

Power and Energy Efficiency Pillar

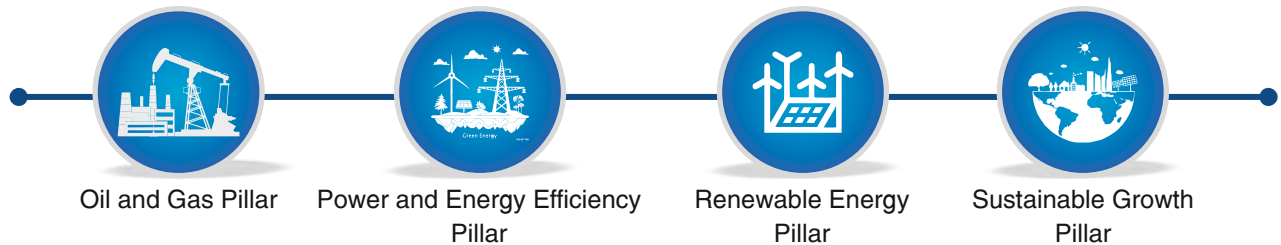
U.S.-India Strategic Energy Partnership



Highlights 2019-2020

The US-India Strategic Energy Partnership (SEP), launched in April 2018 at the direction of President Trump and Prime Minister Modi, set the stage for deeper and more meaningful engagement through government and industry channels using an integrated interagency approach. The SEP's focus is to elevate energy security, expand innovation across the energy sector, deepen bilateral strategic alignment, and increase industry and stakeholder engagement. The Power & Energy Efficiency Pillar is one of four technical pillars under the SEP.

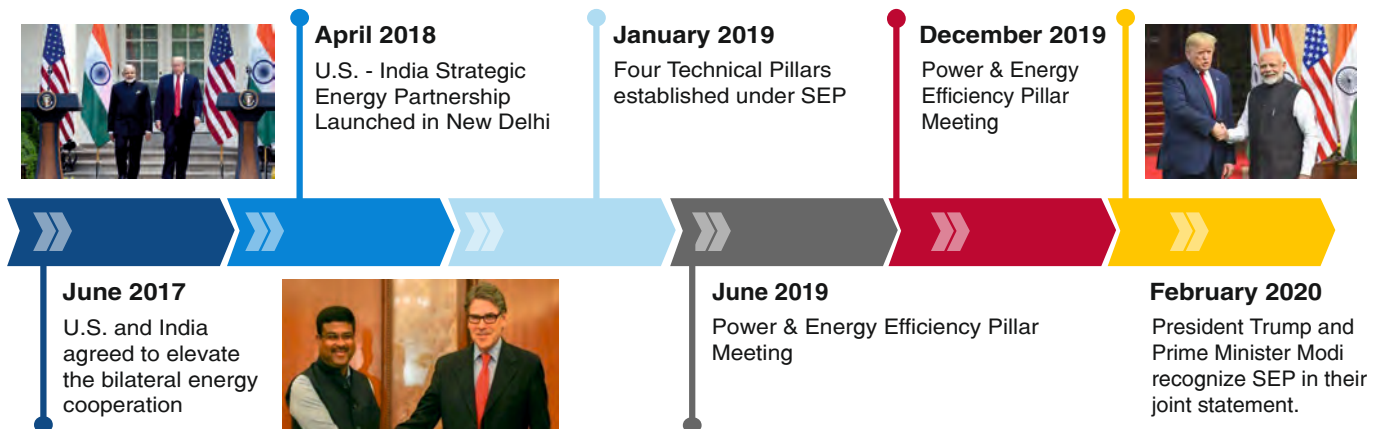
Strategic Energy Partnership



Power and Energy Efficiency Pillar - Priority Areas

To guide the work of the pillar, the sides agreed to six high-level priorities: 1) Modernize power system infrastructure through smart grids, grid integration, and energy storage to promote reliable, secure and efficient transmission and distribution systems. 2) Strengthening electricity systems and markets, including through distributed energy resources, flexible resources and ancillary services. 3) Highly efficient, cleaner, and more flexible coal-fired power generation. 4) Energy efficiency and conservation in buildings, appliances, and the industrial sector. 5) Market transformation through improved investment climate, procurement practices, ease of doing business, business models, regulatory oversight, and private sector engagement. 6) Strengthening the distribution sector through improved business models, technology, innovation, reforms, and public and private investments.

Power and Energy Efficiency Pillar-Timelines



Power and Energy Efficiency Pillar - Co-Chairs



Mr. Steven Winberg

Assistant Secretary for
Fossil Energy
U.S. Department of Energy



Mr. Vivek K. Dewangan

Joint Secretary for
International Cooperation and
Thermal, Ministry of Power

KEY ACCOMPLISHMENTS

Through a productive exchange, the United States and India have made a number of advances to strengthen the power sector, modernize the grid and enhance energy efficiency, including but not limited to, the following:

- Initiated work to develop a Coal Plant Flexibility Toolkit on improving the ability of coal-fired power plants to operate more flexibly in response to variable power demand, and thereby, reduce plant operating and maintenance costs and failure risks.
- Initiated R&D on smart grid and energy storage technologies to modernize the grid and allow increased penetration of renewable energy focused on resilience, reliability and affordability under the Partnership to Advance Clean Energy-Research (PACE-R).
- Assisted 14 Indian states in preparation of Forecasting and Scheduling (F&S) regulations, Deviation Settlement Mechanism (DSM) Regulations and implementation of Scheduling, Accounting, Metering and Settlement of Transactions in Electricity (SAMAST). This support has led to the enactment of DSM and F&S regulations each in six Indian states.
- Supported Power System Operation Corporation Limited (POSOCO) in the design and procurement of the National Open Access Registry (NOAR). Once operational, all applications and approvals related to short-term open access in the inter-state transmission system will be made through the NOAR platform.
- Launched the Flexible Resources Initiative (FRI) to promote cost-effective strategies assuring India's grid has the flexibility to support its energy transition.



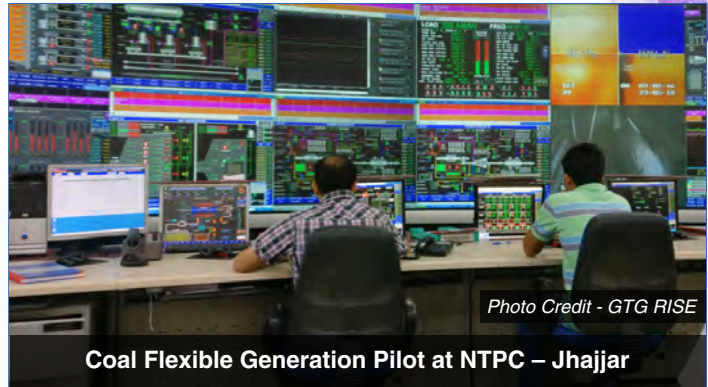
**DOE and NTPC Officials Discussing
Coal Plants Flexibility Toolkit**



Indian and U.S. Researchers collaborating on smart grid and energy storage work (UI-ASSIST)



- Supported 2120 MW for improved flexible operations of coal plants through technical assistance (710 MW at NTPC, 710 MW at GSECL and 700 MW at KPCL) and trained 500 plus power engineers.
- Supported the Central Electricity Regulatory Commission (CERC) in establishing the real-time market (RTM) framework, a landmark initiative by CERC to drive the country's shift from primarily long-term generation contracts to shorter-term contracts and electricity spot markets.



- Supported GSECL's successful operation of its 500 MW Ukai unit at 40% (200 MW) of its capacity in a low-load test run. A detailed Operating Procedure for Low Load Test Runs was prepared and launched as a tool for other Indian utilities.

- Developed a strategic framework for establishing the Ministry of Power's 'Smart Grid Knowledge Centre' as a global center of excellence on smart grids and advanced power technologies.

- Successfully incorporated data centers in the energy conservation building code (ECBC) through technical assistance and capacity building; formulated a user guide on implementing three levels of performance as the ECBC applies to data centers.



- Helped build a robust infrastructure for ECBC implementation across India through technical support and training to create a strong framework for building efficiency in India's Smart Cities.

- In response to the COVID-19 pandemic launched a new initiative, 'Retrofit of Air Conditioning to Improve Air Quality for Safety and Efficiency' (RAISE). Two pilots have been completed resulting in nearly 98% improvement in indoor AQI.

- Created a market by introducing a new category of super-efficient air conditioners in India. This included program design, technical specifications, demand aggregation and implementation support.

- Retrofitted more than 10,000 buildings, airports, and metros in India.

- Developed the vision, guidelines and procurement specifications for green and energy efficient housing under Prime Minister's flagship program on affordable housing (PMAY). The guidelines have been incorporated in the Government's scheme on rural housing for 30 million houses as well as for urban affordable housing in the city of Lucknow (12,000 urban houses under construction).

- Supported the design and deployment of 70+ public charging infrastructure stations for electric vehicles in Delhi and satellite cities.



- Launched a Building Innovation Guide (BIG) for achieving high performance office buildings in India that are smart, green, and energy efficient, offering localized solutions.
- Supported the Ministry of Power's flagship reforms in the distribution sector, including supporting development of the strategic framework and standard bidding documents for a national rollout of prepaid smart meters, one of the largest roll-outs in the world (250 million).
- Supported developments of models and standard bidding documents for private sector participation in power distribution; and developed a web-based open source 'investment analysis tool' for smart grid investment decision making.
- Under the second phase of the U.S.-India Standards and Conformance Cooperation Program (SCCP), worked with the American National Standards Institute (ANSI) and the Confederation of Indian Industry (CII) to host a series of workshops on key areas of standards development in India including past and planned workshops on smart buildings, data centers and solar energy.
- Launched South Asia Women in Energy (SAWIE), a platform to promote women's empowerment and gender sensitization in the energy sector.
- Helped two Indian electricity utilities adopt gender equality initiatives and gender sensitive COVID-19 response.



Launch of the Building Innovation Guide by DOE and BEE



PRIORITIES GOING FORWARD

To build upon the progress to date and address continuing challenges in the sector, the sides agreed to focus on the following priorities going forward:

- Collaborate on 21st Century advanced high-efficiency coal technologies with low-to-zero emissions through carbon capture, utilization, and storage (CCUS).
- Jointly improve coal power plant flexibility to meet requirements of modern power grids.
- Expand R&D cooperation on advanced coal and related environmental technologies with the aim of transforming coal power generation.
- Enhance energy efficiency and energy savings in the industrial sector by advancing a comprehensive energy management system in accordance with ISO50001.
- Following the March 2020 MOU signed between DOE and Indo-U.S. Science and Technology Forum (IUSSTF), DOE will collaborate with Indian implementing partners to launch the first ever Solar Decathlon@ India in 2021, a collegiate competition to prepare the next generation of building professionals to design, build, and advocate for zero energy buildings.
- Present substantially final FRI results to increase the flexibility and robustness of India's grid to support the country's energy transition while reliably meeting its demand.
- Completion, scale up and replication of the grid integration pilots under GTG-RISE (including battery energy storage system, automatic generation control, dynamic compensation, coal flexibility, etc.). Focus would be on sharing the results through knowledge dissemination workshops with key stakeholders including regulators and policy makers. These pilots enhance resilience and flexibility of the power grid which are of great relevance in the post COVID era.
- Support POSOCO in the development and launch of the National Open Access Registry through technical assistance and grant under GTG-RISE.
- Support Karnataka Power Corporation Limited in undertaking techno-economic assessment, low load test runs and development of fleet wide strategy under GTG-RISE.
- Continued regulatory support through GTG-RISE to state and national regulators for development of market redesign, and policies and regulatory framework to support renewable energy integration.
- Institutionalize SAWIE to enhance awareness and promote gender mainstreaming in the energy sector.
- Scale up the RAISE initiative in partnership with EESL in public sector buildings.
- Announcement of National Chillers Efficiency Program with EESL and release of Chiller market Assessment Report.
- Support Ministry of Power in rolling out their distribution reform initiatives in India on smart meters and private sector participation in Indian state utilities by launching the procurement bidding documents and providing implementation support for the same.
- Develop a strategy for enhancing customer experience in the electricity distribution sector and launch report on customer centricity identifying strategies and implementation enablers for customer experience enhancement in the electricity distribution sector.
- Develop a business model and provide implementation support to establish an innovation park and training course for MOP's SGKC as a leading smart grids center of excellence.
- Expand efforts to promote women's empowerment/entrepreneurship in the energy sector.



Photo Credit - DOE

DOE and IUSSTF Sign Solar Decathlon@ India MOU.



Photo Credit - GTG RISE

Closing ceremony of 2nd International Conference on Large Scale Grid Integration of Renewable Energy in India