



ACTIVITY REPORT

2019-2025

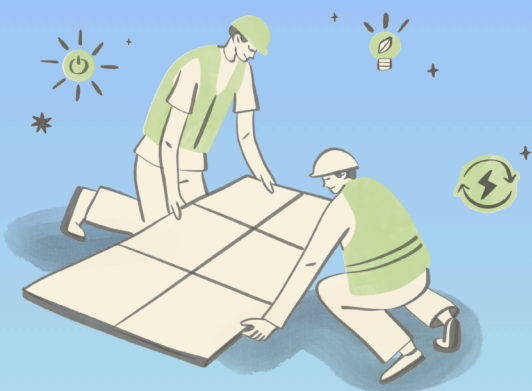


International Solar Innovation Council
Innovating Solar Solutions for Billions

solarinnovations.org



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Innovating Solar Solutions for Billions



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MESSAGE FROM THE TEAM

Dear Innovators, Enthusiasts, and Partners,

Welcome to the 1st edition of our Activity Report, a comprehensive guide to the groundbreaking work and inspiring activities of the International Solar Innovation Council (InSIC). Through the years, we have continued to witness the transformative power of solar energy as it reshapes industries, empowers communities, and drives us toward a sustainable future.

At InSIC, our mission is to foster innovation, collaboration, and education in the realm of solar energy. We are proud to support a global network of researchers, entrepreneurs, policymakers, and advocates who are dedicated to harnessing the sun's potential. Together, we are tackling some of the most pressing challenges of our time, from climate change to energy access and economic development.

This booklet highlights the diverse array of activities and initiatives that our council has been involved in over the past years.

Inside, you will find:

- Innovative Projects: Showcasing solar technologies and their real-world applications.
- Educational Programs: Detailing our efforts to educate and inspire the future generations.
- Collaborative Efforts: Highlighting partnerships and joint ventures that amplify our impact.

We extend our heartfelt gratitude to all our members, partners, and supporters. Your unwavering commitment and passion are the driving force behind our progress. As we look ahead, we remain dedicated to pushing the boundaries of what is possible in solar energy, ensuring a brighter, cleaner, and more sustainable future for all.

Thank you for being a part of this incredible journey.

With warm regards,

The Team InSIC

International Solar Innovation Council



ABOUT INSIC

The International Solar Innovation Council (InSIC) is an international non-governmental organization with its head office in Helsinki, Finland. The aim of this organization is to catalyse the innovation of solar technologies that can simultaneously reduce anthropogenic greenhouse gas emissions and alleviate both energy & economic poverty and the human suffering related to it. Organizational ID: 2888855-8

OUR VISION

InSIC's vision is to catalyze an accelerated transition to the solar energy age in Asian and African countries. We envision a future where clean, renewable solar power is accessible to all, fostering sustainable development, economic growth, and regional cooperation.



OUR MISSION

Innovation for Equity, InSIC wants to act as a global catalyst for solar technologies that serve the two billion people currently neglected by mainstream commercial and governmental R&D. We focus on "Dual-Impact" technologies that;

- Mitigate Climate Change: Dramatically reducing greenhouse gas emissions through renewable adoption.
- Alleviate Poverty: Providing affordable energy tools that enhance education, safety, and economic productivity in off-grid regions.

ACTIVITIES

InSIC strives to undertake research activities on appropriate technological developments in the solar energy sector and to organize seminars, symposiums, workshops, trainings, webinars to enhance the knowledge base about clean energy mainly in Asian countries.



PROJECT FUNDING

SMALL GRANT; We invite applications from legal entities, especially small-scale industries, start-ups, research institutes, academic institutes and non-governmental organizations (NGO) for its small grants program, supporting development of innovative solar energy demonstration projects. The aim of the grant is to develop 'proof of concept' projects demonstrating solar innovation.



WEBINAR

WEBINAR

To create awareness among people at large on different important topics related to climate change, solar energy, and other sources of renewable energy and its recent developmental applications. We organize international webinars involving experts worldwide.



WORKSHOP

We organize **SOLAR AMBASSADOR PROGRAM** and other workshops to create awareness among the students/people on different sources of Renewable Energy, primarily giving emphasis on solar energy and its technological solutions that can be used to improve quality of life and protect the environment.



NEWSLETTER

The newsletter of the International Solar Innovation Council (InSIC) which contains the news on solar innovations and other activities supported by InSIC.

PROJECT FUNDING

InSIC invites applications from any legal entities, especially small-scale industries, start-ups, research institutes, academic institutes and non-governmental organizations (NGO) for its small grants program for innovative solar energy demonstration projects. The aim of the grant is to develop 'proof of concept' projects demonstrating solar innovation. Projects should demonstrate, how the idea can be implemented and also discuss the target market and potential impact for users. Innovation may also lie in the improvement of existing off-grid applications.

PROJECTS SUPPORTED IN 2019

a. Performance enhanced natural convection solar dryer for fruits and fruit products

Small Grants Initiative: Empowering Women in Fruit Processing

In 2019, it was all started with first project funded under Small Grants Scheme, Mitraniketan, Kerala in India, initiated their endeavour with the aim at addressing the challenges faced by small-scale fruit processing units, particularly those operated by women. Recognizing the vital role of these units in producing value-added products from local fruits like jackfruit, banana, cassava, and coconut, Mitraniketan's technical wing embarked on a mission to find innovative technological solutions to enhance their efficiency and productivity.

Led by Dr. Reghu Rama Das, the project focused on the prevalent issues stemming from traditional open sun drying methods, which often left dried products vulnerable to environmental factors, compromising their quality and market value. With a vision to empower women in these processing units, the team devised a plan to develop an enhanced natural convection solar dryer specifically tailored for fruits and fruit products.

The project aimed to leverage solar energy to create a controlled drying environment, mitigating the risks associated with traditional drying methods. By incorporating solar pre-heaters and chimneys into the existing tunnel dryer design, the team sought to enhance drying efficiency, thereby surpassing the limitations of conventional methods.

a. Performance enhanced natural convection solar dryer for fruits and fruit products continued...

The anticipated benefits of this project were manifold. Not only did it promise to deliver an improved solar dryer capable of significantly impacting operations at the village level, but it also aimed to reduce labor, energy expenses, and raw material damage. By introducing cost-effective or even no-cost energy solutions for drying, the project aimed to elevate the quality of dried products, thus facilitating further processing and value addition.



Central to the initiative was the commitment to produce and supply these dryers on a non-profit basis, ensuring accessibility to the beneficiaries. Mitraniketan, serving as the host agency, took on the responsibility of training and establishing enterprises, positioning itself as a facilitator for women's empowerment in the fruit processing sector.

With Adhin D. as the Co-Principal Investigator, the project gained momentum through collaborative efforts and community engagement. By harnessing the potential of solar energy and innovative design modifications, the initiative sought to transform the landscape of fruit processing, empowering women entrepreneurs and fostering sustainable development at the grassroots level.

Through the InSIC funded small grants program, Mitraniketan exemplified its commitment to driving positive change and fostering innovation for the betterment of communities, particularly those marginalized or underserved. By investing in initiatives that empower women and promote technological advancements, Mitraniketan continues to be a beacon of hope and progress in the pursuit of inclusive development.

PROJECTS SUPPORTED IN 2021

a. Clean lighting and efficient cooking through Micro Solar Dome in rural houses.

Continuing the Impact: Small Grants Empowering Rural Innovations

Building upon the success of previous small grants initiatives, InSIC has continued its commitment to driving positive change in rural communities by funding innovative projects aimed at addressing pressing challenges. The next call for grants in 2021 saw a diverse range of proposals, including one focused on providing clean lighting and efficient cooking solutions through the implementation of Micro Solar Dome (MSD) technology in rural households.

Led by Mr. Subhadeep Bhattacharya as the Principal Investigator and Mr. Tanmay Singha Mahapatra as the Co-Principal Investigator, this project aims to tackle the dual challenges of inadequate lighting and unhealthy cooking practices prevalent in rural India. By harnessing the power of solar energy through the Micro Solar Dome, combined with the development of a draft fan mechanism for efficient cooking, the initiative seeks to revolutionize household energy usage and improve overall living conditions.

Drawing inspiration from successful installations of MSDs in regions like the Sundarbans in West Bengal, the project team aims to expand the reach of this technology to more households, offering clean and sustainable lighting solutions while simultaneously addressing the issue of indoor air pollution caused by traditional cooking methods. Through strategic integration of clean lighting and cooking solutions, the project envisions not only improving health outcomes for beneficiaries but also reducing recurring expenses associated with kerosene and mobile phone charging.

The impact of this initiative extends beyond immediate beneficiaries, with a focus on training village youth in the repair and maintenance of these systems, thus creating avenues for economic empowerment and skill development within the community.

a. Clean lighting and efficient cooking through Micro Solar Dome in rural houses continued...



This project exemplifies InSIC's ongoing commitment to supporting grassroots innovations that address the specific needs of rural communities. By providing funding and resources to initiatives like the clean lighting and efficient cooking project, InSIC continues to catalyze positive change and empower communities to thrive in sustainable ways. Through collaborative efforts with partner institutes and organizations, InSIC remains steadfast in its mission to drive inclusive development and create lasting impact at the grassroots level.

b. Indoor Solar Cooking System with "Thermal Batteries in composite matrix structure"

Innovative Solutions for Sustainable Cooking: Small Grants Impact

The quest for sustainable cooking solutions has led to groundbreaking innovations, with another project spearheaded by Dr. Ajay Chandak focusing on indoor solar cooking with "Thermal Batteries in composite matrix structure." This initiative, supported by small grants, seeks to revolutionize solar cooking by overcoming the limitations of traditional methods, such as dependency on climate and sunlight availability.

The innovation lies in the development of a cost-effective thermal battery, designed to store solar energy efficiently for indoor cooking.

b. Indoor Solar Cooking system with “Thermal Batteries in composite matrix structure” continued....

By leveraging solar photovoltaic (PV) panels as an external energy source and introducing a composite matrix structure for thermal storage, the project aims to optimize energy usage while offering the convenience of indoor cooking.

The composite matrix structure, comprising a blend of inexpensive materials like granite, concrete, stones, or gypsum encapsulated in a small quantity of expensive aluminium, serves as a durable and efficient thermal storage unit. This innovation not only reduces the high capital investment associated with conventional aluminium-based heat storage but also ensures durability with an unlimited lifespan.

With a focus on indoor solar cooking, the project envisions specially designed, insulated pots to enhance cooking efficiency. The integrated solar PV panels offer longevity, minimal maintenance, and the convenience of harnessing free solar energy for cooking.

Beyond the technological advancements, the project holds promise for mass dissemination and commercialization, empowering entrepreneurs to produce and distribute these innovative cooking solutions. The benefits are far-reaching, encompassing reduced fuel costs, flexibility in cooking times, extended product lifespan, and user-friendly experiences.



b. Indoor Solar Cooking system with “Thermal Batteries in composite matrix structure” continued....

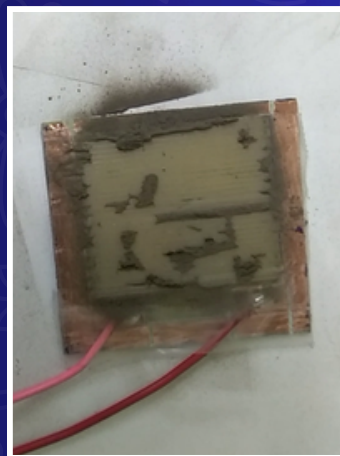
This project epitomizes the impact of small grants in driving innovation and fostering sustainable solutions for pressing societal challenges. As part of the continued efforts by InSIC, initiatives like Dr. Ajay Chandak's indoor solar cooking project exemplifies the commitment to funding diverse projects that have the potential to transform communities and promote sustainable development.

c. Development of Electro Dynamic Screen for Automatic Cleaning of Solar Panels

Pioneering Innovation: Small Grants Impacting Sustainable Energy

In the pursuit of enhancing the efficiency of Solar Photovoltaic (SPV) modules, Prof. (Dr.) Jitendra Nath Bera, alongside Dr. Amitava Biswas and Ms. Swati Saha, lead a groundbreaking project focused on developing an Electro Dynamic Screen (EDS) for automatic cleaning of solar panels. This initiative was supported by InSIC under call for grants 2021, aiming to revolutionize solar energy production, particularly in arid regions where dust accumulation poses a significant challenge.

The proposed Electro Dynamic Screen operates on the principle of Coulomb force, utilizing a traveling electrostatic wave to repel charged dust particles from the surface of solar panels. By applying voltage to electrodes embedded in the screen's surface, the EDS generates a non-uniform electric field, effectively removing dust without the need for water or manual intervention.



c. Development of Electro Dynamic Screen for Automatic Cleaning of Solar Panels continued...

This innovative solution not only improves cleaning efficiency but also minimizes power generation losses associated with traditional cleaning methods.

The potential benefits of this EDS innovation are manifold. Firstly, it significantly enhances the cleaning efficiency of SPV modules, thereby increasing energy generation potential. Secondly, it eliminates the need for water, making it ideal for regions facing water scarcity. Thirdly, it operates with minimal electrical power consumption, offering a cost-effective and environmentally friendly solution.

Moreover, the development of this prototype opens doors for large-scale product development through technology transfer, with training provided for operation and maintenance. This initiative exemplifies the impact of small grants in driving innovation and fostering sustainable solutions for energy challenges.

As part of the InSIC program, this project underscores the commitment to funding diverse initiatives that have the potential to transform communities and promote sustainable development.

d. Solar Powered Grey Water Recycling System for Village Digrajwadi Empowering Rural Communities: Small Grants Transforming Water Management

In the pursuit of sustainable water management solutions, Dr. Yogesh R Kulkarni and Mr. Sanket Valse lead a pioneering project aimed at implementing a solar-powered greywater recycling system in Village Digrajwadi. This initiative, supported by InSIC under call for grants 2021, addresses the pressing environmental and health challenges posed by inadequate wastewater treatment in rural areas.

The proposed solution leverages solar energy to power a greywater treatment system, significantly reducing pollutants and improving water quality.

d. Solar Powered Grey Water Recycling System for Village Digrajwadi continued...



By combining reed bed systems with solar-powered air bubbling devices, the project aims to achieve effective greywater treatment without relying on traditional electricity sources, making it suitable for remote locations with limited access to energy.

The innovative approach not only improves water quality but also reduces the risk of waterborne diseases and environmental degradation. With the capacity to treat 25,000 liters of water per day, the project directly benefits a population of 1500, demonstrating the potential for widespread impact.

Moreover, the project serves as an awareness-building initiative, showcasing the effectiveness of solar-powered greywater treatment systems and encouraging their adoption in neighbouring villages facing similar challenges.

This project exemplifies the impact of small grants in driving innovation and fostering sustainable solutions for water management in rural communities. As part of the InSIC program, it underscores the commitment to funding diverse initiatives that address pressing environmental and health challenges, paving the way towards a more sustainable future.

e. Low-Cost Solar Powered Wheel-Chair for Elderly and Disabled People

Transformative Mobility: Small Grants Enabling Inclusive Solutions

InSIC continues to support innovative solutions that address pressing societal challenges, exemplified by the development of a low-cost solar-powered wheelchair for elderly and disabled individuals. Led by Dr. Shantanu Acharya and Dr. Payel Deb, this project, supported by InSIC under Call for Grants 2021, aims to enhance mobility and independence for those with physical impairments, particularly in rural areas with limited access to electricity.

The proposed solar-powered wheelchair offers a sustainable and reliable solution by integrating a lithium-ion battery with a capacity of 40Ah at 24V, charged through a 75Wp Mono-PERC solar panel. This innovative design ensures self-sufficiency in energy, reducing dependence on the grid and making mobility aids accessible in areas with unreliable electricity supply.

The objectives of the project encompass the development of a cost-effective electric wheelchair, the integration of solar photovoltaics for additional charging capabilities, and the reduction of grid dependency through solar energy utilization in the vehicle. By leveraging solar power, the project not only enhances mobility but also promotes sustainability and resilience in underserved communities.

The estimated benefits of this project are profound, with the potential to improve the quality of life for elderly and disabled individuals by providing enhanced mobility and independence. Through the distribution of solar-powered wheelchairs in rural and remote areas, the project aims to alleviate the burden on individuals with mobility challenges, fostering inclusivity and empowerment.

As a nodal agency, ICFAI University Tripura is committed to fabricating and supplying the solar-powered wheelchairs on a non-profit basis, serving as a catalyst for positive change in the community. This initiative underscores InSIC's dedication to funding diverse projects that address societal needs and promote sustainable development.



Through continued collaboration and strategic funding, InSIC remains at the forefront of driving innovation and fostering inclusive solutions that empower individuals and communities worldwide. The solar-powered wheelchair project exemplifies the transformative impact of small grants in creating a more equitable and sustainable future.

PROJECTS SUPPORTED IN 2022

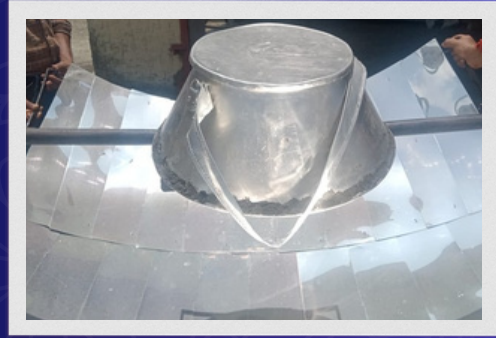
a. Development of portable indoor solar cooking device with energy storage facility

Driving Innovation: Small Grants Paving the Way for Sustainable Solutions

Building upon the success of previous initiatives, the call for grants in 2022 saw a diverse range of proposals & has supported various projects among which the Development of portable indoor solar cooking device with energy storage facility addressing the challenges in thermal energy storage solutions that can be used for cooking. In the realm of renewable energy and sustainable cooking, Dr. Dwaipayan Sen, along with Dr. Sulagna Chatterjee and Mr. Subrata Mukherjee, lead a pioneering project focused on the development of a portable indoor solar cooking device with energy storage facility. Supported by InSIC under call for grants 2022 program, this initiative aims to address the limitations of conventional cooking methods while promoting environmental sustainability and public health.

The project's primary objective is to introduce a low-cost solar stove with thermal energy storage capabilities, offering an alternative to traditional stoves reliant on carbon-emitting biomass.

a. Development of portable indoor solar cooking device with energy storage facility continued...



By harnessing solar energy for indoor cooking and incorporating thermal energy storage using silicon as the phase-changing material, the proposed solar stove presents a transformative solution to reduce indoor air pollution and carbon footprints associated with traditional cooking methods.

The project objective is to develop cost-effective solutions for harnessing solar energy for cooking purposes. This includes the fabrication of a thermal energy storage system integrated with a solar cooker, utilizing phase change material (PCM) storage. Additionally, the project focuses on the installation of solar cookers with double reflector solar concentrators to enhance energy storage capabilities. Furthermore, it involves the design and development of low-volume portable solar stoves. The overarching objective is to minimize the footprint area required for solar energy receivers, offering an alternative to traditional rooftop photovoltaic (PV) setups. These efforts aim to make renewable energy-based cooking solutions accessible and practical for rural communities, particularly those facing challenges related to electricity and LPG access.

The anticipated benefits of adopting this technology are significant, ranging from improved public health outcomes to reduced environmental impact and enhanced energy access for underserved populations. As production scales up and costs decrease, the solar stove has the potential to become a viable and attractive cooking solution for a broader audience. Initiatives like the portable indoor solar cooking device project contribute to the advancement of sustainable infrastructure and community development.

b. E-rickshaws charging up with solar power

Powering Progress: Small Grants Driving Sustainable Transportation

In an effort to overcome the challenges faced by electric rickshaws in India, Dr. Joydip Jana and Mr. Abhijit Das lead an innovative project aimed at integrating solar power into the charging infrastructure of these vehicles. Supported by InSIC under Call for grants 2022 program, this initiative seeks to revolutionize urban transportation by making electric rickshaws both commercially and environmentally viable.

Electric rickshaws, while offering emissions-free and noiseless travel, are hindered by limitations in charging infrastructure and battery technology. Lead-acid batteries, commonly used in these vehicles, require long charging times and suffer from reduced lifespan due to high depth of discharge. To address these issues, the project proposes the development of a network of solar-powered charging stations equipped with multiple charging points capable of accommodating both lead-acid and lithium-ion batteries.

The objectives of the initiative are to enable on-the-road battery charging for electric rickshaws, extend the mileage and lifespan of batteries, and reduce charging costs. By harnessing solar power for charging, the project aims to lower operational costs and decrease carbon emissions associated with coal-based power plants.

The economic and environmental benefits of this transition are significant. With over two million electric rickshaws in operation across India, transitioning to solar-powered charging stations has the potential to substantially reduce carbon emissions and provide a sustainable energy source for rural communities. Moreover, the cost savings associated with solar power make this solution economically viable and accessible.

b. E-rickshaws charging up with solar power continued...



As small grants continue to drive innovation and sustainability, projects like the integration of solar power into electric rickshaw charging infrastructure exemplify the potential for positive change in urban transportation.

c. Design, Development and Pilot scale installation of a Solar powered Sanitary Napkin Vending machine for rural schools in India Empowering Rural Women: Small Grants Driving Access to Sanitary Napkins

The InSIC funded projects are propelling transformative initiatives to address critical challenges faced by rural communities in India. One such project, led by Mr. Anupam Baral, focuses on design & development of a Solar-Powered Sanitary Napkin Vending Machine for rural schools, specifically targeting girls' access to essential hygiene products.

In rural India, the availability and distribution of sanitary napkins remain a significant challenge, particularly impacting school-going girls and women. With over 42% of women lacking regular access to sanitary napkins, there exists a substantial urban-rural divide in sanitary safety. Despite efforts by government initiatives and NGOs to raise awareness and distribute sanitary napkins, issues persist with spoilage, improper distribution, and inadequate availability, leading to adverse health outcomes and school dropouts among girls.

The proposed solution aims to address these challenges by developing a solar-powered vending machine for a rural girls' school in Bolpur Santiniketan Ashram Vidyalaya.

c. Design, Development and Pilot scale installation of a Solar powered Sanitary Napkin Vending machine for rural schools in India continued...



This innovative system ensures timely availability and proper distribution of sanitary napkins while operating autonomously using solar energy.

By introducing a low-power, cost-effective vending system powered by solar energy, the project seeks to bridge the technology gap and reduce reliance on grid power. The objectives include automating the distribution process and ensuring continuous supply.

The benefits of this initiative are vast. It improves access to sanitary napkins, provides easy accessibility, and creates employment opportunities for youth in rural areas in the supply and distribution chain. Through strategic funding and collaboration, InSIC continues to support projects that drive social inclusion, gender equality, and sustainable development, empowering rural communities and advancing progress towards a more equitable future.

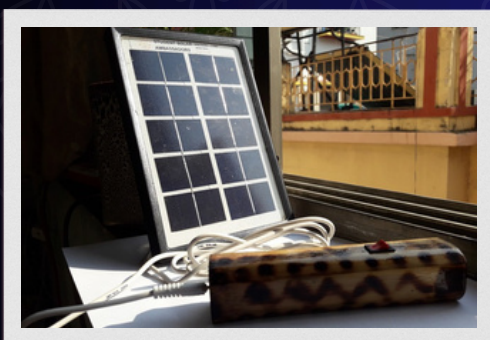
d. Replacement of Structural Steel with Bamboo in The Solar PV Sector to Achieve Carbon Neutrality

Promoting Sustainable Infrastructure: InSIC's Small Grants Initiative

Under the Call for Grants 2022, InSIC is allowing transformative projects that address critical environmental challenges while promoting sustainable development. One such pioneering initiative, led by Mr. Pranoy Lahiri and Mr. Tanmay Singha Mahapatra, focuses on replacing structural steel with bamboo in the solar PV sector to achieve carbon neutrality.

The project addresses the significant carbon emissions associated with steel usage in solar power infrastructure, particularly in a country like India, where reliance on coal and fossil fuels remains high. By exploring bamboo as an alternative material, the project aims to leverage its climate-resilient, environmentally friendly, and sustainable properties. Bamboo, a readily available natural resource in India, offers numerous advantages, including carbon sequestration, quick growth, and renewability. However, the challenge lies in enhancing its durability and longevity to make it a viable structural material.

The key objectives of the project include reducing CO₂ emissions by minimizing steel usage, developing treated bamboo for structural applications, creating affordable bamboo-based mounting structures for solar panels, and replacing steel and plastic-based solar infrastructure with bamboo alternatives. The project also entails providing training for manufacturing, maintenance, and repair of bamboo-based products, promoting bamboo cultivation, and generating employment opportunities.



d. Replacement of Structural Steel with Bamboo in The Solar PV Sector to Achieve Carbon Neutrality continued...



The anticipated benefits of the project are multifaceted. Firstly, it will lead to the development of a procedure for treating bamboo as a structural material, revolutionizing industries and the construction sector. Secondly, bamboo-based solar infrastructure will significantly reduce greenhouse emissions and costs associated with solar projects. Thirdly, it will provide eco-friendly, affordable alternatives for consumers, such as bamboo-based streetlights, garden lights, and torches. Lastly, the project will foster bamboo cultivation, creating employment opportunities and promoting overall sustainability.

InSIC's team continues their support through the small grants program, driving innovation, sustainability, and environmental stewardship. By funding projects like this, InSIC is empowering communities, promoting green technologies, and advancing progress towards a more sustainable future.

PROJECTS SUPPORTED IN 2025

a. Electric conversion and solar integration of an existing diesel catamaran for Emission-Free Tourism

From Diesel to Solar: InSIC's Small Grants Accelerating Green Maritime Solutions

Dubey Eco Sports Boat Pvt. Ltd., led by Partha Dubey, is implementing an innovative project to convert a conventional diesel-powered catamaran into a solar-electric vessel, demonstrating a practical pathway for clean marine transportation in India. The project addresses the growing environmental and economic challenges associated with diesel-powered boats, particularly in ecologically sensitive regions such as the Sundarbans. Diesel vessels contribute significantly to air and water pollution through emissions of CO₂, NO_x, SO_x, and particulate matter, while rising fuel costs place a heavy financial burden on boat operators. The initiative responds to strong demand from fishing and tourism boat owners seeking affordable alternatives to diesel propulsion. The project's key innovation lies in retrofitting existing vessels with a complete solar-electric propulsion system, creating a replicable model for widespread adoption. The converted catamaran will be equipped with a 5 HP electric outboard motor, a 2 kWp solar photovoltaic array, a 6 kWh battery energy storage system, and a custom MPPT-based solar charge controller with remote monitoring capabilities.

Beyond replacing diesel propulsion, the project explores a novel catamaran design concept in which small single-hull boats can be transformed into more stable and safer twin-hull vessels by adding a lightweight secondary hull and installing solar panels across the connecting structure. This approach significantly increases available solar collection area and enhances vessel performance.

The completed vessel is expected to eliminate the consumption of approximately 5 litres of diesel per day and reduce carbon emissions by nearly 5 tonnes of CO₂-equivalent annually. By demonstrating a viable, zero-emission marine transport solution, the project aims to support sustainable tourism, protect sensitive ecosystems and endangered aquatic species, improve livelihoods for fishing communities, and establish a scalable model for commercial deployment across India's extensive fleet of fishing and tourism boats.

b. Development of a Sustainable Solar-Powered Portable Water Purifier with reusable and biodegradable Modular Filters

Delivering Clean Water Anywhere: InSIC's Small Grants Advancing Solar-Powered Water Purification

Techno Services Engineering Systems Pvt. Ltd., led by Abhijit Das and Nilanjan Das, is developing Aqua-Solar, an innovative, affordable, and portable solar-powered water purification system designed to provide safe drinking water to underserved communities and remote users worldwide. The project addresses the critical global challenge of access to clean water, which still affects more than 2.2 billion people and contributes to millions of preventable illnesses and deaths each year. Current portable water purification technologies often rely on disposable plastic cartridges, creating environmental waste and logistical challenges, particularly in remote regions where replacement components are difficult to obtain. Aqua-Solar introduces a sustainable alternative through a reusable, field-serviceable purification system powered entirely by solar energy. Weighing only five kilograms and designed for easy transport, the system can produce up to one litre of safe drinking water per minute, providing sufficient daily drinking water for hundreds of people in off-grid settings.

The innovation combines a four-stage purification process that ensures comprehensive treatment of contaminated water. A reusable multimedia pre-filter removes sediments and suspended particles, followed by a biodegradable adsorption filter made from cocopeat and activated carbon to eliminate chemical contaminants, odours, and impurities. An energy-efficient UV-C disinfection unit neutralizes harmful microorganisms, while a final ultrafiltration stage removes microscopic particles and pathogens to deliver clean and safe drinking water. Powered by a compact solar photovoltaic panel and consuming minimal energy, Aqua-Solar offers a highly sustainable solution for rural communities, disaster relief operations, defence personnel, medical camps, trekkers, and humanitarian organizations. By reducing dependence on disposable filters and fossil-fuel-based purification methods, the project contributes to improved public health, reduced plastic pollution, and greater climate resilience. The initiative demonstrates how solar innovation can advance Sustainable Development Goal 6 (Clean Water and Sanitation) while creating a scalable model for affordable and environmentally responsible water access worldwide.

c. Development of Novel Agrivoltaics Technology for Ecologically Sensitive Wetlands and Urban Rooftops

Growing Food, Generating Power: InSIC's Small Grants Advancing Next-Generation Agrivoltaics

Arka Renewable Energy College (AREC), led by Kapil Bharan Bhowmik and Susanta Karmakar, is developing an innovative agrivoltaic technology that enables the simultaneous production of solar energy and agricultural crops on the same land. While inspired by the need to protect the ecologically significant East Kolkata Wetlands, the technology has the potential to transform agricultural landscapes worldwide by addressing one of the most pressing challenges of the renewable energy transition: competition for land between solar power generation and food production.

The project focuses on the development of novel glass-to-glass solar photovoltaic modules in which the spaces between solar cells are filled with a transparent, light-dispersing material. Unlike conventional solar panels that block sunlight from reaching the ground, this design allows a substantial portion of photosynthetically active radiation (PAR) to pass through, enabling crops to grow beneath the panels while electricity is generated above.

To validate the technology in a controlled and cost-effective manner, the project will construct a rooftop prototype integrated with a hydroponic cultivation system. This pilot installation will allow researchers to evaluate the dual performance of the system, including energy generation, thermal characteristics, light transmission efficiency, and plant growth outcomes. The rooftop demonstration will serve as a scalable model for future deployment in wetlands, agricultural lands, and other sensitive ecosystems.

The innovation addresses a critical technology gap in agrivoltaics by creating solar modules specifically designed to support agricultural productivity. If successful, the system could significantly expand opportunities for co-producing food and renewable energy while reducing water evaporation and crop water requirements through partial shading effects. The project offers a promising pathway for balancing renewable energy development, food security, ecosystem conservation, and rural livelihoods, creating a model that could be replicated across India and globally.

d. Reusing solar runoff rainwater for efficient year-round cleaning of solar PV systems

Saving Water, Sustaining Solar: InSIC's Small Grants Advancing Resource-Efficient Solar Energy

The NB Institute for Rural Technology (NBIRT), led by Professor S.P. Gonchaudhuri and Dr. Richik Ghosh Thakur, is developing an innovative “Solar-Hydro Loop” system designed to reduce the substantial water consumption associated with the maintenance of solar photovoltaic installations. As the world rapidly transitions toward a solar-powered economy, the demand for water to clean solar panels is emerging as a significant environmental challenge. Solar installations can require millions of litres of water annually to maintain efficiency, particularly in regions with high levels of dust and particulate pollution. Without regular cleaning, energy generation losses can exceed 50 percent in heavily polluted environments.

The project addresses a critical sustainability gap by creating a closed-loop system that harvests, stores, treats, and reuses water for solar panel cleaning. The technology integrates rainwater harvesting directly into the solar installation, collecting runoff from panel surfaces through a dedicated gutter system. The harvested water is stored, filtered, and then pumped using a solar-powered DC pump to a custom-designed cleaning mechanism.

At the heart of the innovation is a low-water “Jet-Spray Wiper” that combines a fine mist spray with a squeegee-based cleaning system. This approach dramatically reduces water consumption, requiring less than one litre of water per panel while maintaining effective cleaning performance. The system also incorporates a drainage and filtration mechanism that captures and treats cleaning runoff, enabling water reuse and further reducing freshwater demand.

The pilot project will retrofit an existing 5 kWp rooftop solar installation at NBIRT’s campus in Tripura, providing a practical demonstration of how solar facilities can achieve greater water autonomy and lower operational carbon footprints. The Solar-Hydro Loop could offer a scalable solution for solar installations in water-scarce regions worldwide, supporting both renewable energy expansion and responsible water management. The project highlights the importance of integrating resource efficiency into the clean energy transition and contributes to a more sustainable and resilient solar future.

WEBINAR

To create awareness among people at large on different important topics related to climate change, solar energy, and other sources of renewable energy and its recent developmental applications. We organize international webinars involving experts worldwide.

Exploring Sustainable Solutions: InSIC's Webinar Series on Renewable Energy and Climate Change

In an era where the global community grapples with the pressing challenges of climate change and sustainability, initiatives that foster awareness and dialogue are paramount. The International Solar Innovation Council (InSIC) has been at the forefront of this movement, organizing a series of impactful webinars aimed at shedding light on critical topics surrounding renewable energy, climate change, and technological innovations.

The journey began on Wednesday, 18th November 2020, with an International webinar titled 'Ideas and Innovations on Alternative Energy-based Technological Solutions for Rural Areas.' This session delved into the myriad challenges faced in rural areas concerning alternative energy usage and explored innovative technological solutions to address these issues.

Fast forward to Tuesday, 8th March 2022, InSIC hosted another thought-provoking webinar titled **Can India Reach The 500 GW Renewable Energy target by 2030 - Challenges and Opportunities.** Against the backdrop of COP 26 and India's commitments to climate targets, this webinar sparked discussions on the feasibility of achieving the ambitious 500 GW Renewable Energy target by 2030. Distinguished speakers from industry, academia, and scientific research shared insights on the challenges and opportunities lying ahead in this pursuit.

Continuing its mission to catalyze change, InSIC organized an International webinar on 'Innovations in Clean Cooking' on Saturday, 25th February 2023. This session examined the critical issue of clean cooking and its profound impact on public health and the environment, particularly in developing countries.

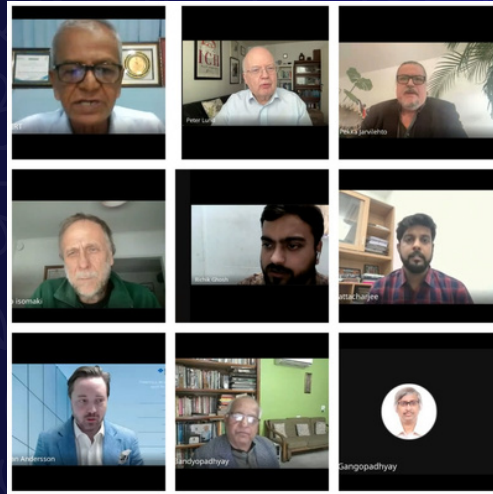
Exploring Sustainable Solutions: InSIC's Webinar Series on Renewable Energy and Climate Change continued...



Next, on Friday, 22nd March 2024, InSIC hosted an International Webinar focusing on the "Carrington Effect and its Impact on the Regional Grid" jointly with the International Solar Alliance. This session aimed to raise awareness about the Carrington Effect, a solar event with the potential to disrupt regional power grids. Aligning with the "One Sun One World One Grid" initiative of the Government of India, the webinar emphasized the importance of international collaboration in developing and implementing protocols to mitigate potential risks.

Most recently, on Monday, 23rd February 2026, InSIC hosted an international webinar titled 'Enabling Solar Society: The Challenge of Energy Storage.' Bringing together experts from India and Finland, the session explored the critical role of energy storage in transforming intermittent solar power into reliable and dispatchable energy. Discussions covered a diverse range of technologies, including lithium-ion and sodium-ion batteries, vanadium flow batteries, pumped hydro storage, supercapacitors, liquid air energy storage, and green hydrogen. The webinar highlighted the importance of storage for achieving India's renewable energy ambitions and emphasized innovation, manufacturing, and international collaboration as key enablers of a sustainable solar future.

Exploring Sustainable Solutions: InSIC's Webinar Series on Renewable Energy and Climate Change continued...



These webinars serve as platforms for knowledge exchange, collaboration, and collective action towards a sustainable future. Through insightful discussions and engaging sessions, InSIC continues to drive awareness and inspire impactful solutions in the realm of renewable energy and climate change.

To access recordings of these enlightening sessions and stay updated on future events, visit InSIC's YouTube channel. Join the movement towards a greener, more sustainable world.

WORKSHOP

The Solar Ambassador Program, organized by The International Solar Innovation Council (InSIC) in collaboration with NB Institute for Rural Technology (NBIRT). The Program, initiated in 2022, is aimed at educating school and college/university students in the field of Renewable Energy Technologies. Students get an exposure to various forms of renewable energy-based applications and develops a basic understanding with the working mechanisms.



On 17th August 2022, 10 students accompanied by a teacher of The Heritage School, Kolkata participated in the Solar Ambassador Program organised by InSIC & NBIRT kolkata.

On 16th December 2022, 12 students accompanied by 2 teachers of Jadavpur Vidyapith, Kolkata participated in the Solar Ambassador Program organised by InSIC & NBIRT kolkata.



SAP- WORKSHOP



On 19th June 2023, 12 students accompanied by 2 teachers from Ramakrishna Mission Vidyalaya, Narendrapur participated in the Solar Ambassador Program organised by InSIC & NBIRT kolkata.

On 24th November 2023, 10 students accompanied by 2 teachers from Gokhale Memorial Girl's School, Kolkata participated in the Solar Ambassador Program organised by InSIC & NBIRT kolkata.



On 17th January 2024, 10 students accompanied by 2 teachers from National High School, Kolkata participated in the Solar Ambassador Program organised by InSIC & NBIRT kolkata.

SAP- WORKSHOP



On 3rd April 2024, 12 students accompanied by 2 teachers from Delhi Public School Newtown, Kolkata participated in the Solar Ambassador Program organised by InSIC & NBIRT Kolkata.

On 7th May 2024, 8 students accompanied by 2 teachers from Desh Bandhu College for Girls, Kolkata participated in the Solar Ambassador Program organised by InSIC & NBIRT Kolkata.



On 10th July 2024, 13 students accompanied by 2 teachers from Meghnad Saha Institute of Technology, Kolkata participated in the Solar Ambassador Program organised by InSIC & NBIRT Kolkata.

SAP- WORKSHOP



On 10th September 2024, 12 students accompanied by 2 teachers from Calcutta Institute of Technology, Howrah participated in the Solar Ambassador Program organised by InSIC & NBIRT Kolkata.

On 1st October 2024, 12 students accompanied by 2 teachers from St. Xavier's Collegiate School, Kolkata participated in the Solar Ambassador Program organised by InSIC & NBIRT Kolkata.



On 22nd November 2024, 12 students accompanied by 2 teachers from Bhavans Gangabux Kanoria Vidyamandir, Kolkata participated in the Solar Ambassador Program organised by InSIC & NBIRT Kolkata.

SAP- WORKSHOP



On 24th January 2025, 12 students accompanied by 2 teachers from Mahadevi Birla Shishu Vihar, Kolkata participated in the Solar Ambassador Program organised by InSIC & NBIRT Kolkata.

On 7th June 2025, 6 students from Loreto College, Kolkata, accompanied by 3 members from Nivedita Shakti, Kolkata participated in the Solar Ambassador Program organised by InSIC & NBIRT Kolkata.



On 19th December 2025, 12 students accompanied by 2 teachers from Basanti Devi College, Kolkata participated in the Solar Ambassador Program organised by InSIC & NBIRT Kolkata.

Empowering the Next Generation through the Solar Ambassador Program

In a concerted effort to foster a profound understanding of solar energy's pivotal role in combating climate change, the International Solar Innovation Council (InSIC) and the NB Institute for Rural Technology (NBIRT) have collaborated on a transformative initiative—the Solar Ambassador Program. This groundbreaking endeavour aims to raise awareness among the younger generation about the diverse applications of solar energy in daily life.

The program, held on various occasions, has seen enthusiastic participation from students of esteemed educational institutions in Kolkata, India. Each edition of the program has been meticulously designed to provide students with hands-on experience and interactive sessions aimed at deepening their comprehension of renewable energy.

During the program sessions, students engage in practical experiments, exploring innovative technologies such as the Pico Hydro Generator, Solar Sanitary Napkin Vending machine, Solar Pumping System, and Solar Water Purification System, solar powered bamboo based garden light and torch light. Additionally, they delve into factors influencing Solar PV Performance, gaining valuable insights into the workings of solar energy systems.

Interactive sessions led by esteemed personalities, including renowned experts from both India and abroad, offer students a holistic view of the global landscape in renewable energy. Discussions range from current issues in solar energy research to future opportunities and the potential for exchange programs, empowering students with knowledge and inspiration.

A crucial aspect of the Solar Ambassador Program is the feedback provided by students, which serves as a testament to the initiative's success and aids in refining future editions of the program. Teachers accompanying the students also echo sentiments of a valuable and enriching experience, highlighting the importance of hands-on exposure to solar energy for school and college students.

Empowering Change Through Sustainable Solutions for Energy and the Environment

April 11, 2025, the International Solar Innovation Council (InSIC), successfully organized a one-day workshop titled "Empowering Change Through Sustainable Solutions for Energy and the Environment." jointly with St. Xavier's Collegiate School, Kolkata. The workshop attracted over 130 participants from 11 prestigious schools across Kolkata, providing a platform for students and educators to engage in meaningful discussions on sustainable energy and environmental conservation. Speaker were from India and Finland.

The programme commenced with a ceremonial lamp-lighting and welcome address by Rev. Fr. Roshan Tirkey, S.J., Principal of St. Xavier's Collegiate School. Chief Guest Rev. Dr. Dominic Savio, S.J., Principal of St. Xavier's College, highlighted the importance of sustainability education in shaping future leaders.

Technical sessions featured expert presentations by Dr. Jayanta Basu, Dr. S.P. Gon Chaudhuri, Dr. Hiranmay Saha, and Dr. Peter Lund (virtual), covering topics related to renewable energy technologies and environmental stewardship.

A lively inter-school quiz competition encouraged teamwork, critical thinking, and awareness of sustainability challenges. The event concluded with a vote of thanks by Fr. Narendra Singh, S.J., Vice Principal of St. Xavier's Collegiate School. The workshop strengthened the awareness of sustainable development and inspired young participants to become active contributors to a greener future.



FEEDBACK



Avirup Roy (XI)- This type of session was very new & useful for school students.

Ayush Ghoshal (X)- This type of technological exposure will help us to think beyond our limits.

Sugata Ranjan Saha (Teacher)- I thank InSIC & NBIRT members for organizing this wonderful advance technological exposure for the students.

Biswanath Bag (Teacher)- I would request InSIC team to conduct this type of programme for a large number of students.

Ramakrishna Mission Vidyalaya, Narendrapur, kolkata, India

Manisha Manna- I learned a lot about sustainable energy solutions and their importance for our future.

Purbita Banik- The program was a great opportunity to understand the practical applications of solar technology.

Shreya Das- I appreciated the detailed explanations and the chance to engage with solar energy experts.

Kartik Chandra Maity (Teacher)- The program was well-organized and provided valuable knowledge for the students.

Manjira Adhikary Dey (Teacher)- It was a wonderful initiative that effectively educate and inspire young minds.

Deshbandhu College For Girls, kolkata, India

Shradha Tiwari (XI)- The hands-on workshops and interactive sessions were both informative and fun.

Sanya Pratihast (XI)- Participating in the program was an eye-opener to the potential of renewable energy.

Sakshi Kumari (XI)- The program provided knowledge about the practical applications of solar technology.

Deepa Kumari Singh (Teacher)- The program was excellently conducted, providing our students with valuable insights.

Shreyashree Sharma (Teacher)- It was a very good initiative that effectively engaged and inspired our students.

National High School, kolkata, India

Kausani Ghosal (XI)- I enjoyed the program a lot as it was very educative and interesting.

Adrija Malakar (XI)- The solar exhibits were fascinating and the program was well organised.

Moupiya Mondal- It was really a great opportunity for me to attend such program.

Suchana Roy Chowdhury (Teacher)- It was a very good experience for me along with the students.

Susmita Bose (Teacher)- It was overall a very good experience for me in attaining this program.

Gokhale Memorial Girl's School, kolkata, India

Niharika Rai (XII)- I gained a lot of practical knowledge and a deeper appreciation for solar power.

Kaamya Daga (XII)- The program was well-organized and very educational, sparking my interest in solar innovations.

Chaitri Sen (Teacher)- The program was excellently conducted, providing our students with valuable insights and hands-on experience.

Pooja Ghosh (Teacher)- It was a highly educational initiative that effectively engaged and inspired our students about the importance of solar energy.

Delhi Public School Newtown, kolkata, India

Trinanjana Dutta (X)- I thoroughly enjoyed learning about innovative solar solutions through this program.

Aman Nandy (X)- The interactive sessions and hands-on workshops were both educational and fun.

Sanjana Ganguly (XI)- The program was well-organized and very educational, sparking my interest in solar innovations.

Susanta Gupta (Teacher)- The program was excellently conducted, offering our students valuable insights.

Subhro Ray Chaudhuri (Teacher)- It was a highly educational initiative that effectively engaged our students.

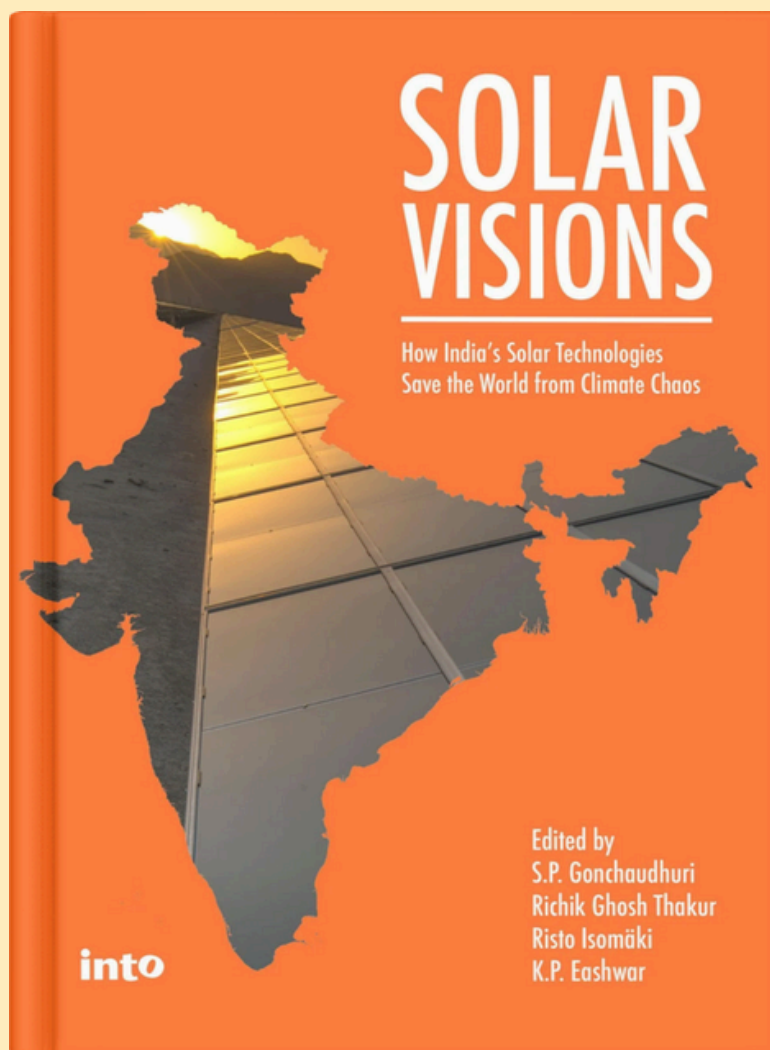
Jadavpur Vidyapith, kolkata, India



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How India's Solar Technologies Save the World from Climate Chaos

India has, during the last twenty years, produced an amazing array of new kind of solar energy inventions. Among them are second-generation pumped storage hydropower plants, ultra-cheap solar space heaters, many kinds of floating solar power installations and solar cookers that can be used inside, after the sun has set.

India's already existing, extremely affordable solar technologies – and numerous other inventions coming after them – will play a crucial and perhaps decisive role in the fight against global warming, if they spread to other continents in a large scale.

India's solar technologies can accelerate the electric vehicle revolution, produce carbon-negative power, eliminate the need of water in cleaning solar panels and solve the problems related to storing wind and solar electricity. They could reduce or eliminate methane emissions from reservoirs and eutrophic lakes, provide rural schools with clean water and reduce pressure on forests and other vegetation, thus increasing the amount of carbon stored in natural ecosystems. They could reduce the evaporation of water from irrigation channels and produce food and solar power on the same patches of land.

At the same time India's new solar technologies can eliminate deep poverty and reduce air pollution, which is currently causing nine million premature deaths per year.

Solar Visions Unveils India's Latest Breakthroughs in Solar Technology

Solar Visions is the first volume introducing dozens of India's new solar innovations – many of which are likely to have major global importance – for the world.

The book has been produced in cooperation with InSIC, International Solar Innovation Council, a small but efficient international network of solar energy scientists and activists. It contains a popular narrative about the potential of India's solar energy technologies, and seventeen more detailed scientific articles written by India's renewable energy experts.

The book's forewords have been written by Dr. Ajay Mathur and Professor Peter Lund. Ajay Mathur is the director-general of ISA (International Solar Alliance), an inter-governmental organization of 120 countries founded to promote solar energy. The establishment of ISA was India's and France's joint initiative. Peter Lund is the professor for advanced energy systems in the Aalto University.



International Solar Innovation Council

Innovating Solar Solutions for Billions

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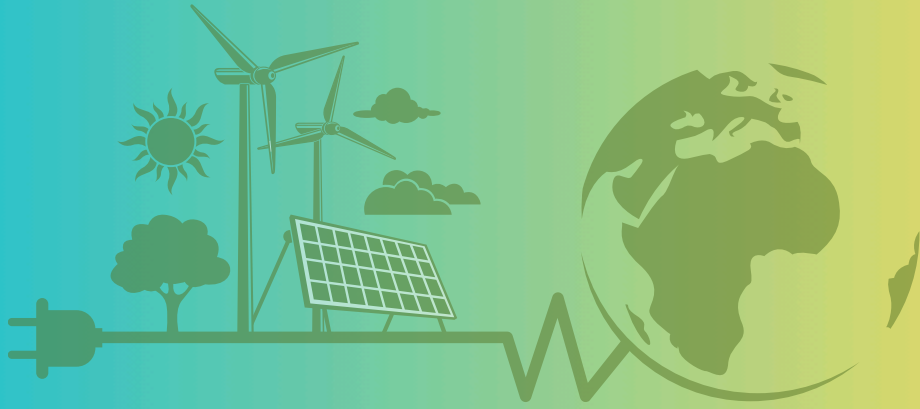
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"Conservation of energy is not about doing less; it's about doing more with less."

