एनएचपीसी
NHPC
A Navratna Company

PROVIDING SOLAR LED STREET LIGHTS IN VARIOUS PARLIAMENTARY CONSTITUENCIES IN HIMACHAL PRADESH

CENTRAL UNIVERSITY OF JAMMU जम्मू केंद्रीय विश्वविद्यालय
बुद्धिर्ज्ञानेन शुद्ध्यति

Central University of Jammu
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Impact Assessment Report 2025

PROJECT SUMMARY

CSR Project Name	Providing Solar LED Street Lights in various parliamentary constituencies in Himachal Pradesh
Executed By	Energy Efficiency Services Limited
Supported By	NHPC Limited
Total Expenditure	₹ 571.82 Lakh
Duration	19/06/2018 to 08/12/2021
Location	Kangra, Chamba, Shahpur, Indora, Chopal, Pacchad, Nurpur, Jaisinghpur, Dalhousie, Kasummpti, Ponta Sahib, Rohru& Solan, Himachal Pradesh

ACKNOWLEDGEMENTS

We extend our deepest gratitude to the ALMIGHTY for giving us the strength and dedication to complete this Impact Assessment Study.

We express our sincere gratitude to **Prof. Sanjeev Jain**, Hon'ble Vice Chancellor, Central University of Jammu for his constant encouragement, timely administrative approvals and unflinching support for successful completion of the study. His abiding commitment to scholarship and academics has been an inspiring example and we are grateful to him for his guidance and mentorship.

We owe our gratitude to **Deputy Commissioner/s,** for their invaluable support and cooperation of District Administration of respective Districts related to data collection from beneficiaries across Kangra, Chamba, Shahpur, Indora, Chopal, Pacchad, Nurpur, Jaisinghpur, Dalhousie, Kasummpti, Ponta Sahib, Rohru & Solan in Shimla & Kangra Parliamentary constituencies of Himachal Pradesh. Areas. We are sincerely grateful to officials and elected representatives of Department of Panchayati Raj, Himachal Pradesh for extending their support in data collection and providing useful inputs about CSR initiative of installing Solar Led Street Lights in various parliamentary constituencies in Himachal Pradesh from 19/06/2018 to 08/12/2021.

We are also grateful to **Office Bearers of NHPC CSR Division, Faridabad** and **NHPC officials** from local Offices for their cooperation and valuable inputs about the CSR activities initiated by NHPC for providing solar street lights. Their dedication and first-hand experiences were central to understanding the real-world implications of the CSR intervention.

We also sincerely thank the beneficiaries and stakeholders who participated in the field surveys and focus group discussions. Their voices brought depth and context to our findings. We express our heartfelt gratitude to all those who contributed to the successful completion of this impact assessment study. This study would not have been possible without the generous support and

strategic vision of the Corporate Social Responsibility (CSR) donor and implementing partner organizations.

We owe our gratitude to our other field work collaborators **Dr. Zubair Ahmed Dada**, Assistant Professor, University of Kashmir, **Dr. Asif Ali,** Assistant Professor, Department of HRM & OB, Central University of Jammu, **Dr. Obaidur Rahman**, Assistant Professor, Sharda University and **Dr. Kishore Kumar,** Assistant Professor, Bennett University, Greater Noida.

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Finally, special thanks to **Dr. Kavyashree K. M** and other team memberswho translated field evidence into actionable insights. We are indebted to **Prof. Yashwant Singh**, Registrar, Central University of Jammu and faculty members from School of Business Studies, Central University of Jammu who have been a constant source of encouragement and moral support for our academic accomplishment and the timely completion of this study.

- **Project Directors**

PREFACE

The study adopts a mixed-methods framework, combining structured field surveys with qualitative inputs from beneficiaries and end-users. The assessment benchmarks outcomes across key domains—access, affordability, and system sustainability—against pre-identified indicators, and aligns them with Sustainable Development Goals (SDGs) and OECD-DAC evaluation criteria.

The insights from this report are intended not only to validate the effectiveness of the current intervention but also to guide future CSR strategies, promote evidence-based policymaking, and inspire cross-sector partnerships.

We hope this report contributes meaningfully to the ongoing discourse on sustainable intervention and provides a roadmap for replicable, scalable, and impactful CSR programs.

PROJECT IMPACT ASSESSMENT TEAM MEMBERS

S. No	Name	Designation
1	Prof. Jaya Bhasin	Project Director/s
2	Dr. Shahid Mushtaq	
3	Dr. Asif Ali	Project Coordinator/s
4	Dr. Obaidur Rahman	
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8	Sh. Udit Mahajan	Technical Advisor

LIST OF ABBREVIATIONS

Abbreviations	Expressions
CSR	Corporate Social Responsibility
SDG	Sustainable Development Goals
SROI	Social Return on Investment
UT	Union Territory

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EXECUTIVE SUMMARY

This impact assessment study evaluates the effectiveness and outcomes of the CSR initiative aimed at providing Solar LED Street Lights in the Shimla and Kangra parliamentary constituencies of Himachal Pradesh. A total of 3,250 Solar LED Street lights were installed across various rural areas, aiming to improve infrastructure and quality of life. The study focuses on assessing the social, economic, and environmental impacts. It also provides recommendations for enhancing the effectiveness and sustainability of future CSR initiatives.

Key Findings

Awareness and Relevance:

- The project directly addressed a critical infrastructure gap in rural areas.
- Villages in the region struggled with basic infrastructure such as roads, power, drinking water, and sanitation, contributing to high levels of poverty.
- The project is seen as highly relevant for improving the living conditions of rural communities, particularly in far-flung and underdeveloped areas.

Impact on Rural Infrastructure:

- The installation of solar LED street lights in Shimla and Kangra has significantly improved the street lighting infrastructure in previously underserved villages.
- The initiative has enhanced rural infrastructure, which is expected to contribute positively to the broader development of the State.

Economic and Social Impact:

- The introduction of street lights is expected to create safer environments for villagers, particularly women and children, who often face safety challenges in poorly lit areas.
- Economic activities in rural areas, such as farming and mason jobs, will be further supported by better infrastructure, improving livelihoods.

- The project is likely to increase the mobility and access of rural communities, especially in the evenings, which could have a positive impact on local businesses and education.

Challenges and Limitations:

- Identification of beneficiaries was a time-consuming process due to the lack of proper contact information for local representatives and beneficiaries.
- Difficult terrain and damaged roads, worsened by rains, caused logistical issues in reaching remote villages for installations.
- Technical issues, such as the need to recharge lead-acid batteries after they were stored for months, further delayed the project.
- The winter climate and the COVID-19 lockdown in 2020 significantly impacted the timeline, leading to halts in installation activities.
- Future projects should consider the use of lithium iron phosphate (Li-Fe) batteries instead of lead-acid batteries to ensure better performance and reliability.

Sustainability and Maintenance:

- The project's sustainability could be improved by addressing challenges related to long-term maintenance and ensuring that local communities and representatives play a more active role in maintaining the infrastructure.

Social Return on Investment (SROI)

The solar LED street light initiative has generated significant social value by improving safety, enhancing rural infrastructure, and contributing to a reduction in poverty. However, delays in installations and technical challenges have impacted the full potential realization of these benefits.

Alignment with SDG Goals

- **SDG 7: Affordable and Clean Energy** – By providing solar LED street lights, the project directly supports access to clean energy.

- **SDG 11: Sustainable Cities and Communities** – The installation of solar street lights promotes safer, more sustainable rural communities.
- **SDG 13: Climate Action** – The use of solar energy contributes to environmental sustainability.

Major Discoveries

- **Infrastructure Gaps:** There is a significant lack of basic infrastructure in the rural areas of Himachal Pradesh, which the project is addressing.
- **Delayed Implementation:** The project faced multiple delays due to logistical challenges, climatic conditions, and the COVID-19 pandemic.
- **Technical Issues:** The reliance on lead-acid batteries and the challenges associated with the terrain contributed to inefficiencies in the installation process.

Policy Gaps and Improvement Areas

- **Stakeholder Engagement:** Increased collaboration with local representatives and communities is essential to streamline the project's execution and ensure better coordination.
- **Maintenance and Support:** Clear policy frameworks and dedicated funding for ongoing maintenance should be established to ensure the sustainability of solar street lights in the long term.
- **Project Planning:** Future CSR projects should account for logistical challenges, such as poor road infrastructure, and consider alternative battery technologies for improved performance.

Way Forward

- **Enhanced Local Involvement:** Encourage greater participation from local communities and stakeholders, including village heads and local leaders, to improve project execution.
- **Improved Infrastructure:** Address gaps in infrastructure such as road networks to facilitate smoother project implementation in remote areas.

- **Technology Upgrades:** Transition to more durable and efficient battery technologies, such as lithium iron phosphate batteries, for future projects.
- **Regular Monitoring and Feedback:** Establish a robust monitoring and evaluation system to track project progress, ensure timely intervention, and address issues as they arise.

In conclusion, while the CSR initiative has made a positive impact on rural infrastructure in Himachal Pradesh, addressing logistical and technical challenges, as well as ensuring better stakeholder engagement, will be key to maximizing its benefits in the future.

1. INTRODUCTION

1.1. Context & Need for CSR in Sustainable Infrastructure

Access to reliable and sustainable public infrastructure is a vital component of inclusive development, particularly in hilly and rural regions such as Himachal Pradesh. Despite ongoing government efforts to improve basic amenities, many areas continue to face infrastructural gaps that affect quality of life, safety, and energy access—especially after sunset. Inadequate street lighting in several villages and towns leads to reduced mobility, safety concerns, and hindered community and economic activities during evening hours.

To address these challenges, Corporate Social Responsibility (CSR) interventions have emerged as a significant enabler of local development. Under the statutory provisions of the Companies Act, 2013, companies are required to spend, in every financial year, at least 2% of their average net profits of the company made during the three immediately preceding financial years towards CSR activities in pursuance of their CSR Policy. It is relevant to mention that sectors such as Rural Development and environmental sustainability have gained prominence in recent years as areas of CSR intervention, especially with growing emphasis on clean energy solutions.

The solar street lighting initiative implemented in Himachal Pradesh with NHPC's support is one such CSR intervention, aimed at enhancing community safety and promoting the use of renewable energy. The project, carried out through Energy Efficiency Services Limited (EESL), involved:

- Installation of 3,250 Solar LED Street Lights (12W capacity) across multiple constituencies in Shimla and Kangra districts, including areas like Chamba, Shahpur, Indora, Chopal, Nurpur, Dalhousie, Rohru, and others.
- Promotion of green infrastructure by replacing or supplementing conventional lighting with energy-efficient solar alternatives.
- Improved night-time visibility and public safety, especially in semi-urban and rural belts where conventional power supply is either weak or inconsistent.

Implemented over a three-year period (from June 2018 to December 2021), with a total expenditure of ₹5.72 crore, this CSR project reflects a convergence of clean energy goals with

grass-roots development needs. It also aligns with national priorities such as the promotion of energy efficiency, rural electrification, and climate action.

The current study is conducted to evaluate the social, economic, and environmental impact of this initiative. It also aims to assess the Social Return on Investment (SROI) and provide actionable recommendations to enhance the effectiveness, replicability, and sustainability of such CSR-led clean energy infrastructure projects.

1.2. Objectives of the CSR Initiative

Table 1: Objectives of the CSR Initiative

Objective	Description
Improve public safety and security	Install solar-powered street lights in underserved areas to reduce crime, improve night-time visibility, and enhance safety.
Enhance mobility and accessibility	Support safe commuting and public movement after dark, especially for women, elderly, and school-going children.
Promote renewable energy infrastructure	Encourage the adoption of solar energy solutions in public utilities to reduce carbon footprint and grid dependence.
Strengthen rural infrastructure	Bridge infrastructure gaps in remote, semi-urban, and hilly regions by ensuring access to reliable lighting.
Support economic activity	Extend business hours and improve the operating environment for small vendors and local markets.
Align with environmental and policy goals	Contribute to SDG targets, state renewable energy mandates, and national sustainability missions through clean technology deployment.

1.3. About the University & School of Business Studies

The Central University of Jammu (CUJ) is a premier institution of higher learning located in the Union Territory of Jammu and Kashmir, established by the Central Universities Act, 2009. Committed to academic excellence and societal engagement, CUJ partners with government agencies and corporate entities in research, development, and evaluation of public welfare

projects. CUJ brings technical expertise, field engagement, and impact assessment capabilities to support evidence-based policy and program development.

Since its inception in 2011, CUJ has grown significantly, offering over 50 programs across 21 Departments, 03 Centers, and 01 College. The University has established dedicated research centers and undertakes prestigious national-level projects, including the Kalam Centre for Science and Technology and the Satish Dhawan Centre for Space Technology

The University has a strong research focus, with faculty members undertaking over 40 major/minor research projects of academic and social relevance. CUJ has also signed 24 national and 4 international MoUs/bilateral agreements, and has obtained membership of apex industry/academic bodies like CII, NHRDN, and ICA. The University has adopted villages near its vicinity and undertakes capacity-building programs for teachers and students.

School of Business Studies

The School of Business Studies, established in 2012, offers a range of programs, including MBA, Ph.D. and Vocational Degree Programs in Business Administration, Human Resource Management, Tourism Management, Marketing Management, Retail Management, And Banking and Financial Services. These programs aim to equip students with multifaceted skills relevant to the contemporary business environment. The school's transactional pedagogy comprises interactive classroom sessions, case presentations, group discussions, and exposure to real-life situations through seminars and workshops. The school has taken several initiatives to drive excellence, including organizing various events and activities. School is able to mobilize resources from various funding agencies for research viz. ICSSR/ UGC /Tribal Affairs/M/O Consumer Affairs/NCW/DST/ EDII/SERB/MHRD/AICTE / J&K Bank /M/O Textile etc. The University faculty has been awarded prestigious National/International Fellowships, project funding and recognition and is constantly contributing to various governmental and non-governmental sectors through research, consultancy and outreach activities.

1.4. About NHPC Limited

NHPC was incorporated on November 7, 1975 as a Private limited company under the name "National Hydroelectric Power Corporation Private Ltd". The company was converted to Public limited company w.e.f. April, 2, 1986. The name of the company was changed to its present name "NHPC Limited" in 2008.

NHPC is a Navratna company with 67.40 % ownership of Government of India. With an Authorized share capital of ₹15,000 crore and an investment base of over ₹ 85,486 crore (as on 31.12.2024), NHPC Limited is the largest hydropower development organization in India, with capabilities to undertake all activities from conceptualization to commissioning of hydro projects. NHPC has also diversified into the fields of solar and wind energy development.

NHPC's total installed capacity as of March 31, 2025, is 8140 MW, including 1,681.70 MW in joint ventures. This comprises 7771.2 MW from 23 hydro power stations, 318.84 MW from six solar power projects, and 50 MW from a wind power project. NHPC's hydro share of 7771.2 MW accounts for about 16.56% of the country's total installed hydro capacity of 46,928.17 MW.

Additionally, nine projects aggregating to a total installed capacity of 4,291 MW are under clearance stage, which includes four hydro and one solar project by NHPC on its own, and four projects (one in hydro and three in solar) in JV mode.

VISION

NHPC's vision is "To be a global leading organization for sustainable development of clean power through competent, responsible and innovative values".

MISSION

- To achieve excellence in development of clean power at international standards.
- To execute & operate projects through efficient and competent contract management and innovative R&D in environment friendly and socio-economically responsive manner.
- To develop, nurture and empower the human capital to leverage its full potential.

- To practise the best corporate governance and competent value based management for a strong corporate identity and showing concern for employees, customer, environment and society.
- To adopt & innovate state-of-the-art technologies and optimize use of natural resources through effective management.

1.5. About Corporate Social Responsibility (CSR)

Corporate Social Responsibility (CSR) represents a company's initiative to assess and take responsibility for its effects on environmental and social well-being. As per the Companies (CSR Policy) Rules, CSR refers to activities undertaken by a company in pursuance of its statutory obligations under Section 135 of the Companies Act, 2013, in accordance with the provisions contained in these rules.

The CSR provisions outlined in Section 135 and the Companies (CSR Policy) Rules emphasize not only regulatory compliance but also the promotion of transparency and accountability in how companies contribute to societal and environmental betterment. Schedule VII of the Act provides a comprehensive list of eligible CSR areas, including poverty alleviation, education, gender equality, health, environmental sustainability, and contributions to various government relief funds.

CSR in India is increasingly seen as a means to contribute toward achieving the UN Sustainable Development Goals, aligning corporate strategies with Global/National priorities for inclusive and sustainable growth.

1.6. About NHPC's CSR Policy

Corporate Social Responsibility is integral to NHPC's commitment to addressing social, economic, and environmental concerns in the regions it serves. NHPC has a CSR & Sustainability Policy aligned with the specific provisions of CSR under Section 135 of the Companies Act, 2013, the Companies (Corporate Social Responsibility Policy) Rules, and subsequent amendments issued by the Ministry of Corporate Affairs, Government of India. NHPC also aims to adhere to the CSR guidelines issued by the Department of Public

Enterprises (DPE). NHPC has strengthened its commitment to CSR in line with Statutory Provisions.

NHPC has undertaken numerous CSR initiatives for communities residing in and around its projects, power stations, and units, focusing on healthcare, education, sanitation, rural development, skill development, environmental sustainability, women empowerment, and other areas outlined in Schedule VII of the Companies Act, 2013. These efforts aim to foster inclusive growth, support marginalized communities, and contribute to national development.

1.7. About Impact Assessment

The Ministry of Corporate Affairs in India requires companies to conduct impact assessments of their CSR initiatives through the amended Companies (CSR Policy) rules. As per the amended Companies (CSR Policy) Rules, every company having average CSR obligation of ₹10 crores or more in pursuance of sub-section (5) of Section 135 of the Companies Act, 2013, in the three immediately preceding financial years, shall undertake impact assessment, through an independent agency, of their CSR projects having outlays of Rs. One Crore or more, and which have been completed not less than one year before undertaking the impact study. Further, a Company undertaking impact assessment may book the expenditure towards Corporate Social Responsibility for that financial year, which shall not exceed two percent of the total CSR expenditure for that financial year or fifty lakh rupees, whichever is higher.

An impact assessment serves as a vital tool to analyze the effectiveness and sustainability of CSR projects. It not only highlights what has been achieved but also assesses how well the projects align with the company's long-term vision and address real community needs. The primary goal of an impact assessment is to provide a clear and measurable understanding of the value created for both society and the company through its CSR efforts.

This study presents the third-party impact evaluation of the CSR initiative, which involved the installation of 3,250 Solar LED Street Lights across Shimla and Kangra districts in Himachal Pradesh. Implemented by Energy Efficiency Services Limited (EESL) under NHPC's CSR initiative, this project aimed to address gaps in public safety, night-time visibility, energy access, and sustainable urban infrastructure through solar-based street lighting. The study examines the

impact of this intervention on community security, environmental sustainability, energy efficiency, and alignment with national and global goals such as the Sustainable Development Goals (SDGs).

2. APPROACH & METHODOLOGY

The impact assessment of the CSR initiative "Providing Solar LED Street Lights in Himachal Pradesh" was carried out using a mixed-method, multi-stakeholder framework. The approach was designed to evaluate the effectiveness, efficiency, relevance, impact, and sustainability of the intervention.

2.1. Assessment Objectives

The key objectives of the impact assessment were:

- To assess the improvement in public lighting and safety post-installation of solar LED street lights.
- To understand the environmental and energy efficiency outcomes of using solar infrastructure in public spaces.
- To evaluate the social return on investment (SROI) **and** community perception of the intervention.
- To provide policy insights and recommendations for scaling similar CSR initiatives across other regions.

2.2. Methodological Framework

The study follows evaluation principles as per **OECD-DAC criteria**, focusing on:

- **Relevance** – Did the lights address the real needs of the communities?
- **Effectiveness** – Were the stated objectives of safety and access achieved?
- **Efficiency** – Were resources used optimally?
- **Impact** – What are the tangible and perceived benefits?
- **Sustainability** – Can the outcomes be maintained over time?

2.2.1. Stakeholder Mapping

The following stakeholder groups were included in the study:

- Local Residents and Community Members
- Gram Panchayat Representatives
- Local Authorities / Ward Members
- School Teachers / Health Workers
- SME owners / Shopkeepers near lighted areas

2.2.2. Sampling Design

A purposive sampling approach was adopted. Respondents were drawn from areas where solar lights were installed across locations in Kangra, Chamba, Shahpur, Indora, Chopal, Pacchad, Nurpur, Dalhousie, Kasumpati, Rohru, Solan, and Ponta Sahib.

- Total sample size: 275
- Valid Responses Considered for Analysis: 210
- Coverage ensured inclusion of urban, semi-urban, and remote villages.

2.3. Tools of Data Collection

Table 2: Tools of Data Collection

Tools	Purpose
Structured Questionnaires	To gather quantitative data on safety, usage, and perceived benefits
In-depth Interviews	Capture qualitative insights from elected leaders and residents
Observation Checklists	Field verification of working status, location, and impact zones
Geo-tagged Photographs	Visual documentation of installed solar street lights

2.4. Data Collection Timeline & Process

Fieldwork was conducted covering all major constituencies. Enumerators were trained on ethical research practices, community sensitivity, and accurate recording of infrastructure condition and community feedback.

2.5. Data Analysis Strategy

- Descriptive statistics for understanding usage and perception trends.
- Thematic coding of qualitative responses from residents and local leaders.
- Comparative analysis of pre- and post-installation conditions where applicable.
- SROI estimation to determine cost-effectiveness and perceived value.

2.6. Measure of Sustainability

Sustainability was assessed across four key areas:

Table 3: Measure of Sustainability

Dimension	Assessment Focus
Institutional Support	Ownership clarity (Panchayats, local bodies) for repair & maintenance
Operational Continuity	Working condition, lighting hours, seasonal challenges (rain/winter)
Community Engagement	Resident vigilance, sense of shared ownership, and usage behavior
Environmental Impact	Energy savings, carbon reduction, and visibility improvements in eco-sensitive zones

2.7. Social Return on Investment (SROI): Methodological Note

This impact assessment adopts a qualitative, perception-based framework to evaluate the Social Return on Investment (SROI) of NHPC's CSR initiative that involved installing 3,250 Solar LED Street Lights across multiple parliamentary constituencies in Himachal Pradesh. The

methodology focuses on community experiences, thematic value indicators, and stakeholder feedback to capture the multi-dimensional social benefits of the intervention.

2.7.1. Evaluation Themes Covered

Structured surveys and interviews were designed to capture perceptions related to:

- Relevance and Local Utility of the solar street lights
- Improvement in Safety, Mobility, and Business Activity
- Operational Efficiency and Functionality of Installed Units
- Sustainability, Maintenance, and Ownership Models
- Environmental Impact and Energy Efficiency
- Community Satisfaction and Support for Replication

2.7.2. Indicators considered for Perceived Social Value

The SROI was interpreted based on the following outcome indicators:

- Reduction in night-time crime or accidents
- Enhanced pedestrian and vehicular mobility
- Expansion of local business hours
- Community satisfaction and pride in infrastructure
- Reduced dependence on grid electricity and promotion of renewable energy
- Alignment with SDG goals and endorsement for replication

2.7.3. Community-based Insights

Respondents reported:

“It feels much safer walking after dark; women especially feel more secure now.”
“Shops in our locality now stay open longer.”
“Earlier, there was no light at bus stops. Now even transport feels safer at night.”

These qualitative accounts reflect the intangible yet powerful outcomes, improved quality of life, safety, environmental consciousness, and increased local economic activity.

Justification for Qualitative SROI

- Monetary proxies do not adequately capture social cohesion, public safety, and dignified access to infrastructure
- This CSR project contributes to SDG 7 (Affordable & Clean Energy), SDG 11 (Sustainable Cities & Communities), and SDG 13 (Climate Action)
- The project's decentralized implementation through EESL and its community-centered use warranted a stakeholder-driven evaluation method over purely financial metrics

The qualitative SROI methodology effectively highlights the broad-based impact of the solar street light installation project. By focusing on the voices of the community, this method reveals meaningful returns in the form of improved safety, inclusivity, and sustainability, demonstrating the value of renewable energy-based CSR initiatives in enhancing public infrastructure and well-being.

Snapshot of Research Methodology

Table 4: Snapshot of research Methodology

Comment	Details
Objective	To assess the social, economic, and environmental impact of the CSR initiative on providing Solar LED Street Lights in various parliamentary constituencies of Himachal Pradesh (Shimla & Kangra districts).
Scope	Evaluating the effectiveness, efficiency, sustainability, impact, and Social Return on Investment (SROI) of the solar street lighting initiative.
Study Area	Areas covered under the project include Kangra, Chamba, Shahpur, Indora, Chopal, Pacchad, Nurpur, Jaisinghpur, Dalhousie, Kasumpti, Paonta Sahib, Rohru, and Solan in Shimla & Kangra parliamentary constituencies.
Stakeholders	Local residents, community members, business owners, local government representatives.
Research Design	Mixed-method approach (Quantitative & Qualitative)
Data Collection	Primary Data (Surveys, Focus Group Discussions, Observational Study)
Sampling Method	Stratified Random Sampling - ensuring representation across different regions and socio-economic groups affected by the initiative.
Sample Size	210
Data Analysis	Descriptive Statistics, Social Return on Investment (SROI) methodology, qualitative analysis
Evaluation Criteria	• Relevance & Effectiveness: Alignment with community needs, impact on safety, security, and local economy. • Efficiency: Cost-effectiveness, energy savings, and resource utilization). • Sustainability: Long-term functionality, maintenance, and impact on carbon footprint reduction). • Impact: Social, Economic, Environmental): Reduction in crime, improved night-time mobility, business activity enhancement, and environmental benefits. • SROI: Quantification of social and economic benefits in monetary terms. • Coherence: Alignment with broader CSR and government renewable energy initiatives.
Reporting	Comprehensive report with recommendations for improving future CSR initiatives in renewable energy and rural infrastructure development.

3. ABOUT THE CSR ACTIVITY

The CSR project titled "Providing Solar LED Street Lights in various parliamentary constituencies in Himachal Pradesh" was initiated by NHPC and executed through Energy Efficiency Services Limited (EESL). The core objective of the initiative was to improve community safety, support mobility during night hours, and introduce renewable energy infrastructure in public spaces.

A total of 3,250 Solar LED Street Lights (12W) were installed across key blocks and villages in the districts of Shimla and Kangra, including locations such as Chamba, Shahpur, Indora, Chopal, Nurpur, Solan, Dalhousie, Rohru, and Ponta Sahib, among others.

The intervention focused on enhancing the quality of life in areas with low grid penetration, frequent power outages, or inadequate street lighting.

Table 5: CSR Activity details

Location	Activity Description	Expenditure Incurred (Rs. In Crore)	Brief About Activity
District Shimla & Kangra (Himachal Pradesh)	Providing Solar LED Street Lights in various parliamentary constituencies in Himachal Pradesh through EESL	5.72	3250 nos. of 12W LED based Solar Street Lights were installed in Shimla &Kangra Parliamentary constituencies of Himachal Pradesh. Areas included Kangra, Chamba, Shahpur, Indora, Chopal, Pacchad, Nurpur, Jaisinghpur, Dalhousie, Kasummpti, Ponta Sahib, Rohru & Solan in the above constituencies. Project implementation period: 19/06/2018 to 08/12/2021 Total expenditure: Rs. 571.82 Lakh Executing Agency: Energy Efficiency Services Limited

3.1. Scope of Intervention

The intervention included:

- Procurement, installation, and commissioning of 12W Solar LED Street Lights
- Targeted installation in community-use areas, such as markets, schools, health centers, bus stops, and residential lanes
- Coordination with Panchayati Raj Institutions and local bodies for site identification
- Assurance of maintenance service for installed units through EESL partner agencies

The project directly addressed issues of safety, accessibility, and energy equity in rural and semi-urban locations of Himachal Pradesh.

3.2. Alignment with NHPC CSR Policy

This CSR initiative aligns with NHPC's CSR Policy. By introducing clean lighting infrastructure in underserved areas, the project fulfils both infrastructure access and environmental consciousness, reflecting NHPC's commitment to responsible and future-ready CSR.

3.3. Role of Partner Institutions

The success of this initiative was enabled by coordination with:

- Energy Efficiency Services Limited (EESL) – Project execution and supply management
- Village Panchayats and Urban Local Bodies – Identifying priority sites for installation
- Local Community Members – Participating in site surveys and reporting faulty units
- Maintenance Vendors – Addressing operational issues and routine checks

This institutional synergy helped ensure timely implementation, functional readiness, and ownership among stakeholders.

4. Analysis & Interpretation

4.1. Data Analysis & Findings

4.1.1. Demographic Profile

Figure 1: Demographic Profile of Respondents

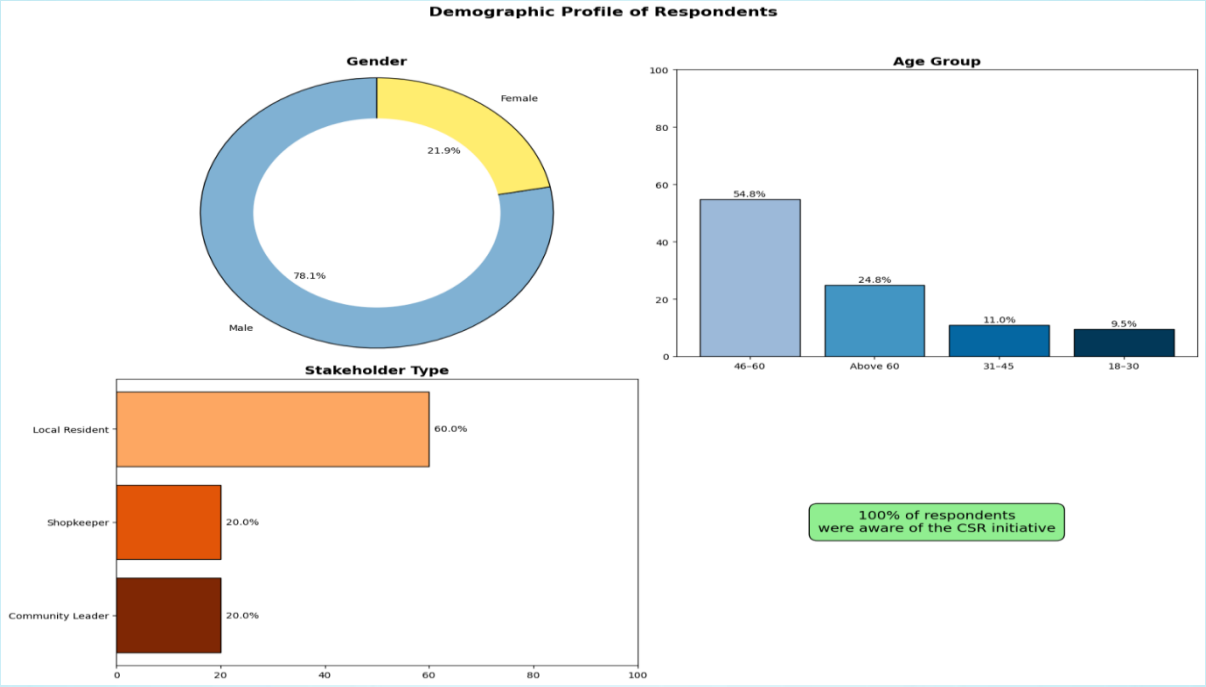


Table 6: Demographic Profile of Respondents

Variable	Key Insights	Discussion Summary
Gender	78.1% were male respondents.	Indicates male-dominant participation, possibly due to cultural or availability factors. Female voices were present but underrepresented.
Age Group	79.6% were above 45 years old.	Insights are shaped largely by experienced and older community members, increasing response maturity and policy relevance.
Stakeholder Type	60% local residents, 20% community leaders, 20% shopkeepers.	The feedback reflects community-level experience and localized insights from key influencers.
Awareness	100% of respondents were aware of the solar light installation.	Demonstrates strong visibility and communication of the CSR intervention among target beneficiaries.

4.1.2. Relevance of the CSR Solar street Light Project

Figure 2: Relevance of the CSR Solar Street Light Project

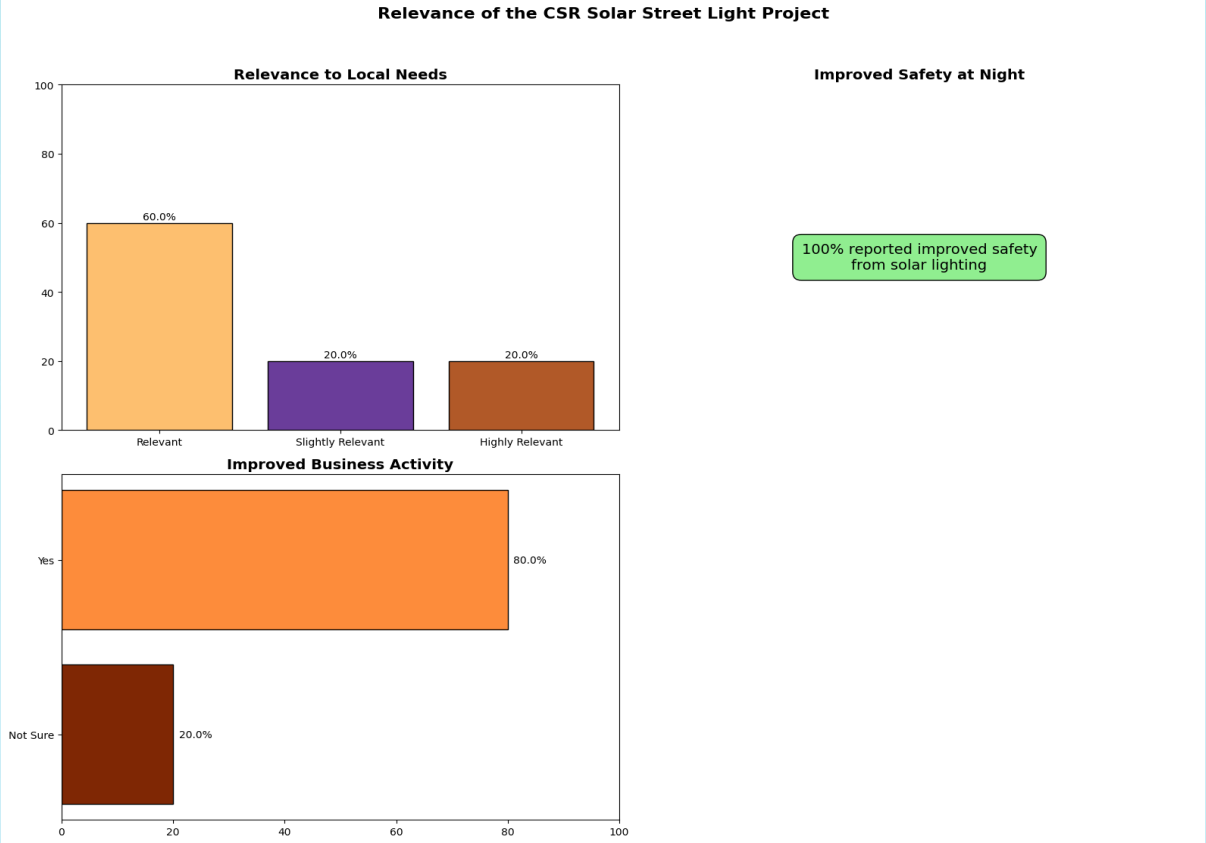


Table 7: Relevance of the CSR Solar Street Light Project

Variable	Key Insights	Discussion Summary
Relevance to Local Needs	80% rated the project as relevant or highly relevant.	The intervention addressed real community needs like mobility, lighting, and security.
Improved Safety at Night	100% reported a positive impact.	The most consistent impact observed was in improving night-time safety.
Improved Business Activity	80% saw improvement; 20% were unsure.	Better lighting contributed to extended market hours and safer transactions.

4.1.3. Effectiveness of the Solar street Light Project

Figure 3: Effectiveness of the Solar Street Light Project

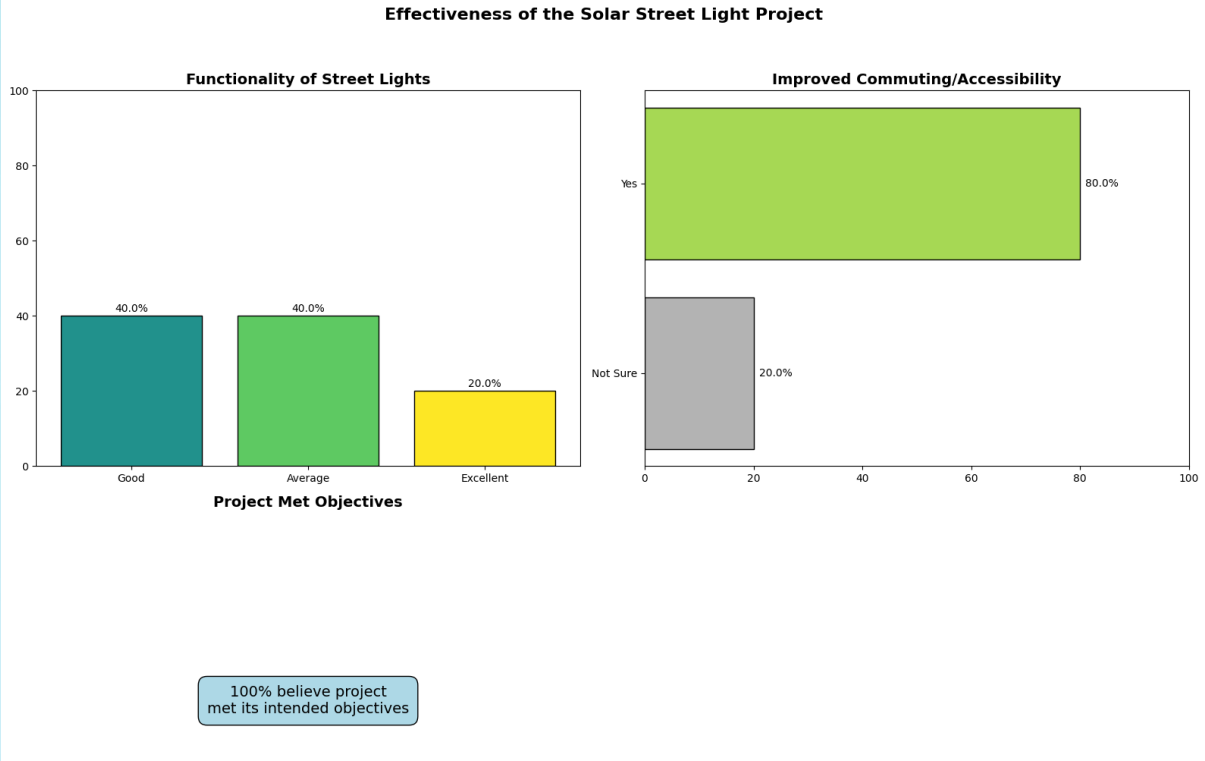


Table 8: Effectiveness of the Solar Street Light Project

Variable	Key Insights	Discussion Summary
Functionality of Street Lights	40% rated as good, 40% average, 20% excellent.	Mixed ratings suggest operational variation may indicate maintenance inconsistencies.
Improved Commuting	80% said "Yes"; 20% unsure.	Project helped enable safer movement at night, especially in previously dark zones.
Project Met Objectives	100% agreed that objectives were achieved.	Reflects a strong match between planned outcomes and community experience.

4.1.4. Project Efficiency

Figure 4: Project Efficiency

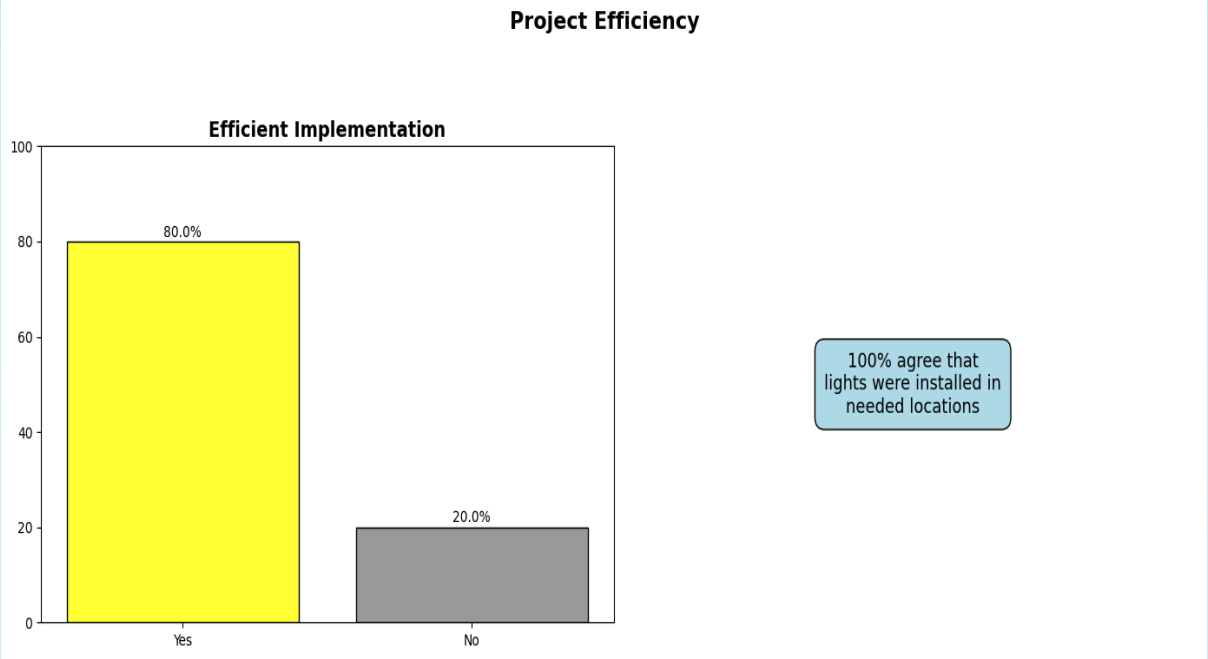


Table 9: Project Efficiency

Variable	Key Insights	Discussion Summary
Efficient Implementation	80% said project was completed efficiently.	Indicates effective execution and minimal delays during implementation.
Lights Installed in Right Locations	100% agreed that installations were in priority areas.	Suggests strong coordination with local representatives and accurate site selection.

4.1.5. Sustainability of Solar Street Light Project

Figure 5: Sustainability of Solar Street Light Project

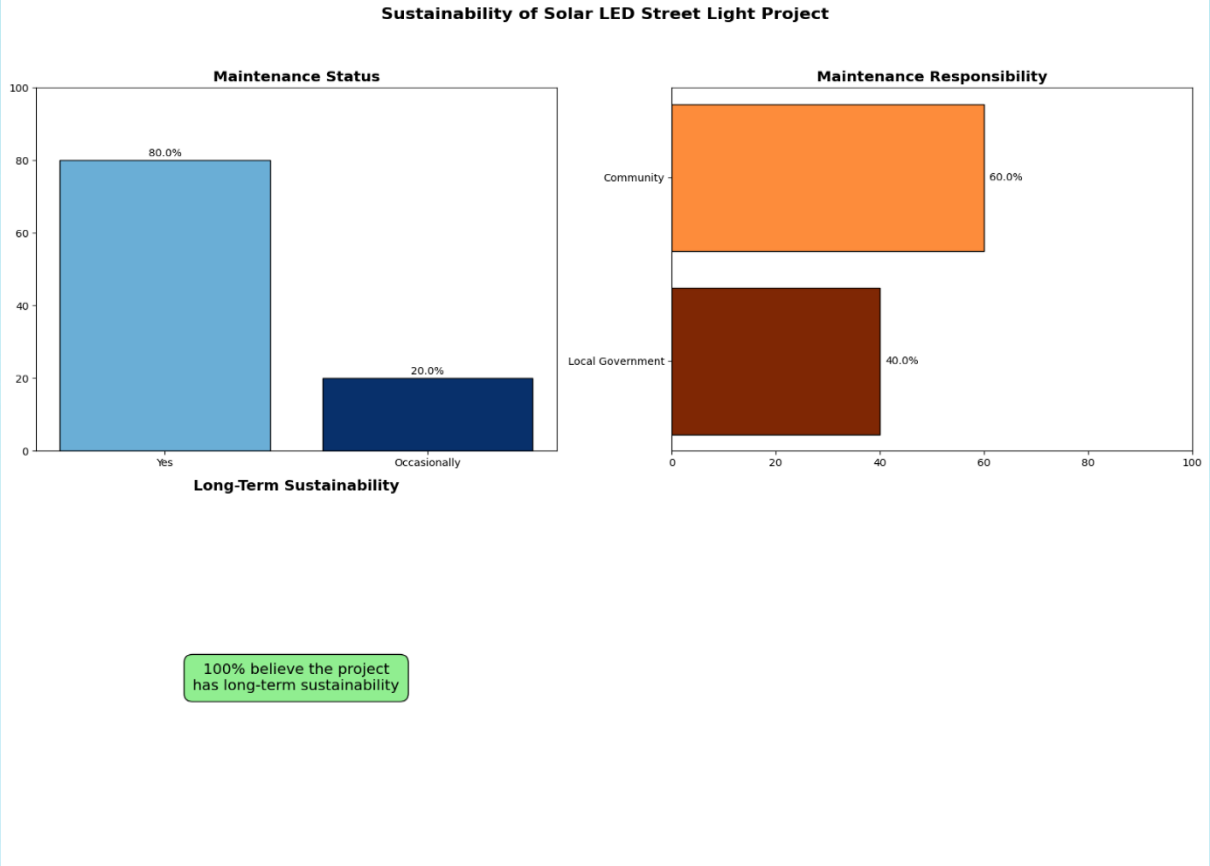


Table 10: Sustainability of Solar Street Light Project

Variable	Key Insights	Discussion Summary
Maintenance Status	80% said lights are being maintained regularly.	Indicates general upkeep, though 20% face occasional issues—pointing to room for improvement.
Maintenance Responsibility	60% said the community is responsible; 40% cited local government.	Community involvement is strong, but formalization of local body roles may help long-term reliability.
Long-Term Sustainability	100% believe the project is sustainable.	Strong confidence suggests alignment with local needs and ownership structures.

4.1.6. Impact of the Solar Street Light Project

Figure 6: Impact of the Solar Street Light Project

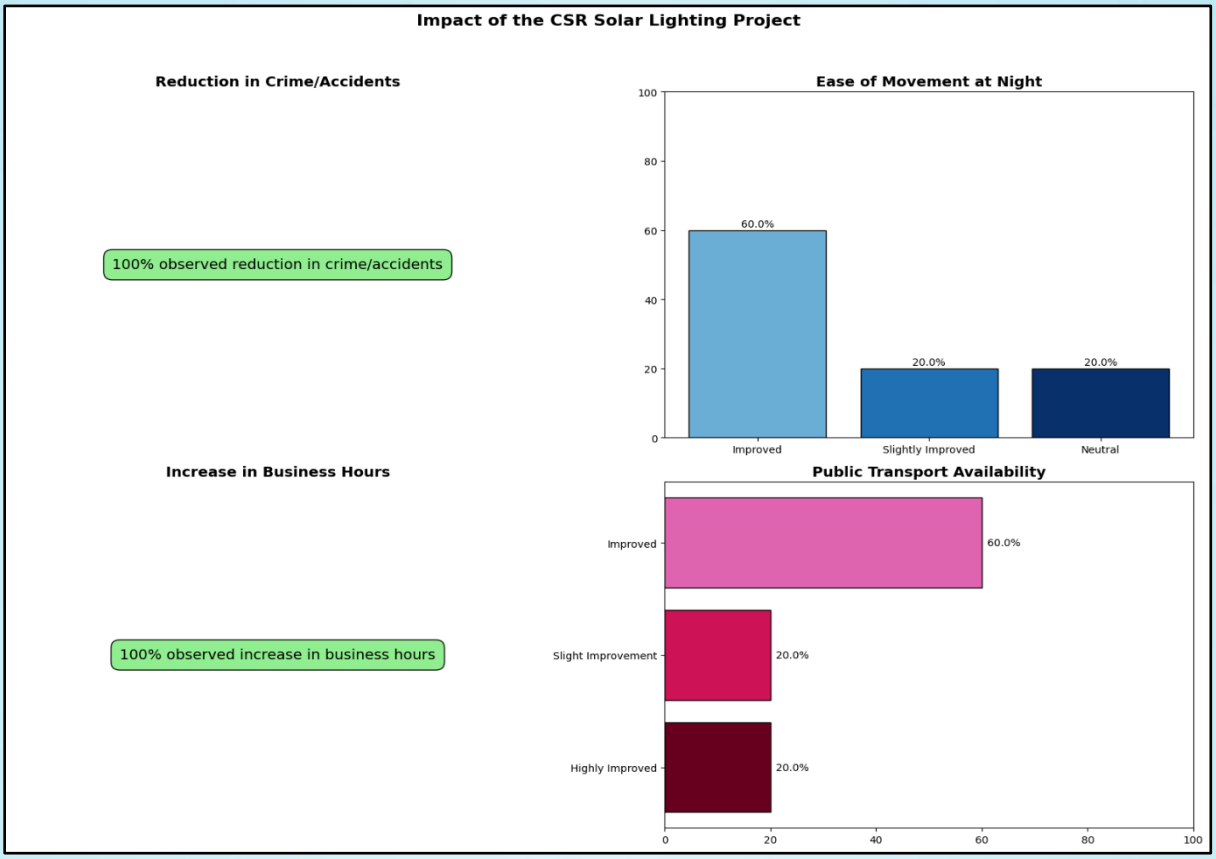


Table 11: Impact of the Solar Street Light Project

Variable	Key Insights	Discussion Summary
Reduction in Crime/Accidents	100% reported a decrease.	Solar lighting improved safety and reduced risk-prone areas in communities.
Ease of Movement at Night	60% said movement improved; others slightly or neutrally affected.	Strong impact on mobility, especially for women, elderly, and daily workers.
Increase in Business Hours	100% observed longer operating hours.	Direct economic benefit through extended market activity and safer commercial zones.
Public Transport Availability	80% noticed improvement; 20% saw only slight improvement.	Lighting boosted accessibility and visibility for night-time public transport services.

4.1.7. Community Satisfaction with the Project

Figure 7: Community Satisfaction with the Project

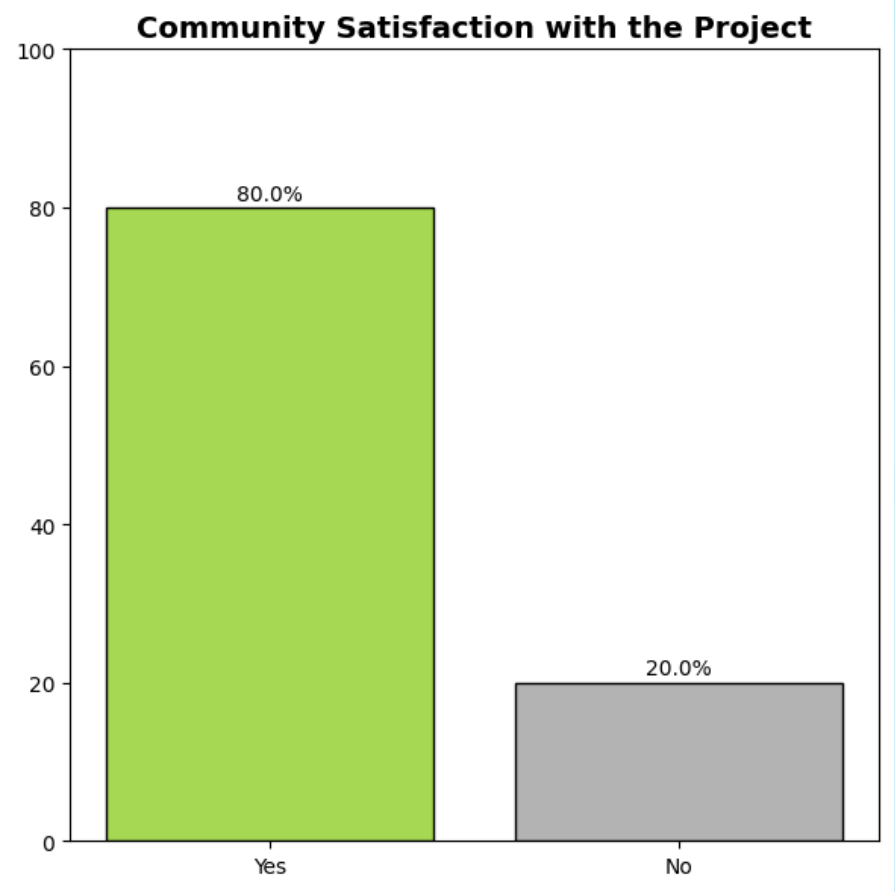


Table 12: Community Satisfaction with the Project

Variable	Key Insights	Discussion Summary
Community Satisfaction	80% reported satisfaction with the CSR initiative	The overall satisfaction rate is high, reflecting perceived benefits in safety, mobility, and infrastructure. However, 20% dissatisfaction suggests areas for operational or maintenance improvement.

4.1.8. Social Return on Investment aligning SDG

Figure 8: Social Return on Investment aligning SDG

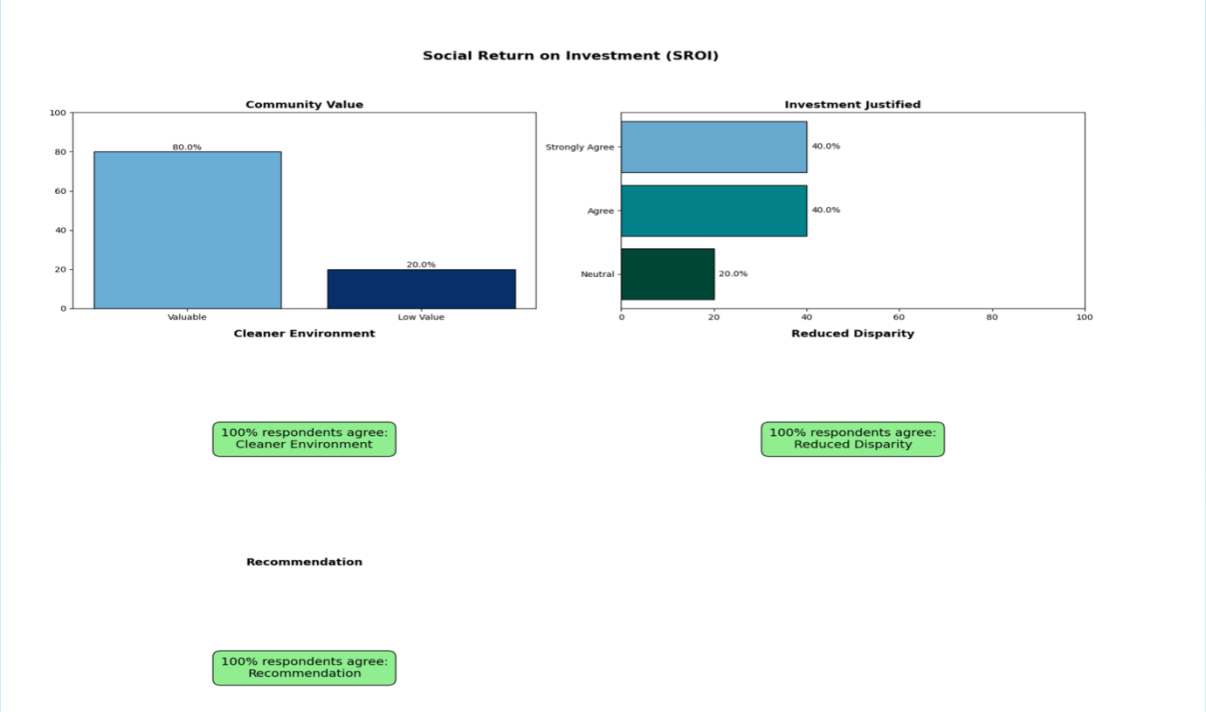


Table 13: Social Return on Investment aligning SDG

Variable	Key Insights	Discussion Summary
Community Value	80% saw the project as valuable; 20% found limited value.	Most respondents observed clear social benefits, though perception gaps may remain.
Investment Justified	80% agreed or strongly agreed; 20% were neutral.	Spending is largely viewed as worthwhile, with a small segment requiring further engagement.
Cleaner Environment	100% acknowledged environmental benefits.	Solar technology use is universally appreciated for its sustainability advantages.
Infrastructure Disparity Reduction	100% said the project improved equity in access.	The intervention bridged infrastructure gaps across remote and underserved locations.
Recommendation for Replication	100% would recommend the project model elsewhere.	Strong endorsement suggests scalability and community-level support for similar CSR efforts.

4.1.9. Coherence

Figure 9: Alignment with Government Renewable Energy Policies

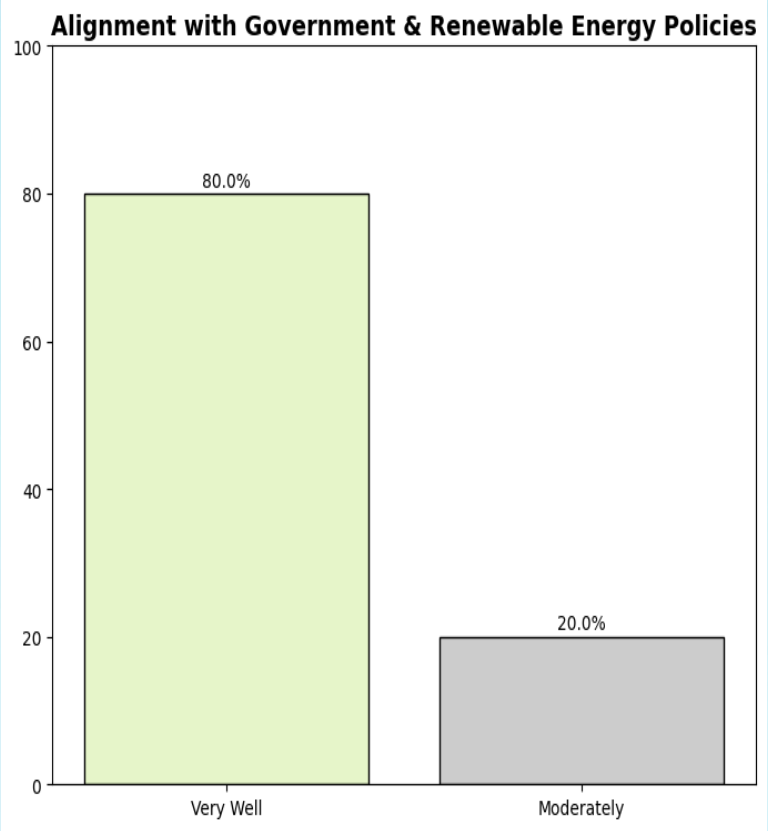


Table 14: Alignment with Government Renewable Energy Policies

Variable	Key Insights	Discussion Summary
Policy Alignment	80% said the project aligns very well; 20% said moderately.	The intervention complements existing government objectives on clean energy and local development.

4.1.10. Recommendations / Suggestions

Figure 10: Suggestions for Future Projects

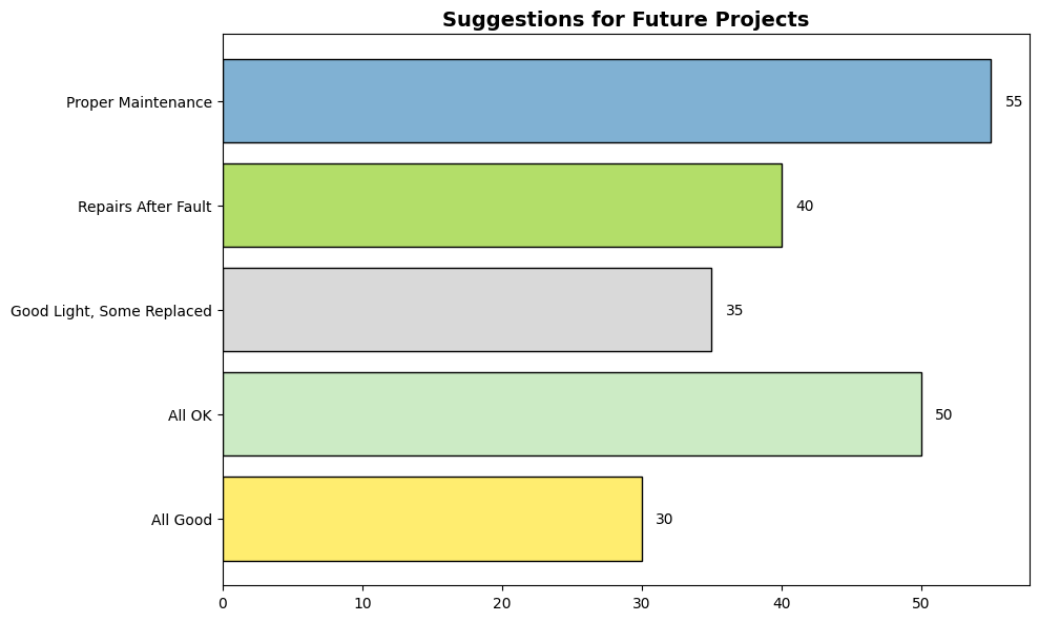


Table 15: Suggestions for Future Projects

Theme	**Key Insights**
Proper Maintenance	Most commonly mentioned; reflects concern over long-term upkeep.
Repairs After Fault	Suggests some lights may not be promptly repaired post-installation.
All OK / All Good	Indicates a generally positive response, with many not suggesting any changes.
Good Light, Some Replaced	Points to selective performance issues requiring replacement attention.

4.2. Summary of Findings

Table 16: Summary of Findings

Theme	Key Highlights	Insight
Demographics & Awareness	78.1% male; majority aged 46–60; 60% local residents; 100% awareness of CSR solar light initiative.	Respondents were largely community users and leaders, showing strong awareness and ownership.
Relevance & Effectiveness	80% found the project relevant; 100% saw safety benefits; 80% saw improved business and commuting.	Strong alignment with local needs; project perceived as effective and impactful.
Efficiency	80% reported timely implementation; 100% agreed on appropriate site selection.	Implementation was smooth and well-targeted, with no reported logistical bottlenecks.
Sustainability	80% said lights are maintained; 60% said community handles upkeep; 100% believe project is sustainable.	Long-term viability is supported by community participation and positive perception of durability.
Impact (Safety, Economy)	100% observed reduced crime & longer business hours; 80% satisfied with the project.	Tangible improvements in night-time security, economy, and social well-being.
SROI	80% called it valuable; 100% saw environmental & equity gains; all recommend replication.	Exceptional return on investment in social, environmental, and equity outcomes.
Coherence & Feedback	80% said alignment with policies was "Very Well"; main suggestions were around maintenance improvements.	The project complements policy frameworks; suggestions point to scalability and upkeep-focused tweaks.

Table 17: SROI with SDG Alignment

Indicator	Observed Outcome	Social Value Created	Aligned SDG(s)
Community Value Perception	80% saw the project as valuable	High local utility and visible daily-life improvements	SDG 11 – Sustainable Cities and Communities
Justification of Investment	80% agreed/strongly agreed	Stakeholders consider the investment efficient and worthwhile	SDG 12 – Responsible Consumption and Production
Environmental Impact	100% confirmed use of clean energy improved environmental quality	Reduced carbon dependency and promoted sustainability	SDG 7 – Affordable and Clean Energy
Reduction in Infrastructure Disparity	100% noted equity improvements	Helped bridge urban-rural gaps in infrastructure access	SDG 10 – Reduced Inequalities
Recommendation for Replication	100% recommend similar projects elsewhere	Signals strong replicability, scalability, and stakeholder trust	SDG 17 – Partnerships for the Goals

4.3. Policy Recommendations

Based on the findings of this impact assessment, the following policy-level recommendations aim to enhance the effectiveness**,** sustainability**,** and scalability of solar street lighting initiatives under CSR. These suggestions draw from community feedback, operational observations, and measurable outcomes and are aligned with relevant Sustainable Development Goals (SDGs)**.**

Table 18: Policy Recommendations

Policy Recommendation	Expected Outcome	Aligned SDG(s)
Establish structured maintenance contracts with local bodies	Improved uptime and long-term functionality of street lights	SDG 11 – Sustainable Cities and Communities
Provide a reporting helpline or QR-tag system for light faults	Faster fault detection and responsive repairs	SDG 9 – Industry, Innovation and Infrastructure
Expand the model to other low-light rural belts	Replication in underserved areas, reducing regional lighting inequality	SDG 10 – Reduced Inequalities
Coordinate with gram panchayats for site planning and handover	Enhanced site relevance and clarity in post-installation ownership	SDG 17 – Partnerships for the Goals
Integrate solar infrastructure planning with district energy goals	Stronger coherence with renewable energy and rural electrification policies	SDG 7 – Affordable and Clean Energy

4.4. Conclusion

The CSR initiative on installation of 3,250 Solar LED Street Lights in Himachal Pradesh has created a transformative social and environmental impact across various semi-urban and rural communities. The initiative has improved safety, extended commercial activity hours, enhanced public infrastructure, and strengthened the visibility of CSR-led sustainability models in underserved areas.

Impact:

- 100% of respondents observed improved night-time safety and reduced accidents/crime**.**
- Business owners reported longer operating hours, improving the local economy.
- 100% endorsed the replicability of the project in other geographies.

- Strong community awareness and satisfaction reflect effective implementation and outreach.

Challenges:

- Maintenance responsibilities remain informal and community-driven, leading to occasional inconsistencies.
- Respondents highlighted the need for timely repairs and replacements, especially after fault detection.
- Some variability in light performance and placement was noted in a few areas.

Recommendations:

- Institutionalize routine maintenance contracts and create fault-reporting mechanisms.
- Ensure handholding support to local bodies and communities post-installation for upkeep.
- Use this model to scale solar infrastructure in other priority districts with low light coverage.
- Strengthen alignment with state renewable energy and smart city goals**.**

5. SUCCESS STORY OF CSR ACTIVITY

Lighting the Way to Safer Nights in Himachal Pradesh

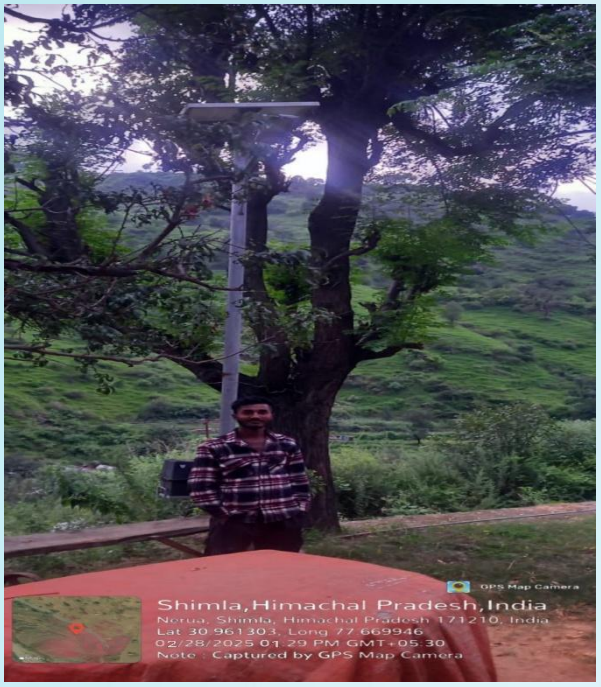
In the remote and hilly villages of Himachal Pradesh, darkness after sunset used to bring life to a halt. Inadequate street lighting in far-flung constituencies like Shimla and Kangra posed safety concerns, hindered mobility, and limited local economic activity. Many communities had no choice but to stay indoors after dark, especially the elderly, children, and women who feared walking even short distances due to the lack of visibility and poor infrastructure.

Through its Corporate Social Responsibility initiative, NHPC took decisive action to address this persistent issue. A total of 3,250 solar-powered LED street lights were installed across multiple towns and villages. Executed by Energy Efficiency Services Limited (EESL), the initiative brought clean, sustainable, and dependable lighting to areas that had long remained in the shadows. Despite several implementation challenges—including harsh terrain, monsoon disruptions, and delays during the COVID-19 lockdown—the project was completed with perseverance and community involvement.

The change was immediate and visible. Local residents began feeling safer walking after sunset, and small shops extended their business hours into the evening. Children could play outside a little longer, and women felt more confident navigating village roads. A local resident shared, “Earlier, our village would go completely dark. Now, with the street lights, we feel safer, and our evenings are brighter.” However, the project also revealed important lessons. Battery storage during delays led to power issues, and in some cases, local cooperation during installation was difficult. These experiences emphasize the need for improved battery technology, flexible planning, and sustained local coordination for future projects.

Overall, the Solar LED Street Light project restored not just light, but a sense of security, dignity, and community vibrancy in rural Himachal. It illuminated more than pathways—it lit up lives. Going forward, ensuring timely maintenance and adopting robust technology will be key to preserving this positive change.

6. SYNOPTIC GLIMPSE OF DATA COLLECTION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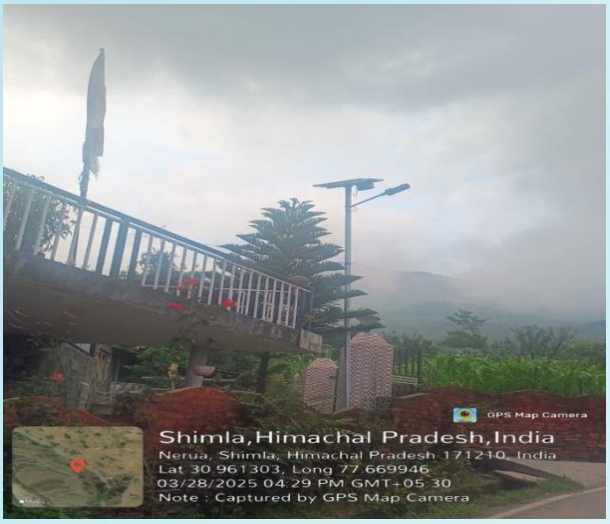
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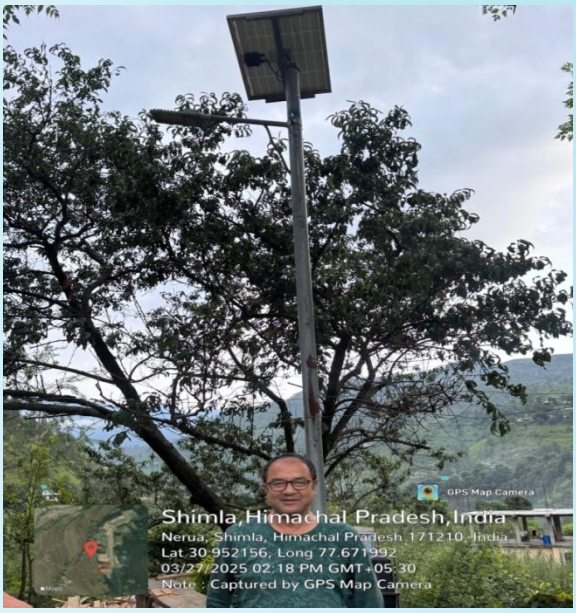
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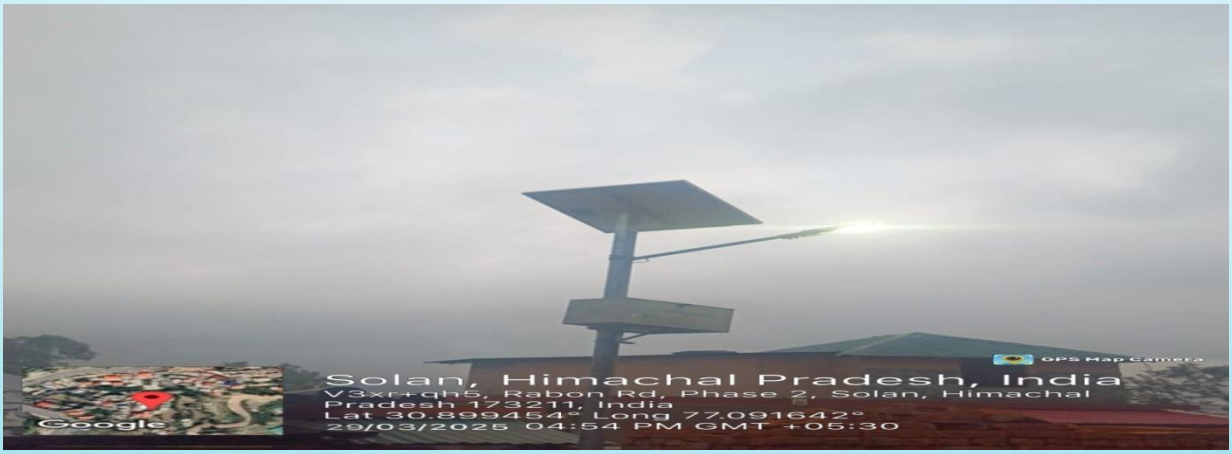
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