

# Greener Industries, Stronger Economies

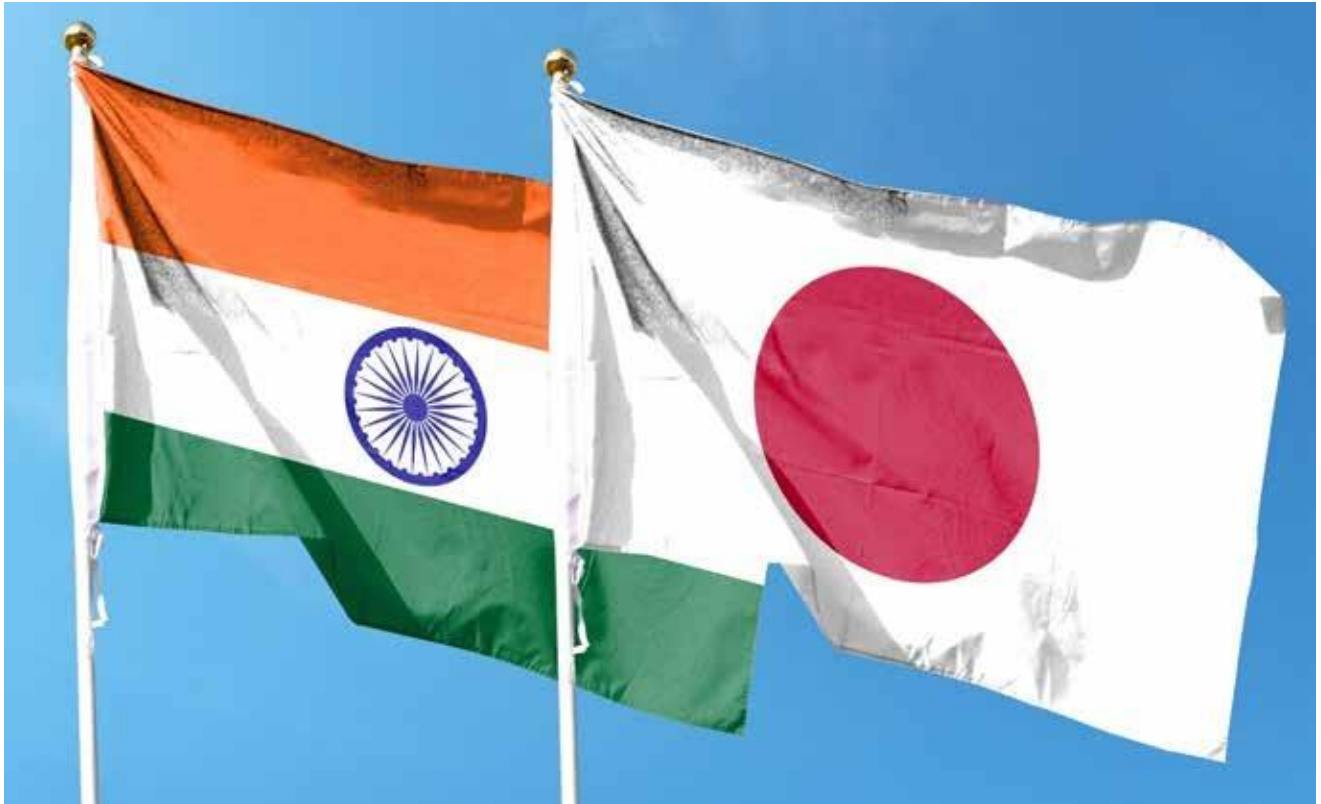
## Japan-India Collaboration on Technology Transfer for a Sustainable Future

In India's ambitious bid to achieve net-zero emissions by 2070, a collective and concerted approach, involving multiple industries and stakeholders, is the need of the hour. With Article 6 of the Paris Agreement emphasizing on international collaboration, the project teams at **IGES**<sup>1</sup> and **TERI**<sup>2</sup> detail how India and Japan are engaging towards the goal by knowledge-sharing and technology transfer.

India is the world's most populous country with approximately 1.43 billion people and is also the world's fastest growing economy. This acts as a big deterrent in promoting economic development in a sustainable manner so that India can address environmental

problems and meet its target to become a net-zero economy by 2070. Overcoming this challenge requires a large-scale switchover from less efficient and highly polluting technologies and practices to highly efficient, environment-friendly technologies (ETs).

The switch to ETs need to be undertaken not only in the materials, equipment and processes that are used in India's industrial sector—which is a prime driver of India's economic development, accounting for about 28 per cent of GDP—but also must



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extend to all the other sectors of the economy that are witnessing rapid expansion in pace with India's overall growth—airports, commercial buildings, communication, housing, power, roads and railways, shipping, etc.

A significant portion of industrial energy demand in India is powered by fossil fuels, especially in hard-to-abate sectors like steel, cement, chemicals, and petrochemicals. The industrial sector alone consumes about 56 per cent of the country's energy and is responsible for 53 per cent of CO<sub>2</sub> emissions. It also contributes to environmental challenges such as air and water pollution. To meet India's net-zero targets, it is crucial for the entire industrial sector to adopt energy-efficient technologies (ETs). However, this is a major challenge due to the vast diversity in operations,

product types, and energy use across industries, which include both large-scale enterprises and small and medium-sized enterprises (SMEs). SMEs are particularly important, representing over 90 per cent of industrial enterprises, 45 per cent of industrial output, 40 per cent of exports, and employing a significant workforce.

## JITMAP

In order to address this challenge, The Energy and Resources Institute (TERI), India and the Institute for Global Environmental Strategies (IGES), Japan have partnered to successfully implement a model titled Japan-India Technology Matchmaking Platform (JITMAP) since 2016 for the transfer of ETs from Japanese technology suppliers to Indian industrial end-users—particularly to Indian SMEs, which tend to lack the

technical capacities to achieve energy efficiency and emissions reduction on their own. The JITMAP has essentially been undertaken in bilateral (Japan–India) mode, involving public and private entities in both the countries with a focus on enabling business-to-business (B2B) transactions between the technology suppliers in Japan and the industrial end-users in India. The ETs include low-carbon technologies (LCTs), energy-efficient technologies (EETs), technologies for monitoring and reducing pollution/contamination of air, water and other natural resources (e.g., continuous emission monitoring systems (CEMS)), and best operating practices (BOPs).

JITMAP activities are structured to bridge the awareness and knowledge gaps that act as barriers to direct



(B2B) transactions between Japanese technology providers and Indian end-users. In many cases, the Japanese manufacturers/suppliers have limited knowledge regarding the (often-unique) needs and local conditions of the Indian end-users, making it likely that the Japanese companies often do not view Indian industries—except, perhaps, large-scale enterprises—as potential customers for their ET products. The Indian end-users too—particularly SMEs—are often unaware of Japanese companies that can provide them with a range of high-efficiency ET options that could bring them significant benefits, both in terms of increased profits with attractive paybacks on investments, as well as reduction in emissions and other forms of pollution, improved productivity, better working conditions, and so on. Also, Indian SMEs are marked by low technical expertise and meagre financial resources, which have further hindered their implementation of Japanese ETs.

JITMAP identifies and addresses these knowledge barriers on both sides in the broad and overlapping domains of awareness generation, technical assistance, and creation of a supportive policy & regulatory environment for technology transfer in India. The primary

JITMAP activities comprise seminars and workshops, feasibility studies, training-of-trainer programmes, and stakeholder meetings covering a number of ETs for various industrial sectors and applications.

#### **Feasibility study enables SME to save over `16 million in annual electricity cost on compressed air system**

In September 2017, a technical feasibility study was conducted by a Japanese expert of the technology under JITMAP in an SME in Maharashtra engaged in manufacturing automobile parts. Based on the study, the SME was advised to implement improved operations in its compressed air system including the replacement of its old air compressor with an energy-efficient inverter compressor and reduction of air leakages, etc. A follow-up survey in January 2024 found that the SME had implemented most of the recommendations, thereby, achieving energy savings of about 30 per cent and reducing electricity consumption by approximately 1.79 million kWh per year—equivalent to around Rs 16.1 million.

By December 2024, JITMAP had conducted 56 feasibility studies, 18

seminars/workshops, 8 training-of-trainer programmes, and 5 stakeholder meetings in different locations in India covering a range of industrial processes and systems including compressed air systems, electric heat pump (EHP) refrigeration systems, steam management systems, energy saving transmission belts, continuous emission monitoring systems (CEMS), etc.

#### **Indian stakeholders' understanding of Japanese ETs was deepened for reducing air and water pollution**

A workshop was held in February 2023 in Pune, Maharashtra, to showcase Japanese ETs that reduce air and water pollution, and to discuss the opportunities for implementing these ETs in the state of Maharashtra. The event was attended by about 65 participants including representatives from state government organizations and energy-intensive industries. A Japanese presenter introduced ETs such as flue gas monitoring technology, process gas analysers, and air and water quality monitoring equipment to enhance the understanding of the participants. During the discussion, the state government organizations welcomed Japan-India collaborative initiatives to help solve environmental problems, while industry participants requested that capacity-building programmes be implemented under JITMAP to increase their awareness and improve their technical skillsets on ETs.

## **Way Forward**

In the coming years, new opportunities for scaling up the mutually beneficial technological cooperation in ETs between India and Japan under JITMAP can be expected, with two key avenues formally opened to incentivize the transition from fossil fuels to low/zero emission options.

At the global level, Article 6 of the



Paris Agreement enables member countries to utilize technology transfer with trading carbon credits and carbon offsets to achieve mitigation targets of countries involved. Countries and entities including their industries and businesses, can derive benefits in terms of energy and cost savings, as well as reduction in carbon emissions and pollution of air and water.

At the bilateral level, steps have been initiated to create a new mechanism for technology cooperation between Japan and India—Joint Crediting Mechanism (JCM)—for which an aide memoire was signed in March 2023 between Ministry

of the Environment, Japan (MoEJ) and Ministry of Environment, Forest and Climate Change, India (MoEFCC). The JCM, as one of the cooperative approaches under the Article 6, will help both countries achieve their respective targets on emission-reduction as well as on solving environmental issues through carbon credits/carbon offsets that will accrue from the transfer and implementation of Japanese ETs in India.

To drive India's sustainable transition, increased participation from both Japanese technology suppliers and Indian end-users in global and bilateral initiatives is essential. JITMAP will

play a pivotal role in facilitating B2B transactions between the two countries, fostering bilateral environmental cooperation. The platform will expand its outreach in both India and Japan to enhance the adoption of target ETs and broaden the network of implementing partners. Additionally, JITMAP will actively engage in the formulation of JCM projects once the agreement is officially signed, ultimately contributing to sustainable, long-term transactions between India and Japan. ■

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