

U.S.-INDIA STRATEGIC CLEAN ENERGY PARTNERSHIP POWER AND ENERGY EFFICIENCY PILLAR

July 2023



PARTNERSHIP OVERVIEW

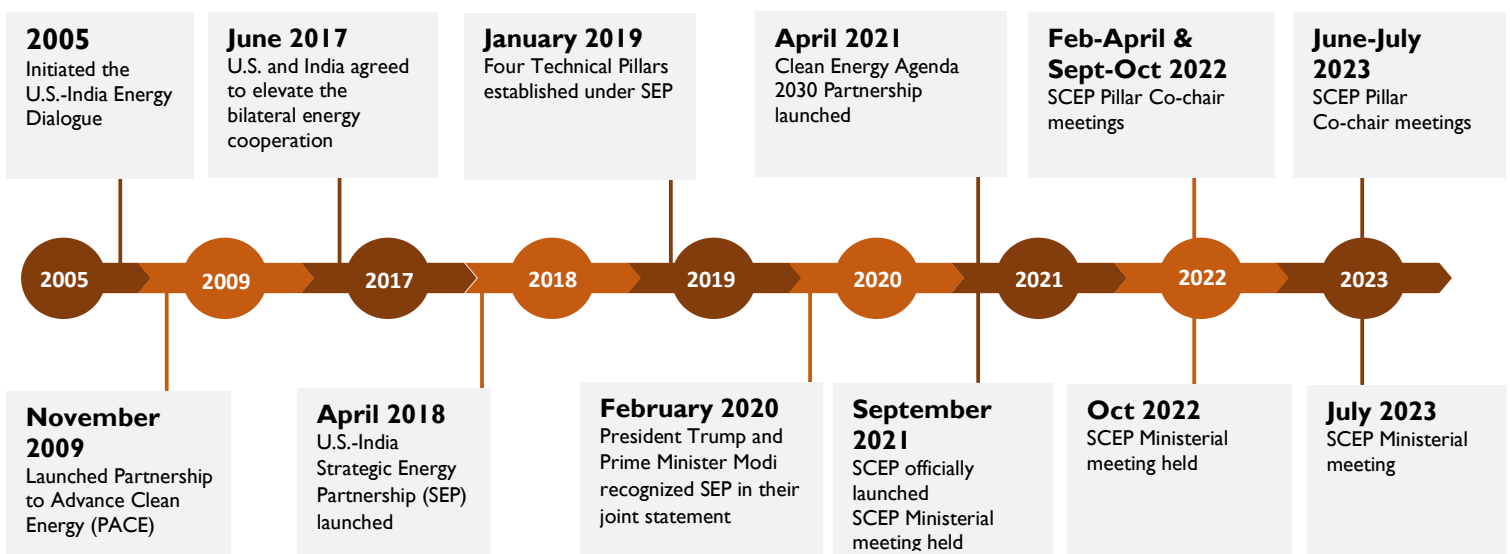
OUTLINE

On the margins of the April 2021 Leaders Climate Summit, President Biden and Prime Minister Modi announced a new high-level U.S.-India Climate and Clean Energy Agenda 2030 Partnership, to accelerate progress toward shared climate and clean energy goals. The Agenda 2030 Partnership includes two tracks of engagement: 1) the Strategic Clean Energy Partnership (SCEP), and 2) the Climate Action and Finance Mobilization Dialogue. The U.S.-India SCEP builds upon a longstanding and fruitful bilateral energy dialogue focused on energy security and innovation. The SCEP was revitalized in September 2021, placing greater emphasis on electrification and decarbonization of processes and end uses, scaling up emerging clean energy technologies, finding solutions for hard-to-decarbonize sectors, and deploying technical solutions. Engagement with the private sector and other stakeholders remains a priority to facilitate rapid technology deployment and create economic opportunities for both countries. The U.S. Department of Energy and India's Ministry of Petroleum and Natural Gas lead overall engagement under the SCEP with robust interagency engagement on both sides.

STRATEGIC CLEAN ENERGY PARTNERSHIP PILLARS



THE JOURNEY SO FAR



PILLAR OVERVIEW



The Power & Energy Efficiency Pillar works to improve the reliability, resilience, flexibility, affordability, and sustainability of the power system. It encourages the reliable grid integration of the massive amounts of renewables that India aims to install as part of its 500GW non-fossil installed capacity goal, while also addressing rising energy demand. It works to modernize and improve grid infrastructure through smart grid technologies, energy storage, distributed energy resources, clean energy installation, digitization, and enhanced cybersecurity. It also works to reduce emissions through the use of emerging technologies like carbon capture, utilization, and storage (CCUS). Furthermore, the pillar works to transform utilities in order to facilitate India's power market transformation. It will also support the integration of a regional power grid to allow for greater development. Finally, the pillar promotes super efficient appliances, improves energy efficiency and conservation in buildings and industrial processes.

U.S.-India SCEP Ministerial Chairs



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U.S. Department of
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Hardeep Singh Puri

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Government of India

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Andrew Light

Assistant Secretary for
International Affairs
U.S. Department of
Energy



Ajay Tewari

Additional Secretary for
International Cooperation
and Energy Transition
Ministry of Power



SUCCESS STORIES

Advancing Smart Grid & Energy Storage Technologies

As part of the longstanding U.S.-India Partnership to Advance Clean Energy-Research (PACE-R), the U.S. Department of Energy and Indian Ministry of Science and Technology supported the U.S.-India Collaborative for Smart Distribution System with Storage (UI-ASSIST), a consortium of 31 entities led by Washington State University and IIT Kanpur. UI-ASSIST is working to advance research and deployment of new smart grid and energy storage technologies and tools to modernize the power grid while providing affordable and reliable energy. This research focused on deployment of advanced technologies and tools, allowing a continued increase of renewable energy penetration into the electric distribution grid for increased reliability and resilience. Now in its sixth and final year, the consortium has implemented its research and development results into 11 laboratory testbeds and 10 field demonstrations across India and the US, including electrifying two India hamlets and developing a microgrid feasibility study with the Tulip Tribes located in Washington, USA. In addition, the consortium has provided workforce training through the project activities and impacted over 170 students.



This WSU testbed enabled advanced simulations of developed models and algorithms in real-time as well as connections to Indian partners. (Photo Credit: Department of Energy)



Battery and controller installed at WSU Pullaman to provide battery backup of key systems during an outage. BESS supplied by Larsen & Toubro. (Photo Credit: Department of Energy)



UI-ASSIST partners visiting one of the India field demonstrations in December 2022 (Photo Credit: Department of Energy)



UI-ASSIST researchers at the 22nd National Power Systems Conference at IIT-Delhi in December 2022. (Photo Credit: Department of Energy)



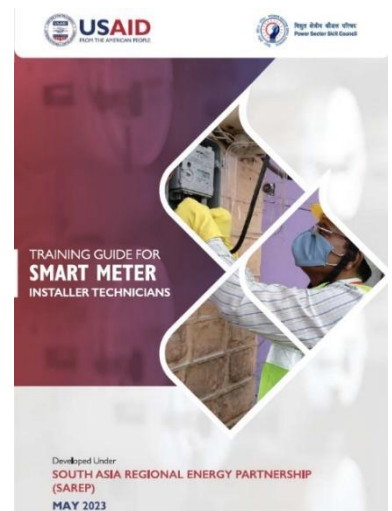
SUCCESS STORIES



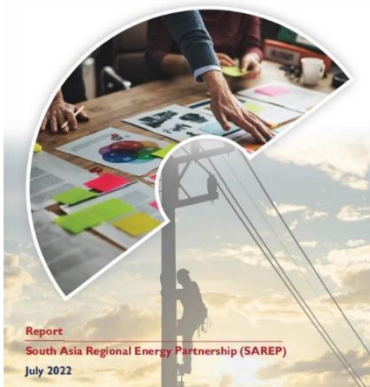
Tulalip Tribes Administrative Building modeled by WSU students for a renewable based microgrid feasibility study. (Photo Credit: Department of Energy)

Strengthening capacities for the largest-ever rollout of smart meters worldwide

To strengthen capacities of DISCOMs officials and technicians for smart meter deployment, USAID's South Asia Regional Energy Partnership (SAREP) signed a memorandum of understanding (MOU) with the National Power Training Institute (NPTI) and Power Sector Skill Council (PSSC). The program developed a training manual for smart meter installation, as well as courses on Information Technology(IT) /communications technology, data analytics, Supervisory Control and Data Acquisition (SCADA), and IT/ Operation Technology (OT) technologies.



  
Training needs assessment of
DISCOMs under RDSS



Part B of the Revamped Distribution Sector Scheme (RDSS), launched by the Government of India, focuses on enabling and supporting activities for the capacity building of discoms. This includes upgrading human skills, process improvements, nodal agency fees, awards, incentives, and evaluation. SAREP is assisting PFC throughout the capacity-building process, which involves assessing training needs, designing, and developing programs, conducting training, reviewing feedback, enriching programs, and ensuring continuity.

SAREP completed a Training Need Assessment (TNA) for PFC which forms the basis for rollout of the program. With the support of USAID SAREP, the capacity-building program of PFC is expected to train approximately 35,000 discom participants on multiple topics identified during the TNA over the next 2-3 years. The proposal and implementation strategy were presented to the MoP's advisory committee on capacity building, **which approved the budget of nearly INR 1 billion for the training programs under RDSS in March 2023.** The Institution's empowerment is under progress.

In addition, SAREP supported NPTI and PSSC as master trainers for training discoms' workforce on smart metering and advanced metering infrastructure under the RDSS. As of May 2023, USAID SAREP has trained over 1,000 discom officials through multiple programs conducted by NPTI and PSSC.



SUCCESS STORIES

Powering Progress - Enabling finance mobilization for GOI's smart meter program under the RDSS

PFC has been designated as the agency for the Smart Meter Accelerator Fund (SMAF) by MOP in September 2022. USAID is assisting PFC to create an accelerator fund to turbocharge the smart meter program under the RDSS scheme. Overcoming financial hurdles is key to success, and this fund aims to provide much-needed financial support to AMI Service Providers (AMISPs). With discoms facing financial constraints and limited private players in the new business model, attracting private investment in smart meters has been challenging. However, through the accelerator fund, USAID aims to mitigate risk perception and ensure access to concessional loans or a first loss default guarantee structure. USAID will work with PFC through SAREP to structure and create SMAF including engaging other development partners to be part of the fund.



Launch of South Asia Distribution Utility Network (DUN)

USAID partnered with PFC to establish the South Asia Distribution Utility Network (DUN). The DUN aims to provide a platform for knowledge sharing on the latest technological advancements in the distribution sector, build capacities and collaborate on pilots and studies.

The DUN was launched on February 20, 2023, in the gracious presence of Sh. RK Singh, Honorable Cabinet Minister (MOP and MNRE, GoI). The launch event was attended by prominent government officials and utility representatives from South Asian countries, both in person and virtually. Presentations were given by delegates highlighting their expectations, including technical support, capacity building, grid modernization, and utility-to-utility dialogue. A white paper was released outlining the objectives, structure, activities, and sustainability mechanisms of the DUN. PFC will serve as the host anchor institution with support from USAID.



Launch of "South Asia Distribution Utility Network" and Release of the White Paper on DUN (Photo Credit: SAREP)



SUCCESS STORIES

Enabling Advanced Technologies for Modernizing Power Distribution Utilities

Advanced technologies like Artificial Intelligence (AI)/Machine Learning (ML), drone applications, and asset-management solutions offer a huge potential to improve the operational efficiency and financial health of discoms.

USAID's SAREP program organized a stakeholder's workshop on AI/ML for high-performing discoms in collaboration with Power Finance Corporation Limited (PFC). The workshop was attended by more than 150 participants from 50 discoms.



The Plenary Session on "Distribution Utilities of the Future: Advanced Technologies for Business Transformation at World Utility Summit (WUS 2023) (Photo Credit: SAREP)

As a knowledge partner of World Utility Summit (WUS 2023), SAREP organized a plenary session on "Distribution Utilities of the Future: Advanced Technologies for Business Transformation". The session provided in-depth information on the role of advanced technologies in transforming distribution utilities, focusing on Smart Grid systems, renewable energy integration, and digital technologies to enhance efficiency and improve customer satisfaction. A white paper on 'Applications of Drones in the Power Distribution Sector' was also released during the inaugural session of World Utility Summit 2023.

Center of Excellence (COE) on Advanced Technologies for Discoms- National SCADA Resource Centre (NSRC)

USAID through SAREP is assisting PFC in establishing a National SCADA Resource Center (NSRC) to address the skilling and capacity building needs of Discoms in advanced technologies like Supervisory Control and Data Acquisition (SCADA), Distribution Management System (DMS), and Outage Management System (OMS). The NSRC will serve as a vendor-neutral training facility, enabling hands-on practice and accelerating the adoption of these technologies for Discoms' modernization. SAREP developed a concept note and conducted a stakeholder consultation workshop in collaboration with PFC to establish the NSRC.

The proposal for the NSRC has been approved by the Monitoring Committee of the MoP, with a budget of nearly **INR 230 million under RDSS in March 2023**. The foundation stone for the National SCADA Resource Center at NPTI Faridabad was laid in April 2023.



USAID SAREP Team assisting PFC in establishing a National SCADA Resource Center (Photo Credit: SAREP)



SUCCESS STORIES

Deployment of Synchronous Condensers (SynCon) for stepping up for RE Integration and unmatched System Reliability



The Deployment of Synchronous Condensers (SynCon) workshop underway at Northern Regional Power Committee office (Photo Credit: USAID)

USAID is supporting GRID-India (formerly Power System Operations Corporation (POSOCO)) to strategize on enabling system inertia adequacy framework with focus on three key activities: i) developing a note on area selection criteria for deploying synchronous condensers; ii) formulate strategy for implementation of synchronous condensers in India; iii) estimation of long-term inertia requirements in the power sector.

To drive this initiative further, raise awareness, and engage key stakeholders, a full-day workshop on "Deployment of Synchronous Condensers (Syncons) in

India" was held at the Northern Regional Power Committee (NRPC) office in New Delhi on May 26, 2023. This workshop, the first of its kind in India, witnessed overwhelming participation with 117 members, including representatives from NRPC, GRID-India, CEA, CERC, NTPC, Powergrid, Regional Load Dispatch Centers, State Transmission Utilities, WBSEDCL (PSP), and other stakeholders.

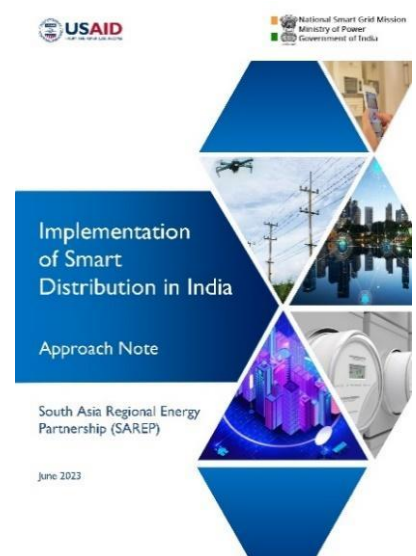
The workshop focused on addressing the challenges posed by increased renewable energy in the power system and highlighted the potential of syncons as a viable solution. Industry-leading syncon Technology Service Providers (TSPs) like GE and Siemens Energy, Germany, presented their market solutions, while renowned experts, including Dr. Luis Rouco from IIT Comillas, Spain, and Fabian Spescha, Grid Connection Manager at Total Eren, shared their experiences as system operators implementing similar solutions in the Australian Energy Market Operator (AEMO).

As a next step USAID will support long term inertia estimation study and support consensus driven strategy for Syncon implementation through regional workshops to engage stakeholders for its implementation.

Empowering the Grid: Ministry of Power and NSGM enlist technical assistance for game-changing 'Smart Distribution' Implementation

In March 2023, Ministry of Power (MoP), Government of India, through National Grid Smart Mission (NSGM) has sought support from USAID on developing an approach note on "Implementation of Smart Distribution in India" under which SAREP has prepared the approach on cities selection, Smart Distribution implementation and estimated a budgetary requirement for Smart Distribution implementation in the select cities.

Through this approach, three cities (Indore, Guwahati and New Delhi) were identified with an estimated budgetary requirement of INR 453.3 Crore and phase wise implementation plan was also shared. The detailed approach note and presentation was submitted to Chairperson, Central Electricity Authority (CEA) and MoP through NSGM.



SUCCESS STORIES

Partnering States for Modernization of Distribution Utilities

USAID has partnered with the state of Madhya Pradesh (MP) to modernize their DISCOMs through implementation of advanced technology solutions under its SAREP program. This includes deployment of pilot projects in key discoms of MP on frontier technologies across thematic areas like theft detection and revenue assurance, asset health monitoring using data analytics and using drone applications, and consumer experience transformation. The Proof of Concept will be scaled up by the state based on successful outcomes.



Program Kick-off Workshop and field site inspection for Advance Solutions for Power Distribution, Madhya Pradesh (Photo Credit: SAREP)

Pilot	DISCOM	Technology Service Provider
AI/ML based Distribution network analytics	MP West Discom, Indore	SEW
Distribution asset health management using drones	MP Central Discom, Bhopal	Vidrona
AI/ML based DT health management using data analytics	MP East Discom, Jabalpur	Itron

Enhancing Cybersecurity Capacity at the Central and State Level

In a bid to fortify the nation's critical infrastructure against cyber threats, Power Utilities have embarked on a mission to enhance their cybersecurity capacity. This proactive move reflects the commitment to protect the power sector from malicious cyber activities and ensure the uninterrupted supply of electricity to millions of households and businesses.

To support power utilities in South Asia, USAID's SAREP initiated the development of a cybersecurity posture assessment tool (CPAT) for distribution utilities and transmission utilities (including system operators). Consultations with stakeholders such as Bhutan Power System Operator (BPSO), Nepal Electricity Authority (NEA), Power Grid Company of Bangladesh (PGCB), Assam Electricity Grid Corporation Ltd (AEGCL), and Assam Power Distribution Company Ltd (APDCL) revealed interest in the cybersecurity posture assessment.

CPAT is developed to assess, create, and improve the security posture of utilities, specifically Distribution and Transmission utilities. Adopted from the global standards (NERC CIP, C2M2, NCIIPC) to match the advancement levels of the south Asian region, this holistic tool will help the utilities to evaluate and benchmark their security posture and ease the process of assessment without burdening with too many self-evaluator questions.

USAID
Cybersecurity Posture Assessment Tool (CPAT)

The cybersecurity maturity assessment tracker adopts NIST framework to evaluate the cybersecurity preparedness of the utility. Data is gathered to assess the utility's status across the following functions: Identification, Protection, Detection, Response, and Recovery.

Please click on the icons to initiate the maturity assessment for the specific module.

- Identify (ID)**
 - Asset Management
 - Business Environment
 - Governance
 - Risk assessment
 - Risk management strategy
 - Supply chain risk management
- Protect (PR)**
 - Identity management, authentication and access control
 - awareness and training
 - Data security
 - Information protection and procedures maintenance
 - Protective technology
- Detect (DE)**
 - Anomalies and events
 - Security continuous monitoring
 - Detection processes
- Respond (RE)**
 - Response planning
 - Communications
- Recover (RE)**
 - Recovery planning
 - Improvements
 - Communications



SUCCESS STORIES



USAID SAREP Team in the Round Table Consultation on GAP Assessment of STUs (Photo Credit: SAREP)

Empowering State Transmission Utilities (STUs) Planning and Operational Capacity to enhance Grid Efficiency and Reliability

In a bid to revolutionize the power sector and ensure seamless electricity transmission, State Transmission Utilities (STUs) across the nation are embarking on a transformative journey. With a resolute focus on strengthening their planning and operational capacity, these utilities are set to enhance grid efficiency and reliability to unprecedented heights. Recognizing the critical role played by STUs in the power ecosystem, USAID is supporting STUs in following areas: i) transmission planning; ii) operational efficiency; iii) infrastructure; iv) adoption of advanced technologies; and v) capacity building of human resources.

A report “Roadmap for State Transmission Utilities (STUs) Capacity Strengthening” has been prepared. The report is based on the gap-assessment surveys of six STUs, and covers present practices, ongoing initiatives, gaps, recommendations, and roadmaps. SAREP organized a stakeholder consultation workshop and presented the findings of the above-mentioned report to obtain further inputs from stakeholders. Representatives from 10 STUs, key central stakeholders, and expert speakers engaged in a deep-dive discussion on the challenges faced by STUs in infrastructure, technology, and operations; tools and techniques; policies and regulations; and institutional and human capacity. Attendees also discussed recommendations to address these challenges, and ideas to develop a roadmap to improve the operational and financial performance of STUs.

Supporting integration of Renewable Energy in the Grid through Energy Storage

To support the integration of RE to the grid, SAREP is working to encourage the adoption of Battery Energy Storage System (BESS) and Pumped Storage Plants (PSP) in India. In the PSP domain, SAREP supported Power Company of Karnataka Limited (PCKL) in procurement 1 GW x 8 hours per day storage from Pumped Hydro Storage capacity by assisting in reviewing bid documents and recommending modifications to make the selection process competitive.

In the domain of battery energy storage system, SAREP is providing support to states to promote the deployment of BESS at grid-scale:

- SAREP is working with three states – Haryana, Gujarat, and Assam to develop a staff paper for respective state electricity regulatory commissions that determines the role of BESS and its revenue stream. The staff papers being developed aim to cover Determination of use cases for BESS; Capacity expansion over the years with location and role of BESS at each node,;
- Role of BESS and its revenue stream for Haryana, Gujarat, and Assam where investment and operational costs of transmission, generation, and storage are co-optimized; Policy and regulatory design to support BESS adoption and scale up in the three Indian states



SUCCESS STORIES

Support to Government of India’s Virtual Smart Grid Knowledge Centre (SGKC) and Global Center of Excellence

USAID partnered with MoP, POWERGRID and National Smart Grid Mission (NSGM) to develop SGKC as a leading Global Center of Excellence (CoE) to foster innovation, entrepreneurship and research in smart grid technologies and create capacities in the power distribution sector. To support SGKC in this, USAID through SAREP has planned activities in three areas: i) set up a technology incubation hub; ii) establish an innovation park; and iii) develop capacity-building programs for SGKC.



In November 2022, SAREP submitted a draft action plan and roadmap to SGKC for development of a technical incubation hub. Further, in June 2023, a draft Detailed Project Report (DPR) for “Augmentation of SGKC Activities and Infrastructure” was submitted to SGKC. The DPR includes the proposed approach, SOW, cost estimates and timelines for setting up the incubation hub, expansion of the physical innovation park, IT services, capacity building, and infrastructure augmentation.

USAID in partnership with MoP, POWERGRID and National Smart Grid Mission (NSGM) to develop SGKC as a leading Global Center of Excellence (CoE) (Photo Credit: SAREP)

U.S.-India Energy Storage Expert Webinar Series

Critical to India achieving 500GW of non-fossil installed capacity, energy storage is essential for enabling large-scale renewable energy integration and ensuring a clean, efficient, and reliable grid. To that end, the U.S. Department of Energy together with the India Energy Storage Alliance (IESA) launched a 6-part energy storage series of expert-led webinars focused on the range of emerging energy storage technologies and the necessary policy and regulatory frameworks and other enablers to support their deployment.

Launched in June 2023, the expert series includes exchanges on field deployments, safety issues, lessons learned, and best practices, as well as business / use cases on properly valuing energy storage and technology deployment across a variety of applications. This effort supports the goals of the U.S.-India Energy Storage Task Force



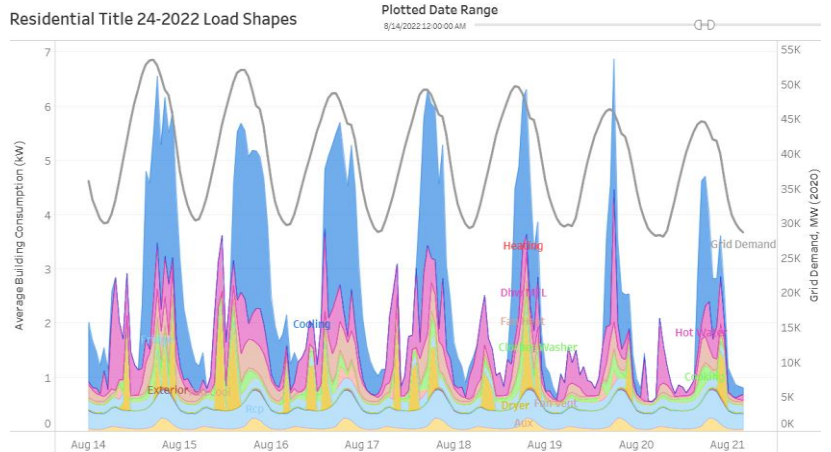
Launch of the 6 Part US-India Energy Storage Expert Webinar Series (Photo Credit: IESA)



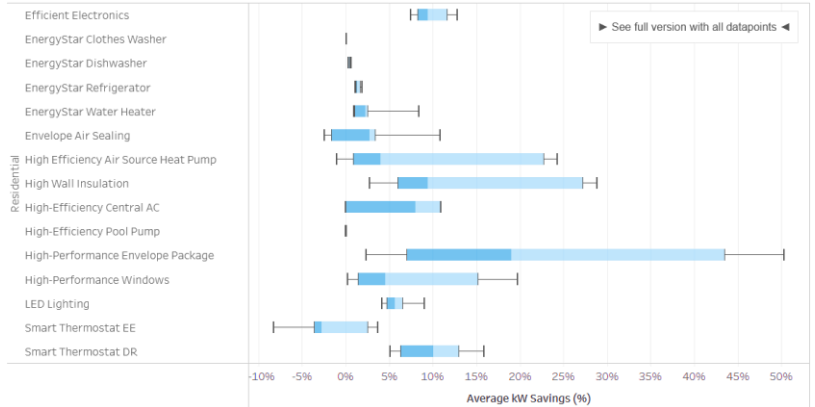
SUCCESS STORIES

Supporting the mainstreaming of Grid Interactive Buildings as Last Mile Element of a Future Smart Grid

Under the SAREP Partnership Fund of the USAID, New Buildings Institute (NBI) – a leading non-profit organization in the energy efficiency sector of the United States, is working in India with the leading utilities to develop and disseminate India-specific GridOptimal® metrics. The initiative will facilitate building-grid optimization through the identification of key behind-the-meter time-oriented energy efficiency and demand flexibility strategies in major building typologies and grid contexts (e.g., constrained distribution grid, system-wide transmission-level conditions, current coal-dominated or future solar-heavy grid, etc.). Once developed, the metric shall support the Indian utilities in developing their energy savings program, energy efficiency rating systems such as LEED, market levers such as building valuation and financial decision making, policy development, and other applications. Discussions for engaging the utility in the state of Haryana and Madhya Pradesh have been carried out.



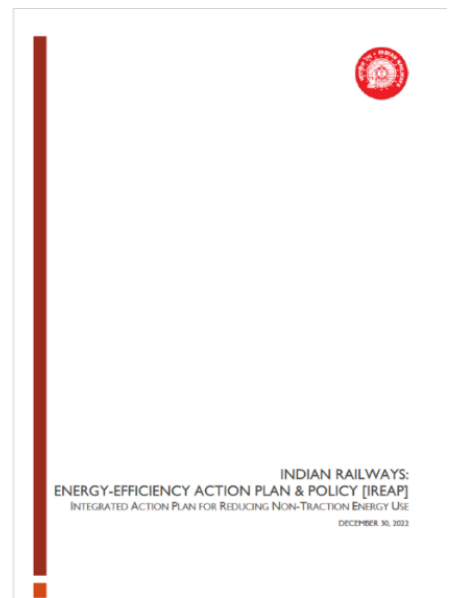
Average kW savings during the peak summer design day from 7-9PM



Supported Indian Railways on Energy Efficiency as a Strategic Approach Towards their Net Zero Targets

USAID SAREP program has played a pivotal role in assisting Indian Railways in the development of their Energy Efficiency Action Plan and Policy. Launched in December 2022, the policy enables Indian Railways to make significant progress towards their goal of achieving net-zero emissions by 2030. The action plan serves as a comprehensive strategy to integrate energy efficiency and renewable energy and thereby reducing the emissions from non-traction energy usage.

USAID SAREP is facilitating Indian Railways in the wide-spread dissemination and implementation of this policy. As one of the outcomes, Indian Railways has launched a large-scale Building Energy Efficiency Retrofit Program targeting its 2500+ buildings. SAREP continues its technical assistance in rolling-out this program through Investment Grade Energy Audits and Energy Savings Performance Contracts. This comprehensive approach ensures that energy efficiency measures are effectively deployed, driving sustainable practices, and optimizing energy consumption within the railway infrastructure.





Training Program on Indian Railways' EE Action Plan and Policy (Photo Credit: SAREP)

SAREP is also building institutional capacity through Indian Railways training institutes, Indian Railways Institute of Electrical Engineering (IRIEEN) and Indian Railway Institute of Civil Engineering (IRICEN). SAREP has institutionalized courses and facilitates training on achieving net-zero through energy efficiency and renewable energy.

Further the program has institutionalized Super Energy Conservation Building Code (ECBC) compliance requirements in all station developments under the purview of Indian Railways. This will ensure that all station developments henceforth will be high performing with regards to energy efficiency.

Igniting Change: A Groundbreaking Strategy pioneering India's Net Zero Transformation

USAID through SAREP supported Energy Efficiency Services Limited (EESL) in crafting their vision and strategy with the objective of upgrading EESL's role as catalyst to India's net-zero transition. This strategy sets the stage for EESL to assume a leading position in driving energy efficiency and clean energy market transformation across all sectors of the economy. With a focus on the public sector and public benefit, the strategy outlines EESL's long-term vision to spearhead the net-zero market transformation through integrated solutions that prioritize impactful outcomes.



Deliberation on EESL's policy and vision for India's net-zero transition (Photo Credit: SAREP)

In line with this strategy, EESL aims to champion energy efficiency in the public sector, unlocking substantial energy savings for the country. Additionally, EESL intends to stimulate the private sector through technical innovation and scalability, fostering a thriving clean energy market. As EESL progresses, it will increasingly serve as a value creator for the nation, expanding its role in advancing India's clean energy transition. The collaboration between USAID and EESL in formulating this strategy demonstrates their shared commitment to driving sustainable and resilient energy practices in India.



SUCCESS STORIES

Driving Carbon Neutrality in Ladakh through Energy Efficient Space Heating Solutions



EESL signing MoU for Ladakh Administration for implementation of demonstration of Heat Pump technologies and Improving Energy Efficiency (Photo Credit: SAREP)

As part of India's ambitious endeavor to make Ladakh carbon-neutral by 2050, USAID through SAREP is actively assisting Energy Efficiency Services Limited (EESL) in the implementation of the Public Building Retrofit program.

SAREP is informing EESL's retrofit strategy through analytical evidence, aiming for scalable solutions including insulation, heat pumps, solar based heating solutions, energy efficient windows and control systems.

SAREP provided technical assistance in devising the technical specifications of heat pumps for their optimal performance. It is also assisting EESL

in the development of optimized insulation options and the integration of hot water storage systems, encompassing solar-based space heating solutions. Through this collaborative effort, USAID and EESL are propelling this transition, aligned with the vision of the Prime Minister of India.

Mainstreaming Demand Response

USAID aims to mainstream Demand Response (DR) through market-based mechanisms for flexibility and facilitate demand management programs in utilities. USAID's SAREP is supporting EESL in a large-scale demand response program design in consultation with Grid-India, CERC and state stakeholders. The intent is to create a market for demand response which can be offered to distribution utilities and load dispatch centers.

In collaboration with a prominent distribution utility, SAREP is supporting a technology pilot for Behavioral Demand Response (BDR) to effectively reduce peak electricity consumption. This pioneering program aim to nudge consumers' behavior in responding to changing grid conditions, thus fostering a culture of energy efficiency among end-consumers. Through the BDR program, consumers are empowered to optimize their electricity load by heeding signals delivered via text messages, emails, or a combination of both. By voluntarily participating in load shedding during peak periods, consumers are not only contributing to the efficient management of electricity demand but also being incentivized for their capacity shedding efforts.



USAID's SAREP is supporting EESL in a large-scale demand response program design in consultation with Grid-India, CERC and state stakeholders (Photo Credit: SAREP)

Demand Response initiatives, at scale, can not only benefit electricity distribution companies (DISCOMs) in India by enabling them to effectively manage increasing future electricity demand using smart energy meters but also complement the integration of distributed renewable energy resources. SAREP also facilitated a dialogue on critical aspects of Demand Response and new dimension of demand side flexibility. Adapting the principles of Behavioral Science, USAID is paving the way for a more consumer centric, resilient, and sustainable energy transition.



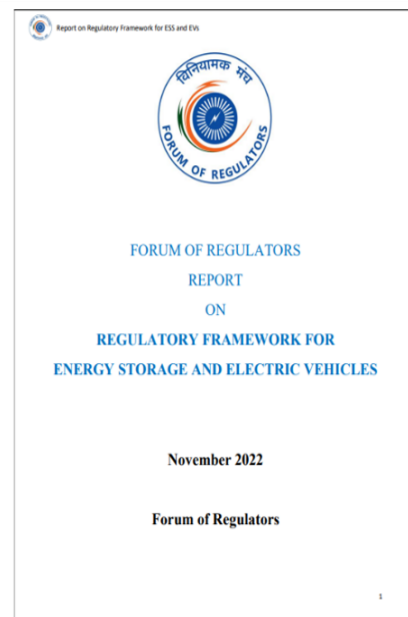
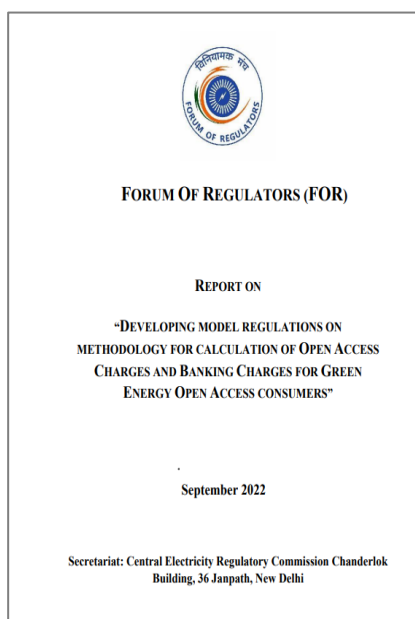
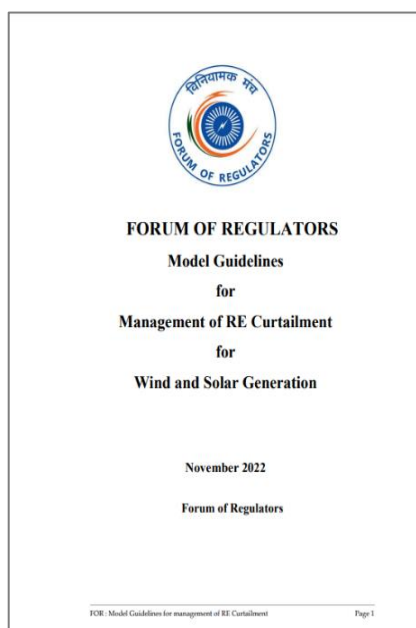
SUCCESS STORIES

Flexible Resources Initiative (FRI) Supporting India's Clean Energy Transition by 2030

On February 6, 2023, the Lawrence Berkeley National Laboratory, under the Department of State's FRI program, released technical studies on four partnering states (Gujarat, Karnataka, Maharashtra, and Rajasthan), identifying least-cost pathways to incorporate flexible resources to integrate renewables into their electricity grids, without the need for additional thermal generation, to meet their growing energy demand by 2030. These studies will assist state system operators, transmission companies, utilities, and electricity regulators to plan how to optimize their systems. The FRI team selected these states based on their excellent renewable energy resource potential and policy environments conducive to renewable energy deployment. India's central and state governments, system operators, utilities, and private sector participated in an April 27 webinar to amplify the findings of these state technical studies. In conjunction with the FRI national-level study, launched in December 2021, these technical studies will help India develop robust policies and regulations to ensure a balanced mix of renewable energy, reliable power, and the need for grid-scale storage solutions.

Support to Forum of Regulators (FoR) on scaling and integration of renewable energy

USAID is supporting FoR to develop regulatory frameworks, guidelines, and undertaking supporting studies for promoting renewable energy and its grid integration in India. As a part of the engagement, SAREP has provided support to FoR in developing model regulations on methodology for calculation of green energy open access charges, preparing regulatory framework for energy storage and electric vehicles, and developing model guidelines for management of RE Curtailment for wind and solar generation. The model guidelines and model regulations were developed through a highly consultative process and involved extensive deliberations with the FoR working group. Currently, SAREP is supporting FoR in developing draft regulations of long-term resource adequacy framework for system planning and procurement.



SAREP is also supporting the Central Electricity Regulatory Commission (CERC)'s Deviation Settlement Mechanism (DSM) Expert Committee to revise the existing DSM regulations, which were issued in March 2022. The revised (amended) regulations will help in reducing grid fluctuations and improving grid stability.



SUCCESS STORIES

Strengthened states with resilient and reliable grids

USAID's SAREP is assisting the states of Karnataka, Haryana, and Assam in making their grid resilient to vulnerabilities. In this regard, the following efforts have been undertaken:

Karnataka: SAREP is assisting the Karnataka State Electricity Regulatory Commission (KERC) in revamping the Electricity Supply Code to align it with the latest sectoral developments and MoP Rules. Additionally, SAREP is also providing assistance to Karnataka Power Transmission Corporation Ltd. (KPTCL) in carrying out a transmission network assessment for the years 2027 and 2030 in view of the large-scale integration of renewables, carrying out a capacity gap assessment for modernization of STU and SLDC, carrying out an asset monetization exercise to increase funds in the sector, assessing banking capacity of the intra-state grid as well as support in configuration and operationalization of Energy Management System (EMS) applications for SCADA system



Meeting of USAID and SAREP Team with Karnataka Power Transmission Corporation Ltd. (Photo Credit: SAREP)

Haryana: In Haryana, SAREP is assisting Haryana Electricity Regulatory Commission (HERC) in review of regulations viz Electricity Supply Code and the State Grid Code. SAREP has already assisted HERC in notification of HERC (Green Open Access) Regulations, 2023. Additionally, SAREP is also assisting Haryana Vidyut Prasharan Nigam (HVPN) in carrying out resource adequacy assessment for transmission.

Assam: SAREP is assisting Assam Electricity Grid Corporation Ltd. (AEGCL) improve its grid resilience by carrying out a network assessment to make it resistant to natural calamities and enhancing its cybersecurity maturity towards any cyber threats. SAREP is also supporting Assam Electricity Regulatory Commission on regulatory framework for Demand response, resource adequacy and Storage.

Identifying Commercial Opportunities for Power Sector

The U.S. Commerce Department recruited and supported a delegation of over 26 Indian regulators and utilities' executives to attend Distributech 2023, a signature conference and trade exhibition in San Diego, CA, focused on the electric power sector. Prior to the conference, the Indian delegation participated in discussions in Washington, D.C. with U.S. government agencies (the Departments of Commerce and Energy) on commercial opportunities and ways to leverage U.S. Government programs to support the Indian power sector. At the Distributech 2023 conference, the Department of Commerce coordinated with the India Smart Grid Forum to organize a U.S.-India Smart Grid Roundtable attended by senior U.S. and Indian business leaders in the electricity transmission and distribution sector with U.S. Department of Energy and other interagency participation.



SUCCESS STORIES



USAID along with a delegation of Indian state regulators, along with CEA, MOP, and POSOCO on a tour to Brussels and Oslo in November 2022
(Photo Credit: USEA)

Supported India's Regulators to Understand Financial Derivatives Market and Optimization of Battery Energy Storage Systems (BESS) for the Grid

USAID through its Energy Utility Partnership Program (EUPP) and South Asia Regional Program conducted a study tour in November 2022 for a delegation of Indian state regulators, along with CEA, MOP, and POSOCO, to Brussels and Oslo. The study tour included examination of international best practices in two areas:

1. To ensure liquidity in the market and protect the interests of the smaller players, the delegation obtained frameworks on the regulatory environment, strategies, and uses of financial derivatives in energy markets,
2. The delegation identified European policy structures to enable R&D and utilization, current economic viability of battery technology, uses and benefits of BESS for renewable energy integration and efficient grid operation for application in India.

South Asia Group for Energy (SAGE 2.0) partnership launched to drive excellence in clean energy systems



The Phase 2 of the South Asia Group for Energy (SAGE) launched during the South Asia Clean Energy Forum (SACEF) (Photo Credit: SAREP)

The Phase 2 of the South Asia Group for Energy (SAGE) was launched in May 2023 in the South Asia Clean Energy Forum (SACEF). SAGE is a consortium of USAID, the US Department of Energy (DOE) and U.S. National Laboratories - National Renewable Energy Laboratory, Pacific Northwest National Lab and Lawrence Berkley National Lab - representing excellence in research and international development in the energy sector. The Consortia implements research, analysis, and capacity building activities throughout South Asia whose outputs and recommendations are seen as independent and trusted across the globe. Given the advanced technical knowledge embedded in the National Labs, SAGE seeks to elucidate and provide

implementation strategies for energy sector-related opportunities that equip USAID partner governments with critical information and consultation to allow strategic investments on South Asia's path to self-reliance. SAGE will provide a vital contribution towards achieving the goals of the U.S. India- Strategic Clean Energy Partnership. Through SAGE, the ongoing partnership between MNRE Indian institutions and U.S. National Lab will be deepened. Currently, consultations with NIBE and NIWE are ongoing to finalize the scope of work plan for SAGE 2.0.



SUCCESS STORIES

USAID organizes South Asia Clean Energy Forum (SACEF) 2023 – The First Regional Energy Forum

The first South Asia Clean Energy Forum (SACEF) took place in New Delhi, India, from May 2-4, 2023. The event, held on the theme ‘Catalyzing Partnership for Clean Energy Transition’, was organized by United States Agency for International Development (USAID) through the South Asia Regional Energy Partnership (SAREP) and the South Asia Regional Energy Hub (SAREH). It comprised 16 sessions across three days attended by 60+ speakers and 400+ participants from across the globe.

The forum began with a Partners’ Day, featuring sessions by USAID partner organizations on topics such as ‘Solutions Offered by USAID and U.S. Department of Energy National Labs through SAGE 2.0’ to ‘Decentralized Renewable Energy for Rural Livelihoods and Women Empowerment’. Over two days, energy stakeholders from public and private sectors in Bangladesh, Bhutan, India, Nepal, Maldives, and Sri Lanka actively participated in sessions and contributed to discussions around the region’s clean energy transition.

Notable outcomes from the forum included the launch of SAGE 2.0, a report on Green Hydrogen Investment in India, and training resources for EV charging stations and smart meters. Esteemed speakers shared insights on financing mechanisms, technology, capacity building, and inclusive policies for clean energy development.



The opening session from the South Asia Clean Energy Forum (SACEF) 2023 – The First Regional Energy Forum (Photo Credit: SAREP)





Source: 123rf.com

- The Energy Information Agency (EIA) and the Bureau of Energy Efficiency conducted an information-sharing webinar on methodologies for designing energy consumption surveys, focused on commercial buildings, to support BEE's new mandate under the Energy Data Management Unit.
- USAID through SAREP has completed a national level analysis for “Roadmap for State Load Dispatch Center (SLDC) Capacity Strengthening” which identifies key gaps and recommends measures to strengthen their operational and institutional performance.
- Through USAID SAREP program, technical assistance is offered to Telangana State Renewable Energy Development Corporation (TSREDCO) to design a Grid Interactive Net Zero Building, which is now in the advanced stages of construction.
- USAID through its SAREP program has conducted training programs to effectively implement its EE policy and action plan. More than 200 railway officials have been equipped with the necessary knowledge to build the capacity of other officials in a bid to effectively implement the policy.
- Facilitated Investment Grade Energy Audits (IGEA) for 10 railway buildings and Integrated Net-Zero Audits for 5 railway facilities. Basis the pilot experience, model IGEA bid documents have been prepared for Indian Railways to enable building energy retrofits in close to 2500 buildings in ESCO based model.





Source: 123rf.com

The pillar will continue to strengthen engagement according to the following agreed priorities:

- Modernize power system infrastructure and strengthen electricity systems for a more reliable, secure, efficient, affordable, and cleaner energy supply. Modernization efforts may be accomplished through implementation of smart grids, grid integration of renewables, energy storage, distributed energy resources, flexible resources, ancillary services, and enhanced digitization and cybersecurity.
- Support reform of the distribution sector through new business models, increased private sector participation, incubation, and deployment of smart distribution technologies, and strengthening of institutions.
- Promote energy efficiency and conservation, including in buildings, appliances, and the industrial sector; promote use of information and communication technologies (ICT) in energy efficiency.
- Supporting net-zero ambition of Indian Railways through improved energy-efficiency and renewable energy integration in their traction and non-traction load.
- Actively assist public sector undertakings in India to set their net-zero targets in line with national commitments. Through strategic development and comprehensive implementation support, empowering these undertakings to embrace sustainable practices and contribute to the nation's net-zero goals.
- Support power market transformation and technology deployment by improving the investment climate, including through improved procurement practices, ease of doing business, new business models, regulatory oversight, and private sector engagement.
- Support utility modernization and integration of power grids in South Asia and Indo Pacific to support development of clean energy.
- Promote industrial decarbonization, including in sectors like steel and cement, through electrification, energy efficiency, and emerging technologies (e.g., CCUS and hydrogen).





U.S.-INDIA STRATEGIC CLEAN
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