

U.S.-INDIA STRATEGIC CLEAN ENERGY PARTNERSHIP

EMERGING FUELS AND TECHNOLOGIES PILLAR

July 2023



पेट्रोलियम एवं प्राकृतिक गैस मंत्रालय
MINISTRY OF PETROLEUM AND NATURAL GAS
Government of India



USAID
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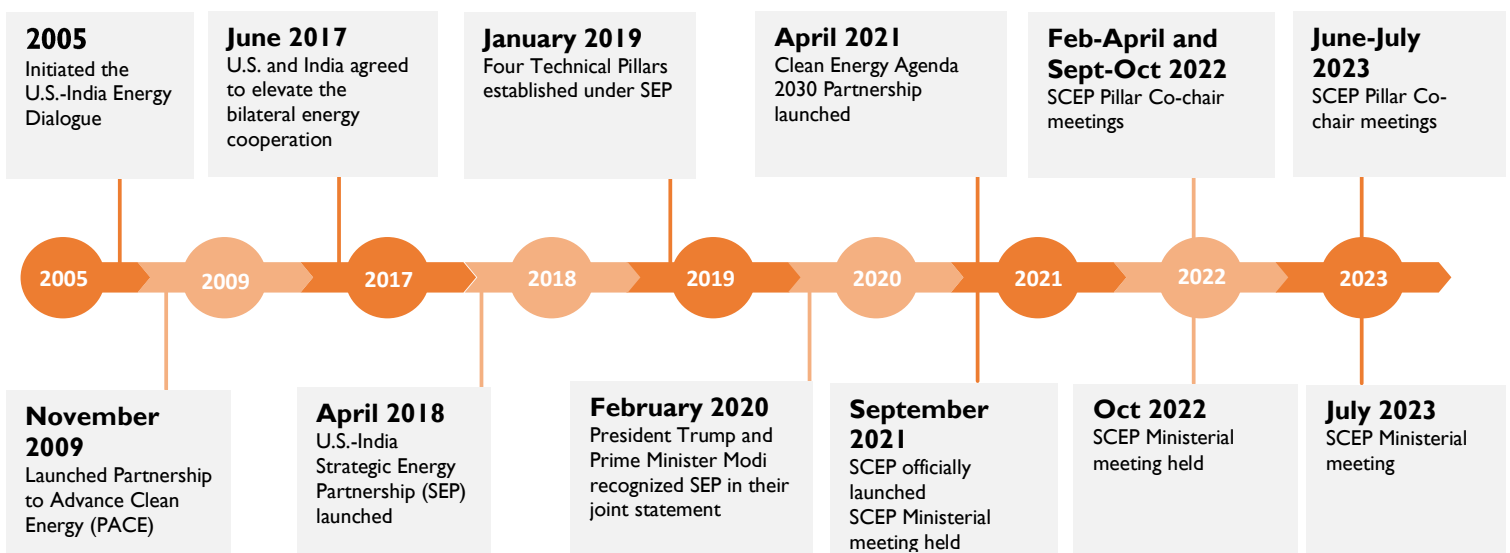
OUTLINE

During 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 bilateral energy dialogue focused on energy security and innovation. The revitalized SCEP will continue to advance energy security and innovation with 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





Emerging fuel and Technologies Pillar Priorities

As part of the revitalized U.S.-India Strategic Clean Energy Partnership (SCEP), the U.S. and Indian governments agreed to launch a new technical pillar for cooperation on Emerging Fuels and Technologies to help reduce emissions across the energy sector. This pillar will advance clean energy pathways utilizing emerging fuels, including converting biomass and other waste resources into cost effective, low-carbon biofuels and bioproducts. Work will be coordinated with other relevant pillars under the SCEP. The priorities for the Emerging Fuels and Technologies Pillar are:

1. Promote sustainable biofuel production and use to decarbonize all modes of transport, including sustainable biofuels for air and sea transport, and advance waste-to-energy efforts. Facilitate public-private dialogue on biofuels development and deployment.
2. Facilitate the commercialization and deployment of hydrogen technologies across applications and sectors, including to decarbonize the transport, industry, and power sectors and for use as energy storage. Facilitate public-private partnerships, and leverage global partnerships on hydrogen, including to promote safety, codes and standards.
3. Accelerate transport electrification and decarbonization, particularly for medium- and heavy-duty vehicles, by increasing efficiencies and reducing emissions of freight transport, advancing deployment of long-haul trucks powered by batteries and fuel cells, enhancing EV charging infrastructure, and collaborating with private industry to accelerate deployment of cleaner vehicles, and development of battery supply chains

U.S.-India SCEP Ministerial Chairs



Jennifer M. Granholm

Secretary
U.S. Department of Energy



Hardeep Singh Puri

Minister of Petroleum and Natural Gas & Minister of Housing and Urban Affairs
Government of India

Responsible Oil and Gas Pillar Co-Chairs



Esha Srivastava

Joint Secretary,
International Cooperation
Ministry of Petroleum and Natural Gas



Michael Berube

Deputy Assistant Secretary
for Sustainable
Transportation, U.S.
Department of Energy





U.S.-India Public-Private Engagement to Support Hydrogen Development and Deployment

Collaboration between the Department of Energy (DOE), Ministry of New and Renewable Energy (MNRE), and U.S. and Indian industry continues under the public-private Hydrogen Task Force. A meeting was held in November 2022 with task force members on the role of hydrogen in India’s energy transition, implementation of the national hydrogen strategies in both countries, and industry perspectives on how to grow demand and incentivize hydrogen deployment.



DOE-MNRE Interaction with Hydrogen Industry-Event hosted by USISPF (Photo Credit: USISPF)

Hydrogen Safety Workshop (under auspices of the Hydrogen Task Force)

The U.S. Department of Energy (DOE) and the U.S.-India Strategic Partnership Forum (USISPF), in partnership with the Ministry of New and Renewable Energy (India), held a deep-dive safety workshop to ensure that safety information, resources, and best practices are widely disseminated as the hydrogen industry ramps up. The June 2023 workshop was also conducted in collaboration with the Center for Hydrogen Safety (CHS), a global non-profit dedicated to promoting hydrogen safety and best practices worldwide.

Sunita Satyapal US D...	Jill Evans		Chitra Rajagopal
Nick Barilo	Umesh Dhake (AIChE...	Darlene Schuster CE...	
		AJAY YADAV	

National Green Hydrogen Mission targets			
At least 5 MMT GH ₂ Annual Production	60-100 GW Electrolyser capacity	50 MMT Emissions Averted	
₹ 1 lakh crores Import Savings	125 GW RE Capacity for GH ₂ Generation	\$100 bn Investment	

<p>US-INDIA Strategic Partnership Forum</p> <p>National Hydrogen Strategies and Deep Dive on Hydrogen Safety Activities</p> <p>U.S.-India Hydrogen Task Force</p> <p>Virtual Workshop June 14, 2023 8:30am EST – 10:30am EST // 6:00pm IST – 8:00pm IST</p>
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Participants in the Hydrogen Safety Workshop (Photo Credit: USISPF)



Promote Green Hydrogen Deployment

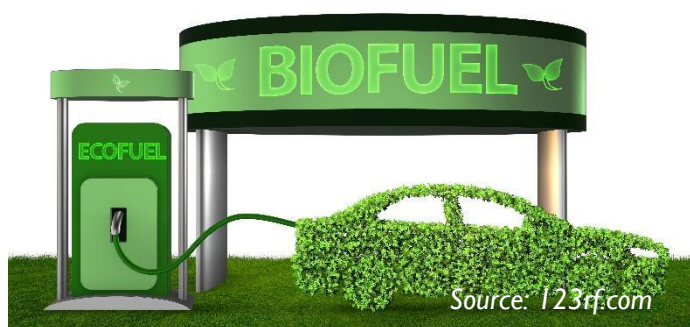
USAID and MNRE collaborated through the South Asia Regional Energy Partnership (SAREP) program on advancing green hydrogen through a range of initiatives. This included two techno-commercial feasibility studies and tender design for 100 and 50 ton per day green ammonia plants in Uttar Pradesh and Punjab for NTPC Renewable Energy Ltd. The study covered techno-commercial aspects of green ammonia generation and hydrogen storage infrastructure best suited to the site. A comprehensive research report on the investment landscape of green hydrogen in India was also developed. The report will enable investments by simplifying the green hydrogen sector value chain for financing institutions. To enhance the understanding of the financial institutions and banks, a knowledge sharing workshop was organized for around 100 participants from 15 financial institutions. USAID's SAREP program also partnered with Skill Council for Green Jobs for a training program to increase techno-economic awareness on emerging fuel with participants from India and South Asian countries.



The launch of the report on the Investment Landscape of Green Hydrogen in India during SACEF 2023 (Photo Credit: SAREP)

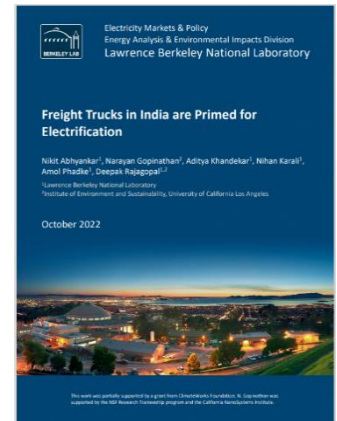
U.S.-India Biofuels Task Force

Under the public-private Biofuels Task Force, both sides are working to share information and best practices, market-based insights, inputs for policy development, and identification of research and deployment projects that are beneficial to both U.S. and Indian biofuels sectors. The industry-led working pillars organized along three working pillars focused on ethanol production and trade, advanced biofuels, and industrial biofuels. Through these groups, a report has been commissioned on developing a carbon market framework for India, and efforts are underway to develop industry recommendations for waste-based biofuels. As part of the Task Force, an MoU was signed in January 2023 between the Society of Automobile Manufacturers (SIAM) and the US Grains Council (USGC) to create ethanol awareness, increase production capacity and efficiency and advocate for ethanol's wide adoption.



Electrifying Freight Trucks in India

The Department of Energy supported a technoeconomic analysis of electrifying freight trucks in India, implemented by Lawrence Berkeley National Laboratory. The study, published in October 2022, found that advances in battery technology and dramatically decreased battery costs in recent years open up an opportunity to make electrification of heavy freight trucks more viable. The report demonstrates that with the right policies and incentives, battery electric trucks could be more affordable to operate than diesel, and could significantly reduce GHG emissions, oil imports, and the cost of freight movement in the country. The study suggests next steps for freight electrification for heavy-duty vehicles and a similar analysis is underway for medium-duty trucks.



Scaling E-mobility in India and South Asia

USAID collaborated with Niti Aayog, INVEST India, Indian Railways, Convergence Energy Services Ltd (a Govt of India enterprise) and Delhi Government through the SAREP program to enable large-scale deployment of Electric Vehicles (EVs) and E-mobility services through a range of initiatives. This included developing an EV Charging Station Assessment Tool (CSAT) for Delhi Government that helps in addressing key questions in planning EV public charging stations for Delhi. The tool helps in setting targets for installing EV charging stations and helps in identifying priority sites for installation of chargers. A comprehensive investment landscape report on the e-mobility sector in India was prepared in collaboration with Invest India which is the national investment promotion and facilitation agency of India. In addition, more than 150 meetings between high potential E-mobility investee companies and prospective investors were facilitated during an E-mobility Investment Mobilization Platform event that was conducted by USAID's SAREP. USAID is collaborating with private sector players like Tata CleanTech and Bharat Light and Power to structure innovative financing instruments to enable access to capital and low-cost financing to E-mobility players. USAID's SAREP continued its engagement with Indian Railways (IR) on the implementation of its EV policy, involving EV vehicle uptake by railway personnel and EV charging station for deployment in railway stations. In collaboration with Power Sector Skill Council, USAID's SAREP developed an EV Training Handbook to help develop a skilled cadre of technicians to install, commission and operate the growing number of EV charging stations. USAID's SAREP facilitated a study-trip of Royal Govt of Bhutan delegates to learn and exchange knowledge about the EV landscape in India, the EV financing ecosystem, SAREP's interventions in EV, and Bhutan's own initiatives in this area. USAID's SAREP is also collaborating with CESL in modifying the tender documents for the National Electric Bus Program (NEBP) and developing an implementation model for charging as a service including designing bid documents and onboarding private charge point operators.



Launch of Investment Landscape Report on E-mobility on 15th March' 23 (Photo Credit: SAREP)



Bhutanese delegation visit to Battery Swapping Station (Photo Credit: SAREP)



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