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FINANCING THE WORLD'S SOLAR FUTURE

THE NEED FOR A SOLAR FINANCE CORPORATION

Jayant Sinha • Nandini Sarma

FINANCING THE WORLD'S SOLAR FUTURE: THE NEED FOR A SOLAR FINANCE CORPORATION

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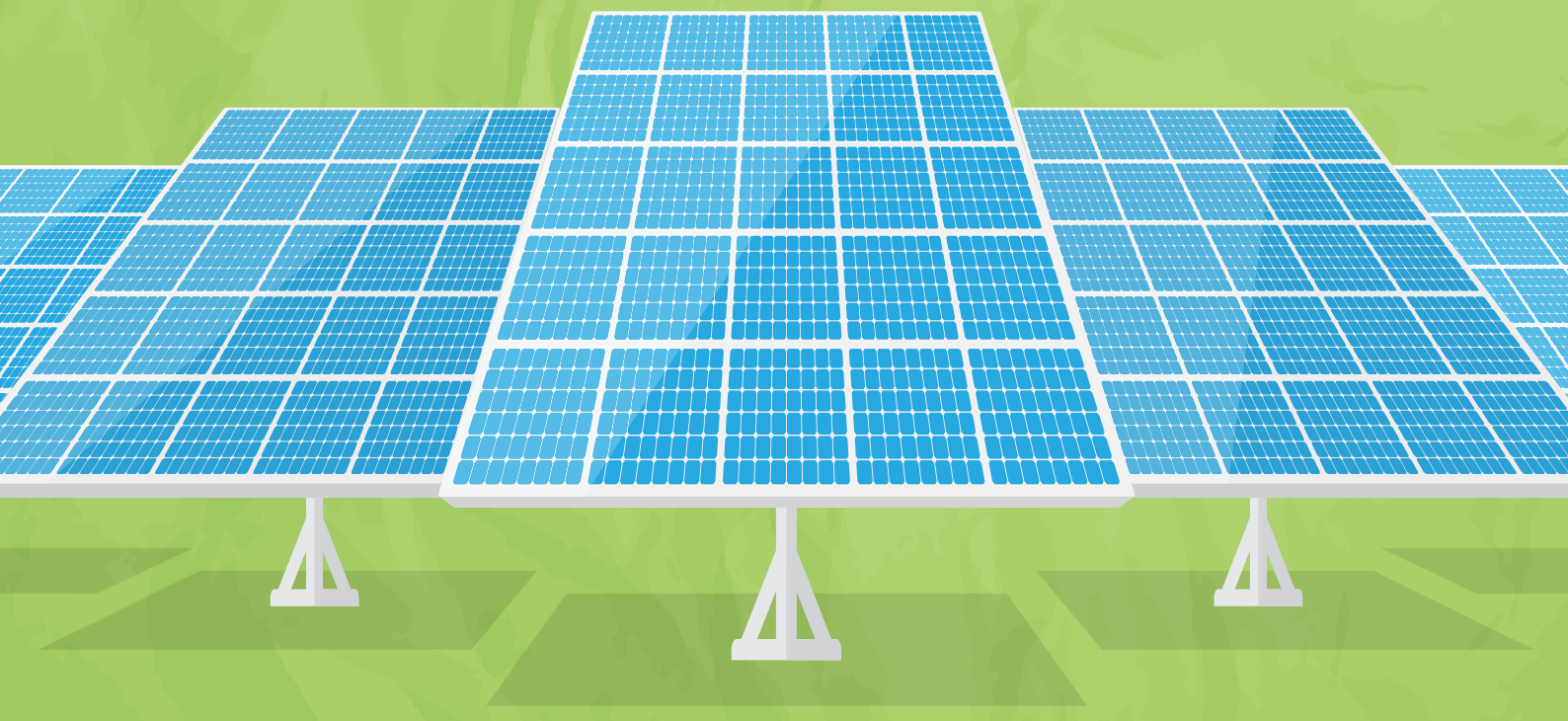
ABSTRACT



Investment in the renewable energy sector is crucial for the world to meets its climate goals. For this, there is a need for an institutional mechanism that helps channel global funds to developing and least developed countries (LDCs) at affordable interest rates. This report outlines the sources of finance and the challenges faced by developing countries when attracting funding. It makes the case for the creation of a Solar Finance Corporation, a bank that will be given the dual mandate of earning returns as well as providing financing at affordable rates to under-developed markets in developing countries and LDCs. India has met with some success in implementing solar energy projects. With the setting up of the International Solar Alliance (ISA), India has taken centrestage in the global renewable energy order and can play a leading role in setting up such a financing institution.

INTRODUCTION

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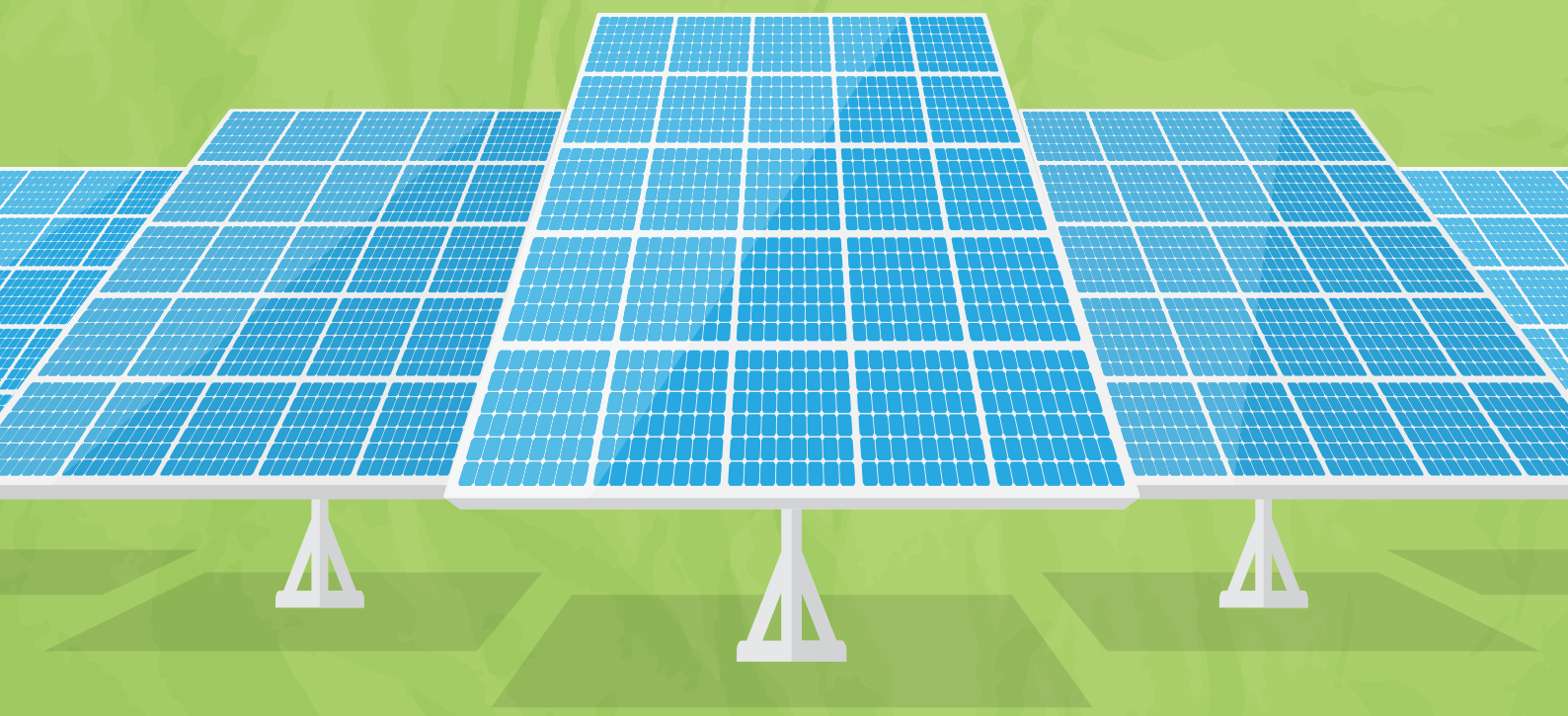

Global investments in renewable energy are increasing at an exponential rate. At the start of the century, between 2000 and 2009, this sector drew total investments of US$ 2.6 trillion.[1] It continued to grow in the subsequent years and peaked at US$ 351 billion in 2017, before declining to US$ 322 billion in 2018 due to falling cost of renewable energy which meant more capacity addition per unit of investment. Cost reductions as well as improved technology and systems have made this sector competitive as compared to conventional fossil fuel. The cost of solar energy has dropped by 85 percent over the last decade.[2] There is increased policy support from the government as well as from members of the industry that are increasingly adopting sustainability parameters as part of their mandate.

Solar energy is an abundant resource and can play a significant role in meeting the climate goals of keeping global temperature below 2 degrees. Successfully meeting the goals set by the Paris Agreement would lead to the share of renewables in total electricity use to increase to 85 percent in 2050 as compared to only 20 percent in 2016. Further, end-use products such as solar pumps can power livelihoods in developing countries.

The corporate and industrial sectors constitute two-thirds of global power consumption and must therefore become important customers of renewable energy. Many companies are voluntarily adopting targets to increase the mix of renewable energy in their power consumption. Mobilising finance for the renewable sector is a key challenge, especially for developing countries. Newer and innovative sources of funding are needed to help direct investment into solar energy sources. This report outlines a proposed structure for a bank in the form of a Solar Finance Corporation, that can help channel financing (e.g., grants, debt, and equity) towards solar projects across the world, with a focus on developing countries.

THE RATIONALE FOR A SOLAR FINANCE CORPORATION

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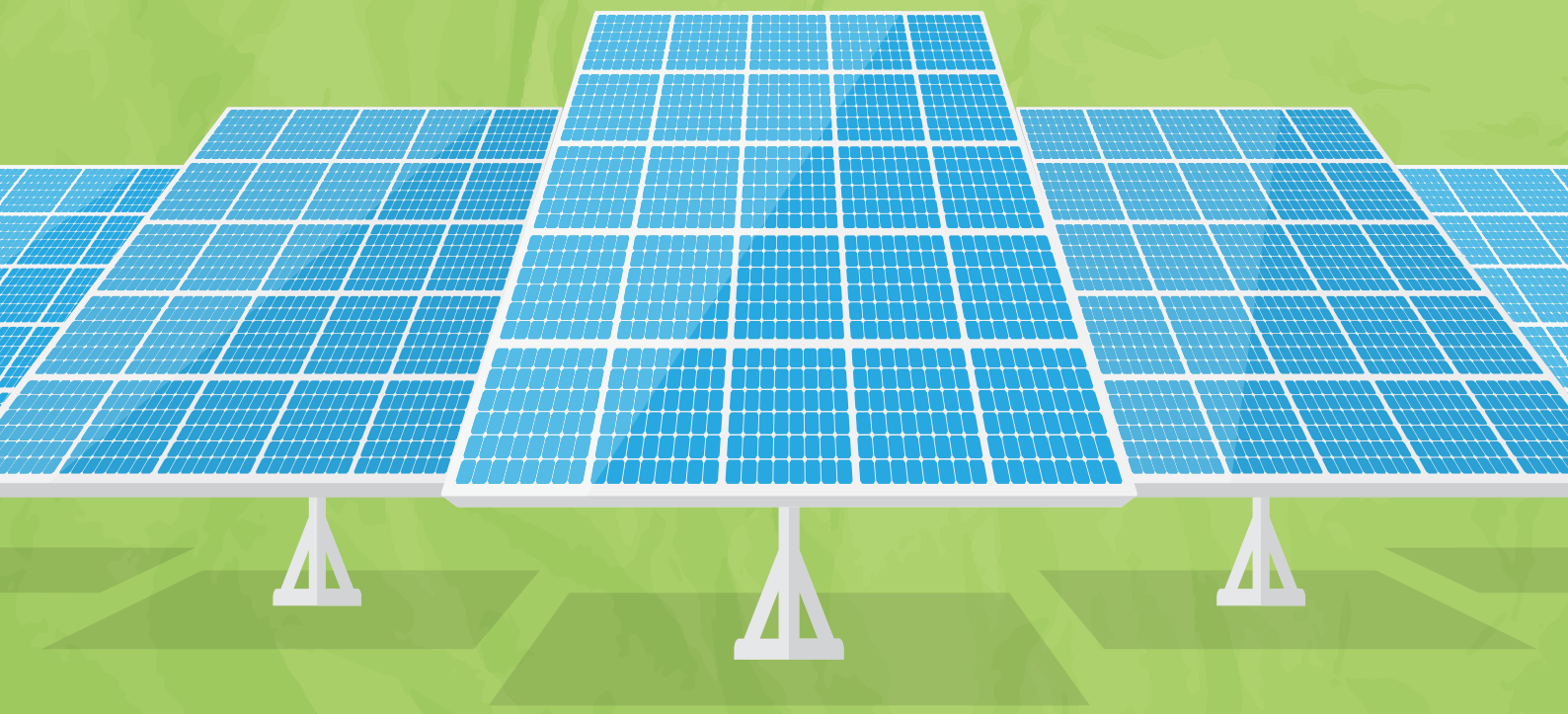
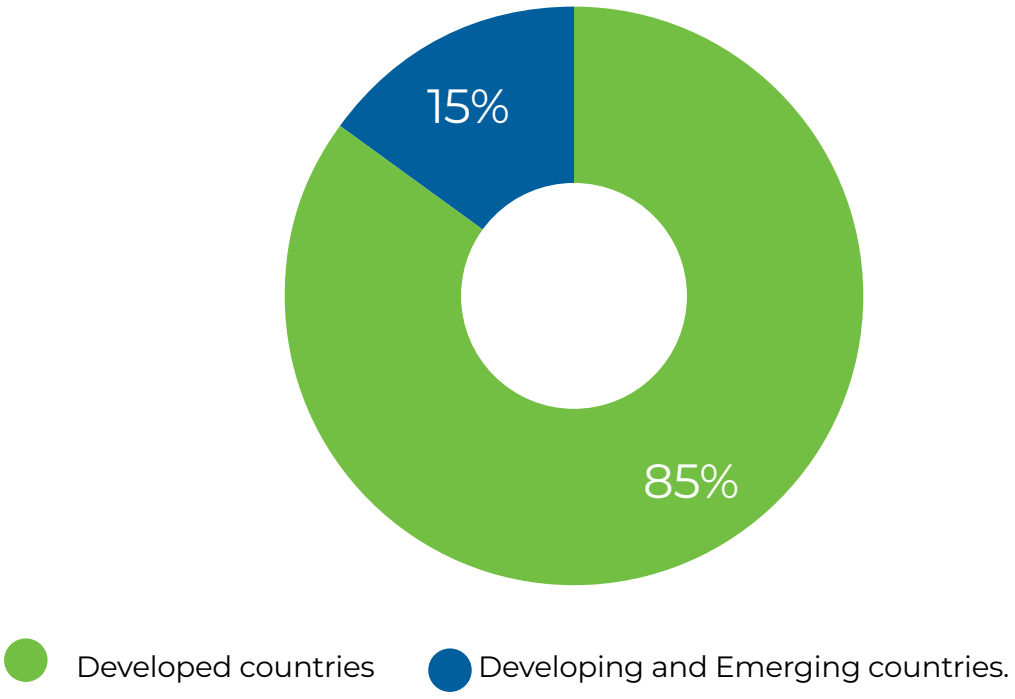


Between 2000 and 2017, there was a 15-fold increase in investment flows to developing countries that have focused on clean and renewable energy.[3] However, the majority of total investments originated from, and flowed to Organisation for Economic Co-operation and Development (OECD) countries. Between 2013-2018, 85 percent of the investments went to developed countries, whereas only about 15 percent was invested in developing and emerging economies.[4] Of this, South Asia attracted about 4 percent of the total, averaging US$ 16 billion between 2013 to 2018.

Figure 1. Investments in renewable energy (2013-2018)

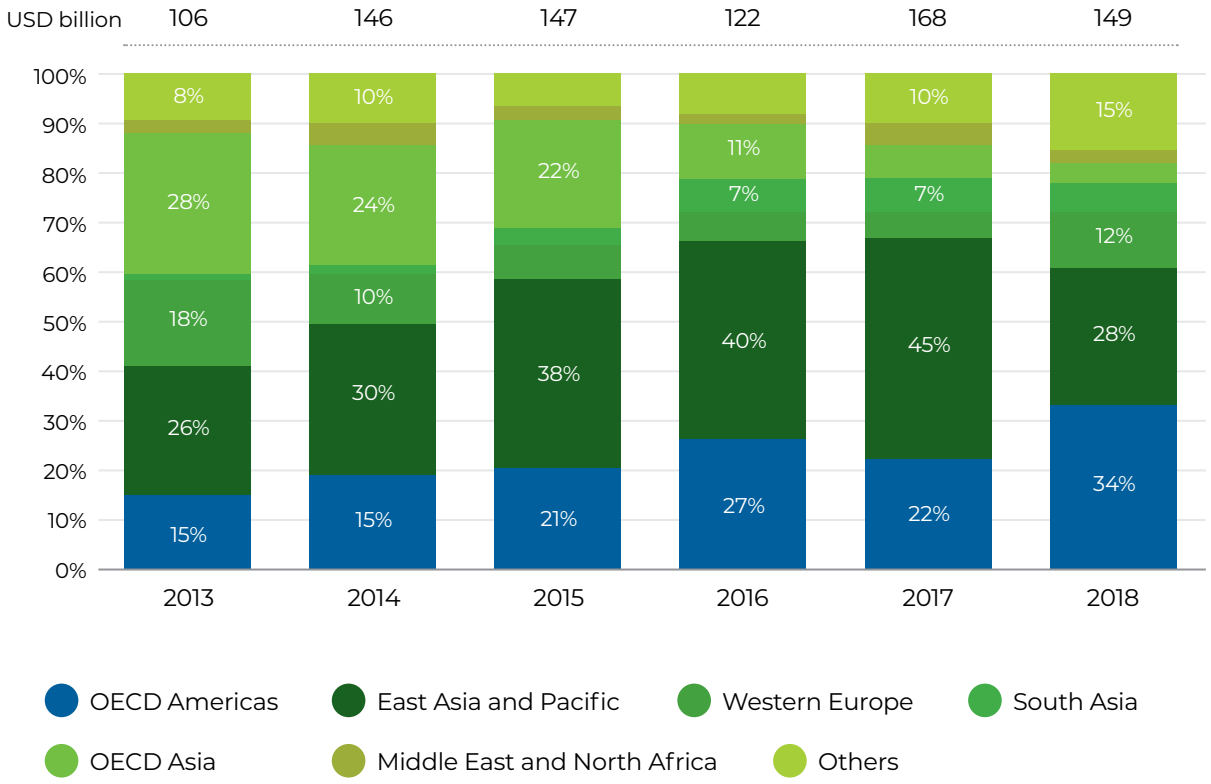


Source: Authors' own, using data from IRENA

Renewable energy is financed largely by private financial institutions, which account for 86 percent of the financing provided in the same 2013-2018 period. Private financial institutions are profit-driven and tend to concentrate on mature technologies and regions to capture attractive returns. A Solar Finance Corporation can help in financing investments in new technologies and underdeveloped markets.

In the solar PV sector as well, majority of the financing favoured the OECD countries and the Pacific region (See Figure 2).

Figure 2. Investments in Solar PV Sector (By region, 2012-2018)

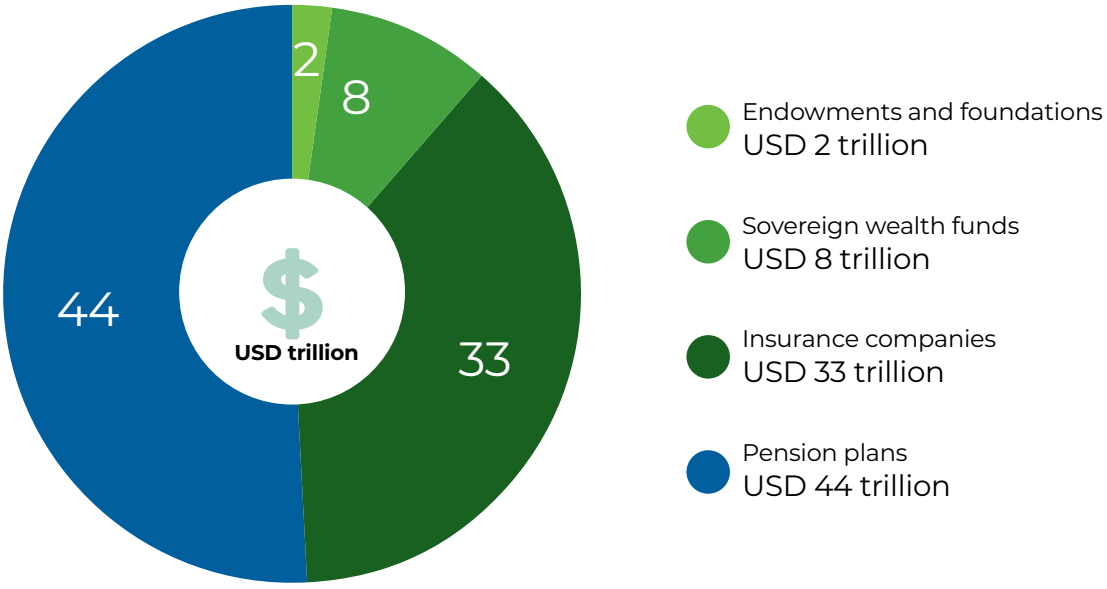


Source: IREDA report on Global Landscape of Renewable Energy Finance 2020[5]

Developing and emerging countries need access to financing at concessional rates (relative to typical commercial rates) to allow them to make investment choices that will replace brown energy sources with greener ones. It is noteworthy that 95 percent of financing for renewable energy between 2013 and 2018 was provided at commercial rates, and only 4 percent were financed at concessional rates. International public finance plays a significant role in investing in riskier countries, but even in this category only about 12 percent of the total went to the least developed countries.

Renewable energy projects require long-term funding. Institutional investors such as pension funds, sovereign wealth funds, and insurance companies hold vast financial resources that are conducive to this type of funding (See Figure 3). However, institutional investors accounted for only about 2 percent of direct investments made in the renewable sector. A Solar Finance Corporation can help tap into these important financing sources and incentivise institutional investors to give more attention to renewable energy projects. It will also help these investors diversify their portfolio and integrate sustainability parameters in their mandates, which is a growing regulatory requirement today.

Figure 3. Assets under management of institutional investors (2018-2019 average; USD trillion)



Source: IRENA report on Mobilising institutional capital for renewable energy[6]

Although the majority of institutional investors are concentrated in developed countries, the growth in emerging economies is picking up and there are sizable institutional investors in these markets as well. Insurance markets in Africa, Latin America and Asia-Pacific accounted for more than 50 percent of the growth between 2014 and 2017.[7] Given that capital flows originate and invest in domestic markets, this growing pool of institutional investors in emerging countries can be a key source of financing that can be used to fund green and long-term investments.

Finally, development finance institutions (DFI) have had limited growth in recent years as their investments have plateaued. This is in part due to the shrinking fiscal space in developed countries, as well as higher risk perception in emerging countries.[8] Thus, while there is growing need and demand in emerging countries, existing DFIs are not meeting them.

There are a number of reasons why investments, particularly from private financial institutions, are unable to flow freely to emerging countries. Market failure and undeveloped financial markets are a few of the reasons that prevent a transparent risk analysis of projects. This report focuses on financial risks and makes a proposal for the creation of a Solar Finance Corporation (SFC) that can bridge the gap and provide financing at concessional rates to poorer countries.

BARRIERS TO SOLAR INVESTMENTS IN DEVELOPING COUNTRIES

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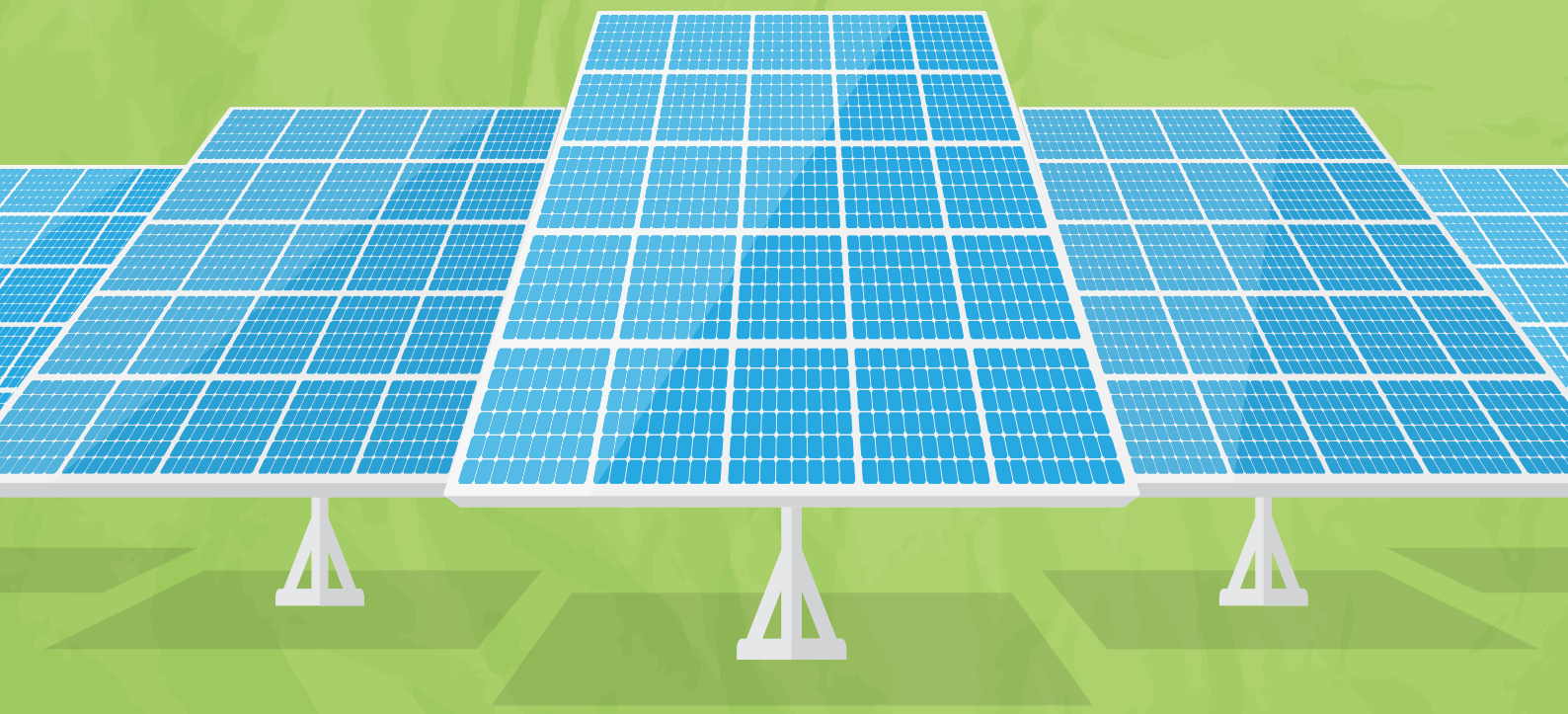

Solar energy requires large and long-term financing that is difficult to obtain especially for developing countries. Debt financing is generally available only for periods of five to six years. Banks are also wary of lending in this sector as they lack the experience with renewable technologies that would allow them to assess the risks involved. This results in high costs of financing for renewable sector projects. The cost of borrowing can be significantly higher than in developing countries.

Moreover, renewable energy projects require significant equity finance. This helps them cover the development activities of the project and represents the risk capital invested in a project. Equity investments imply that the investor has an ownership stake in the project. Different equity investors are involved at different stages—for example, venture capital firms are focused on the early stages of the project, and corporate or strategic investors cover the latter stages, including just before an initial public offering.

The small scale of the projects in developing countries is another factor that creates issues when accessing private financing. The initial cost of such projects can be a significant obstacle in its widespread deployment, leaving a limited number of financing institutions that are willing to invest in this market segment. Off-grid solar projects are also an important local power generation for rural areas that are not connected to the grid due to high costs. Such projects are crucial to ensure affordable access to energy. The risks for such decentralised systems are much higher due to the location (for example rural areas for off-grid projects) as well as the target group (low-income populations).

Currency risk is also higher in developing countries, especially for currencies that are not traded frequently. There is a need for new innovative financing structures that help provide a risk-adjusted return that is attractive to investors by covering early-stage risks in such projects. This is where multilateral financing institutions such as an SFC can be crucial in helping reduce risk for the private sector and help develop new markets for renewable energy.

PROPOSED MANDATE FOR A SOLAR FINANCE CORPORATION

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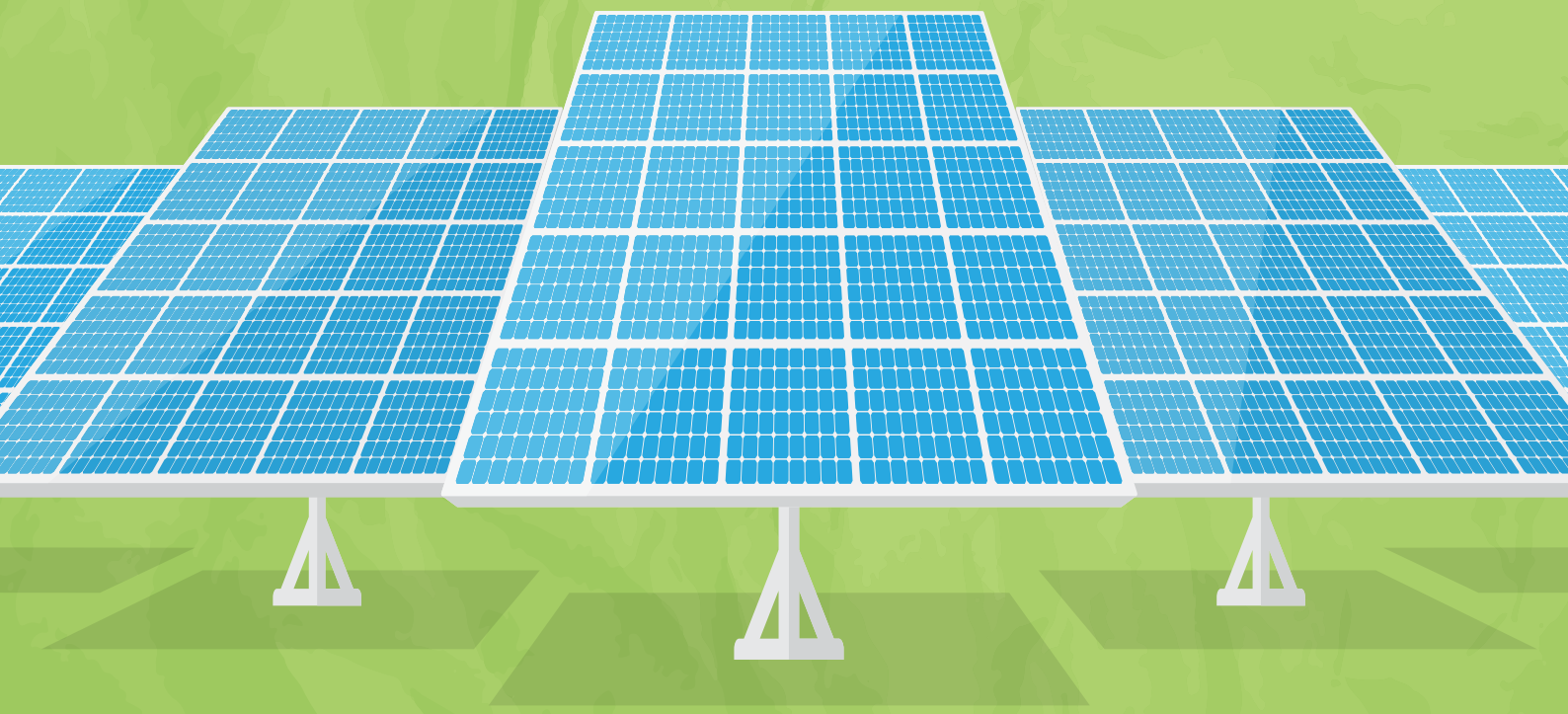
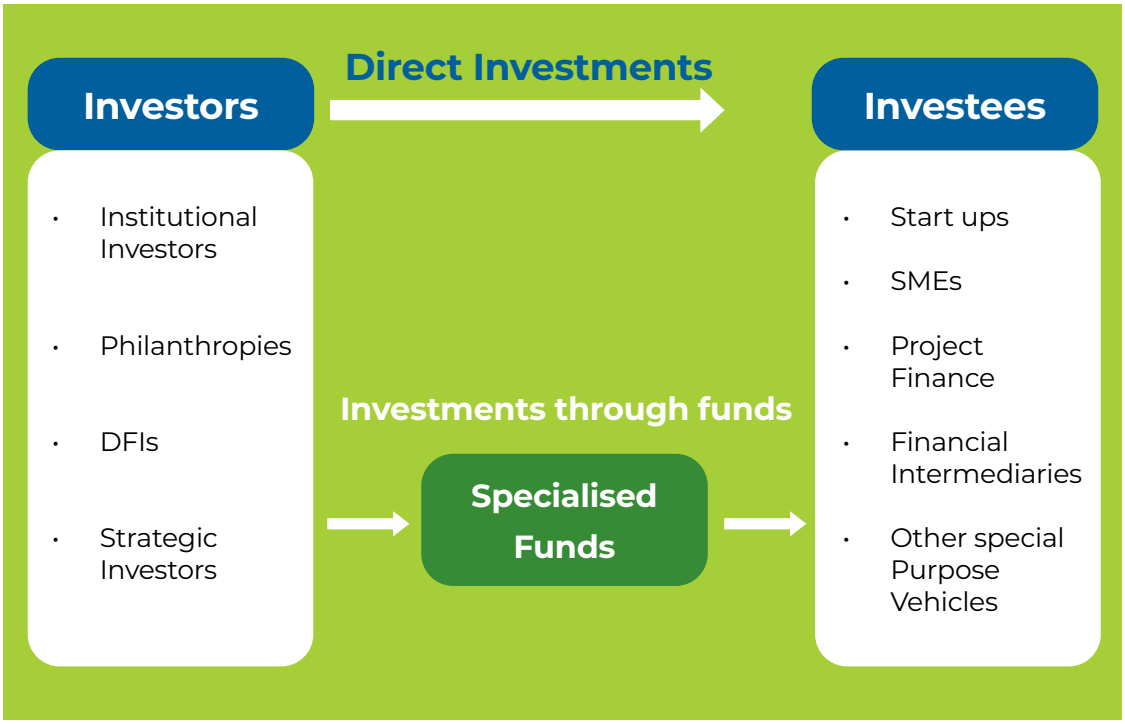


The challenges associated with investments in renewable projects include currency risks, high up-front costs, and under-developed markets in developing countries. The rationale for concessional equity investments is to fill the gap in underserved markets in developing countries. But due to the new and risky nature of such investments, the returns may be lower. On the other hand, equity investments can also allow the bank to earn high rates of interest through investments in proven technologies and established markets. Thus, a balanced approach to equity investments can help fulfil the mandate of maximising developmental impact while earning a commercial rate of return. Equity investments also have a higher demonstration effect as it encourages further investments by other players.

The Solar Finance Corporation that is being proposed in this report will have to develop a balanced portfolio with some speculative projects with steep returns that will offset more traditional projects with well-defined returns. The International Finance Corporation's (IFC) proven returns shows that it is possible to achieve both these objectives: the IFC has obtained 15 percent returns over the last 20 years in markets where it was a first-time investor.[9] The positive returns can then be used to provide concessional loan products to LDCs and developing countries.

Equity investments can be made directly or indirectly through specialised funds (See Figure 4). Direct equity investments can help the SFC to establish its local presence and exert more direct governance over the workings of the company. At the same time, investing in first-time funds can be useful in developing the expertise of fund managers in new markets. This is one area where existing DFIs have a lower emphasis and something that the proposed Solar Finance Corporation can seek to develop.

Figure 4. Equity Finance (Direct and Indirect)



Source: Authors' own, using data from various sources

Investing in established funds can also be useful to enter a market where the SFC has little experience or presence and it can then use this experience to invest more directly in the future. A study highlights that when investing in established funds, it is important to understand the investing strategy being followed by these funds.[10] This is especially important when the objective is to support new and risky technologies. Thus, the SFC's investment approach should consider these historical biases or directions when selecting financial instruments.

INDIA'S LEADERSHIP ROLE IN THE SOLAR ENERGY SECTOR

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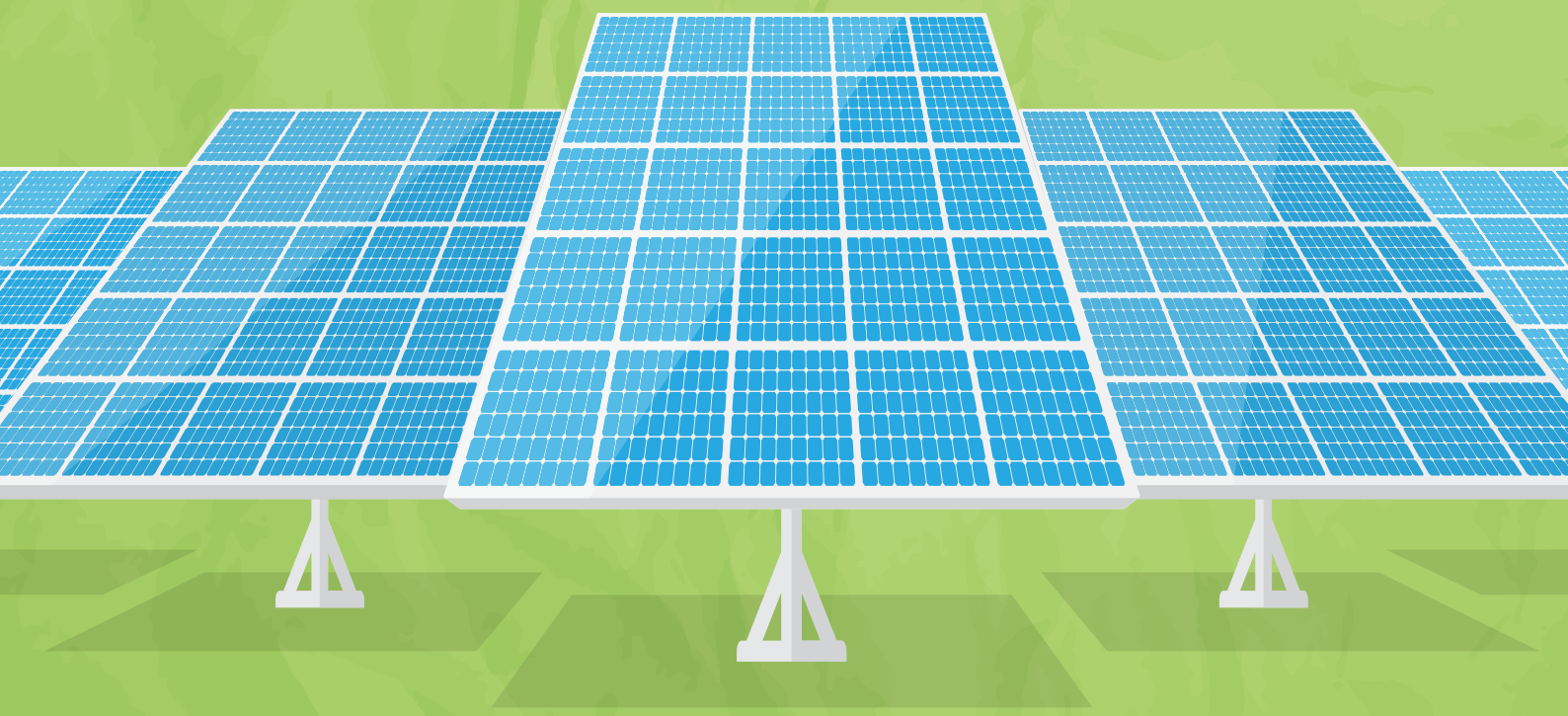

The SFC concept is closely linked with India's leadership role in the solar energy sector. The International Solar Alliance (ISA) is an inter-governmental treaty-based alliance, an idea that was conceived by India in 2015. It is a coalition of solar-rich countries to promote investment in solar energy and cooperate in research and development on solar energy technologies. The concept of ISA is an effort by India to play a greater role in the global climate governance. It also reiterates India's commitment to its climate goals. The ISA aims to mobilise more than $1,000 billion by 2030 and install 1000 GW of solar power capacity globally.

ISA has signed joint financial declarations with international institutions such as the Asian Development Bank, Green Climate Fund, and Asian Infrastructure Investment Bank.[11] It also plans to develop insurance for the various risks involved in solar projects by aggregating demand for finance and insurance of the member countries of the ISA. The ISA will also collaborate in research with member countries and has announced the solar technology mission as part of its 10-point action plan.[12] In 2020, ISA released the first of what they promise to be an annual 'Ease of Doing Solar' report that will identify countries that perform well in the solar energy sector. The report compares 80 member countries across various parameters such as macroeconomy, policy enablers, technological feasibility, power market maturity, infrastructure, financing, and energy imperatives. The report is expected to be a reference for financial investors seeking to take part in the solar sector. Thus, ISA can play an important role in closing the information gap that investors face and facilitate greater investments towards the sector.

Solar energy has been central to India's transition to clean energy and it has met with success in implementing solar energy projects domestically. India has set ambitious targets and has been successful in increasing the share of solar energy in the country's renewable energy mix. Solar parks have attracted private sector participation, and India is today home to the two largest ultra-mega solar parks in the world; they continue to attract foreign capital.[13] Specialised bodies such as the Ministry of New and Renewable Energy (MNRE)

and the Solar Energy Corporation of India (SECI) have played pivotal roles in the adoption of solar energy. In supporting the setting up of solar parks, SECI has also taken steps to encourage private sector developers through direct investment in land acquisition and a payment security mechanism. SECI has also played an important role in central as well as state-level utility scale projects in facilitating tenders. Furthermore, individual states are accelerating the adoption of solar energy through various policy initiatives and incentives. Tata CleanTech Capital Limited (TCCL) is India's first private non-bank financial company that has been set up with support from the IFC; it has so far mobilised US$700 million in the solar energy sector.[14]

Thus, given India's experience in the solar energy sector, India is in a position to take a lead and establish a Solar Finance Corporation. The following section details the structure that this report is proposing for the bank.

STRUCTURE OF THE SOLAR FINANCE CORPORATION

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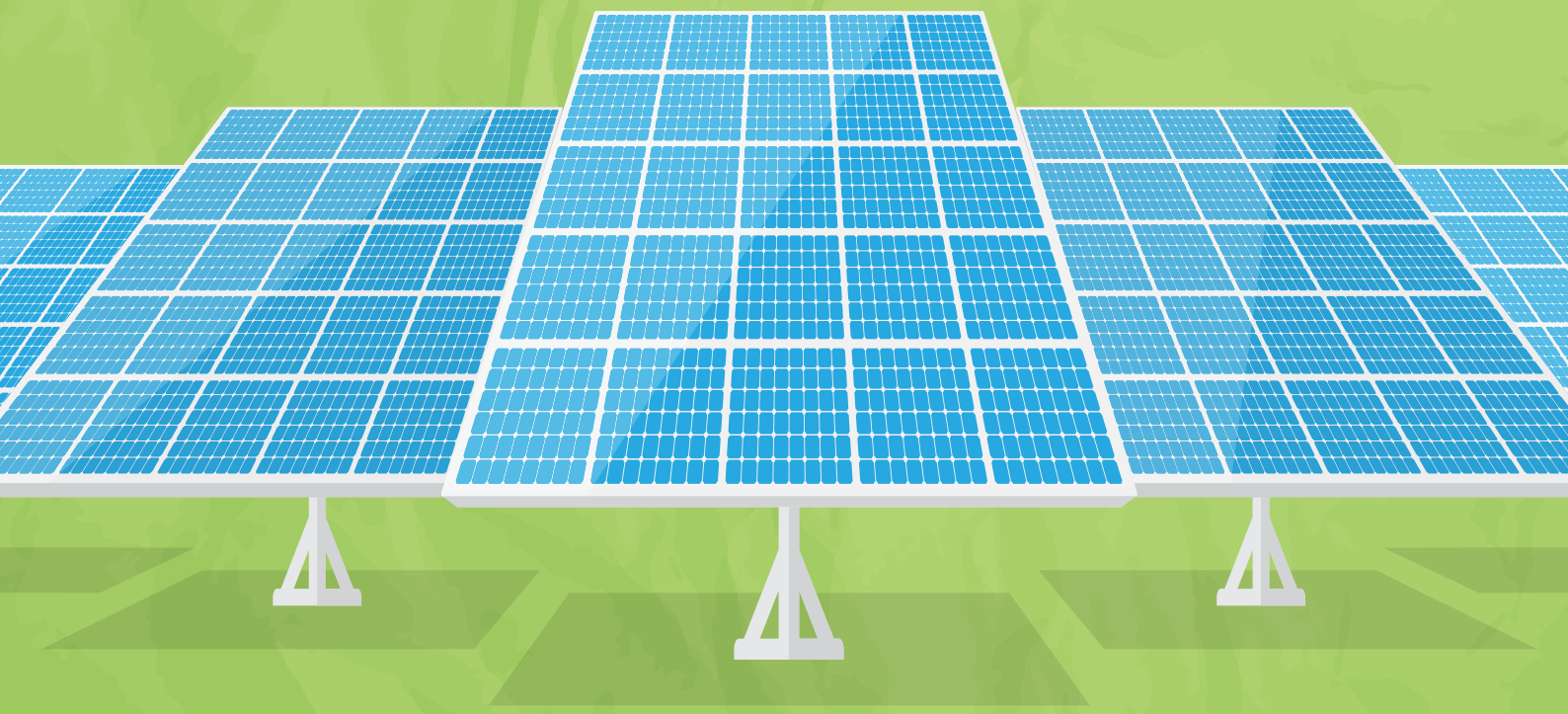

Despite the presence of many international development banks, there is still a huge shortfall in the finances required in developing countries that these institutions are unable to meet. A financing institution such as an SFC can play an important role in bridging this gap.

Mandate

This SFC's mandate would be to provide access to financing in the solar energy sector, especially in emerging and least developed countries. These funds would be provided across the entire supply chain—from project developers to end users. It will help provide long-term financing at affordable rates to provide funding of solar projects across the member countries. It will also help to form links with cross-South development financial institutions. The scope of the SFC will be from individual small projects to utility-scale projects covering all geographical areas.

1. Leverage public finance to attract private finance by sharing the risk involved in projects.
2. Help source both domestic and international funds for investment through different financial instruments such as loans, grants, and equity.
3. Seek to tap into and mobilise institutional investors such as sovereign wealth funds, pension funds, philanthropies to invest in the solar sector.
4. Enabling and expanding livelihood options for end-users through solar products such as solar pumps, solar-powered sewing machines, solar milk chillers, and fishing boats.
5. Seek commercial rates of return through equity investments in mature markets in the EU or US that can be reinvested in emerging and LDC markets.

Governance

The powers of the SFC will be vested in a Board of Governors. Each member of the SFC will appoint a Governor and an Alternative Governor. The Board will select one of its members as Chairperson. Each member will have voting

power equal to its share of votes. A Board of Directors headed by a Chairperson will be responsible for the granular operations of the SFC.

The SFC will publish an annual report that will detail its profit and loss statements as well as audited statements. The SFC will also publish any study or report that it deems fit for its purposes.

Finances

The Bank will be set up using share capital from its member countries. It will mobilise funds from multilateral institutions, sovereign wealth funds, and philanthropies. It will also raise capital from the global capital market through bond issuances. The bank can mobilise institutional investors through various instruments such as green bonds, which will adhere to global standards that use established criteria for their classification.[15] The growth potential is large for green bonds as the cumulative green bond issuances are less than 1 percent of the global bond market. The SFC will also issue local-currency bonds to help develop domestic capital markets and enable lending in the local currency that will help to mitigate foreign currency risks.

Financial Instruments

- **Equity –** These are direct or indirect investments in return for partial or total ownership of the company.
- **Quasi-equity –** This is hybrid in nature with a mix of debt and equity. It has a higher risk than senior debt and a lower risk than common equity. Examples of quasi-equity financing includes subordinated debt, convertible debt, profit-sharing debt, and mezzanine securities (debt with warrants or rights to equity conversion).
- **Blended concessional finance –** This is an important tool that can help mobilise private finance. It is a blend between concessional donor funds and commercial funding.[16] It is done with cooperation with donors and other development partners. It is designed to help attract finance for a project

that has high level of risk. Different financial instruments can be used to implement this that includes equity, concessional debt, performance-based incentives, financing in local currency, and risk guarantees.

- **Partial Guarantees –** It is a credit enhancement mechanism for debt instruments such as bonds and loans. It is an assurance to pay a pre-determined amount of the principal or interest. This helps to improve the credit rating of the issuer and reduce investor or financing risk. This can be especially useful in countries where sovereign guarantees are not available. Thus, institutions such as the proposed Solar Finance Corporation can play a significant role.
- **Risk management products –** Hedging instruments to help mitigate risks such as currency risks, as well as credit and liquidity risks. Interest rate swap, cross-currency swaps forwards, commodity hedges and other instruments are available in the market.
- **Local Currency Bond issuance –** To help develop local capital markets. This is to facilitate more investment by other investors through the demonstration effect. This is also an instrument to help minimise dependence on more volatile sources of international finance. This provides an important source of financing beyond the banking system and equity finance.
- **Financial crowd funding –** This is increasingly becoming a popular method to source financing. Crowdfunding is an easier form of funding as compared to traditional sources of finances. This can be particularly important for small-scale projects or off-grid solar projects. It allows an organisation to source funds from the general public via the internet through a dedicated platform. Equity crowd funding is similar to when funders invest money in exchange for equity shares. Similarly, debt crowd funding is investment in return for interest. Non-financial crowd funding may also be explored for small projects where donations are made without any expectation of reward.

Investment Board

The debt investment board will consist of technical and financial experts who will devise new and innovative financial tools to help tap into lesser developed markets in developing countries and LDCs. It will help access the various risks and returns involved in different projects and ways and means to balance it across projects. A separate equity board will be established to deal with equity investments that will comprise members with specialised skills in the area.
A risk management committee will be established to evaluate the risks and returns of investments over a period of time. There would be a sub-committee dealing with risks involved in equity investments.

New financing methods will also be devised to improve investments in off-grid solar projects. This would have to be in the form of long-term concessional finance that would make it easier for project developers as well as end-users to access and adopt solar energy. Further, for low-income groups the focus should be on improving livelihood through livelihood solutions that can help to raise the purchasing power of the groups and would be a more sustainable long-term strategy.

Equity Investment process

1. **Screening of projects for equity investing –** This would be done using a combination of top-down approach (e.g., analysing the growth potential of the country, financial and regulatory environment, among others) and bottom-up (i.e., evaluating local demand and various business models)
2. **Structuring of projects –** This would involve key decisions about shareholding size. The process would have to choose between the various forms of investment such as equity, quasi-equity, mezzanine or blended finance.
3. **Supervision of projects –** The monitoring process for equity investments is more complex as compared to debt investments. The risky and volatile nature of investment requires monitoring credit, market and liquidity

risks. Thus, it needs continuous evaluation and forecasting of the risks and returns of the investment.

4. **Exit strategy –** This is discussed during the initial approval process of the project. The exit plan, however, may vary at the time of exit depending on market conditions and other factors. Thus, disinvestment from direct equity investments at the correct time, when prices are high, is crucial. This also requires continuous valuation of the portfolio and rebalancing exercises to ensure sufficient return profile.

Evaluation

Evaluation of the SFC can be in terms of financial returns and meeting specific developmental goals.

- Financial rate of return
- Development goals such as
    - job creation
    - access to electricity
    - number of solar panels installed, ,
    - market development
- Evaluation as per specific financial instruments can also be tracked to analyse the performance of different instruments (e.g., equity, debt)

Advisory Services

Advisory services is an important component of building new markets and reaching out to the private sector. This would include market analysis so as to give investors insight into newer and untapped markets. Joint studies can also be conducted with similar organisations working in the areas. Such services can be given to companies, governments as well as financial institutions. This would range from designing loan products, working to strengthen financial markets, and assisting companies on how to manage risks.

CONCLUSION

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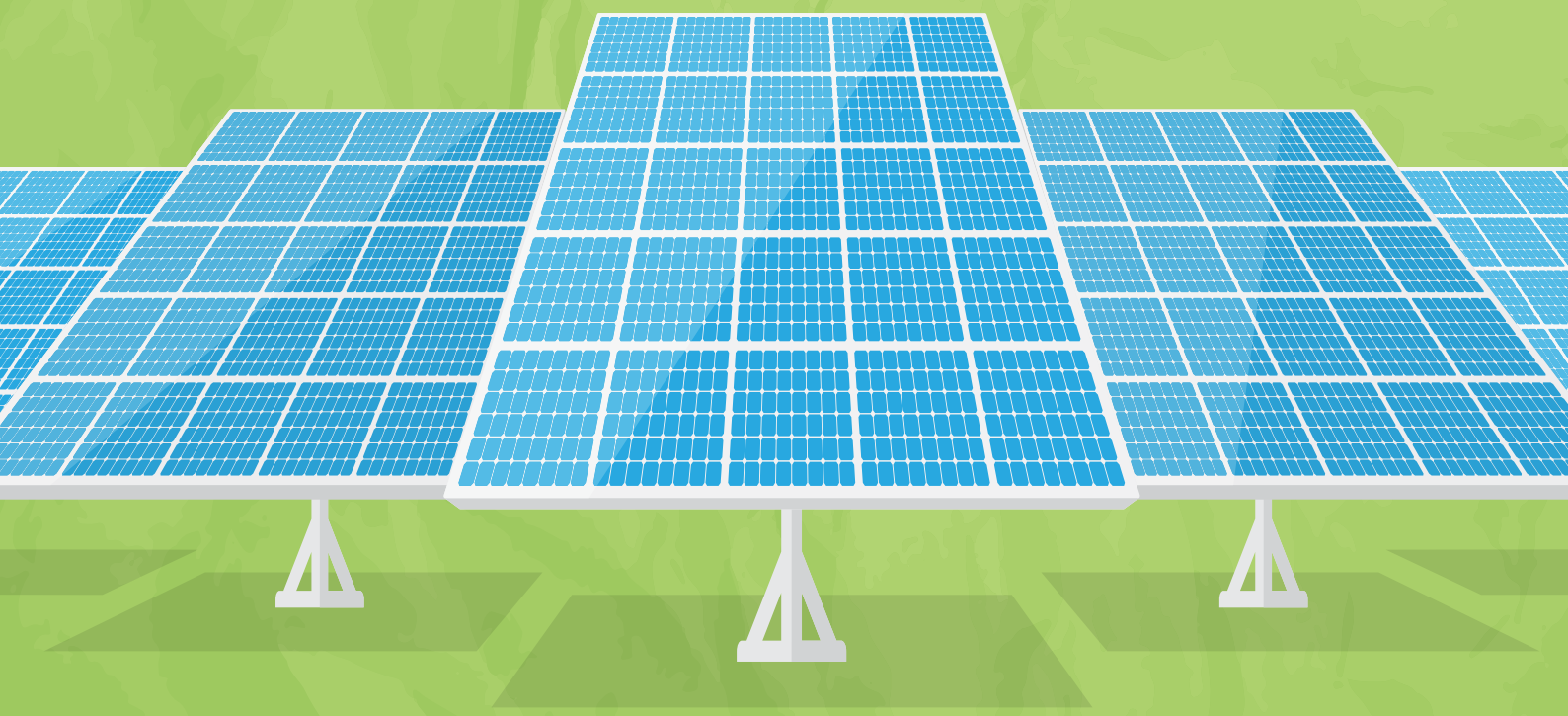

Access to affordable financing for renewable projects is increasingly becoming a necessity. Increasing global investments and focused policy initiatives require that the vast savings across the world be directed to meet the needs of the LDCs as they transition towards a low-carbon pathway. The global financial system still has a long way to go to meet the investment needs required for a faster transition to renewable sources of energy. Current data shows that financing sources are heavily skewed towards OECD countries. Financing sources have to be developed at scale for the developing world as well. At the same time, it is important to increase the role of institutional investors whose investment portfolios are more in line with the long-term funding needed for solar and other renewable energy finance.

With India's leadership, a Solar Finance Corporation has the potential to generate funding for the solar energy sector globally. The successful implementation of solar sector projects can then help the corporation to expand the model to other areas of renewable energy as well as to newer technologies such as hydrogen.

Finally, the role of the government in creating a stable regulatory and legal framework is important for global financial institutions to channel their funds with less risk and higher predictability. Governments should also be strengthening policy initiatives to enable transparency and a better business environment. In addition to meeting energy requirements, it is also important to focus on job creation. Thus, the success of the SFC will depend on effective collaboration among all stakeholders including government, energy companies, financial institutions, distribution and transmission companies, and the end-user.

Endnotes

[1] "Renewable Energy Investment," 2019, Bloomberg, https://www.bloomberg.com/graphics/climate-change-data-green/investment.html

[2] "Renewable Energy Investment," Bloomberg

[3] "Finance for Renewables in Developing Countries Is on the Rise," 17 September 2017, IRENA, https://www.irena.org/newsroom/articles/2020/Sep/Finance-for-Renewables-in-Developing-Countries-Is-on-the-Rise

[4] Global Landscape of Renewable Energy Finance 2020, November 2020, IRENA, https://www.irena.org/-/media/Files/IRENA/Agency/Publication/2020/Nov/IRENA_CPI_Global_finance_2020.pdf

[5] Global Landscape of Renewable Energy Finance 2020, IRENA

[6] Mobilising institutional capital for renewable energy, November 2020, IRENA, https://www.irena.org/publications/2020/Nov/Mobilising-institutional-capital-for-renewable-energy

[7] Mobilising institutional capital for renewable energy 2020, IRENA

[8] "Development Finance Institutions: Plateaued Growth, Increasing Need," 13 February, 2019, Centre for Strategic and International Studies (CSIS), https://www.csis.org/analysis/development-finance-institutions-plateaued-growth-increasing-need

[9] "Comparative Study of Equity Investing in Development Finance Institutions," March 2017, Inter-American Development Bank, https://publications.iadb.org/publications/english/document/Comparative-Study-of-Equity-Investing-in-Development-Finance-Institutions.pdf

[10] Mariana Mazzucato et al., "Financing renewable energy: Who is financing what and why it matters," February 2018, Science Direct, https://www.sciencedirect.com/science/article/pii/S0040162517306820

[11] "ISA-ADB, NDB, GCF, AfDB and AIIB joint declarations of financial partnership," 10 March 2018, Press Information Bureau, http://pib.nic.in/newsite/PrintRelease.aspx?relid=177248

[12] "International Solar Alliance Summit: PM Modi lays down 10-point action plan for clean energy," 11 March 2018, Indian Express http://indianexpress.com/article/india/international-solar-alliance-summit-pm-modi-lays-down-10-point-action-plan-for-clean-energy-5093843/ (Accessed 12 March 2018).

[13] "India's Utility-Scale Solar Parks a Global Success Story," May 2020, Institute for Energy Economics and Financial Analysis, https://ieefa.org/wp-content/uploads/2020/05/Indias-Utility-Scale-Solar-Parks-Success-Story_May-2020.pdf

[14] Annapurna Mitra et al. “A Green Investment Architecture for India: Building a Bridge for Global Capital,” 12 June 2020, ORF, https://www.orfonline.org/research/a-green-investment-architecture-for-india-building-a-bridge-for-global-capital-67192/

[15] Cllimate Bonds Initiative website, https://www.climatebonds.net/standard

[16] “Blended finance at IFC,” July 2019, International Finance Institution, https://www.ifc.org/wps/wcm/connect/b775aee2-dd16-4903-89bc-17876825bad8/IFC+Blended+Finance+Fact+Sheet+%28July+2019%29.pdf?MOD=AJPERES&CVID=mUEEV3E

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