. To address this financing challenge, this brief proposes (a) establishing a multi-stakeholder focus group under the Energy Transitions Working Group for DRE, (b) providing capital support to pilot innovative financial instruments in the DRE sector, and (c) creating a robust framework for knowledge sharing among member countries through dedicated monitoring and impact evaluation efforts.

The Challenge

1

Decentralised Renewable Energy: Key to an equitable energy transition

In many low- and middle-income economies, the livelihoods of millions of marginalised populations are strained due to a lack of access to reliable and affordable energy. Additionally, around 75 million people are likely to lose existing access to electricity due to rising prices.[1]

Economies around the world, especially developing economies, are still recovering from the COVID-19 pandemic. Problems of rising inflation,[2] unemployment, and soaring interest rates continue to plague them. Against this backdrop, it is imperative for emerging economies to build development pathways that are inclusive of marginalised populations so that they are not driven down further into poverty.

Decentralised renewable energy (DRE) can play a crucial role in building this resilience. DRE provides affordable and reliable energy access while supporting a variety of livelihoods. There is a potential US$53 billion market for clean energy technologies in India and a US$11 billion market across Africa.[3] DRE can also help play a crucial role in job creation in developing economies, thereby driving economic growth. For example, the sector is projected to employ 89,000 and 58,000 individuals in India and Kenya, respectively, by 2023.[4,5]

The G20 countries and other invited nations form a powerful group to advance developmental dialogues. In line with this, India's national framework for "Promoting Decentralised Renewable Energy Livelihood Applications",[6] a first-of-its-kind policy framework to drive the adoption of DRE livelihood solutions (see the appendix) in the country, acts as a useful resource for other G20 countries to develop similar policies which integrate DRE into their development agendas.

A DRE system is an energy system installed close to where the energy is stored and used. It can be generated via several renewable energy sources, including solar, wind, hydro, and bioenergy. DRE technologies have multiple social, environmental, and economic benefits.[7] DRE productive use appliances can help improve livelihoods and streamline manufacturing of energy in regions where the supply of electricity is unreliable. It can also help reduce drudgery by minimising or

eliminating manual labour and boosting productivity, thereby bolstering income levels, especially for women. DRE livelihood technologies have enabled up to a 35 percent increase in users' annual incomes, in effect increasing their investment in their children's education and healthcare.[8] These types of benefits can support countries in meeting multiple sustainable development goals. Developmental organisations have been supporting initiatives that deploy these technologies in India and across Africa,[9,10] enabling an improvement in the quality of life[11] and productivity of users. However, one of the key challenges to scaling innovations continues to be the lack of access to enterprise-level finance for entrepreneurs and affordable financing[12] for end-users.

Sustainable and distributed energy brings with it a unique opportunity to strengthen and empower value chains across different sectors including agriculture, animal husbandry, textiles and crafts, and micro-businesses. For example, in India, more than half of the population is engaged in farming-related activities, and around 120 million people are engaged in Micro, Small and Medium Enterprises (MSMEs). DRE helps streamline the expansion of off-grid technologies and offers a way to integrate all the off-grid projects launched by different ministries supporting core sectors such as agriculture and micro-businesses.

Many organisations (non-profit organisations and clean energy enterprises) engaged in the DRE space in India have piloted multiple solutions[13] across value chains and observed solution workability. However, successful long-term adoption is only possible through the coming together of factors like technology, financing, backward and forward linkages, training, and policies.[14]

The objective of this brief is to lay out broad recommendations for the G20 to mainstream DRE for livelihoods in their green growth plans. The brief will use the DRE policy framework developed by India and the ground experience of the authors to highlight how India's case could be used as a guiding example for replication in other G20 countries and beyond. The brief looks to bring to light a critical aspect of the framework, i.e., availability of affordable financing for DRE, both at the enterprise and the end-user levels. Additionally, it discusses challenges and offers solutions leveraging the G20 network and resources.

Challenges in financing DRE technologies: End-user and enterprise perspectives

A major obstacle to the widespread adoption of DRE-based livelihood solutions is that they are perceived as expensive and capital-intensive by diverse stakeholder groups within this ecosystem. This makes enabling financial support for both enterprises and end-users essential for large-scale deployment. Enterprises face numerous challenges in accessing low-cost capital in the research and demonstration phases, as well as growth capital to streamline manufacturing and accelerated deployment. Similarly, end-users have insufficient capital support to adopt DRE-based solutions.

There are a few key reasons for the limited uptake of DRE technology through formal sources of finance**:**

Financiers

- Bankers believe it is risky to finance DRE-enabled livelihood appliances due to their lack of familiarity with these technologies and the viability of these solutions.[15]
- Financiers' confidence is further affected by the lack of market data on successful DRE deployments, borrowers' credit histories, and the experience of financing such DRE livelihood applications. For smaller products, with required loan amounts below INR 1 lakh (US$1,220), bankers are not as interested in lending owing to high transaction costs.[16]

End-users

- For capital-intensive DRE-enabled livelihood appliances, long-term asset-based financing is necessary. However, many of the small and micro enterprises are often self-funded or rely on consumptive financing for growth. Such financial products are not appropriate for DRE financing.
- End-users find it difficult to afford financing even when financiers are ready to disburse credit.

Policy

- There is limited government activity attempting to mainstream DRE technologies in the G20 countries that face energy access challenges.
- Even in a country like India, which has a centrally drafted DRE framework, state-level policies/schemes are incapable

of effectively supporting DRE technologies, especially when it comes to enabling affordable financing for entrepreneurs and end-users.

Research and Development

- Although there has been work done in this space, opportunities for global South-South learning and resource sharing have been few and far between. This has led to a challenge of limited understanding of available data and poor comprehension of successful case studies for adoption across geographies.

End-user financing

The nature of consumer financing and its design depends on the cash-flows of consumers, ownership structures, and the business models of the various applications. For example, the cost of these technologies can range from INR 15,000 (US$ 182) for an individual silk reeling machine (capacity- 300g yarn/day) to INR 22 lakhs (US$ 26,770) for a solar-powered cold storage room (capacity- 10 MT) that can support a small farmer's group/collective. Generally, to be able to invest in such technologies, consumers need to secure a loan for a period of three to five years at affordable interest rates. Such financing is usually beyond the reach of most of the population. Additionally, the cost of capital for many of the existing financing institutions, including Savings and Credit Co-operatives, might not allow them to design affordable financial products.

In India, nearly half the population[17] (47 percent) are dependent on agriculture and the average annual income of a farmer is INR 122,616 (US$1,490).[18] Many sub-Saharan African countries have similarly low Gross National Income per capita of US$ 1,085 or less and are, therefore, classified as low-income countries by the World Bank.[19] Such low incomes restrict purchasing power and curtail people's ability to save, trapping them in a vicious cycle of low productivity and low income. In the absence of affordable credit options, the deployment of DRE livelihood solutions becomes very limited. Its users would only be those who can access these technologies through self-financing, loans, or subsidies from civil society/government agencies/philanthropic funds. Analysis by the Council on Energy, Environment and Water found that almost 90 percent of

study respondents in India received the technology utilising subsidies.[20] These models of support not only limit the number of deployments but also their sustainability and scalability. Thus, the availability of affordable financing is critical to enabling the large-scale adoption of DRE livelihood solutions.

Enterprise financing

Financiers are sceptical about funding entrepreneurs who base their businesses on customised DRE-enabled livelihood solutions because these solutions are still in the early stages of development and data highlighting the success of these business models is not universally available. Furthermore, unfamiliarity with DRE technologies and their market often discourages financiers from investing in the sector, as it adds to the perceived risk. Usually, financiers have little appetite for risk, even in sectors that show promising growth. Lastly, funding presently available in India is often inconsistent with the estimated market size. Financiers prefer making large investments which MSMEs are unable to absorb. This further pushes MSMEs to access funding unsuited to their needs, leading to stalled growth.

The challenges outlined above have created an environment where MSMEs in the DRE sector have to resort to debt financing[21] contingent on loan histories, balance sheets, and collateral, which MSMEs often do not have. Moreover, debt financing, with higher interest rates compared to other financial products, strains MSMEs' ability to deploy solutions with longer return on investment periods.

Recent Aspen Network of Development Entrepreneurs (ANDE) research also indicates that although there is growing entrepreneurial activity in the renewable energy sector, sources of funding continue to be limited across India and Kenya.[22] Across entrepreneurial ecosystems like Brazil, India, Kenya, and Southeast Asia, ANDE observes that there is a lack of knowledge and expertise among investors regarding successful green business models, particularly those that are not software-based, leading to a greater hesitancy to invest.[23]

A funding gap is seen at the growth venture stage which makes the scaling and growth of the DRE market challenging. On the other hand, DRE

solutions that require a higher capital investment to test and validate a product-market fit, face challenges in accessing capital early on. This translates into fewer solutions moving entrepreneurs from idea to early development stages, restricting quick access to viable solutions that can be scaled.

The G20's Role

2

Globally, G20 economies account for approximately 80 percent of greenhouse gas emissions[24] and 76 percent of these come from the energy sector.[25] Moreover, G20 countries produce 85 percent of coal, 64 percent of crude oil, and 65 percent of fossil gas[26] highlighting the importance of prioritising clean energy transitions within G20 countries.

Under the Indonesian presidency in 2022, the G20 adopted the Bali Energy Transitions Roadmap, articulating three core priorities of securing energy access, scaling up smart and clean energy technologies, and advancing clean energy financing.[27]

With India assuming the G20 presidency in 2023, clean energy and green transition have been given key priority under its theme, 'Vasudhaiva Kutumbakam' (one Earth, one family, one future). A core component of this priority is availability of low-cost finance to support the development of new and emerging energy technologies-particularly in developing countries.[28]

Recommendations to the G20

3

Create a sub-group focussed on DRE for green growth under the Energy Transition Working Group (ETWG) to actively plan and support the scaling up of DRE technologies. The process should be geared towards providing initial energy access to support a clean energy transition and job creation. In addition to the identified activities under the Bali Roadmap, there is a need for the member countries to actively include DRE, and the livelihood technologies supported by DRE, in the discourse on energy transition. It is also important to keep the job creation potential of DRE at the centre of these conversations. The ETWG and associated organisations could organise dedicated discussions focused on scaling these technologies, while highlighting the solutions needed to address the identified gaps.

Creating opportunities to accelerate DRE uptake and increase access to affordable financing, while encouraging an active exchange of knowledge. The G20 and the ETWG can drive cross-learning about DRE initiatives and schemes among member countries so that they can be replicated and scaled up across different geographies. Further, the G20 can also create opportunities for developed countries to support such projects in emerging and developing economies to enable equitable and sustainable economic development in line with target 7.a of the Sustainable Development Goal 7.

Bringing together a focused working group of sectoral experts, implementers, policymakers, and financiers to collaborate on scaling DRE technologies. The G20 can play a role in institutionalising a global platform for 'DRE and Sustainable Growth' where experts from the sector including technology providers, implementers, policymakers, and global financial institutions, such as the World Bank and International Renewable Energy Agency, can convene. The platform, which could potentially be built from existing platforms like the Clean Energy Ministerial, can facilitate collaboration and build up a robust ecosystem for DRE. The members will have an opportunity to discuss challenges and learnings, pitch new technologies, and further develop innovative ideas on affordable financing for end-users, with a view to support sustainable livelihoods and optimise job creation.

Encouraging countries to provide financial support to projects that help scaling up of DRE technologies. Developed countries could offer affordable financial instruments to enterprises and end-users in high market-potential countries, leveraging the experience of countries like India, among others. The G20 host countries can facilitate pilot demonstrations in different parts of the world for relevant use cases, which will improve confidence and address the critical concern of knowledge gap on product capabilities. Shifts in the public discourse around DRE, with governments and larger multilateral financial institutions looking to deploy funds in this space will gradually also help unlock a greater pool of private investment opportunities.

A key motivation, driving this conversation, should be to catalyse enterprise and end-user finance to accelerate the uptake of DRE solutions across geographies. This includes encouraging countries to look at innovative and blended finance instruments, like dedicated subsidies on DRE technologies provided to manufacturers by governments, provision of patient capital to early-stage companies, and affordable credit options for consumers. The Taskforce focusing on 'Refuelling Growth' can also look at the role the G20 can play in building capacities of policy stakeholders, governments, and financiers to help raise awareness of DRE-related models.

Enabling international cooperation across sectors for an equitable exchange of knowledge and resources essential for scaling DRE technologies. The G20 countries and their policymakers need to come together to leverage existing resources and efforts to scale DRE technologies. Collaborations that supply project designs, technical advisories, and implementation support can go a long way in this regard. One avenue that could be explored is the addition of DRE to the countries' lines of credit, thereby helping G20 countries meet their developmental goals.

It is estimated that an annual investment of US$45 billion is required to achieve SDG7 by 2030.[29] There need to be effective policy and financing mechanisms in place to unlock potential investments from both private and public finance sectors. Given that DRE

livelihood technologies provide reliable energy access and support livelihoods across sectors, they present an excellent opportunity to leverage existing efforts, resources, and funds to further energy access and sustainable livelihoods.

Getting buy-ins from financiers, policymakers, and implementing organisations based on evidence from proposed innovative use case interventions. Using the G20 forum, host nations can support partner countries in facilitating data-driven research and innovation in the sector. Under the ETWG, one of the priority areas could be to track, monitor, and utilise data to generate evidence on the impact of DRE technologies. This data can focus on socio-economic and environmental indicators, capture technology utilisation rates and measure the effectiveness of enabling affordable financing. The evidence could be disseminated through exhibits, case studies, and digital dashboards during G20 meetings. The effort on evidence generation can be led by India, drawing from its experience of drafting a DRE policy framework and deploying DRE technologies. This evidence dissemination will help in raising awareness and accelerating buy-ins from stakeholders.

Attribution: Divya Gaur et al., "Unlocking Finance to Scale Decentralised Renewable Energy for Clean Energy Transitions: Learnings from India," *T20 Policy Brief*, July 2023.

Endnotes

1 International Energy Agency, *World Energy Outlook 2022* (IEA, 2022), https://iea.blob.core.windows.net/assets/830fe099-5530-48f2-a7c1-11f35d510983/WorldEnergyOutlook2022.pdf.

2 Drew DeSilver, "Research from 44 countries shows levels of rising inflation across the world," *World Economic Forum,* June 23, 2022, https://www.weforum.org/agenda/2022/06/inflation-stats-usa-and-world.

3 Abhishek Jain, Arunabha Ghosh, Sanjana Chhabra, *Powering Livelihoods Globally through Clean Energy* (Stockholm: Global Challenges Foundation, 2021), https://www.ceew.in/publications/how-distributed-renewable-energy-can-boost-livelihoods.

4 Power for All, *Powering Jobs Census 2022: Focus on India* (Power for All, 2022), https://www.powerforall.org/resources/reports/powering-jobs-census-2022-focus-india.

5 Power for All, *Powering Jobs Census 2022: Focus on Kenya* (Power for All, 2022), https://www.powerforall.org/resources/reports/powering-jobs-census-2022-focus-kenya.

6 Ministry of New and Renewable Energy, *Framework for promotion of Decentralised Renewable Energy Livelihood applications* (New Delhi: MNRE, 2022), https://mnre.gov.in/img/documents/uploads/file_f-1644909209115.pdf.

7 Jain et al., *Powering Livelihoods Globally through Clean Energy.*

8 Divya Gaur, Priyatam Yasaswi, Abhishek Jain, *How Decentralised Renewable Energy-powered Technologies Impact Livelihoods : Findings from the Ground* (New Delhi: Council for Energy, Environment and Water, 2023), https://www.ceew.in/sites/default/files/how-decentralised-renewable-energy-powered-technologies-impact-sustainable-livelihoods.pdf.

9 "Productive Uses of Energy," Efficiency for Access, accessed 2023, https://efficiencyforaccess.org/themes/productive-uses-of-energy.

10 "Powering Agriculture," U.S. Agency for International Development (USAID), accessed 2023, https://www.usaid.gov/energy/powering-agriculture.

11 Efficiency for Access Coalition, *Uses and impact of solar water pumps* (Efficiency for Access, 2021), https://storage.googleapis.com/e4a-website-assets/Use-and-Impacts-of-SWPs-July-2021-v2.pdf.

12 Efficiency for Access, *Uses and impact of solar water pumps.*

13 SELCO Foundation, *175 Livelihoods Sustainable Energy Driven Applications* (SELCO Foundation, 2023), https://selcofoundation.org/wp-content/uploads/2023/06/SELCO-Foundation-_175-Sustainable-Energy-Driven-Livelihood-Applications-2023_compressed-1.pdf.

14 IRENA, SELCO Foundation*, Fostering Livelihoods with Decentralised Renewable Energy: An Ecosystems Approach* (Abu Dhabi: International Renewable Energy Agency, 2022).

15 Shaily Jhai, Sasmita Patnaik, Abhishek Jain*, Financing Solar-powered Livelihoods in India: Evidence from Micro Enterprises* (New Delhi: CEEW, 2019), https://www.ceew.in/sites/default/files/CEEW-Financing-Solar-powered-Livelihoods-in-India-24Sep19_compressed_0.pdf.

16 Jha et al. , Financing Solar-powered Livelihoods in India: Evidence from Micro Enterprises.

17 "Economic survey highlights thrust on Rural Development," Ministry of Finance, Press Information Bureau, last modified January 31, 2023, https://pib.gov.in/PressReleasePage.aspx?PRID=1894901.

18 "Income of Farmers," Ministry of Agriculture and Farmers Welfare, Press Information Bureau, last modified December 16, 2022, https://pib.gov.in/PressReleasePage.aspx?PRID=1884228.

19 "World Bank Country and Lending Groups – World Bank Data Help Desk," The World Bank, 2021, https://datahelpdesk.worldbank.org/knowledgebase/articles/906519-world-bank-country-and-lending-groups.

20 Divya Gaur et al., *How Decentralised Renewable Energy-powered Technologies Impact Livelihoods : Findings from the Ground*.

21 Clean Energy Access Network, *State of the Decentralized Renewable Energy Sector in India: Insights from CLEAN,* (New Delhi: CLEAN, 2022), https://www.thecleannetwork.org/pdf/State-of-the-Decentralized-Renewable-Energy-Sector-in-India-Insights-from-CLEAN.pdf.

22 S. Kim, A. Davidson et al., *Building the Green Economy: Trends and Opportunities for Green Entrepreneurship in India* (Aspen Network of Development Entrepreneurs, 2023), https://andeglobal.org/publication/green-entrepreneurship-in-india/ ; S. Kim, A. Davidson et al., *Building the Green Economy: Trends and Opportunities for Green Entrepreneurship in Kenya* (Aspen Network of Development Entrepreneurs, 2023), https://andeglobal.org/publication/green-entrepreneurship-in-kenya/.

23 Kim et al., *Building the Green Economy: Trends and Opportunities for Green Entrepreneurship in India and Kenya*.

24 Net Zero Tracker et al., *Net Zero Stocktake 2022* (Net Zero Tracker, 2022), https://zerotracker.net/analysis/net-zero-stocktake-2022.

25 Net Zero Tracker et al., *Net Zero Stocktake 2022*.

26 "Energy Statistics Data Browser," International Energy Agency, last modified August 18, 2022, https://www.iea.org/data-and-statistics/data-tools/energy-statistics-data-browser

27 G20 Research Group. 2022. "Decade of Actions: Bali Energy Transitions Roadmap." www.g20.Utoronto.ca. September 2022. http://www.g20.utoronto.ca/2022/220902-energy-roadmap.html#fn1

28 "Decade of Actions: Bali Energy Transitions Roadmap," G20 Research Group, last modified September 2, 2022, https://www.g20.org/en/media-resources/press-releases/may-2023/etwg/.

29 IEA, IRENA, The World Bank, WHO, UN Statistics Division, *Tracking SDG7: The Energy Progress Report, 2022* (IEA, 2022), https://www.iea.org/reports/tracking-sdg7-the-energy-progress-report-2022.

वसुधैव कुटुम्बकम्

ONE EARTH • ONE FAMILY • ONE FUTURE