# Joint Credit Mechanism (JCM): Feasibility Study regarding the Application of Japanese Low-carbon Technology in India for FY 2014

## Executive summary

### Background

Industry lies at the heart of economic development. It drives the processes of growth in all sectors of the economy—commerce, agriculture, transport, infrastructure, and household. It also consumes huge amount of energy— in India, the industrial sector accounts for more than half of the total energy consumed in the country. Industrial energy consumption can be reduced by 10–20 per cent through better energy management practices and by the adoption of suitable Energy Efficient (EE) technologies. At the unit level, better utilization of energy will reduce operating costs and improve profitability and competitiveness—both vital, in an increasingly globalized market.

Domestic policies, especially the National Mission for Enhancing Energy Efficiency (NMEEE) has given a boost to the promotion of energy efficiency in the industry sector. The Government of India has estimated that energy saving opportunities of about 10 mtoe exist in the industry sector. The Bureau of Energy Efficiency (BEE) has already initiated the process of introducing a market-based mechanism called PAT (Perform, Achieve and Trade) in India for promoting energy efficiency.

Japan has been a pioneer in the development and commercialization of low-carbon energy efficient technologies in the industrial sector. A number of Japanese low-carbon technologies such as inverter-type air compressors, industrial fans, blowers, waste heat recovery systems, electric/gas heat pumps and so on have good potential for adoption among energy intensive industries in India. The adoption of such low-carbon technologies from Japan by Indian industry will not only reduce their carbon footprint, but at the same time also help them to meet the commitments under PAT.

With an objective to promote energy efficient low-carbon Japanese technologies among energy-intensive industries in India, TERI and Institute for Global Environmental Strategies (IGES), Japan, have successfully undertaken a four-year project aimed at demonstrating low-carbon Japanese technologies with support from Japan Science and Technology Agency (JST) and Japan International Cooperation Agency (JICA). The project had shown that a large energy saving potential exists in compressed air systems in Indian industry.

Hence, a project to promote the application of Japanese low-carbon compressed air technology among Indian industries was conceived. Under the project, feasibility studies on the application of the technology were proposed to be conducted in order to facilitate its uptake in India. In addition, it was proposed to raise the awareness of Indian stakeholders on the Japanese low-carbon air compressor technologies, as well as the JCM scheme and Measurement, Reporting and Verification (MRV) methodologies.

### Objective

The objectives of the project is to conduct feasibility studies regarding the application of compressed air technology in Indian industry and to raise the awareness about JCM scheme among relevant stakeholders in India.

## Facilitation of Joint Site Visits

In order to conduct feasibility studies on low-carbon Japanese compressed air technology in the selected Indian industries, TERI facilitated site selection and visits to the selected sites. Interactions were held with the State Designated Agency of BEE in Maharashtra—Maharashtra Energy Development Agency, located in Pune in order to identify potential sites for undertaking site investigations.

The six industries selected for further investigation are: Mahindra Hinoday, Pune; Ahmednagar Forgings, Pune; Morarjee Textiles Ltd, Nagpur; Arvind Textiles Ltd, Ahmedabad; Raymond UCO Denim, Nagpur; Bombay Dyeing Ltd, Pune. Site visits to the selected industrial sites were conducted jointly with the Japanese experts. The feasibility studies show an attractive potential for energy savings and carbon emission reduction by adoption of energy efficient compressed air system technologies. For example, energy savings, typically in the range of 20–40 per cent can be achieved through adoption of energy efficient inverter-type air compressor. The simple payback period on the investment is about 2–3 years. The total energy savings was found to be in the range of 5–14 per cent in compressed air systems. In quantitative terms, the energy saving potential was in the range of 350–1650 MWh per year and carbon emission reduction potential was in the range of 320-1500 $TCO_2$ per year. The studies show the possibility of high-energy savings and $CO_2$ reduction potential in Indian industry by adoption of the low-carbon air compressor technology from Japan. In addition to adoption of low-carbon compressed air technology, there is a good possibility to adopt smart, real time energy monitoring systems among Indian industries. It can be concluded that the attractive energy savings and consequent $CO_2$ reduction will motivate many large industries and designated consumers to favourably consider investing in these innovative, advanced, and similar low-carbon systems/technologies available commercially in developed Japan.