

The US-India Clean Energy Partnership and Quad Provide Overlapping Pathways to Produce Clean Energy

By Nischal Dhungel and Sethuram Senthil Kumar

India, with a population of [1.4 billion](#) and rapidly growing energy demands, is undergoing a significant transformation in its energy sector. Central to this transformation is a robust partnership with the United States, strategic cooperation within the Quad framework, and collective efforts across the Indo-Pacific region to advance clean energy solutions and foster a greener, more resilient future.

Mr. Nischal Dhungel and Mr. Sethuram Senthil Kumar, Consultant at the World Bank Group and Energy Engineer at both TRC Companies, Inc. and MCFA, respectfully, explain that "Robust partnerships with the United States, strategic cooperation within the Quad framework, and collective efforts across the Indo-Pacific region drive India's transformation in the energy sector."

The [US-India Clean Energy Partnership](#) supports India's plan to install 450 gigawatts (GW) of renewable energy by 2030 and achieve net zero carbon emissions by 2070. As of April 2024, India had installed 190 GW of renewable energy capacity. For example, US-based First Solar [invested](#) \$700 million in a solar manufacturing plant in Tamil Nadu, with an annual capacity of 3.3 GW. This plant produces First Solar's "Series 7" photovoltaic (PV) solar modules, catering specifically to the Indian market, which use 50% less energy and only a third of the water compared to polysilicon modules produced in China. This partnership exemplifies the critical role of US-India cooperation in accelerating India's renewable energy transition, enhancing technological advancements, and achieving mutual climate goals. Despite these admirable advances, India will still need to install an additional 260 GW of capacity within six years to meet its 2030 target.

The Quad's Role in Indo-Pacific Clean Energy Initiatives

The Quad countries—Australia, India, Japan, and the United States—play a critical role in promoting clean energy and climate resilience in the Indo-Pacific region. The Quad collectively [houses](#) 1.9 billion people, makes up 24% of the world's population, contributes 35% of global GDP, and accounts for 18% of international trade. Quad countries are pivotal in [Indo-Pacific](#) agenda-setting as both Japan and the United States have official Indo-Pacific strategy documents. Moreover, Quad initiatives counterbalance Chinese influence in battery and critical mineral supply chains. At the 2022 Quad Leaders' Summit, the Quad countries launched the [Quad Climate Change Adaptation and Mitigation Package](#) (Q-CHAMP), focusing on climate ambition, clean energy, adaptation, and resilience. The [Quad Clean Energy Supply Chain Diversification Program](#) will fund research and feasibility studies on solar photovoltaics, electrolyzers, and batteries, with the Australian government pledging \$50 million to support these studies. Moreover, the [Australia-India Economic Cooperation and Trade Agreement](#) (ECTA) is a major milestone designed to facilitate strategic investments by Indian corporations in Australia's critical mineral mines, such as lithium and cobalt, which are crucial for battery production. There is tremendous potential for advancements and innovation in technologies, ranging from mineral mining to the manufacturing of clean energy products through ECTA.

The US Government's Broader Efforts

Regionally, India's collaboration with [Bhutan](#) and [Nepal](#) centers on renewable energy, specifically hydropower development. Nepal signed a long-term [agreement](#) to export 10,000 MW of power to India over the next decade, and both countries inaugurated three cross-border transmission lines. In September 2017, the US Government's [Millennium Challenge Corporation](#) (MCC) signed a \$500 million compact with Nepal to maintain road quality, increase electricity reliability, and facilitate cross-border electricity trade, supporting India's clean energy journey. The MCC and the Indo-Pacific strategy are [separate](#) initiatives, but they are both part of the US government's broader efforts to promote economic development and

strategic cooperation in the Indo-Pacific region. This regional collaboration, along with US engagement like the MCC with Nepal, provides significant support to India's clean energy journey, showcasing the power of cooperative efforts in driving sustainable development.

Government of India Initiatives in Clean Energy

Recognizing the urgent need to reduce reliance on fossil fuels and address environmental concerns, the Indian government has launched ambitious policies and initiatives aimed at establishing a more sustainable and self-reliant energy system. India's [National Electric Mobility Mission Plan \(NEMMP\)](#), launched in 2013, aims to boost hybrid and electric vehicle adoption, targeting annual sales of 6-7 million vehicles and saving 9,500 million gallons of crude oil. The [Faster Adoption and Manufacturing of Hybrid & Electric Vehicles \(FAME India\)](#) scheme, introduced in the 2015-16 Union Budget with \$9.2 million, and its [Phase II](#) with a \$1.2 billion budget over five years, have significantly increased electric vehicle sales. Additionally, India has become a [major](#) biofuel producer through policies like the [National Biofuel Policy](#), aiming for an 11.5% ethanol blend in 2023 and a 20% blend by 2025. The biodiesel sector remains fragmented due to raw material shortages, high feedstock costs, and government policies favoring ethanol, resulting in a low blend rate of 0.1% in 2023. The [Production Linked Incentive \(PLI\) Scheme for Advanced Chemistry Cell \(ACC\) Battery Storage](#) promotes domestic manufacturing with \$2.2 billion allocated to reduce electric vehicle costs. The abovementioned initiatives, including the [Rooftop Solar Scheme](#), are crucial, but support for the United States, along with other Quad members, will further accelerate India's renewable energy deployment.

A recent [research report](#) highlighted the positive impacts of initiatives like NEMMP and the National Biofuel Policy but called for implementation to be improved and regional disparities to be addressed. The report recommends a multifaceted approach to accelerate India's green energy transition, including strengthening grid infrastructure, streamlining regulatory processes, providing financial incentives, promoting R&D, and addressing social and environmental concerns.

Future Collaborations and International Institution Efforts

India's proactive approach to adopting alternative fuels and international collaborations enhances its clean energy transition, setting a strong example for other nations. These efforts are complemented by several multilateral initiatives that go beyond the Quad. For example, the [Global Biofuels Alliance \(GBA\)](#), launched at the G20 Summit in India in 2023, aims to enhance global biofuel deployment. Similarly, India Co-founded the International Solar Alliance (ISA), partnering with countries like [France](#), [Germany](#), [Japan](#), and the [United States](#) to focus on advancing solar, wind, and clean energy technologies. These partnerships facilitate investment, technology transfer, and knowledge sharing.

The World Bank (WB) is collaborating with India on energy efficiency measures targeting residential and industrial sectors to avoid tons of CO2 emissions and prevent the need for 10 GW of additional generation capacity. As of March 2023, the WB's [India Energy Efficiency Scale-up Program \(EESL\)](#) made significant progress in developing sustainable business models and institutional strengthening for energy efficiency. Current achievements [include](#) over 80% progress towards lifetime energy savings and avoiding 265 million tons of CO2 emissions associated with projected lifetime savings from LED bulbs, LED tube lights, energy-efficient ceiling fans, and LED streetlights sold via EESL programs.

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These multi-strand collaborations are crucial for advancing clean energy solutions and fostering a greener, more resilient future. The Quad's clean energy initiatives align with broader goals of promoting a free, open, inclusive, and resilient Indo-Pacific. By leveraging their collective strengths and resources, Quad countries, especially the US and India, set a strong example for addressing the region's clean energy needs and contributing to global climate goals through multilateral and regional cooperation.

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