

US-India Clean Energy Finance



Programme Evaluation Report
June 2023

Acknowledgements

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List of abbreviations

4PEL	Fourth Partner Energy Limited
BoA	Bank of America
C&I	Commercial and Industrial
CAPEX	Capital Expenditure
CPI	Climate Policy Initiative
CREST	Chandigarh Renewable Energy, Science & Technology Promotion Society
C&I	Commercial & Industrial
CO₂	Carbon Dioxide
DFI	Development Finance Institution
DRE	Decentralised Renewable Energy
EFL	Electronica Finance Limited
ESP	Empanelled Service Provider
EV	Electric Vehicle
IREDA	Indian Renewable Energy Development Agency
LPS	Learning Paths School
MSME	Micro, Small, and Medium Enterprises
MNRE	Ministry of New and Renewable Energy
NBFC	Non-Banking Financial Company
OPIC	Overseas Private Investment Corporation
OPM	Oxford Policy Management
PPA	Power Purchase Agreement
RESCO	Renewable Energy Service Company
RFP	Request for Proposal
RTS	Rooftop Solar
SME	Small and Medium-Sized Enterprise
USICEF	US–India Clean Energy Finance Initiative



EXECUTIVE SUMMARY



1. Executive Summary

The US–India Clean Energy Finance (USICEF) initiative was launched in 2017 to increase access to clean energy in India, by catalysing investment in distributed renewable energy projects – particularly solar rooftop and off-grid. At that time **in order to meet its sustainable energy targets, India required an annual Decentralised Renewable Energy (DRE) investment of US\$ 18 billion by 2024**¹.

About USICEF

USICEF is a partnership between Government of India's Ministry of New and Renewable Energy (MNRE), the Overseas Private Investment Corporation (erstwhile OPIC), and a consortium of foundations. The program is managed by Climate Policy Initiative (CPI), a finance and policy analysis and advisory organisation with a mission to help governments, businesses, and financial institutions drive economic growth while addressing climate change.

USICEF is India's first project preparation and pipeline development facility that undertook a market-driven, broad approach to catalyse funds into a range of distributed solar project business models in India. It helps early-stage renewable energy developers prepare projects to attract debt funds for the execution of their projects. USICEF focuses on six primary sub-segments: Rooftop Solar (RTS) for commercial and industrial (C&I) users; mini- grids, residential, and institutional RTS; solar home systems; financial intermediaries; small ground-mounted solar projects; and solar-based Electric Vehicle (EV) charging infrastructure.

The programme is led by Dr. Dhruva Purkayastha, Director, USICEF and India Director Climate Policy Initiative who along with his team designed the application process to select the grantees based on their potential to create climate mitigation and developmental impact, financial viability and potential to raise debt financing. These identified project developers were provided with the required technical expertise to address financing and execution-related barriers.

During the implementation period of five years, USICEF became a landmark bilateral programme as its grants provided smaller rooftop solar developers with an opportunity to access institutional finance from Indian banks and financial institutions as well as International Financial Institutions. All the supported USICEF applications were structured keeping in mind the lenders' perspective such as applying metrics that were commonly used by lenders. USICEF actively engaged with lenders to receive feedback on applications that were being evaluated. USICEF formed an advisory committee where 3 out of 5 members were from the lending fraternity.

During the last five years, USICEF has provided 47 grants to 39 early-stage organisations with projects across 20 states in India. Project developers, aggregators, and financial intermediaries that finance developers in the off-grid and RTS sectors were eligible to apply for project preparation support from USICEF. As a next step, CPI empanelled experienced service providers like PwC, Dalberg, Trilegal, DNV GL, and UL Solutions to provide the necessary project preparation support to the selected project developers.

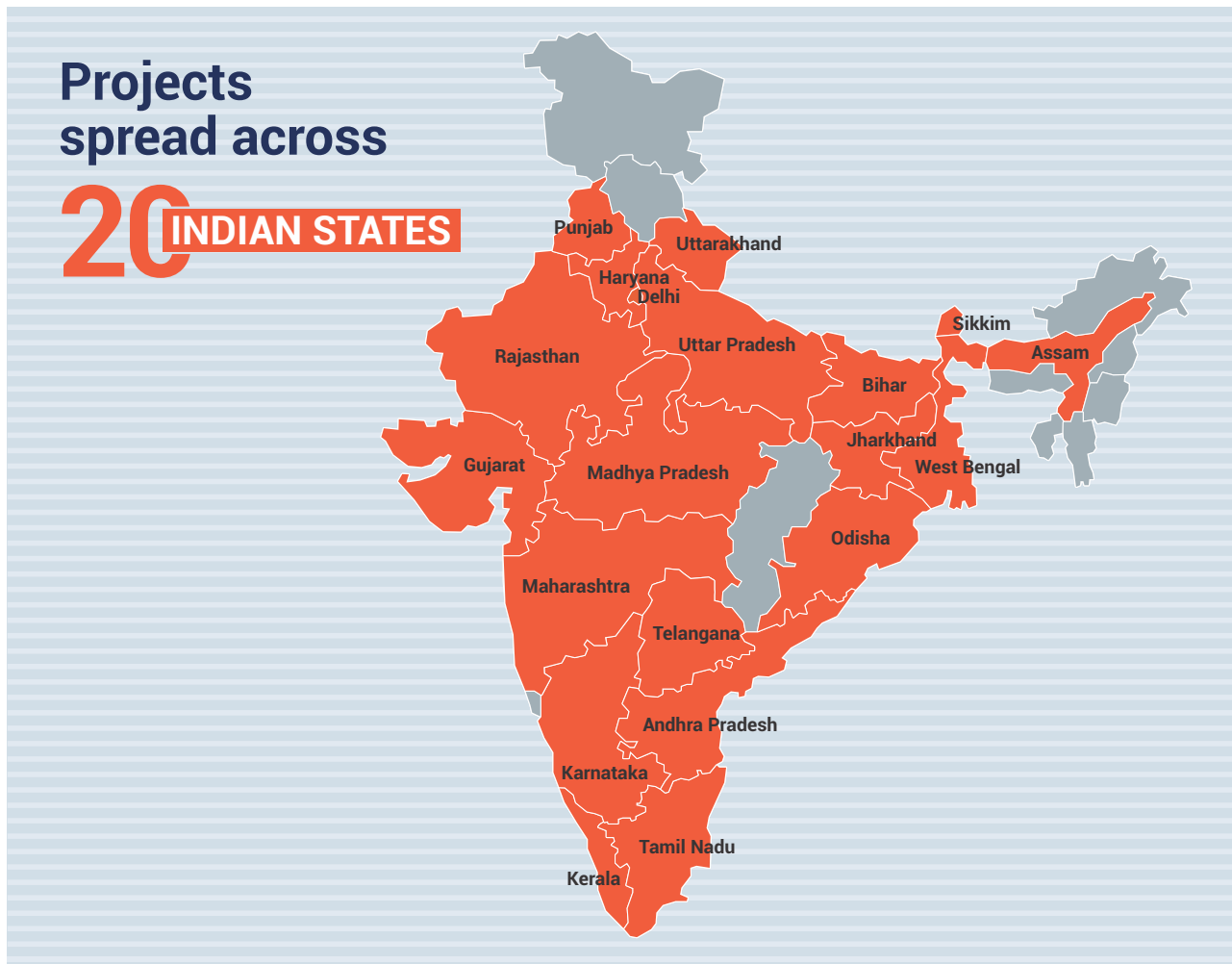
Early-stage enterprises are often lacking in-house capacity and financial resources to prepare detailed progress reports, follow lender diligence services, and negotiate effectively with lenders. The Empanelled Service Providers (ESPs) stepped into this lack, providing capacity support either by directly preparing technical reports or by handholding the developer through the process. Technical assistance was provided through market-sizing and demand-estimation studies, as well as technology feasibility studies.

¹ The Future of Distributed Renewable Energy in India by CPI:
<https://www.climatepolicyinitiative.org/publication/the-future-of-distributed-renewable-energy-in-india/>



Legal advisory services were provided when required, such as in the preparation of documentation relating to Power Purchase Agreements (PPAs), procurement and construction, operations and maintenance, and debt financing. Expert financial advisors were also engaged to provide support tailored to the needs of the beneficiaries.

Feedback from the project developers chosen shows that USICEF's process of selecting and supporting beneficiaries was efficient.



CPI's engagement with project developers under USICEF - a five step process:

- a call for grant applications;
- screening and selection of eligible projects;
- selection of service providers;
- grant disbursement
- ongoing support for long-term financing from domestic and international financial institutions

There was unanimous agreement among beneficiaries on CPI's correct selection of service providers for the projects, while some requested widening the pool of service providers when the programme is scaled up. ESPs also reported finding the entire funding process to be creative. A few recommendations regarding the scoring of technical and financial capabilities and structured feedback were also put forth by the ESPs.



Our analysis shows that USICEF was effectively aligned with several of the most critical constraints faced by early-stage solar project developers in growing their business. The following are three particularly important areas in which USICEF's support was most valuable.

Navigating regulatory issues



USICEF focused on improving the chances of receiving long-term debt financing through grant-funded technical assistance aids in the preparation of high-quality investment-grade project proposals. Beneficiaries reported increased confidence about not missing any compliances due to easy access to experienced sectoral legal and technical advisory companies.

Negotiating project financing/ capitalist financing



USICEF supported its beneficiaries through financial advisory services that included the preparation of information memorandum and business plans for investors' outreach and engagement. Additional services like credit assessment frameworks and technical, financial, and legal due diligence helped the beneficiaries to create strong proposals to secure project financing at competitive terms.

Demonstrating competitiveness



Collaborating with USICEF upheld the status of several beneficiaries as credible investees in the impact assessment market and established working relationship with the service providers. It also brought the beneficiaries onto the radar of renowned investors such as the Bank of America (BoA), the Indian Renewable Energy Development Agency (IREDA) Limited, and Tata Cleantech.

During the course of the programme, CPI conducted periodic surveys to collect feedback from its grantees and other project developers in DRE space. This was done in order to gain a more accurate understanding of the prevailing market sentiments and on-ground regulatory challenges faced by the developers. An overwhelming number of respondents to the survey found the USICEF program to be instrumental in their project development activities and would benefit immensely from additional USICEF grants. The respondents also mentioned actions such as improved credit availability through credit guarantee schemes as well as reduced regulatory and compliance roadblocks like import duties and net metering approvals as important interventions for the growth of the DRE sector.

During the COVID-19 lockdown period, the respondents experienced a mix of demand, policy, and financing roadblocks that created balance sheet and liquidity constraints. The respondents anticipated the coming years with cautious optimism and with concern regarding future government actions and lender responses that outweighed positive sentiment around a possible uptick in demand for DRE. In the uncertain environment, developers benefitted from USICEF's support, both in the form of tangible grants as well as intangible commitments. This was particularly relevant with regard to transaction advisory and policy advocacy.

USICEF Impact



365 MW

Distributed solar energy installed



USD \$303M

Debt funding mobilised



68%

32 of the 47 supported applications mobilised debt

About this report

This report is backed by evidence and feedback collected from the ecosystem stakeholders, and presents the lessons learned from the USICEF programme with the view to inform future design. Five case studies that reveal the direct and indirect benefits of USICEF are presented in the last section of this report as 'Stories of Change'. These handpicked case studies outline the history and company profile of the selected beneficiary, the collaboration with USICEF, the type of support received, and the benefits to the consumers/end users. Three of them shed light on the benefits of adopting solar for the commercial sector: a reduction in operation costs, emission saving (abiding by government mandates of installing renewables) and developing into green businesses. These case studies showcase how reliable solar energy has improved the quality of social life in villages, empowering women, generating employment at the village level, and electrifying villages that have lived in darkness for ages.



INTRODUCTION



2. Introduction

2.1 Project background

USICEF was launched in 2017 to increase clean energy access in India by catalysing investment in distributed solar energy projects, including rooftop and off-grid.

USICEF focused on the DRE space, particularly solar photovoltaic technology, with various business models including the mini-grid, distributed rooftop and off-grid solar projects, smaller-scale grid connected solar projects, solar home systems, and other decentralised application of solar energy. The programme supported technical, financial, legal, and other advisory services required by DRE companies to attract debt investment. Services provided under USICEF grants supported specific projects to target funders in order to raise debt capital to scale and help them become self-sustainable organisation. This effectively increase deployment of DRE at the same time.

Over the last five years, USICEF has provided 47 grants to 39 early-stage organisations and deployed over US\$ 5 million in regrants. The supported projects have been able to raise over US\$ 300 million in debt from international and domestic institutions, as well as deploy large amounts of solar capacity across multiple states in India.

USICEF stems from a partnership between Government of India's Ministry of New & Renewable Energy (MNRE), Overseas Private Investment Corporation (erstwhile OPIC, now USDFC), and a consortium of US foundations.



Figure 1: USICEF Partners



The program is managed by Climate Policy Initiative (CPI), a finance and policy analysis and advisory organization with a mission is to help governments, businesses, and financial institutions drive economic growth while addressing climate change.

2.2 Purpose and scope of the learning assignment

After completion of USICEF's execution phase, CPI commissioned this learning assignment primarily for two reasons:

1. to understand the impact of the programme backed by evidence collected from the ecosystem stakeholders; and
2. to provide feedback on the learning generated through this process in order to inform future programme design, as well as implementation.

Oxford Policy Management (OPM) worked with CPI to finalise the scope and design of the learning process and output, including selection of five USICEF partners to interview and preparation of a detailed questionnaire to seek input on impact metrics from programme beneficiaries on:

- 1  the debt facilitated by USICEF grants;
- 2  capacity deployed/under deployment;
- 3  electricity units generated (project lifetime);
- 4  CO₂ abated (project lifetime);
- 5  jobs created (project lifetime);
- 6  list of states covered;
- 7  other development parameters, such as the economic opportunities created in rural areas and for women; the number of households electrified; additional study hours for children; etc.



In consultation with CPI, OPM shortlisted five beneficiaries to conduct detailed interviews on USICEF's impact on each, and how USICEF has been instrumental to beneficiaries in scaling up and raising capital.

OPM prepared detailed case studies of five high-impact beneficiaries, visiting the project and impact sites of each, as well as documenting the impact on the end beneficiaries.

In consultation with CPI, OPM prepared a questionnaire for the project's ESPs. OPM reached out to five ESPs to document their feedback about the programme and the impact of project preparatory services in developing the DRE space in India.

OPM conducted detailed interviews with two partner lenders and documented the role of grants in supporting the lender's requirements, while bridging the information gap for early-stage to mid-scale developers.

As part of the impact report, OPM captured the views of the programme leadership team and programme funders.

However, OPM did not validate the results. The sampling process prioritised partners with clear results and achievements, rather than seeking out non-achievers.

Table 1: Stakeholders involved

Stakeholders	Description
Beneficiaries	Awardees who have received grant support from CPI for various project preparatory activities—including legal, technical, and financial advice—to raise funds from the lenders
Empanelled Service Providers (ESPs)	Over 125 service providers enlisted by CPI to provide the requested services to beneficiaries
Lenders	These are independent groups/financial institutions who made the funds available to the beneficiaries for project support: CPI does not have a direct relationship with these lenders
End beneficiaries	End users who have received the final benefits from projects implemented by the main beneficiaries (awardees), e.g. rural households; Micro, Small, and Medium-sized enterprises (MSMEs); and micro-enterprises



DATA ANALYSIS AND EVALUATION



3. Data analysis and evaluation

3.1 USICEF's contribution to developing the DRE sector in India

This section explores whether, and how, USICEF has achieved its high-level objective of growing the DRE sector in India, and ways in which the overall programme has helped various early-stage organisations to scale up, helping them build a long-term roadmap by supporting them in raising funds.

USICEF's approach to addressing the financing gap for DRE

USICEF's objective was to support early-stage project developers and DRE solution providers by funding their project preparation requirements that would catalyse additional financing for them. This would demonstrate the investment readiness of early-stage organisations and support them to become sustainable by tapping into the market opportunity of DRE.

While foundations, philanthropic investors, Development Finance Institutions (DFIs), and development partners have historically been key sources of catalytic finance for DRE, USICEF has taken a more market-driven, broader approach. USICEF is a partnership between the Government of India and a consortium of foundations and investors, and was designed to be a critical step towards increasing access to reliable energy in underserved regions in India.

USICEF is India's first project preparation and pipeline development facility to help promising distributed solar projects to develop into viable investment opportunities and drive long-term debt financing. It has helped early-stage renewable energy developers prepare projects to attract debt funds for deployment (see the next section for more detail). During the last five years, USICEF has provided 47 grants in the range of US\$ 50,000–US\$ 300,000 to 39 early-stage to mid-stage organisations ('beneficiaries') operating across 20 states in India.

It has supported a wide range of project developers and solution providers with diversified business models in the DRE sector. USICEF focused on six primary sub-segments: RTS for C&I users; mini-grids, residential, and institutional RTS; solar home systems; financial intermediaries; small ground-mounted solar projects; and solar-based EV charging infrastructure. USICEF project grantees serve a range of beneficiaries, from providing services to large corporates to rural households, and from high-rated companies to medium and small enterprises. However, they all share a common purpose: to meet India's energy requirements through clean and green sources.



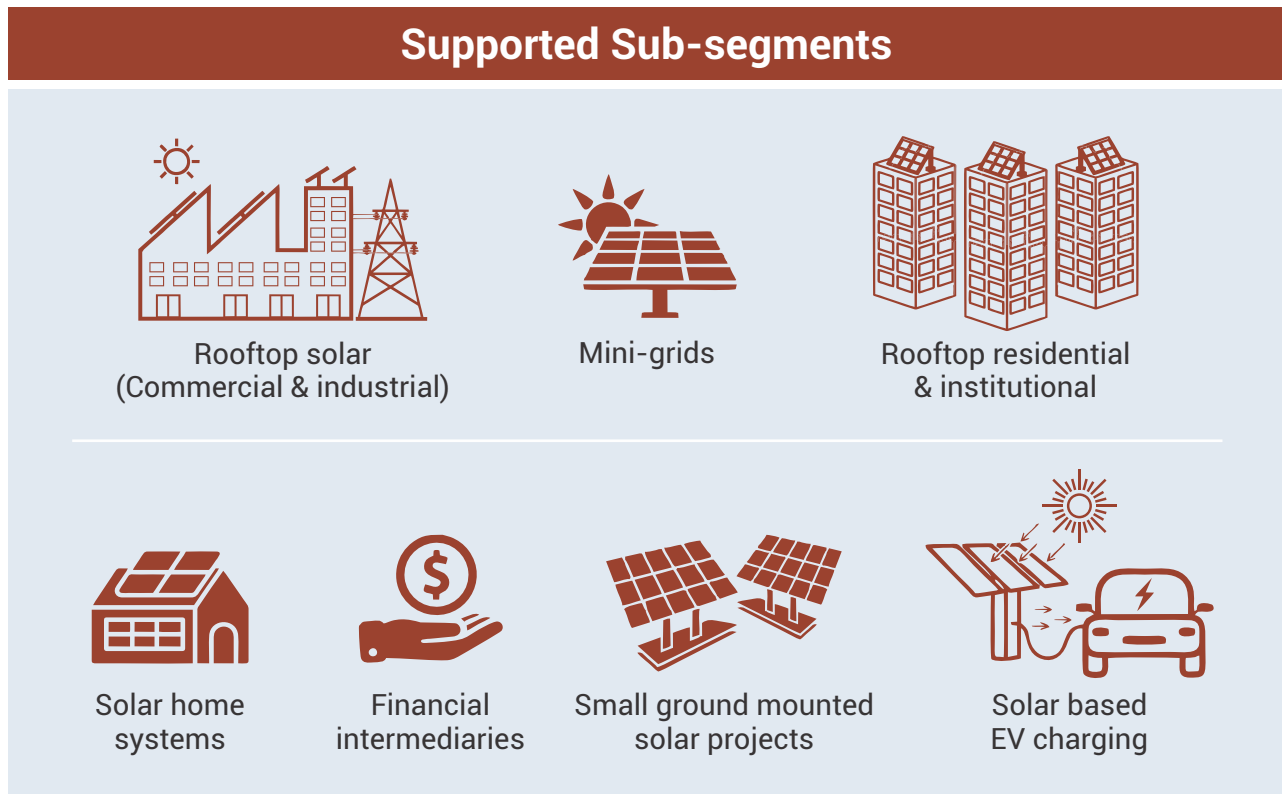


Figure 2: USICEF supported sub-segments in distributed solar

3.2 Lessons learned from USICEF on how to catalyse financing for DRE

In this section, the key types of support provided by USICEF are described along with feedback from stakeholders on whether and how this was relevant and effective. This is based on in-depth interviews with USICEF stakeholders (beneficiaries, lenders, and service providers) and project site visits. These interactions highlighted the benefits grant awardees received from USICEF, especially regarding project preparatory aid such as lender due diligence services, market assessments or commercial feasibility studies, and financial advisory support.

Overview of support provided by USICEF

Project developers, aggregators, and financial intermediaries in the DRE sector were invited to apply for funding for project preparation support from USICEF. The following types of organisation were eligible to apply:

- project developers focused on solar power generation and distribution and financial intermediaries;
- those with technologies approved by MNRE/already been proven in commercial operations; and
- project developers not blacklisted by any government or public sector agency in India.

There was an aspirational target set at the start of the programme to reach 8 grantees each year. This was exceeded, and in the span of 5 years, 47 grant awardees were declared (3 in 2017; 19 in 2018; 8 in 2019; 6 in 2020; and 11 in 2021). The lower number in 2020 was due to the onset of COVID-19 pandemic. These grantees were termed 'beneficiaries' once they were selected.





Off grid segment includes mini-grid and micro-grid solar power projects with or without grid interactivity. Projects also include sale and distribution of solar powered goods, such as house lighting systems, pumps lanterns etc.

Figure 3: Mini-grid power plant (courtesy, OMC Power)



Rooftop solar segment and ground-mounted solar projects with a capacity of less than 5 MW individually or 20 MW collectively

Figure 4: Rooftop solar power plant (courtesy, 4PEL)





Financial institutions, and Non-Banking Financial Companies (NBCFs) that finance consumers or developers in the off-grid and rooftop solar sectors.

Figure 5: Representation of solar financing

CPI contracted over 125 experienced service providers to be empanelled members of the USICEF service provider network, including PwC, Dalberg, Trilegal, DNV GL, and UL Solutions. These ESPs were funded to provide the necessary project preparation support to the selected project developers. Using a Request For Proposals (RFP) procedure, project developers selected service providers from the USICEF network with CPI's close collaboration. The list of ESPs was regularly updated on their official website for the convenience of project developers.

USICEF's focus was to help early-stage enterprises in raising debt. These small players lacked the in-house capacity and financial means to carry out the necessary tasks to raise this debt; in particular, they struggled to prepare detailed progress reports, follow lender diligence services, and negotiate effectively with lenders. The ESPs provided this capacity support, either by directly preparing technical reports or by handholding the developer through the process. In certain cases, they also supported established enterprises (such as ReNew Power and Amplus) to come up with innovative renewable projects for the MSMEs. This in turn also helped build new opportunities for early-stage organisations in the market to enter at a later stage. For the abovementioned support, service providers with the following expertise were empanelled by CPI.

The type of support provided by USICEF's ESP network included the following:

1. market sizing and demand estimation studies;
2. product development and testing;
3. technical feasibility studies (resource estimation, technology assessment, etc.);
4. third-party monitoring and verification of project performance;
5. engineering costs associated with project design, site selection, technical assessment, plant sizing, etc.;
6. legal costs for transaction advisory services (preparation of documentation relating to permitting, PPAs, engineering, procurement and construction, operations and maintenance, debt financing, shareholder agreements, etc.);
7. financial advisory services;



- 8. environmental and social impact assessments; and
- 9. load development support.

3.3 Lessons learned from the efficiency of USICEF's processes

The general feedback received from organisations pointed to the fact that USICEF's process of selecting and supporting grantees was efficient. After this initial selection, CPI engaged with the project developers using a five-step process: call for grant applications; screening and selection of eligible projects; selection of service providers; grant disbursement; and ongoing support for long-term financing from domestic and international financial institutions.

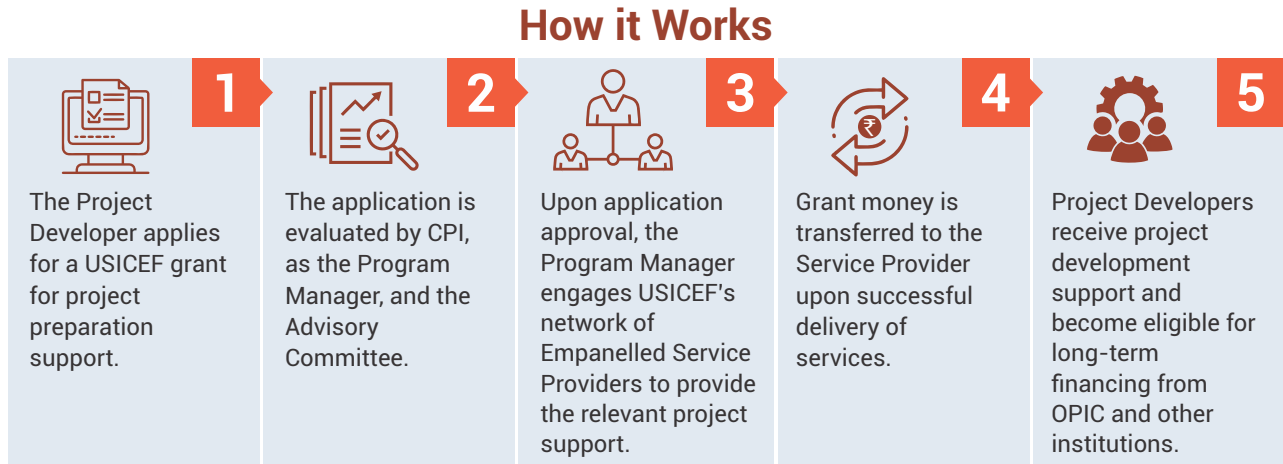


Figure 6: USICEF application process

“ CPI helped to structure the Asset Co, helped to earn traction in the market for the financial products and finalise the vendors i.e JSA, Trilegal, Unitus, etc.

”
Nishant Sood
Managing Director,
Candi Solar

“ USICEF team was very active, it was an immense learning exercise for OMC, great insight on areas of improvement and the impact actually created. USICEF could have expanded the investor pool, would be great platform networking and stakeholder engagement.

”
Pooja Raman
Legal Counsel,
OMC Power

“ Worked with USICEF team in a collaborative, co-creative way, ran the process smoothly, and follow-ups were efficient. Overall funding process is great; however, payment milestones was a challenge for long duration work.

”
Balwant Joshi
Managing Director,
IDAM (ESP)

“ CPI had been proactively involved, the assessments that were carried out through USICEF budget - energy yield reports, commercial due diligence and market assessment reports became an asset to the company.

”
Pradhyum Reddy
Corporate Finance,
Fourth Partner



Feedback on the funding process was positive overall, with multiple ESPs reporting a high level of trust in how the funding was being allocated. There was some concern around how the beneficiary receiving the funding divided it for different services to different ESPs, and there was a feeling among ESPs that they would have preferred to deliver the full scope of work.

However, some efficiency challenges were highlighted. Interviewed ESPs commented that there was a lack of clarity in the awarding process and in the scoring on the technical and commercial capabilities. The relationship between ESPs and grantees also presented some challenges to the former. Some examples included delays by the grantee in the confirmation of the product; changes in applications; the milestone-based payment structure; and the inability to renegotiate the fee. In addition, structured feedback from USICEF or beneficiaries regarding the services provided was requested to help the ESPs in their internal evaluations.

Table 2 summarises the feedback both from beneficiaries and ESPs on the efficiency of the process at each stage of their engagement with CPI under USICEF.

Table 2: Application process for project developers, along with feedback

Application step	CPI target and support	Beneficiary/ESP feedback
Step 1: Call for grant applications	Grants announced publicly; project developers apply for project preparation support Sixty days of support provided to grant applicants for application submission, as well as for preparation of recommendation notes	<ul style="list-style-type: none"> • Clear and efficient RFPs • Basic company inputs and data needed in the application process • Straightforward and collaborative process
Step 2: Screening and selection	Applications are evaluated by CPI and the advisory committee based on the eligibility criteria Average duration of this step: 1.5 months, reduced over subsequent rounds of funding	<ul style="list-style-type: none"> • Quick turnaround • Results for a few projects out in a week • Time reduced for the second round of funding • Easier for developers with a predefined focus, such as MSMEs
Step 3: Selection of service providers	CPI facilitates engagement with USICEF's network of ESPs to provide relevant support Finalising a service provider is subject to developers' discretion; in case of conflicts, or lack of expertise, service providers could also reject the RFPs	<ul style="list-style-type: none"> • Competitive bidding for ESPs • Contracting process efficiently managed by the CPI team • CPI frequently interacted with ESPs • ESPs had to respond to RFPs within a week • Average contracting process 3–6 weeks



<p>Step 4: Grant disbursement</p>	<p>Average time of three months from contract signing until final payments; some projects of longer duration, based on developer's prioritisation of tasks and other external factors</p> <p>Milestone-based structure to transfer grant money to the service provider; 20% advance, and 80% on successful project completion</p>	<ul style="list-style-type: none"> • Entire process from application submission to empanelment of consultants and fund grant about 3–6 months • Creative ways of fund disbursement: funds disbursed to the consultants for their services • CPI team helped in negotiating with service providers • Service providers found the payment structure challenging at times, especially when the projects got delayed (especially during COVID-19)
<p>Step 5: Ongoing support</p>	<p>Support from CPI's project delivery team throughout the development of the project and long-term financing</p> <p>Detailed survey carried out in 2020</p>	<ul style="list-style-type: none"> • CPI project delivery team aware of the end beneficiaries and of the master plan • Informal feedback received from developers on an ongoing basis • CPI proactively involved; the assessments carried out through USICEF budget became an asset to the company • CPI could leverage own connections and help map international investors through networking events

3.4 Lessons learned from relevance of the USICEF grant

The feedback from the early-stage DRE developer beneficiary companies was that USICEF was aligned to several of their most critical constraints to growing their business. In general, association with USICEF made it easier for the grantees to access experienced service providers. Project developers were working with some of the most competitive service providers with the help of CPI, which would otherwise have been quite expensive for them.

Three particularly important areas for which USICEF's support was valuable were as follows.

Navigating regulatory issues: Many companies requiring the use of services like energy are subject to regulatory and permitting procedures. Most developers in the DRE space in India face regulatory hurdles. The regulations are complex, ever-changing, and vary significantly between States. DRE developers, especially the early-stage ones, find it very cost intensive to manage these challenges, affecting the projects' overall commercial viability. If not addressed, these challenges can also lead to further operational risks. USICEF addressed these risks by supporting developers through regulatory landscape assessments and legal structuring of projects tailored according to local regulations.



Beneficiaries reported increased confidence about not missing any compliances due to easy access to experienced sectoral legal and technical advisory companies. Collaborations with TuV India, UL Solutions, DNV, PwC, Trilegal, and Desai & Diwanji were cited as being particularly useful. The assessments and product reviews also helped in monitoring asset performance, which increased the investors' confidence in turn.

Negotiating project financing/balance sheet financing: Businesses with a strong balance sheet, economically viable technology, and expertise in creating infrastructure projects for renewable energy or other sectors benefit from project financing.² Project financing has been the preferred way of financing for solar projects; it typically calls for the existence of a comprehensive set of project contracts, including a formal off-take agreement with a high credit counterparty. Early-stage DRE developers struggle to secure project financing due to the lack of capacity and information, for lenders' outreach and negotiation.

USICEF's support aided this in a number of ways. For example, projects that appear scalable, sustainable, and financially viable, usually lower investor's obstacles to investment in sustainable development. 4PEL (Case Study 4.3) highlighted the asset generation and internal evaluation for aggressive fundraising through grant aid. USICEF enabled a sufficient number of initiatives to have access to funding from public and private sources, benefiting underprivileged areas in India. OMC Power (Case Study 4.2) reflects how indirect funds were raised after the due diligence conducted using USICEF grant.

USICEF focused on improving the chances of receiving long-term debt financing through grant-funded technical assistance aids in the preparation of high-quality investment-grade project proposals. Frontier Markets (Case Study 4.5) features this aspect of grant, through which they received support in structuring their fundraising application. Market sizing and legal due diligence helped Electronica Finance Limited (EFL) expand beyond its focused geographies (Case Study 4.4).

There is a strong focus on DRE for blended financing, as organisations are unable to raise funds from commercial banks because startups lack a contractual base and cannot cover operational and vendor claims. The ESPs helped beneficiaries create tight templates to insulate them from claims and save future costs from rebuilding contracts every time.

Demonstrating competitiveness and an efficient management team: Investors show interest in companies that are aware of the market landscape and offer incentives for them to stay and sustain in the highly competitive environment. A company that has obtained early traction is viewed positively by investors. Another important characteristic is the quality and experience of the management team, as regulatory, capital, and product issues can be particularly complicated.

Collaborating with USICEF was viewed favourably by some beneficiaries who felt the association upheld their image as a credible investee in the impact assessment market and helped them develop a working relationship with the service providers. Grant advisory services helped them earn traction in the market for financial products, as evident in the case of Candi Solar (Case Study 4.1). This brought the beneficiaries onto the radar of seasoned investors such as BoA, IREDA, and Tata Cleantech.

² Project financing is a loan structure that relies primarily on the project's cash flow for repayment, with the project's assets, rights, and interests held as secondary collateral. Project finance is especially attractive to the private sector because companies can fund major projects off-balance sheet.



3.5 Lessons learned from the effectiveness of the USICEF grant

Under USICEF, US\$ 6.5 million was approved for project preparation services and leveraging debt. Of this, US\$ 5.2 million was used by the target grantees for the relevant services received from the ESPs, and the remainder was rolled back due to delays in projects or in case where grant objectives were met at a lower funding usage level. The percentage of grant distribution among the beneficiary sub-segments is depicted in Figure 7.

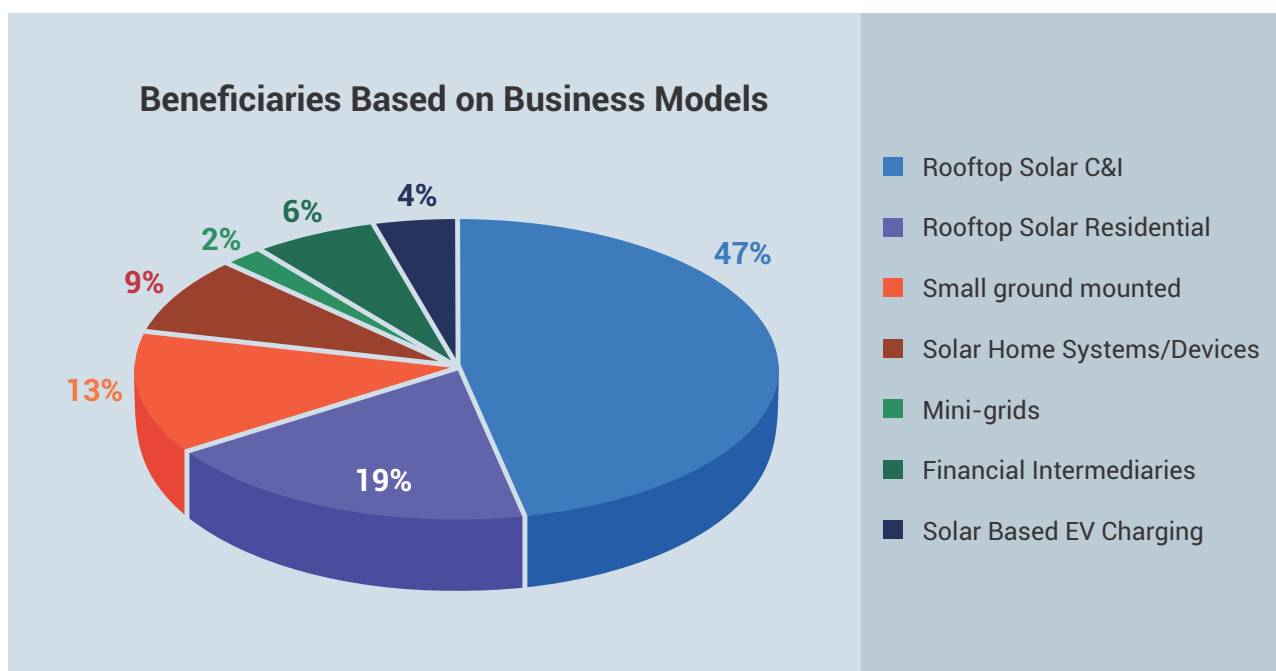


Figure 7: Categorisation of beneficiaries based on their business model

A significant portion of USICEF support was focused on the C&I segment of RTS, while most early-stage technologies were not well represented. Various discussions were initiated, and applications were evaluated for a number of early-stage technologies and mini-grid entities. However, post evaluating did not make the mark as they did not appear to be in a position to absorb commercial capital, and therefore did not fit into USICEF programme objectives.

Discussions with DFIs and other lenders beyond OPIC were initiated by CPI, aimed at the expansion of USICEF. This bore fruit with CPI signing five formal agreements/Memorandums of Understanding with OPIC, IREDA, Tata Cleantech Capital Limited, PTC Financial Services Limited, and IndusInd Bank— adding these lending bodies to the existing investor pool for better support to the project developers. In addition, CPI was successful in developing informal partnerships with more than 10 lenders.

A target of 20 times debt mobilisation of the invested amount was set for the programme. Out of the 47 supported project developers, 32 successfully mobilised debt using USICEF grants. This translated to US\$ 303 million surpassing the set target. Grant awardees successfully mobilised debt from 15 different international and domestic lenders, including IREDA, the State Bank of India, Tata Cleantech Capital Ltd, Lendahand, Bettervest, Responsibility



investments, Aditya Birla Capital, cKers Finance, and L&T Finance.

The funding mobilised translated into 365 MW capacity of DRE installed and 305 MW under pipeline. Additional DRE capacity through this programme is expected to generate 960,000 MWh of clean electricity annually helping in further greening of India's economy.

USICEF's grants have also resulted in a range of socioeconomic and other benefits. In addition to generating clean power and meeting the energy needs communities sustainably, solar energy projects provide new economic opportunities. Along with boosting the economy in the Indian context, USICEF has provided a much-needed solution to unemployment in a growing population and labour force. Grantees have estimated that up to **20,600 new green jobs** have been created as an indirect benefit of the support provided through the programme. This demonstrates the importance of renewable energy to the local economy.

Electricity generated from solar panels is clean and emission-free. By using solar energy instead of fossil fuels to generate electricity, greenhouse gas emissions can be greatly reduced. **An estimated 960,000 megatonnes of CO₂ emissions might be avoided every year by the cumulative capacity expected to be installed by the target grantees.** This provides a range of direct and indirect environmental and public health benefits to society. However, USICEF has not been monitoring the indirect benefits of the grant, meaning the full scope of its impacts is difficult to assess.

Some suggestions regarding ways to enhance the effectiveness of USICEF evolved from the engagement. Some beneficiaries reported that the **collaboration felt transactional at times**, limited only to the service provider and the investor. Thus, the beneficiaries felt, constrained them from tapping into the benefits of the global network of USICEF. Therefore, there is greater potential for the network to assist beneficiaries in pitching their models better as well as in raising future funds.

The USICEF team had organised an information session on SME exchange listing as a possible option for equity fund raising by beneficiaries, Even so there was request for USICEF to participate more actively in raising investor interest and assist in mapping investment opportunities. Some of the beneficiaries responded that the programme should have **a component of networking events or physical meetings to bring the beneficiaries, investors and other stakeholders together on one platform in order to share the lessons learned from this experience.**

3.6 Lessons learned from the sustainability of the USICEF grant

The benefits of USICEF to the beneficiaries are expected to be sustained, particularly for those that have become mature market players as a result of the capacity support and mobilisation of funds.

USICEF has built the capabilities of beneficiaries, particularly in transaction services such as market assessment or commercial feasibility studies and financial and legal advisory support. This capacity should be sustained and applied to further grow the business. It was evident from the beneficiary feedback that the ESPs had helped build the in-house skills of beneficiaries by providing the required support as an 'outsourced' service. Numerous direct and indirect benefits have been created by the impacts of the services provided, which have laid the foundation for project developers in distributed solar power to access the much-needed capital to scale up their businesses.



Any funders/lenders looking to fund an organisation or project will check whether the compliances and governance capabilities are in place. However, many early-stage organisations lack the understanding and the allocated resources to fulfil funder expectations.

Lenders interviewed during the evaluation process acknowledged the support system USICEF created for early-stage organisation, helping them elevate towards raising funds. Based on the transactional learning, it was suggested that USICEF should support building a capability development roadmap together with authorities to accelerate this initiative.

In the next section, five case studies are presented to highlight the direct and indirect benefits of USICEF.



STORIES OF CHANGE POWERED BY USICEF



4. Stories of Change powered by USICEF

Stories of Change' in this section highlight case studies that reveal how the support provided by USICEF catalysed and sustained additional benefits for organisations. For example, by leveraging the legal and financial assistance received under USICEF, Candi Solar was able to raise US\$ 20 million, but is expecting to raise domestic debt of US\$ 1.3-1.5 million in 2023. By adopting the Non-Banking Financial Company (NBFC) model through the grant, they were able to break even at the operational level itself.

4PEL grew from a small business into one of the major players, and it attributes this to USICEF's support. 4PEL was able to raise US\$ 50-60 million of debt funds from various funders, including BoA, IREDA, and Tata Capital, which helped them deploy over 200 MW of solar capacity. As a result of having structured funding from multiple sources, they are now well connected in the financing ecosystem and likely to secure future funding.

4.1 Candi Solar



Company Profile

As the devastating effects of CO₂ pollution become impossible to ignore and the costs of traditional, non-renewable energy sources are taking their toll on business owners, RTS provides a great opportunity to cut costs while contributing to a greener planet.

In light of this, Candi Solar assists SMEs across Asia and Africa by acting as a dedicated RTS installer, and proposes to be a financier as well as an operator. The company focuses on the C&I rooftop segment, targeting a good mix of high credit grade corporates and SME players to create a well-diversified portfolio. The company was established in 2017 with the intention of unlocking the potential of solar for SMEs – a largely overlooked market at that time – that were fiscally constrained and unable to readily embrace the transition to a sustainable and renewable future.

Candi Solar aims to harness the growing possibilities for businesses and institutions around the world to generate their own power by facilitating an uncomplicated investment process. Currently, Candi Solar has contracted 58 MW solar plant with 79 installations built and mitigated around 32,000 tonnes of CO₂. Currently, Candi Solar straddles two countries, has over 20 clients across almost 5 MW, and has successfully closed Series A, as well as debt rounds with international investors

Equipped with the vision to streamline everything from contracts to credit screening for this sector, Candi Solar's journey in India began with the invaluable support of USICEF very early on. Candi Solar was selected in two rounds of grants under USICEF for various projects. Candi Solar leveraged the grant very well for varied strategic purposes, including the incorporation of an asset company, the evaluation of a security and open access model, the analysis of different products (including PPA and leasing), financing advisory services focusing on domestic debt, and the incorporation of an NBFC model. Leveraging the legal and financial assistance received through the programme under the USICEF grant, Candi Solar was able to raise US\$ 20 million, and is expecting to raise domestic debt of US\$ 1.3-1.5 million in future. Pursuing the NBFC model with the support of the USICEF grant was a strategic move by Candi Solar, especially since NBFCs have played a pivotal role in India's growth story over recent years. With the Reserve Bank of India relaxing the norms for NBFCs, there has been a spate of registrations. Sensing that the financial needs of such a huge population are hardly catered to by a limited number of banks, private players like Candi Solar have jumped in to occupy this space.



Acknowledging the support received from the USICEF programme, Mr Nishant Sood, in conversation with the OPM team, said that with the support of the USICEF grant, Candi Solar was able to develop an in-house risk assessment tool to cater to BB-rated or BBB-rated MSMEs, offering a **Renewable Energy Service Company (RESCO) model in Tier 2 and Tier 3 locations in India. This is the space from which the majority of RESCO/capital expenditure (CAPEX) finance players shy away due to the high capital risks involved.**

“

Support received through the USICEF programme was instrumental in allowing Candi Solar to focus and develop their business model in a way that helped in accelerating Candi's growth and impact.

Nishant Sood,
Managing Director, Candi Solar

”

After its constructive collaboration with USICEF, Candi's 'less is more' approach helped it in gaining traction in the market, and the company has managed to offer solar and storage solutions for businesses of all sizes at lower costs, as well as enabled businesses to cut their energy expenditure and reduce their carbon footprint.

In this case study, focus will also be on sharing the experiences of two selected MSMEs (Tribune

and Learning Paths School (LPS)) that have collaborated with Candi Solar to move ahead with their decarbonisation journey by installing RTS systems on their premises. CPI and OPM teams visited both the premises to document their various working parameters along with the benefits that resulted from the services provided to them by Candi Solar.

The Tribune, Chandigarh: A leading newspaper facility

In a big push to generate green energy and transform Chandigarh into a model solar city, building mandates were introduced in 2016 by the Chandigarh Renewable Energy, Science & Technology Promotion Society. The scheme was formulated for the Union Territory to produce its own power through rooftop-based solar photovoltaic plants and thus reduce its dependence on neighboring states. It was made mandatory to install solar rooftop systems for large residential and non-residential buildings.



Figure 8: The Tribune solar power plant visited by CPI and OPM, along with Candi Solar representatives



To comply with the building mandate, Tribune, the largest selling English newspaper facility situated in Chandigarh, installed a solar photovoltaic power plant with a capacity of 182 kW spread across three building rooftops. Tribune contracted Candi Solar to install the units through a process of competitive bidding. The services and discounted rates of 9% on the grid electricity offered by Candi Solar made them the best choice for getting the job done. Moreover, Candi Solar provided Tribune with a RESCO solution with a PPA agreement for 15 years. This was a win-win situation for Tribune, as they did not have to invest any upfront CAPEX while the operations and maintenance of the plant is being managed by Candi for the PPA term. The OPM team visiting the Tribune campus, witnessed first-hand the ongoing scheduled cleaning of solar panels managed by Candi Solar, to ensure optimum generation from the solar power plant.



Figure 9: The Tribune solar power plant being cleaned

The PPA business model used by Candi Solar to install the plant also helped the newspaper facility gain various direct and indirect benefits. Almost 300,000 newspapers are printed daily for more than 1.5 million readers. Each day, an average of 672 kWh of solar energy is generated and, to date, 1.1 million units have been generated, which has helped avoid 1,019 tonnes of CO₂ between 2018 and 2023. The facility has saved a total of ₹ 488,497 so far owing to Candi Solar's uncomplicated process, and it has managed to achieve a 9% economic gain per unit rate. Not only have the systems helped reduce carbon emissions and produce savings, but the staff at the facility have also been educated about the benefits of solar energy.

Although the facility installed the rooftop systems as part of the mandate to make Chandigarh a model solar city, the benefits received have persuaded them to install RTS on two more printing plants, in Jalandhar and Gurugram, with Candi Solar on the PPA model. This can be seen as a testament to Tribune's satisfaction in working with Candi Solar.

Learning Paths School (LPS)

According to a study, solar energy can aid schools reduce their carbon footprint by 28% and meet 75% of their electricity needs. LPS—a private, air-conditioned school located in Chandigarh—is one example of such a school that installed RTS. 1 kW rooftop system can easily save money by lowering reliance on the power grid and can produce three to five units of electricity each day.





Figure 10: LPS solar power plant of 82 kW

Keeping in mind these environmental and economic benefits, LPS approached Candi Solar to install solar units on their buildings. With Candi Solar's assistance, the school installed a system with a 50 kW capacity, which was eventually increased to 82 kW. The systems were installed in 2016 and are able to generate 250 kWh solar energy every day; 360,628.96 kWh of solar energy has been produced over 2019–23. So far, emissions of 335 tonnes of CO₂ have been avoided owing to the green energy generated. Additionally, the facility has saved a total of ₹ 449,864 owing to Candi Solar's uncomplicated processes, and it has managed to achieve an economic gain of ₹ 1.3 per kWh. The collaboration with Candi Solar was set up on a PPA model. Instead of fragmenting the aspects of solar financing, operations and maintenance, and asset management, all these were offered to the school as a wrapped solution. This packaging made the entire experience seamless for the school, as it did not need to manage each aspect separately. Because of this ease of management, the school decided to add more capacity with each phase building.



Figure 11: LPS solar grid tie inverters



During the OPM team's visit to LPS, the Director and founder of the school, Mr Robin Agarwal—who is personally passionate about green energy and new technologies—further reinforced his decision to use green power for his school. He also acknowledged that his decision to use solar power was not just based on economic sense, but also because he wanted to create awareness about climate change for all his students and their guardians, while showcasing his school as a green campus.



Figure 12: LPS Director Mr Robin (centre) with CPI, OPM, and Candi Solar representatives

These advantages have also contributed to building the school's reputation. The Director of LPS, Mr Robin, intends to use the CAPEX model for the upcoming new building within the campus.

4.2 OMC Power

Company Profile

OMC Power, a leading rural utility company, focuses on providing sustainable solutions, empowering hundreds of thousands of lives by distributing renewable energy.



Figure 13: OMC Power advertisement



With their first-of-a-kind energy ecosystem, OMC generates, stores, and supplies reliable and affordable energy to several Indian villages, and has been successful in catalysing their economic development. Their unique ABC business model brings three segments of customers together on one platform: Anchor telecom sites (A), small and medium-sized Businesses (B), and rural Communities (C).

Currently, OMC has 350 solar power-enabled smart mini-grids in 22 districts spread across Uttar Pradesh and Bihar. 39 megawatt hours of green energy production capacity saves over 13,000 tonnes of CO₂ emissions a year. Primarily using solar to supply energy to different sets of customers, OMC was one of the early adopters of hybrid technology and aims to eliminate diesel and restructure rural infrastructure growth. Erratic power supply remains a common issue in rural India, pushing people to ineffective and expensive alternatives such as kerosene lamps at home and diesel generators/inverters to make a living. In addition to being unsustainable, these alternatives pose environmental and health risks. OMC focuses on aiding economic, safety, and lifestyle improvements in such underserved areas.

As one of the largest rural energy service companies and a growing distribution grid, OMC's vision is exemplary: to transform a village through environmental enrichment, economic upliftment through employment opportunities, educational improvement, and enabling social and gender inclusion. Since its establishment in 2011, OMC has come a long way; it is currently serving 100,000 beneficiaries and aims to expand its reach to at least 20 million people, with 1,000 micro-power plants under construction. The organisation's distinct Indo-Japanese partnership maintains a lead in technological innovation in the renewables industry and it has also ventured into EV infrastructure.



Figure 14: OMC mini-grid power plant at Hardoi (Uttar Pradesh)

USICEF aligns with the vision of OMC and other global organisations to bring sustainable power to every person in the country. The USICEF team joined hands with OMC in 2016 when the company was operating on a smaller scale. OMC participated in the first round of debt mobilisation and, with the help of multi-party engagement managed by CPI, a technical due diligence project was awarded to the service provider. OMC was the subject of due diligence by the investor (FMO). The project was completed in 12–18 months, the end product of which was an investor-approved technical due diligence report for OMC. OMC heavily relied on the due diligence report for internal evaluation and used the final report to raise funds from other investors.





USICEF supported OMC's potential funder for due-diligence process, which was a great learning experience during early growth stage of OMC

Pooja Raman,
Legal Counsel, OMC Power



OMC's association with USICEF in augmenting renewable energy targets and bringing customers on one platform. After its constructive collaboration with USICEF, OMC has been viewed as a credible investee by other lenders. OMC expressed the desire to scale up its relationship with USICEF and could use its network in DFIs and micro-finance institutions to map new investment opportunities. With the help of such initiatives, OMC has its eyes

on scaling up to other geographies and impacting last-mile users.

Its unique business model has enabled OMC to bring reliable energy access to rural areas and electrify villages that have lived in darkness for ages. Energy access fuels economic development and entrepreneurship; for instance, villagers can run their machinery or cold storage for a longer time, effectively increasing earning opportunities. Along with electrifying households, OMC also focused on the productive load, i.e. the use of energy to generate income. OMC has reduced the telecom industry's dependence on diesel generators, and they have powered small businesses from grocery stores to hospitals, barber shops, restaurants, to banks. OMC gives special attention to creating employment options for rural women.



Figure 15: OMC mini-grid household end beneficiary, together with OPM and CPI representatives

One of the textile centres run on OMC's solar mini-grid electricity is exclusively operated by women in district of Hardoi. This has given a push to the local women to make a choice and earn a living for themselves.

In the absence of such opportunities, women are often left with no other alternative than to get married and stay financially dependent on men. Today, however, local women can earn a monthly income by working on the solar-powered sewing machines. The area sales manager reported that the centre had released an order worth ₹ 30,000 the previous month. The facility is also used as a training centre for other women who use their free time to learn income generating skills.

Speaking to the CPI and OPM team, a resident (a vocational teacher) from Hardoi highlighted that her house had been purchasing OMC solar power at a monthly package of ₹ 125 for the last five years.





Figure 16: OPM representatives interviewing OMC mini-grid household end beneficiaries

use electricity from the 38 kW solar mini-grid installed and operated by OMC in their area. The end beneficiary OPM interviewed uses solar power to light up a bulb in her shop that she keeps open till 9 pm. She uses the money she earns for her children's education and saves the rest in a bank nearby.

"We can rely on OMC electricity and keep the shop open for extended hours; it has improved our monthly earnings", said the woman shopkeeper.

A tea stall owner from Kothava, a village receiving solar power from OMC, happily shared his story of taking a metered connection package that helps him power a deep freezer. *"I used to buy ice to keep the soft drinks cool. It used to cost me ₹ 200 daily. With stable solar power, I decided to buy a deep freezer. Using solar power costs me around ₹ 700– ₹ 800 a month".*



Figure 17: OMC mini-grid micro-enterprise end beneficiary showing his deep freezer operated by OMC electricity service

"Earlier, I used kerosene oil lamps in the evening. Now, I use solar power to light up my shop and house", she said, showing the OMC Power kit, comprising two bulbs and a switch board (which each household receives on taking the connection). She added that her little sister helped her father during the day and studied in the evening under the bulb in the living area.

On being asked about the other benefits, she added: *"The house remains smoke-free, which has many health benefits".*

Like her, most of the village women



Other grocery store owners echoed the same thoughts on solar power, which was more reliable than unstable power, giving them a business advantage.

"This is my ancestral shop. My father used to close this shop early. Now we get six hours of stable electricity in the evenings from 5 pm to 11 pm. This gives us the chance to keep the shop open during late hours. I get many customers in the evening", said a 50-year-old shop owner.



Figure 18: OMC mini-grid micro-enterprise end beneficiary interviewed by OPM representative

OMC solar grids usually rely on one or two large users of power (often telecom towers) to meet their revenue needs for the system. But with stable solar electricity beyond the primary grid, other businesses are developing in these villages that could in time become anchor users.



Figure 19: OMC mini-grid end beneficiaries with middle-sized enterprises in rural areas using OMC services

The pictures above are of an OMC-powered bike company and Gramin Bank, which not only enable people to access services locally but also provide employment opportunities to the villagers. The bank serves about 6,000 customers, while the bike company gets a daily footfall of 500 customers. The bike company manager said, 'Diesel generator sets used as backup used to create a lot of noise that would affect our working. Reliable power provides employee and customer satisfaction.'



4.3 Fourth Partner Energy Limited (4PEL)



Company Profile

Founded in 2010 as a solar products and Engineering, Procurement and Construction (EPC) company, in just over a decade 4PEL has emerged as a leading renewable energy solutions provider. 4PEL has in-house expertise across energy analysis, design, financing, procurement, construction, and operation and maintenance of renewables infrastructure, while offering allied services.

To date, 4PEL has managed a portfolio of over 950 MW of solar power plants, which has helped avoid the emission of 1,305 MTs of CO₂ annually. 4PEL, which is also one of the grant beneficiaries under the USICEF programme, provides energy as a service to help businesses offset almost all of their energy requirements through clean and green sources.



4PEL leveraged USICEF's grant for technical due diligence, making their projects bankable and thereby raising structured financing from various lenders.

Pradhyum Reddy,
Corporate Finance, 4PEL



4PEL leveraged the USICEF grant for various purposes, which in turn helped them raise a debt of between of US\$ 50–60 million from various funders including BoA, IREDA, and Tata Capital, which has helped them deploy over 200 MW of solar capacity.

USICEF disbursed two rounds of grants to 4PEL, which utilised them for a mix of purposes, including project technical evaluation and financial advisory

services. This helped them make their projects bankable where they were able to engage global advisors, including DNVGL, PWN, and UL.

During the evaluation, the OPM team visited the 4PEL head office in Hyderabad and had the opportunity to interact with Mr Pradhyum Reddy, who manages corporate finance. He acknowledged the contribution of USICEF and the project team to 4PEL's growth story, as it directly helped the organisation to secure structured financing from various funds. **He mentioned that the programme had also helped 4PEL to connect with various ecosystem partners.**

4PEL has acquired rooftop assets from RENEW Power and Statkraft India, which have positioned themselves among the largest renewable energy solutions companies in India, catering to C&I businesses and accelerating decarbonisation across the corporate sector.

The OPM team visited two commercial sites operated and installed by the 4PEL team in Hyderabad city.

SPAR Hypermarket

Commercial buildings have substantial energy requirements for their daily operations, which implies that real estate developers have to pay a high cost for electricity. Shopping malls, which are commercial establishments, typically consume 4 MWh to 10 MWh energy per day depending upon their size. For a real estate developer, energy operational cost are major overheads, while rising utility rates will continue to increase these fixed costs.

Installing solar panels on the roof of a shopping mall or big-box retail facility is a smart move. Not only do these





Figure 20: SPAR Hypermarket in Hyderabad, end beneficiary for 4PEL

buildings have large, flat roofs that are perfect for solar panels, but they also typically receive plenty of sunlight, especially in India.

SPAR Hypermarket is one such example. It is located in urban Hyderabad and consumes over 2 million units annually for daily operations. Considering the rising fixed overhead costs of utilities, in 2018 the SPAR management decided to utilise the roof for setting up their own solar power plant.

The solar plant was established in collaboration with 4PEL, which is also a beneficiary under the USICEF programme.

Following initial analysis of power consumption patterns and roof space availability, the 4PEL team offered to install a capacity of **585 kWp** on the roof of SPAR.



Figure 21: SPAR Hypermarket roof top solar power plant





Figure 22: SPAR hypermarket in Hyderabad 585 kW plant

With this generation, the real estate developer is able to save 60% of costs compared to using conventional utility power. This in turn is generating an average annual saving of ₹ 5 million (US\$ 62,000 approx.) for the property owner not to mention the CO₂ emissions avoided.

This project was installed by 4PEL on the RESCO model. RESCO model is one of the methods of implementing RTS installations. Under this an energy service company that provides energy to consumers from renewable energy sources (RESCO) develops, installs, finances, operates, and owns the RTS power project and supplies power generated from the project to the consumer on whose premises the project is set up (the customer) or to the grid through net metering.

The RESCO and the customer enter into a long-term **PPA** for an agreed tenure, which sets out, among other things, the terms at which the power generated from the project will be sold to the customer and the tariff at which the power will be sold. Excess power from the project (if any) might be sold by the customer to the distribution utility through a net metering system (the net metering regulations differ from state to state).

Under the PPA, the RESCO owns the project and is responsible for its installation, as well as for its operation and maintenance throughout the tenure of the agreement. At the end of the PPA term, the ownership of the project is transferred to the customer. Thereafter, the customer may either choose to retain the RESCO for operation and maintenance services or engage a third-party operator.

For large commercial establishments, the RESCO model has major advantages over the CAPEX model.

4PEL deployed non-penetration technology, an advanced technology that involves no drilling and avoids cracks on the roof to protect the life of the roof. The elevated roof over the shopping mall was paved with 1,747 high-efficiency polycrystalline solar panels (335 Wp each), manufactured by a reputed global manufacturer.

After five years of deployment, the plant is generating over 0.85 million units of electricity annually. This is providing about 40–45% of the overall daily energy demand for SPAR Hypermarket.



Figure 23: The OPM team at SPAR hypermarket



The real estate developer does not need to invest upfront capital to install the project, as the major challenge involves maintaining the power plant after it is installed. The RESCO manages and monitors operation and maintenance during the tenure, while the property owner enjoys the savings on power consumption per unit generated of up to 70% (depending on the PPA).

For SPAR Hypermarket, the 4PEL team is continuously monitoring and managing operations and maintenance to maximise the photovoltaic output yield.

DMART

DMART is another shopping mall located in a prominent urban area in Ramanthapur, Hyderabad. It is spread over three acres of land.



Figure 24: DMART complex in Hyderabad, end beneficiary for 4PEL

This complex requires 2.8 million units of electricity annually for its daily operations. In the middle of 2022, 4PEL made an agreement with DMART to offer them a sustainable energy solution by deploying solar power on their roof.



Figure 25: 547 kW plant installed at DMART rooftop by 4PEL





Figure 26: OPM team inspecting DMART plant



Figure 27: OPM team at DMART power plant

A total of 547 kWp RTS system capacity was deployed over a roof area of over 55,000 sqft. The system was designed using the latest technology of high-efficiency mono-crystalline half-cut 540 Wp solar panels with over 21% of efficiency sourced from a reputed global manufacturer. Mono-crystalline PERC half-cut solar is a recent technology that became widely commercial last year. Most global solar panel manufacturers, including Indian manufacturers, are switching to this from polycrystalline solar panels.

The DMART solar power system has integrated over 1,000 solar panels, using five grid tie-invertors to power the complex through green energy.

The solar system is capable of providing around 25-30% of the energy requirements for the complex, which generates about 700,000 units of electricity annually, in turn creating a saving of over ₹ 4.7 million (US\$ 60,000 approx.) annually for DMART.

This project was also installed on the RESCO model with a PPA covering a term of 15 years.

4.4 Electronica Finance Limited (EFL)

Company Profile

EFL is a leading NBFC with a sectoral focus, primarily on MSME finance. The enterprises EFL caters to for all of its products have an annual turnover of anywhere between ₹ 10-600 million. The company is based in Pune and has over 30 years of experience in financing machinery. Some of its current products on offer include machinery (for industries such as plastic, printing, automobile, textile, and food processing), business and working capital loans, and institutional lending, loans against property, and loans for emerging enterprises. With over 160 branches, EFL operates in many states across India³.

³ Delhi, Haryana, Gujarat, Jharkhand, Karnataka, Madhya Pradesh, Maharashtra, Pondicherry, Punjab, Rajasthan, Tamil Nadu, Telangana, Uttar Pradesh, Uttarakhand, and West Bengal.



EFL's value addition

EFL brings to the table decades of experience of working in the MSME sector. This has allowed it to tailor RTS loans to meet the needs of various types of MSME customers. **EFL is one of the few financiers who look at business models to come up with risk assessment for customers on a case-to-case basis, customising loan packages based on context.** This allows EFL to address one of the key impediments that restricts access to RTS finance: collateral⁴.

The RTS loan that EFL offers (*Surya Shakti*) is a financing option that allows customers to purchase their own solar power system, or to pay for the installation costs upfront and then repay the loan over time. The loan is repaid monthly, with interest, over a set period. The interest rate is flexible and depends on the customer's profile.

USICEF and EFL collaboration

EFL started looking into expanding into the RTS segment in 2016, and eventually offered the product in 2019. Engagement with USICEF began in early 2020 with four specific areas of engagement: debt advice; market sizing; setting up internal environmental, social, and governance systems; and technical advice. These programmes

“ The programmes have added immense value and remained relevant to our work. While the market sizing was a one-time input, - the rest have kept feeding into how we work.

Ashutosh Puntambekar,
Executive Vice President,- Secured Business
Finance (Solar Finance and Marketing), EFL ”

helped EFL build the requisite internal operational systems and protocols for environmental, social, and governance; helped them understand the technical parameters for RTS products available in the market; and also helped them build a geographical expansion strategy based on the market sizing exercise. EFL continued to expand its RTS business, and has had 500 successful installations so far. Today, almost 5% of EFL's total business portfolio comes from RTS. The company,

a pioneer in the segment, has managed to achieve this despite the challenges of COVID-19. While EFL has accessed a new customer base for its solar loans, the bulk of these are in the manufacturing sector, while the rest are services firms with an estimated turnover of between ₹ 50-250 million. In terms of installation size, the average ticket size is roughly ₹ 4 million, with an installation capacity ranging from 80 kW to 500 kW.

Its solar rooftop customers are mostly located in Haryana, Rajasthan, Gujarat, Maharashtra, Tamil Nadu, and Karnataka, representing the company's large geographical footprint.

Why RTS for MSMEs?

Most MSMEs spend anywhere between 5% and 10% of their operating expenses on electricity. The exact amount depends on the type of industry. This is a significant amount that can be reduced by adopting solar energy as a primary or even secondary source of electricity. One of the biggest hindrances to MSME adoption of RTS is the lack of awareness of the technology's cost reduction potential. The second major challenge is the inability to pay upfront capital costs given other pressing core expenses. For MSMEs, resources are often finite and need to be spread across various expense line items, including expansion of operations. Given the fact that solar arrays cannot be used as collateral for loans, financing options for RTS are limited and not widely understood by the MSME sector.

The MSME segment accounts for approximately 48% of the total energy consumed by India's industrial sector. As such, this segment has the potential to tap into renewable sources of energy, such as RTS.

⁴ EFL provides collateral-free loans for amounts up to 5 million. However, a personal guarantee is required.



Impact of financing on customers and the broader ecosystem

EFL's solar loan can be accessed by residential and C&I customers who have a property that is fit for solar panel installation. RTS deployment means lower utility bills for customers, which can free up capital that can be used for other expenditure. The loan is easy to access, with a streamlined application process that can take as little time as seven days.

Allianz Exports: Leather garment factory

There is visible impact on the ground where MSMEs have deployed RTS. For instance, Allianz Exports which the OPM team visited, is based in Noida (Uttar Pradesh). Allianz Exports is a leather export factory and has been one of EFL's customers since December 2022.



Figure 28: Sewing machines of Allianz Exports operated by solar power

Allianz Exports is a leading export unit for customised leather garments that are shipped to global export markets. The factory employs about 300 employees in the unit, half of whom are women.



Figure 29: Allianz Exports employee on shop floor, along with OPM representative



Access to EFL financing has allowed Allianz Exports to install 40 kW RTS, which now takes care of roughly 30-40% of their electricity needs (primarily to run 40 sewing machines), resulting in cost savings as well as improved reliability on electricity. This system generates a total of 58,400 kWh electricity annually, while creating recurring savings of approx. US\$ 6,500 annually for Allianz Exports.



Figure 30: 40 kW on-grid solar power plant of Allianz Exports

Nagdev Industry: SOBOTECH WIRES

The Nagdev Industry unit in Bhiwadi, visited by OPM representatives, was established in 2017. Under the brand name of SOBOTECH, Nagdev Industry manufactures aluminium, copper enamelled wires, and annealed bare copper and aluminium wires. Their manufacturing facilities are in the Bawana Industrial Area, in Delhi and Bhiwadi, and in Rajasthan State Industrial Development and Investment Corporation. SOBOTECH targets the domestic Indian market, while substituting for foreign suppliers under the 'Make in India' initiative.

Nagdev Industry has accessed an EFL RTS loan of ₹ 20 million for a term of five years. Through the finance facility, the Nagdev team installed a solar plant capacity of 430 kW in early 2023.



Figure 31: Nagdev wire brand, SOBOTECH





Figure 32: Solar power plant of 430 kWp capacity at Nagdev Industry

This plant produces an average of 6.2 million kWh annually. During the first month of implementation, this led to a cost saving of US\$ 4,500 (approx. ₹ 350,000). With a combination of electricity sources, the company is able to run operations more reliably all day and every day of the week, even during high-production months.

While interacting with the OPM team, Mr. Narendra Kumar, who works as Finance Controller with this unit, informed that, other than direct savings from generation, Nagdev is able to take the benefits on their tax savings with accelerated depreciation policy on solar power plant. This will help the company get a return on its investment sooner.



Figure 33: Mr Narendra Kumar, financial controller of Nagdev interacting with OPM

However, these success stories, MSMEs continue to perceive solar installations as risky. EFL is also trying to make more MSMEs, including those located in manufacturing and commercial clusters, realise that RTS is commercially viable. EFL has conducted pilots, and where possible asked existing customers to demonstrate how the installation of RTS has been helping improve business. This has led to more MSMEs opting to install RTS and being open to accessing loans to finance installation and meet other upfront costs.



4.5 Frontier Markets



Figure 34: Representation of women empowerment by Frontier Markets

Company Profile

Frontier Markets, through its unique rural distribution platform, is driving access to the products and services that the rural population wants delivered to their doorstep. Frontier Markets, headquartered in Jaipur, Rajasthan, is also a beneficiary of USICEF programme, and began its journey in 2011, offering energy access solutions in rural Rajasthan.

Their unique proposition is to onboard local women entrepreneurs, who become their distribution channel partners at the last mile, called 'Sahelis'. This model has helped Frontier Markets penetrate into remote regions and has helped create a strong last-mile network.

In 2018, Frontier Markets formally launched their app 'Meri Saheli'—India's first assisted e-commerce app designed by, and for, rural women. This digital app revolutionised the overall operations of Frontier Markets and helped them scale their operations in other states in India.

Frontier Markets' product offerings are high-quality, climate-friendly, and gender-inclusive, and include clean energy services. It is investing in rural women, making them entrepreneurs and building a strong network that acts as a bridge to rural communities. The Meri Saheli app is an e-commerce platform customised to deliver products to rural communities that remain unserved by mainstream e-commerce platforms.

Frontier Markets was a Phase 1 grantee under the USICEF programme. Frontier Markets were looking to raise funds for their solar home system product to reach out to 300 women entrepreneurs (Sahelis), which would impact 3,600 lives in rural communities. USICEF supported them with financial advisory services from Intellicap.



“ This was a great learning experience for Frontier Markets team. The advisory under USICEF grant did an amazing job in developing their overall portfolio and analysing business opportunities and risks.

Ajaita Shah,
Founder, Frontier Markets

”

While interacting with the OPM team the company's founder, Ajaita Shah acknowledged that the USICEF opportunity had given the company an overall prospect of understanding how funding looks and is evaluated. Although Frontier Markets was unable to raise funds from the targeted funds, the grant project preparatory service helped them to raise funds with other funders like FMO and the DOEN Foundation. This fund helped them reach out to 2,500 Sahelis,

creating major social impact and women's empowerment.

Frontier Markets has enabled over 35,000 women rural entrepreneurs to help over 1 million families in over 5,000 villages adopt over 50 million solutions.



Figure 35: Frontier Markets 'Sahelis'

Village Nangal Heera

Manpreet has been associated with Frontier Markets since 2017. She used to work as a primary teacher in a nearby village. However, during the COVID-19 pandemic, she had to give up this fulltime job, but now she thinks that she does not require a fulltime job as she is able to earn well as Frontier Markets' Solar Saheli.

Manpreet lives in the village with her two teenage daughters, who are studying, and her husband, who is an engine mechanic.



Figure 36: Manpreet—'Saheli' based at Village Nangal Heera—with OPM representative



In the village, she is well known and well connected, with over 400 families living near. She has onboarded over 180 families from the village as regular customers.

Indian rural societies are male-dominated, but Manpreet acknowledges that after years of support from Frontier Markets in pitching its various products, she is able to deal with male members of different families with confidence.

During the OPM team's visit, Manpreet also introduced some of her local customers who have been connected with Frontier Markets through Manpreet for many years.



Figure 37: Manpreet interacting with the OPM team

The OPM team witnessed the overall trust the Frontier Markets social and business model has created on the ground, where customers see the value of Frontier Markets' product offerings for their daily material requirements.

OPM team observed the digital revolution Frontier Markets has created, and by leveraging technology they have created a deep-rooted network in rural regions.

Manpreet acknowledged the role of the Meri Saheli app. It has become an essential part of her daily life, through which she not only browses for new products and orders but also creates new customer leads, while following up with customers as there is a professional customer relationship management tool integrated into the app.



Figure 38: Power of the app 'Meri Saheli'



Manpreet currently delivers various kinds of climate-friendly solution to 1,000 individuals in rural families, which is helping reduce carbon emissions, earn income, and generate substantial business for Frontier Markets and its partners.

Santhali Village

Sahuli Khan is another Solar Saheli, who became associated with the Frontier Markets team six years ago. Compared with Manpreet, who the OPM team met in Village Nangal Heera, Sahuli Khan comes from an entirely different background. She left her studies before high school and comes from an underprivileged family.

She lives with her mother, her husband, and five children.

With a bare minimum education, it was very challenging for her to learn the overall business model of Frontier Markets, along with the operation of the digital app.

Sahuli acknowledged that the Frontier Markets team has provided extensive training for her.

Sahuli said: *"The Frontier Markets team has been very hospitable. She still gets opportunities to travel and learn at various locations, including the head office in Jaipur." Further, she proudly shared that 'she normally travels in a double-decker air-conditioner train to Jaipur for any meetings or training, while all the accommodation and local transport is being arranged by Frontier Markets at their cost.'*

Sahuli is very passionate as a Solar Saheli. While interacting with her, she also introduced a male customer who has been her customer for over four years. She revealed that coming as she does from a very conservative background, being a female on the job was very challenging in a society where communication with male members other than of one's own family is considered taboo. However, her association with Frontier Markets and their skills development programme helped her overcome such so-called social barriers.



Figure 39: Ms Sahuli, 'Saheli' for Village Santhli



Not only that, but it has also helped develop Sahuli's confidence. With her experience and exposure at Frontier Markets, Sahuli got the courage to enrol for training as a veterinary volunteer. Currently she also helps local communities with cattle, providing basic first aid services, which is yet another revenue stream for her.

The stories of Manpreet and Sahuli are inspiring. They showcase how the USICEF beneficiary, Frontier Markets, is creating major social impact for women's empowerment and community uplift, while supporting climate change both directly and indirectly.



Figure 40: Sahuli interacting with the OPM team

ANNEXURE A: DATA SOURCES



Sampling data

Tool	Type	Mode of interaction	Respondent type	Number of respondents	Date of interaction
Online survey	Quantitative	Online	All beneficiaries	47	20 February - 30 March 2023
Key informant interviews	Qualitative	Online	CPI project team	3	16 March 2023
			ESPs		
		Online	PwC	2	28 February 2023
		Online	CKinetics	1	
		Online	IDAM	2	28 February 2023
		Online	Excelsior Energy	1	23 February 2023
		Online	Desai & Diwanji	1	20 February 2023
			Lenders		
		Online	Tata Capital	1	01 March 2023
		Online	IREDA	1	12 April 2023
In-depth interviews	Qualitative		Beneficiaries		
		In person	4PEL (SPAR & DMART)	2	23 February 2023
		In person	4PEL (Hyderabad)	4	23 February 2023
		In person/online	EFL (Pune/Delhi)	2	02 March 2023
		Online/in person	Frontier Markets (Alwar)	6	13 March 2023/ 24 March 2023
		In person	Candi Solar (Gurgaon/CHD)	3	17 February 2023/ 02 March 2023
		Online/in person	OMC Power (Lucknow)	6	20 February 2023/ 27 February 2023
In-depth interviews	Qualitative (site visits)		Site visits/end beneficiaries		
		In person	4PEL (SPAR & DMART)	2 sites	23 February 2023
		In person	EFL (Allianz Exports and Nagdev Industry)	2 sites	21 March 2023
		In person	Frontier Markets (Village Santhali, Nangal Heera)	2 villages/2 Sahelis/6 end beneficiaries	24 March 2023
		In person	Candi Solar (LPS and Tribune)	2 sites	02 March 2023
		In person	OMC Power (Hardoi)	6 sites/8 end beneficiaries	27 February 2023



ANNEXURE B: SURVEY QUESTIONS



Impact Assessment of the U.S.-India Clean Energy Finance (USICEF) Initiative

Evaluation questions for impact assessment - In Depth Interviews (IDI)

A. Project achievements and areas for improvement

(To understand the programmes' progress and delivered results)

Evaluation Question

- How did you find out about the USICEF grants?
- Was the application process user friendly?
- How long did it take for the contract signing/ grant approval?
- Were you able to identify the end beneficiaries in the context of the project?
- To what extent have the needs of end beneficiaries been incorporated in the design and planning of the support you've received?
- Could CPI have done anything better to include end beneficiaries and ensure that project design was tailored to their needs?
- What characteristics of the project made it effective or ineffective in targeting the end goals?
- What do you expect will be the key results for your company through receiving support from the programme?
- Have factors other than the project itself contributed to or hindered these results? Please describe those factors.
- In your opinion, does the project improve your company's ability to contribute to the resilience of target beneficiaries? If so, please explain how.
- In your opinion, do any aspects of the project hinder your company's ability to contribute to the resilience of target beneficiaries? If so, please explain how.
- Briefly describe the specific needs of your company needed to raise capital that was identified for the project



- Briefly describe the type of support provided to your company by USICEF/CPI
- How was the outputs anticipated through these grants introduced to your company?
- To what extent has the output been adopted to your company's vision? Please explain.
- If not embedded /used what would you need to adopt it?
- Please describe in brief the types of capacity building Consulting activities that were provided to your company by the project.
- How does CPI collect evidence of outputs of the grants?
- Do the project achievements after 5 years of implementation align with the KPIs discussed with you?
- What other external factors have contributed to achieving KPIs?
- What role does CPI play in ensuring coordination and convergence?
- What activities need to be refined/or discontinued?
- Is the programme collecting the right set of data for understanding progress?

B. Partnerships developed

(To what extent are the grants relevant and appropriate to address the problem?)

Evaluation Question

- Please describe the collaborations that were facilitated during the project, and the nature of the collaboration.
- What did USICEF/CPI do to facilitate these collaborations?
- What is your company hoping to achieve through these collaborations?
- What is the current partner analysis? Are these the right set of partners



- Are these partnerships under grants working the way they were envisaged?
- Are programme partnerships deemed relevant by stakeholders?
- Which collaborations did you find most useful?
- Which collaborations did you find not so useful?
- Did these collaborations help you to raise funds? If yes, How?
- How can these collaborations help in scaling up DRE?

C. Project goals and sustainability

(To what extent has the programme achieved its goal and is the intervention sustainable?)

Evaluation Question

- To what extent has the grant been used efficiently and successfully?
- Has the project reached the anticipated target? If not, why?
- Are the results likely to be sustained?
- Do you believe the results from the project's support will continue after the project ends? If so how? Can you please explain?
- If not, what would be required to sustain this over time?
- Number of annual feedback forms submitted to CPI
- What is your regular assessment and reporting process?
- How did CPI help grantees overcome any problems in project delivery?
- What has been learnt about how to scale up decentralised solar power?
- How does your company help the end beneficiaries to roll out and scale new projects?





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