

# U.S. - INDIA STRATEGIC CLEAN ENERGY PARTNERSHIP

## EMERGING FUELS AND TECHNOLOGIES PILLAR

October 2022



# PARTNERSHIP OVERVIEW

## 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



UN Climate Change Conference Glasgow 2021 (November 2021)



*"We can create an environment that raises the standard of living around the world. And this is a moral imperative, but it's also an economic imperative – if we fuel greater growth, new jobs, and better opportunities for all our people"*

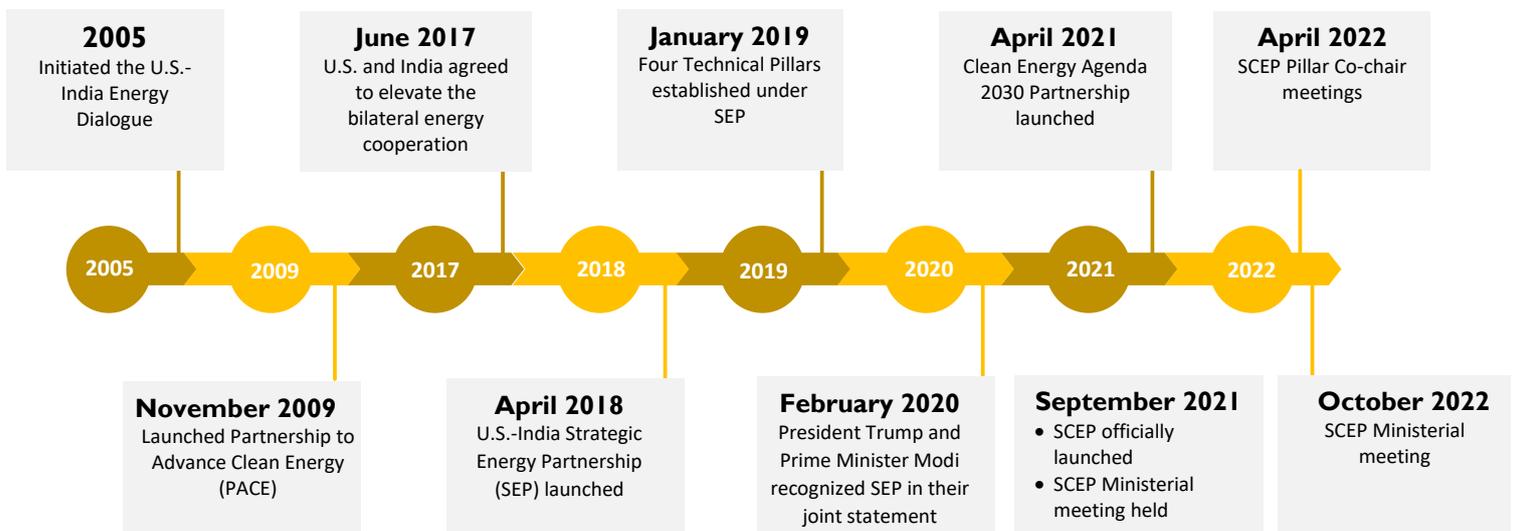
**Joe Biden**  
President of the United States



*"With the India-U.S. Climate and Clean Energy Agenda 2030 partnership, together we will help mobilize investments, demonstrate clean technology, and enable green collaborations."*

**Narendra Modi**  
Prime Minister of India

## THE JOURNEY SO FAR



# CURRENT AND FUTURE ACTIVITIES IN SUPPORT OF PILLAR PRIORITIES



## 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

## Emerging Fuel and Technology Pillar Co-Chairs



**Esha Srivastava**

Joint Secretary,  
International Cooperation  
Ministry of Petroleum and Natural Gas



**Michael Berube**

Deputy Assistant Secretary  
for Sustainable  
Transportation, Department  
of Energy (DOE)



# CURRENT AND FUTURE ACTIVITIES IN SUPPORT OF PILLAR PRIORITIES

## U.S.-India Public-Private Biofuels Task Force

At the August 2021 SCEP Ministerial Meeting, the U.S. and India established a public-private Biofuels Task Force to integrate public and private sector inputs on concrete initiatives that can contribute to energy security, foster the exchange of the latest technology, facilitate adoption of business models in the Indian market that accelerate the development of the biofuels sector, and strengthen the U.S.-India bilateral trade relationship. The Task Force is industry-driven and focused on sharing 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. Initial suggested topics included life cycle energy efficiency and emissions reduction, oil refinery output optimization, including co-processing, biofuel pricing mechanism and policy, sustainable and reliable supplies for grain-based biofuel industry, research on biofuels market circulation and ethanol blending policy, research on feasibility of strategic investment cooperation for ethanol and other advanced biofuels.



*U.S. and Indian Stakeholders Discuss Biofuels Cooperation in Delhi*

## Sustainable Aviation Fuel (SAF) and Renewable Diesel Trilateral Cooperation

The U.S. Department of Energy (DOE) proposes to develop and implement a trilateral cooperation initiative with India and Brazil to accelerate research, development, and policy options for bringing sustainable aviation fuels (SAF) to market, while also sharing lessons learned in adopting modern renewable alternatives for the diesel cycle in the transportation sector. Achieving a sustainable path for the production and adoption of SAF would help decrease the carbon footprint of the air transportation sector. Most SAF production technologies co-produce renewable diesel, which can be used as a drop-in fuel in any diesel application (marine, long haul trucking, commercial vehicles, rail, off-road vehicles, and home heating).



# CURRENT AND FUTURE ACTIVITIES IN SUPPORT OF PILLAR PRIORITIES

## U.S.-India Public-Private Hydrogen Task Force

The United States and India established a public-private U.S.-India Hydrogen Task Force co-chaired by the Department of Energy and Ministry of New and Renewable Energy to facilitate an ongoing and meaningful dialogue among U.S. and Indian government officials, industry representatives, and other stakeholders to scale up hydrogen technologies and bring down the costs of their deployment. This activity supports U.S. and Indian goals to accelerate decarbonization through development of emerging technologies to support a clean energy transition. The H2 TF is working to facilitate information exchange on existing and planned hydrogen projects; assess the state of H2 technology and review current policy and regulations; pursue innovation through joint studies, R&D collaborations, technology demonstrations, and pilot projects; and propose technical and/or policy actions to help scale deployment. The activities are aligned among five initial working groups including transportation, industry, energy storage, safety codes and standards, and finance. Several listening sessions with industry were held, including a meeting of the Hydrogen Task Force held on May 2022 in Delhi.



## Project Preparation and Transaction Support for Deployment of India's Green Hydrogen Projects.

This activity will support project preparation and transaction for deployment of green hydrogen projects in support of India's green hydrogen ambition. As of July 2022, USAID kickstarted technical assistance to NTPC-REL for conducting a feasibility study and tender design for a 50 tons per day green ammonia plant in Punjab. The study will cover the technical aspects of ammonia generation and storage infrastructure that is best suited to the site. The proposed study will help NTPC-REL in ascertaining technical and commercial viability of such projects and support in planning future projects based on green hydrogen.



*U.S.-India Hydrogen Task Force Meeting*



# CURRENT AND FUTURE ACTIVITIES IN SUPPORT OF PILLAR PRIORITIES



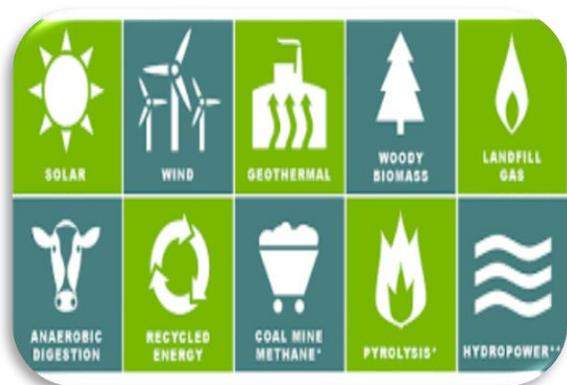
## Collaboration on Clean Cities through Electrification of Transport

This project will build upon previous work under the Clean Cities initiative to support power system planning, including EV adoption and planning for EV charging infrastructure.

Power System Planning for EV Adoption for collaboration with Government of India, local modelers, energy system experts, and other stakeholders to develop and apply custom and/or commercial power system modeling tools for analyzing the bulk power system impacts of high levels of electric vehicle adoption, with and without smart charging infrastructure and/or time of use electricity pricing.

Charging Infrastructure for two-wheeler and four-wheeler electric vehicles considering:

- Sizing and siting of charging stations
- Standardization of chargers
- Coordination between storage and PV systems
- Economic considerations, including the cost of EV, battery, tariff, range, etc.



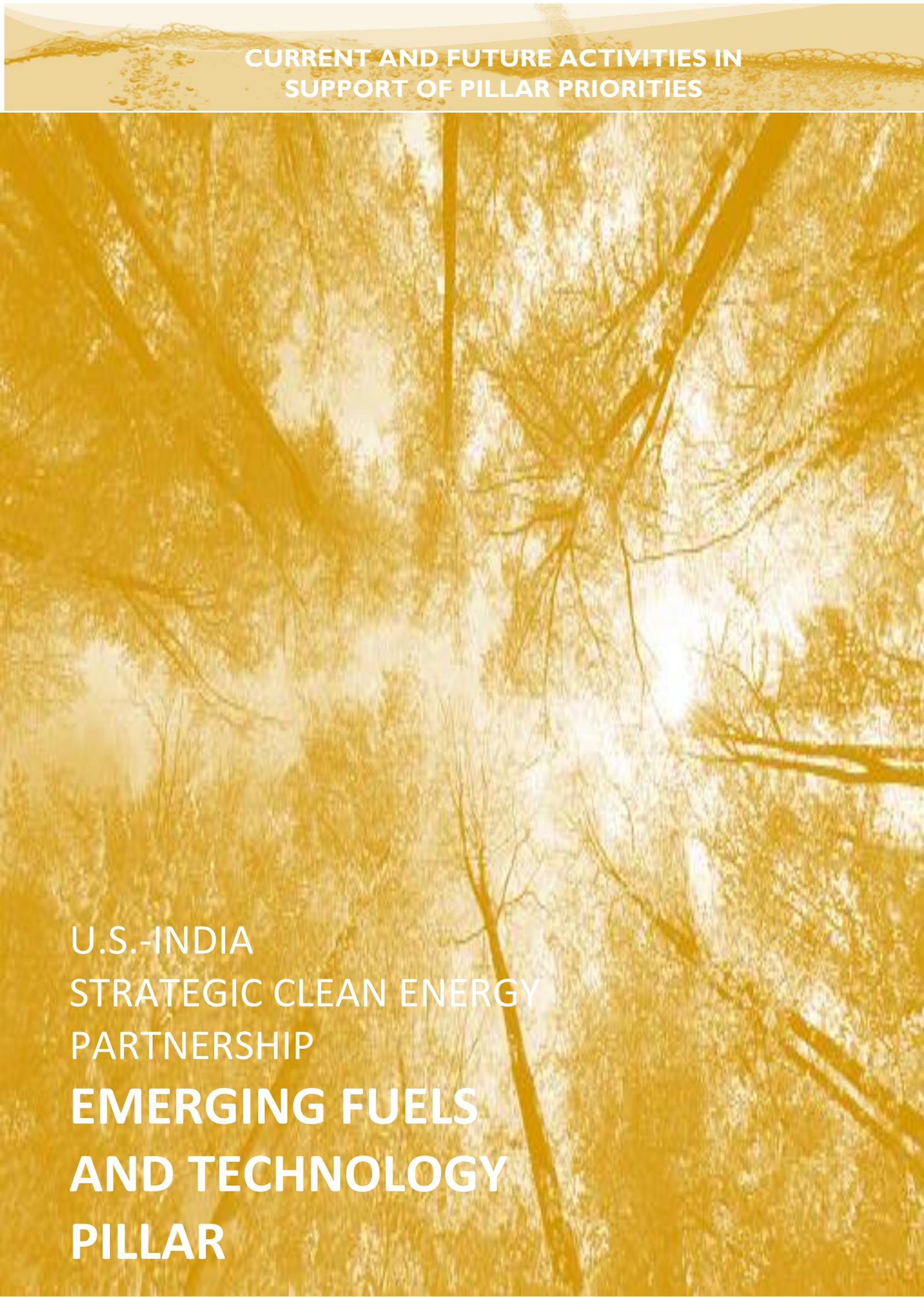
## Industry Roundtable/Seminar on Biofuels

Several Indian companies are undertaking pilot and commercial scale project in the area of 2G ethanol production, green hydrogen manufacturing, Compressed biogas, e-mobility value chain etc. Several Indian companies are collaborating with USA based Licensors/technology providers to set up ethanol and other Carbon sequestered products. MoPNG has proposed to conduct an Industry Roundtable to facilitate Indian and US businesses to have one-on-one business meetings and provide platform to forge commercial collaborations.

## USTDA's Global Procurement Initiative

Under U.S. Trade and Development Agency's (USTDA) Global Procurement Initiative, USTDA is developing an Interstate Clean Energy Procurement Program (ICEPP or Program) for India, considering six (6) states (Gujarat, Kerala, Haryana, Tamil Nadu, Maharashtra, and Punjab) and possibly one (1) additional state (potentially West Bengal). The ICEPP will consist of three components, in-country workshop, a virtual training series, and a study tour to the United States. The in-country workshop will likely be held in New Delhi with participants of the program representing the participating Indian states.





**CURRENT AND FUTURE ACTIVITIES IN  
SUPPORT OF PILLAR PRIORITIES**

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