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# A STUDY ON THE ENVIRONMENTAL IMPACT OF SOLAR PANEL INSTALLATION THROUGH CSR DIRECT COMMUNITY INTERVENTION

TEAM SUSTAINABLE BANKING

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## Introduction:

Access to reliable and sustainable energy is a cornerstone of equitable and high-quality education, particularly in marginalized and underserved regions. In many parts of rural India, educational institutions continue to face persistent challenges due to inadequate or unreliable electricity supply. These energy deficits not only hinder the adoption of modern pedagogical tools and digital resources but also reinforce existing disparities in learning outcomes and opportunities.

Based on the evaluation of multiple direct community intervention requests, it was observed that a significant majority sought access to reliable and economical power solutions for educational institutions. This clearly highlights the pressing need for sustainable energy access in education sector, particularly

In response to this and Recognizing energy as both a basic social good and a catalyst for human development, ESAF Small Finance Bank has undertaken a transformative community-based initiative aimed at promoting energy equity in education. Through the installation of solar power systems in schools, the Bank's Corporate Social Responsibility (CSR) program seeks to bridge energy access gaps, empower communities, and enhance the overall learning environment.

Solar energy presents an effective, sustainable, and context-appropriate solution for educational institutions, particularly in rural and semi-urban areas. It offers a dependable source of power that reduces reliance on polluting and often unreliable grid electricity. Reliable solar energy ensures uninterrupted access to lighting, ventilation, and digital learning tools, critical components of a modern, inclusive educational experience. In addition, it enables the operation of essential infrastructure such as clean water systems powered by solar pumps.

Beyond operational advantages, these solar installations serve as living laboratories, introducing students to the principles of renewable energy, sustainability, and climate responsibility. By embedding environmental consciousness into everyday learning environments, ESAF's initiative nurtures a generation that is not only educated but also environmentally aware and responsible.

Under the Direct Community Intervention program of CSR, ESAF Small Finance Bank has installed 100KW of solar power capacity across 20 educational institutions, addressing the acute need for clean and reliable energy. This approach, rooted in community engagement and local branch-level proposals, ensures that the interventions are responsive to the specific needs and contexts of each school.

Studies on solar energy adoption in schools highlight its multidimensional impact—from reducing carbon emissions and lowering energy costs to enhancing academic performance and creating opportunities for hands-on learning in renewable technologies. These outcomes reinforce the critical role of energy in shaping not just educational outcomes but also broader developmental goals.

This report explores ESAF Small Finance Bank's solar energy initiative as a case study in inclusive, sustainable development. By leveraging decentralized renewable energy, the program contributes to social justice, climate action, and community resilience. At its core, this initiative envisions a future where every child regardless of geography or socio-economic status can learn and thrive in an energy-secure, environmentally conscious school setting.

## Expected Benefits:

**01 ENVIRONMENTAL SUSTAINABILITY:**
Reduce carbon footprint by shifting to solar energy.

**02 FINANCIAL SAVINGS:**
Lower electricity costs for schools, allowing funds to be redirected toward education.

**03 EDUCATIONAL ENHANCEMENT:**
Provide reliable power for better learning conditions.

### Objectives:

- To quantify the environmental benefits (e.g., CO2 reduction, water conservation).
- To evaluate the financial savings and cost-effectiveness for the schools involved.
- To assess the impact on educational infrastructure and student learning environments.
- To understand the level of awareness and behavioural change regarding sustainability among students and faculty.

## Regulatory Requirement:

Under Schedule VII of the Companies Act, CSR activities may include:

## Clean Energy / Environmental Sustainability:

- Clause (iv): "Ensuring environmental sustainability, ecological balance, protection of flora and fauna, animal welfare, agroforestry, conservation of natural resources, and maintaining quality of soil, air and water."
- This includes:
  a. Installation of solar power systems
  b. Renewable energy initiatives
  c. Carbon footprint reduction projects

## Education:

- Clause (ii): "Promoting education, including special education and employment-enhancing vocation skills especially among children, women, elderly, and the differently abled and livelihood enhancement projects."
- This includes:
  a. Infrastructure support to schools
  b. Scholarships and skill-building
  c. Digital literacy and solar-powered classroom initiatives

## Key Focus Areas

### 1. Environmental Impact

a. Reduction in greenhouse gas emissions ($CO_2$ equivalents)

b. Conservation of natural resources (especially water)

c. Comparison with environmental equivalents (e.g., number of trees planted)

### 2. Economic Impact

a. Energy cost savings for schools

b. Return on investment from solar infrastructure

c. Reallocation of saved funds toward educational development

### 3. Social and Educational Impact

a. Improved energy reliability in schools

b. Enhanced student awareness and knowledge about renewable energy

c. Curriculum integration of sustainability concepts

d. Empowerment of school communities through green infrastructure

### 4. Alignment with SDGs

a. Mapping project outcomes to SDGs (Sustainable Development Goals)

b. Identifying areas for increased contribution toward global development goals

### Stakeholders:

**Schools & Students:** Ensuring uninterrupted power for better learning.

**Local Communities:** Reducing environmental impact and promoting sustainability.

**Government & NGOs:** Supporting national renewable energy and education goals.

## Methodology:

The study was designed to evaluate the impact and effectiveness of the solar power installations sponsored under the Direct Community Intervention of CSR across 20 educational institutions across India. A mixed-methods approach was employed, combining quantitative data analysis with qualitative insights collected through field visits.

## Data Collection Methods

1. **Telephonic Interviews:** All participating schools were contacted via telephone to collect preliminary information and feedback. Structured interviews were conducted with designated school representatives, ensuring consistency across all responses.
2. **Field Visits:** Field visits were conducted across 25% of the schools to validate data, assess on-ground implementation, and collect qualitative feedback. These visits provided direct observation opportunities and helped gather contextual information that could not be captured through telephonic means.
3. **Key Respondents:** Data was collected from key stakeholders within the schools, including:
    - School Principals
    - Headmasters/Headmistresses
    - Managers or administrative heads of the institutions
4. **Survey Instrument:** A structured questionnaire was used during both telephonic and in-person interactions. The questionnaire included both close-ended and open-ended questions covering:
    - Electricity reliability
    - Pre- and post-installation cost metrics
    - Functionality and performance of the solar power system
    - Perceived educational and operational benefits

## Sampling Method

All the 20 schools where the Solar power solutions were provided under the direct community intervention was selected, ensuring that no institutions were missed. This focused approach allowed for detailed impact assessment relevant to the program's scope. The period of the assessment from 5$^{th}$ June 2023 to 5$^{th}$ June 2025.

## Impact Metrics and Technical Calculations

1. **Carbon Emission Reduction:**

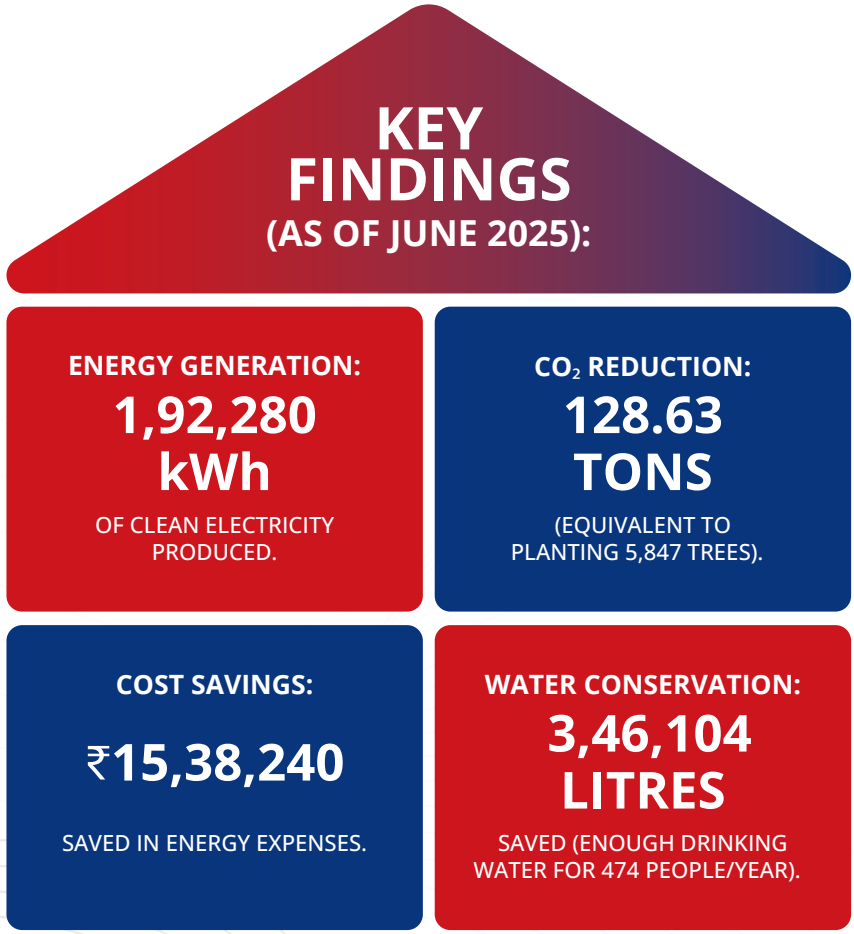
Calculations for carbon dioxide ($CO_2$) savings were based on electricity and emission baselines from the $CO_2$ Baseline Database for the Indian Power Sector, User Guide Version 18.0, December 2022, published by the Central Electricity Authority (CEA), Ministry of Power, Government of India.

2. **Water Savings:** The quantity of fresh water saved through solar power usage (compared to traditional thermal power generation) was calculated using validated methodology based on the Technical Report on Renewable Energy by the National Renewable Energy Laboratory (NREL), published December 2003,
3. **Equivalent Trees Saved:** The equivalent number of mature trees saved as a result of CO2 reduction was calculated based on the validated methodology showcased in: The Power of One Tree – The Very Air We Breathe, a publication by the U.S. Department of Agriculture, dated March 17, 2015.

## Executive Summary

This report outlines the impact of the direct community intervention of Solar Power Plant Initiative, a Corporate Social Responsibility (CSR) project aimed at promoting sustainable energy, reducing carbon emissions, and enhancing educational infrastructure in schools. By installing solar power plants, the initiative has contributed to significant financial savings, environmental benefits, and educational advancements while aligning with multiple Sustainable Development Goals (SDGs)

This impactful initiative has significantly brightened the future of our children, contributing not only to sustainable energy generation but also to the broader vision of environmental responsibility. By leveraging solar power, we have harnessed a renewable energy source that supports the educational sector while simultaneously reducing the schools' reliance on conventional energy.



| S.No | District | State | Location | Installed Premise | No of Students | School Type | Installed capacity | Installation Date | Total Generation Till 5th June 2025 | Total Savings in terms of Monetory Value | Total CO2 Saved from emitting towards Environment | Equavalant Number of trees | Equavalant Litres of Water |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Thrissur | Kerala | Cherlayam | Holy Child Convent GUPS Cherlayam | 600 | Aided | 5 KW | 05-06-2023 | 14620 | 116960 | 9781 | 445 | 26316 |
| 2 | Thrissur | Kerala | Cherpu | CNN Boys High School Cherpu | 1500 | Aided | 5 KW | 05-06-2023 | 14620 | 116960 | 9781 | 445 | 26316 |
| 3 | Thrissur | Kerala | Kazhimbram | VPM SNDP Higher Secondary School | 1900 | Aided | 5 KW | 05-06-2023 | 14620 | 116960 | 9781 | 445 | 26316 |
| 4 | Thrissur | Kerala | Thrissur | Vivekodayam Boys high school | 1700 | Aided | 5 KW | 05-06-2023 | 14620 | 116960 | 9781 | 445 | 26316 |
| 5 | Thrissur | Kerala | Marottichal | Marottichal AUP School | 514 | Aided | 5 KW | 05-06-2023 | 14620 | 116960 | 9781 | 445 | 26316 |
| 6 | Thrissur | Kerala | Thrithallur | Thrithallur UP school | 303 | Aided | 5 KW | 05-06-2023 | 14620 | 116960 | 9781 | 445 | 26316 |
| 7 | Thrissur | Kerala | Padur | Vanivilasam UP School | 750 | Aided | 5 KW | 22-12-2023 | 10620 | 84960 | 7105 | 323 | 19116 |
| 8 | Waynad | Kerala | Kottapadi | Arapetta CMS Higher Secondary School | 1155 | Aided | 5 KW | 08-12-2023 | 10900 | 87200 | 7292 | 331 | 19620 |
| 9 | Palakkad | Kerala | Kuzhalmanna | CA HSS | 775 | Aided | 5 KW | 12-06-2023 | 14480 | 115840 | 9687 | 440 | 26064 |
| 10 | Palakkad | Kerala | Mala | Kottakkal S C G H S S | 1566 | Aided | 5 KW | 30-11-2023 | 11060 | 88480 | 7399 | 336 | 19908 |
| 11 | Palakkad | Kerala | Ayakkad | CA HSS | 800 | Aided | 5 KW | 05-09-2023 | 12780 | 102240 | 8550 | 389 | 23004 |
| 12 | Ernakulam | Kerala | Aluva | CSI Karunalayam | 75 | Aided | 5 KW | 19-12-2023 | 10680 | 85440 | 7145 | 325 | 19224 |
| 13 | Thrissur | Kerala | West Mangad | St. Joseph & St. Cyrial School | 851 | Aided | 5 KW | 05-06-2024 | 7300 | 58400 | 4884 | 222 | 13140 |
| 14 | Kannur | Kerala | Thalassery | BEMP HSS | 700 | Aided | 5 KW | 05-06-2024 | 7300 | 58400 | 4884 | 222 | 13140 |
| 15 | Nagpur | Maharashtra | Kohi Nagpur | Mission India Vidya Nikethen | 600 | Aided | 5 KW | 19-06-2024 | 7020 | 56160 | 4696 | 213 | 12636 |
| 16 | Pakhanjore | Chathisgarh | Pakhanjur | Life Accadamy Higher Secondary School | 600 | Aided | 5 KW | 23-12-2024 | 3280 | 26240 | 2194 | 100 | 5904 |
| 17 | Nagpur | Maharashtra | Nagpur | Prem Seva shikshan sangh, gorewada | 410 | Aided | 5 KW | 17-01-2025 | 2780 | 22240 | 1860 | 85 | 5004 |
| 18 | Wardha | Maharashtra | Wardha | Bodhi sattva Vidyalay | 250 | Aided | 5 KW | 18-01-2025 | 2760 | 22080 | 1846 | 84 | 4968 |
| 19 | Mandideep | Bhopal | Mandideep | St. Thomas Mission High School, Bhopal | 450 | Aided | 5 KW | 07-03-2025 | 1800 | 14400 | 1204 | 55 | 3240 |
| 20 | Nagpur | Maharashtra | Amla | St. Thomas Mission High Secondary School, Amla | 500 | Aided | 5 KW | 07-03-2025 | 1800 | 14400 | 1204 | 55 | 3240 |
| | | | | | 15999 | | 100 KW | | 192280 | 1538240 | 128635 | 5847 | 346104 |

## Detailed Report

Based on the projections and actual field data till 5th June 2025, these solar power plants have collectively generated approximately 1,92,280 KWh of electricity since their installation. This renewable energy production transition has translated into substantial financial benefits, with projected savings of Rs.15,38,240 underscoring the prosperity pillar of our triple bottom-line (TBL) philosophy.

On the environmental front a remarkable reduction of 1,28,635 kilograms (128.63 Tons) of $CO_2$ emissions, equivalent to the environmental benefit of planting 5,847 fully grown trees. This clearly reflects the planet aspect of our TBL approach and demonstrates our commitment to combating climate change and fostering sustainable practices within the education sector.

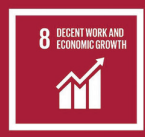
The project has made a meaningful social impact, positively influencing the lives of 15999 students, a testament to the People dimensions of our TBL framework.

Furthermore, the switch to solar energy not only reduces greenhouse gas emissions but also helps conserve valuable water resources. Traditional thermal power plants consume large amounts of water for cooling, whereas solar power generation uses no water at all. Based on details as on 5th June 2025, the solar installations will have saved approximately 3,46,104 litres of fresh water. This is enough to meet the drinking water needs of 474 people for an entire year, thus contributing to the conservation of this essential resource.

The deployment of solar panels in these schools also brought valuable educational benefits. Students had the unique opportunity to learn about renewable energy and sustainability, enhancing not only environmental awareness but also fostering a sense of responsibility toward the planet. Moreover, the solar power initiative helped reduce one of the largest budgetary expenses faced by many of these schools: energy and utility costs. By lowering these expenses, schools were able to allocate more resources towards improving the quality of education and infrastructure.

Authorities reported that reliable and uninterrupted energy supply is crucial in maintaining a conducive learning environment. With solar power, these schools were able to ensure that students and faculty have access to the electricity needed to operate efficiently, regardless of weather conditions or temperature extremes. This ensured that classrooms remain comfortable, well-lit, and conducive to learning, creating a positive impact on the educational outcomes.

This CSR Intervention is closely aligned with several key Sustainable Development Goals (SDGs). These goals focus on addressing global challenges such as poverty, inequality, climate change, environmental sustainability, and promoting education. Here's how the initiative contributes to achieving these SDGs:

| SDG & GOAL | KEY CONTRIBUTIONS OF THE SOLAR ENERGY INITIATIVE |
|---|---|
|   **Ensure healthy lives and promote well-being for all at all ages** | a Reduced air pollution by eliminating 128.63 tons of $CO_2$ emissions, lowering risks of respiratory and cardiovascular diseases. |
| | b Saved 3,46,104 litres of water, helping prevent water contamination and waterborne illnesses. |
|   **Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all** | a Provided a reliable and conductive learning environment with uninterrupted power supply, improving lighting and digital classroom infrastructure. |
| | b Enabled schools to save Rs. 15,38,240, allowing them to allocate these funds towards improving quality of education and infrastructure. |
|   **Ensure access to affordable, reliable, sustainable and modern energy for all** | a Transitioned schools to renewable energy sources, reducing dependency on non-renewables. |
| | b Provided a zero-cost, sustainable energy solution, significantly lowering electricity bills. |
| | c Supported clean, modern energy access for educational institutions. |
|   **Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all** | a Generated local employment through installation and maintenance of solar panels. |
| | b Created opportunities for schools to generate income through transferring excess energy to the grid. |
|   **Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation** | a Modernized school infrastructure with solar energy, smart meters, and energy-efficient lighting. |
| | b Ensured uninterrupted power for digital learning and internet access. |
| | c Created replicable models for decentralized renewable energy in other public institutions. |

| | | |
|---|---|---|
|  **Reduce inequality within and among countries** | a | Bridged the energy gap in rural and under-resourced schools, ensuring equitable access to quality education. |
| | b | Empowered marginalized communities to learn under better infrastructure facilities. |
|  **Ensure sustainable consumption and production patterns** | a | Promoted the use of renewable energy, reducing reliance on fossil fuels. |
| | b | Encouraged sustainable production and energy consumption practices. |
| | c | Reduced environmental waste from traditional power generation methods. |
|  **Take urgent action to combat climate change and its impacts** | a | Prevented over 128.63 tons of $CO_2$ emissions, supporting carbon footprint reduction. |
| | b | Contributed to global climate mitigation efforts by transitioning to clean energy. |
| | c | Supported adaptation to climate risks by reducing dependency on unsustainable energy systems. |
|  **Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification and halt and reverse land degradation and halt biodiversity loss** | a | $CO_2$ reduction equivalent to planting 5,847 fully grown trees. |
| | b | Helped preserve ecosystems and biodiversity through reduced emissions. |
| | c | Supported reforestation and environmental health indirectly. |

## Photos:


Marottichal AUP School

CA HSS Ayakkad


CNN Boys HSS, Cherpu


CA HSS, Kuzhalmannam

Vivekodayam Boys high school, Thrissur

പാടൂർ വാണി വിലാസം യു പി സ്കൂളിൽ സൗ രോർജ്ജ പദ്ധതി ഇസാഫ് ബാങ്ക് വൈസ് പ്ര സിഡന്റ് എം പി പീറ്റർ നിർവ്വഹിക്കുന്നു

Vanivilasam UP School, Padur, Thrissur

## സോളാർ പാനൽ ഉദ്ഘാടനം

തൃശ്ശൂർ: വിപിഎം എസ്എൻഡിപി എച്ച്എസ്എസ് കഴിമ്പ്രം വിദ്യാലയത്തിലെ ഹയർസെക്കൻഡറി കെട്ടിടത്തിൽ സോളാർ പാനൽ ഉദ്ഘാടനവും, ടോയ്ലറ്റ് ബ്ലോക്ക് ഉദ്ഘാടനവും സി സി മുകുന്ദൻ എംഎൽഎ നിർവഹിച്ചു. അഞ്ച് കിലോവാട്ട് യൂണിറ്റ് വൈദ്യുതി ലഭ്യമാകുന്ന സോളാർ യൂണിറ്റാണ് ഇസാഫ് സ്മാൾ ഫിനാൻസ് ബാങ്കിന്റെ സിഎസ്ആർ ഫണ്ട് വിനിയോഗത്തിൽ നിന്ന് വിദ്യാലയത്തിന് ലഭിച്ചത്. സോളാർ യൂണിറ്റിന്റെ ഔദ്യോഗിക അനുമതിപത്രം ഇസാഫ് സ്മാൾ ഫിനാൻസ് ബാങ്കിന്റെ സസ്റ്റെയ്നബിൾ ബാങ്കിംഗ് ഹെഡും വൈസ് പ്രസിഡന്റുമായ റെജി കോശി ഡാനിയൽ, അസിസ്റ്റന്റ് വൈസ് പ്രസിഡന്റും ക്ലസ്റ്റർ ഹെഡുമായ സ്മിതാ രാമചന്ദ്രൻ എന്നിവർ സ്മാൾ അധികൃതർക്ക് കൈമാറി.

പരിസ്ഥിതി ദിനാചരണം എസ്എൻഡിപി യോഗം നാട്ടിക യൂണിയൻ പ്രസിഡന്റ് ഉണ്ണികൃഷ്ണൻ തക്ഷ്ണാത്ത് ഉദ്ഘാടനം ചെയ്തു. പച്ചത്തുരുത്ത് നിർമ്മാണത്തിന്റെ ഭാഗമായി എംഎൽഎ വിദ്യാലയ അങ്കണത്തിൽ വൃക്ഷത്തൈ നട്ടു. പിടിഎ പ്രസിഡന്റ് രമേഷ് പള്ളത്ത്

VPM SNDP Higher Secondary School, Kazhimbram, Thrissur

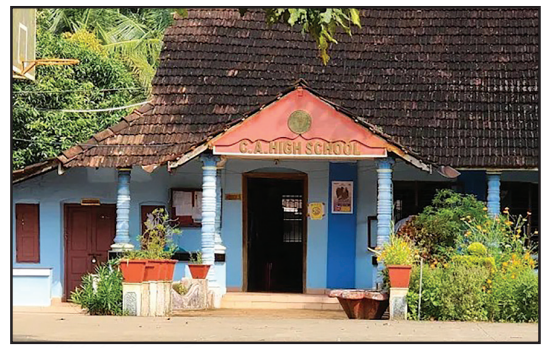
St. Joseph & St. Cyrial School, West Mangad, Thrissur


BEMP Higher Secondary School, Thalassery, Kannur

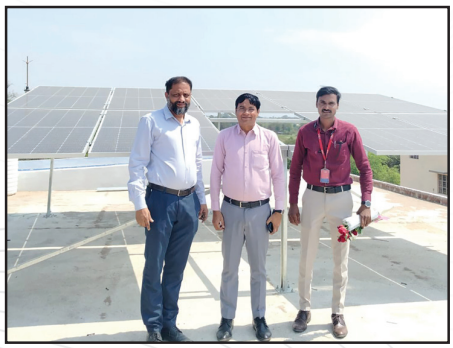
UP school, Thrithallur, Thrissur



Bodhi sattva Vidyalay, Wardha, Maharashtra




CA HSS, Kuzhalmannam



St. Thomas Mission High Secondary School, Amla, Maharashtra

CA Higher Secondary School, Ayakkad, Palakkad

CSI Karunalayam, Aluva, Ernakulam, Kerala

## Conclusion:

In essence, our CSR initiatives go beyond just contributing to the social and environmental well-being of communities. The installation of solar power units in schools embodies a commitment to fostering a healthier, more resource-efficient, and sustainable learning environment for future generations. By addressing energy consumption, promoting renewable energy, and supporting educational excellence, we have been playing a pivotal role in shaping a brighter, greener future for all.

## Testimonials:

We extend our heartfelt gratitude to ESAF Small Finance Bank for their generous support in installing a Solar Power Plant at our special school. This initiative has significantly reduced our electricity expenses, with our current electricity bill now as low as Rs. 70. The solar plant has not only introduced a highly sustainable and cost-effective energy solution but has also empowered us to channel our resources more effectively toward the welfare and development of our students.

**Fr. Renju,**
CSI Karunalayam,
Special School, Aluva

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The installation of solar panels at our school has been a great blessing for all of us. It not only reduced our electricity bills but also set a good example for our school students to use our resources wisely. We are teaching our students to care for the planet and showing how technology can make a positive impact. Going Solar has truly empowered our school on multiple levels.

**Bapu Desai**
Prem Sewa Shikshan Sangh Nagpur,
Maharashtra

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I wish to express our sincere appreciation for the support extended by ESAF Small Finance Bank through its CSR initiative, which enabled the installation of a 5KW solar power system at our school. This initiative has led to a remarkable reduction in our electricity expenses—from over Rs. 7,000 to approximately Rs. 1,500—through the efficient use of solar energy. The system has provided us with a reliable, cost-effective, and environmentally sustainable energy source, significantly enhancing our operational efficiency.

**Smt. Jensy**
St. Joseph & St. Cyril School,
Mangad, Thrissur, Kerala

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The installation of the on-grid solar panel system has brought long-term benefits to our school. By feeding power back to the grid during the day, we're not only reducing our electricity bills but also contributing to a cleaner environment. These savings are being redirected to improve student facilities and learning tools. It has also increased awareness among students and staff about renewable energy, inspiring the entire community to think sustainably and act responsibly for the future.

**Prayon Mathew Jacob**
St. Thomas Mission High School,
Mandideep Madhya Pradesh