

# Japan–India Technology Matchmaking Platform: Approach to Promote Japanese Low Carbon Technologies in Indian Industries

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*Resources, Energy, and Development* **16**(1): 9–18

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## ABSTRACT

This paper details the efforts made by Institute for Global Environmental Strategies (IGES) and The Energy and Resources Institute (TERI), under their Japan–India collaborative projects, to promote low carbon technologies (LCT) among small and medium enterprises (SMEs) in India. The empirical evidence gathered during the projects show that three key barriers hinder faster adoption of Japanese LCT among the Indian SMEs: (i) information and knowledge gaps; (ii) networking and communication challenges; (iii) higher cost of the LCT. To bring stakeholders from the two countries together, a multi-stakeholder platform called Japan–India Technology Matchmaking Platform (JITMAP) was developed. The paper outlines how JITMAP, through its online information sharing and on the ground activities, is addressing some of the barriers by promoting awareness enhancement, arrangement of business meetings, study on LCT application (feasibility studies), access to financial schemes, and arrangement of policy and regulatory discussions. There is ample scope to scale-up the JITMAP activities and replicate it as a model for LCT cooperation between other developed and developing countries.

**Keywords:** Low carbon technology transfer, Technology matching platform, JITMAP

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## Introduction

The flow of low carbon technologies (LCT) from developed countries to developing countries will continue to play a crucial role in meeting the targets under the Paris Agreement and the UN 2030 Agenda for Sustainable Development. For India, promoting the implementation of LCT will contribute to achieving the country's Nationally Determined Contribution (NDC) under the Paris Agreement, in general, and in reducing the emission intensity of the industrial sector, in particular, which accounts for 58% of its energy consumption (MSPI 2018).

Japanese companies are globally renowned for their LCT products. India, with its rapidly growing economy and burgeoning energy needs, presents a huge market for the Japanese LCT products. The number of Japanese companies present in India has steadily increased over the last 10 years, from 550 companies in 2008 to 1441 in 2018 (Japan Embassy in India 2018). Nevertheless, a significant market potential remains untapped because the players in both the countries face barriers in accessing and applying the information, knowledge, and expertise that are required for the smooth transfer and adaptation and adoption of Japanese LCT in India. Most Japanese businesses lack information about the Indian market (Fenetre Partners, M+V 2018). Lack of knowledge and information was also cited to be a major reason for the relative low level of Japanese foreign direct investment in India (Mathew and Bera 2012). There is information gap about the market potentials and the business opportunities in both India and Japan (Kumar 2018). Knowledge and information availability is very crucial, given that firms with local knowledge are able to respond far more quickly to changes in demand trends (Kondo 2012).

This paper draws on the empirical insights from collaborative projects undertaken by the Institute for Global Environmental Strategies (IGES), Japan and The Energy and Resources Institute (TERI), India in the past decade (Abdessalem 2018)<sup>1</sup>. During the period, IGES

<sup>1</sup> Details available at <https://pub.iges.or.jp/pub/jitmap-promoting-japanese-low-carbon>

and TERI have interacted with over 10 Japanese technology suppliers and more than 100 Indian end-users for feasibility studies and actual implementation of projects. Interactions were also held with large number of technical agencies, financing institutions, and policymakers to discuss ways of enhancing the implementation and upscaling of Japanese LCT. Therefore, this paper draws on the findings and observations from direct field-level interactions with various stakeholders.

The paper is arranged as follows. Section 2 briefly elaborates the key barriers to promote LCT in India. Section 3 emphasizes on the need for synergized efforts and discusses a model to promote LCT transactions. Section 4 provides a case study of a matchmaking platform, Japan–India Technology Matchmaking Platform (JITMAP), based on the proposed model. Section 5 gives the conclusion.

### Key barriers to promoting Japanese LCT among SMEs in India

Technology transfer involves both vertical technology transfer (from the research and development stage to commercialization) and horizontal technology transfer (from one geographical location to another) (Ockwell, Watson, MacKerron, *et al.* 2008). This paper focuses on horizontal technology transfer of LCT from Japan to India. Therefore, it is situated from the perspective of technology transfer in the low carbon policy debate in the North–South context. IGES and TERI, based on their large number of feasibility studies and interactions with the Indian stakeholders, concluded that India's LCT market, especially in the small and medium enterprises (SMEs) sector, remains largely untapped by Japanese companies. The common barriers to faster adoption of Japanese LCT among Indian SMEs were found to be the following: (i) information and knowledge gaps with regard to technologies, supportive policies, regulations, and financing schemes needed by the Indian SMEs (needs) to those available in Japan (seeds); (ii) networking and communication challenges for Japanese businesses to access and

effectively communicate with decision makers in the Indian SMEs; (iii) higher capital cost of Japanese LCT. Each of these barriers is briefly elaborated in the ensuing sections.

### Information and knowledge gaps

One of the major barriers to faster adoption of Japanese LCT among the end-users in India is the information and knowledge gaps, especially lack of comprehensive databases on LCT, policies, financing schemes, etc. Information is either not available or available but scattered between various institutions. Information about the technical and financial feasibility of LCT [energy-saving potential, investment cost, return on investment (ROI)] is vital for end-users to make reasonable decisions; but often it is not elaborated.

Various efforts were made offering useful information about Japanese LCT (Table 1); however, end-users, particularly SMEs, usually have limited technical capacity to operate and maintain the new imported LCT. Hence, the provision of the information should be coupled with capacity building and training activities.

### Networking and communication barriers

While it is easier for large and well-known Japanese companies to access ‘top Indian decision-makers’ and to communicate with them, it is not always the case for those newly entering the Indian market. The Indian business culture focuses a lot on relationship and trust building (Matthew 2010), which sometimes requires to be built. Interactions with a number of Japanese

companies during the project revealed that though the products and suppliers are well trusted by Indian end-users, often they face challenges of accessing the top decision-makers on their own.

Accessing the ‘top’ decision-makers is also one step of the process as this often starts the communication challenge. Japanese companies, though well known for the quality and reliability of their technologies and products, often face challenges to communicate and present them adequately owing to various technical, social, and cultural differences.

### Higher capital cost

Among the top features that define the Indian market is the fact that it is highly price sensitive. Studies indicate that consumer behaviour tends to lean towards price over value (Arsha Consulting 2017). The intense market competition places Japanese products at a disadvantage (Kondo 2012).

Supporting schemes to promote ‘green’ technologies are abundant in India (Table 2) which can be used to promote Japanese LCT as well; however, most end-users prefer to use these schemes to implement alternative technologies that are available in the market at a lower cost.

### Multistakeholder approach to promote LCT in India

Various supporting stakeholders from both the countries are making efforts to support businesses to address the above-mentioned challenges (Table 3).

**Table 1** Examples of technology databases in Japan

Source	Link to technology database
Ministry of the Environment, Japan	<a href="http://www.env.go.jp/press/files/jp/29036.pdf">http://www.env.go.jp/press/files/jp/29036.pdf</a> (in Japanese)
Kansai Economic Federation (KANKEIREN)	<a href="http://www.kankeiren.or.jp/kankyoen/energy.html">http://www.kankeiren.or.jp/kankyoen/energy.html</a>
UNIDO Investment and Technology Promotion Office	<a href="http://www.unido.or.jp/en/activities/technology_transfer/technology_db/">http://www.unido.or.jp/en/activities/technology_transfer/technology_db/</a>
Japanese Business Alliance for Smart Energy Worldwide (JASE-World)	<a href="https://www.jase-w.eccj.or.jp/technologies/index.html">https://www.jase-w.eccj.or.jp/technologies/index.html</a>
Embassy of Japan in India	<a href="http://www.in.emb-japan.go.jp/itpr_en/00_000519.html">http://www.in.emb-japan.go.jp/itpr_en/00_000519.html</a>
New Energy and Industrial Technology Development Organization (NEDO)	<a href="http://ietd.iipnetwork.org/sites/ietp/files/Japanese%20Technologies%20for%20Energy%20Saving.pdf">http://ietd.iipnetwork.org/sites/ietp/files/Japanese%20Technologies%20for%20Energy%20Saving.pdf</a>

**Table 2** Examples of financing options for SMEs in India

Subsidy schemes	Source of financing	Brief description	To know more, visit
Credit Linked Capital Subsidy Scheme for Technology Upgradation (CLCSS)	Ministry of MSME, Government of India	Facilitate technology up-gradation in MSEs by providing an upfront capital subsidy of 15 per cent (on institutional finance of upto Rs 1 crore availed by them) for induction of well-established and improved technology in the specified 51 sub-sectors/products approved.	<a href="http://www.dcmsme.gov.in/schemes/sccredit.htm">http://www.dcmsme.gov.in/schemes/sccredit.htm</a>
Technology and Quality Upgradation Support for MSMEs (TEQUP)		A grant assistance to the extent of 25% of the project cost for implementation of Energy Efficient Technologies (EET) subject to maximum of 10 lakh is provided. MSMEs to be audited for energy consumption by a qualified Energy Auditor and project/machines installed in the units should lead to minimum 15% reduction in energy consumption.	<a href="http://msme.gov.in/WriteReadData/DocumentFile/technology&amp;quality10.pdf">http://msme.gov.in/WriteReadData/DocumentFile/technology&amp;quality10.pdf</a>
Technology Upgradation Fund Scheme (TUFS)	Ministry of Textiles, Govt. of India	Facilitate induction of state-of-the-art technology by the textile units. Under the Amended TUFS effective from January 13, 2016, only Capital Subsidy is provided [subject to a cap of Rs 30 crore] for eligible units in the Textile sector.	<a href="http://texmin.nic.in/schemes/technology-upgradation-fund-scheme">http://texmin.nic.in/schemes/technology-upgradation-fund-scheme</a>
Scheme for Technology Upgradation/ Establishment/ Modernization for Food Processing Industries	Ministry of Food Processing Industries, Govt. of India	Assist processing industries in the form of grant subject to 25% of the plant & machinery and technical civil work subject to a maximum of Rs 50 lakh in General Areas and 33.33% up to Rs 75 lakh in Difficult Areas	<a href="http://www.mofpi.nic.in/">http://www.mofpi.nic.in/</a>
Integrated Development of Leather Sector (IDLS)	Ministry of Industries & Commerce, Govt. of India	Financial assistance under the Scheme will be investment grant to the extent of 30% of cost of plant and machinery for MSMEs and 20% of cost of plant and machinery for other units	<a href="http://dipp.nic.in/English/Schemes/ILDP/leather_scheme_om.pdf">http://dipp.nic.in/English/Schemes/ILDP/leather_scheme_om.pdf</a>
JICA-SIDBI Financing Scheme (JICA 2008-19)	Japan International Cooperation agency	The loan is used to provide SMEs with funds necessary to invest in energy-saving equipment (and some medical equipment) in the form of two-step loans through SIDBI or three-step loans through intermediary financial institutions.	<a href="http://www.jica.go.jp/english/our_work/evaluation/oda_loan/economic_cooperation/c8h0vm000001rdjt-att/india_140901_01.pdf">http://www.jica.go.jp/english/our_work/evaluation/oda_loan/economic_cooperation/c8h0vm000001rdjt-att/india_140901_01.pdf</a>
JBIC-SBI Green Line (JBIC 2013)	Japan Bank for International Cooperation (JBIC)	For projects contributing to preservation of global environment, i.e. significant reduction of GHG emissions.	<a href="https://www.jbic.go.jp/en/information/news/news-2010/0401-2050.html">https://www.jbic.go.jp/en/information/news/news-2010/0401-2050.html</a>

**Table 3** Examples of India–Japan bilateral collaborations

Stakeholder category	Example		Collaboration
	From Japan	From India	
Government	Ministry of Economy, Trade and Industries (METI) [through Energy Conservation Center Japan (ECCJ)]	Ministry of Power (through (Bureau of Energy Efficiency (BEE))	Developed Energy Conservation (EC) guidelines for industries
	Ministry of the Environment, Government of Japan (MOEJ)	Ministry of Environment, Forests & Climate Change, (MOEF&CC)	Initiated Policy Dialogue to discuss on issues such as Waste management, Air pollution and climate changes, including the Joint Credit Mechanism (JCM) to advance the implementation of LCT in India
	Hyogo Prefecture Government	Gujarat State Government	MOU to expand effective and mutually beneficial cooperation and development on (six) components (ABCDEF), including proportion of business exchange (B) and addressing environmental challenges (E)
Supporting/Financing entities	Small Industries Development Bank of India (SIDBI)	The Japan International Cooperation Agency (JICA)	ODA loan (2 step loans) to enhance energy availability in (Energy efficiency in Small and Medium Industries (SME)
	Indian Renewable Energy Development Agency Limited (IREDA)	The Japan International Cooperation Agency (JICA)	ODA loan (2 step loans) to enhance energy availability in India (more on renewable energy)
	-ICICI Bank -State Bank of India (SBI)	The Japanese Bank for International Cooperation (JBIC)	“GREEN” program to promote renewable energy projects and energy efficiency projects
Private Sector (Business associations, consulting firms, contractors)	Business associations	Business associations	Scheme facilitators
	Local service providers and consultants	Local service providers and consultants	
Research institutes	IGES	TERI	Conduct commissioned projects to promote low carbon technologies application in India

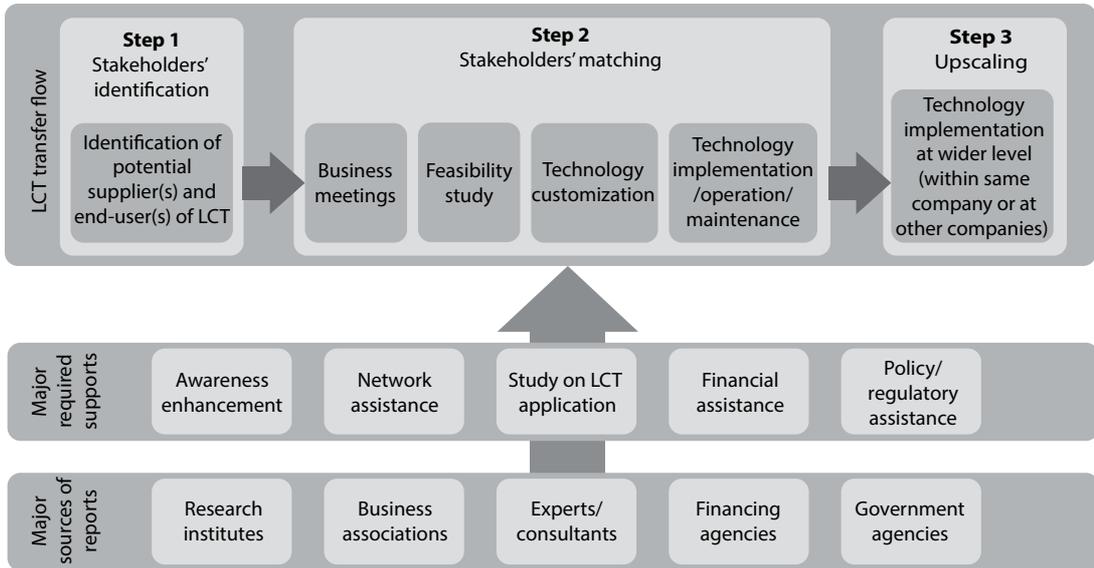
As immediate opportunity and interest grows, there is a need for further collaboration to address all the problems collectively (Sinha 2010). Rather than a partial, there is a need to address the complete process of LCT transfer (Abdessalem 2015). For instance, the type of required support depends on the step of LCT flow, which could be decomposed into three broad steps:

Step 1: Stakeholder identification (Japanese LCT suppliers and potential end-users in India)

Step 2: Stakeholder matching through meetings, feasibility studies, technology customization, and implementation assistance

Step 3: Upscaling of the technology within the same or similar companies in India through awareness creation and technical support.

As each step requires different types of competence, a number of partners (research institutions, business associations, experts, financing institutions, government agencies) have to collaborate in this exercise (Figure 1).



**Figure 1** Schematic diagram of LCT flow, required supports, and potential sources of such supports

## Case study of a technology matchmaking platform to promote LCT in India

This case study summarizes the technology matchmaking platform – JITMAP – developed and implemented jointly by IGES and TERI, with the support from the Ministry of the Environment, Government of Japan (MOEJ), on a trial basis.<sup>2</sup> IGES and TERI, as core members, invite representatives from Business Associations (BA), Supporting/Funding Agencies (FA), and Government Agencies (GA), from India and Japan to join the platform as dialogue (consulting) members.

### How does JITMAP works?

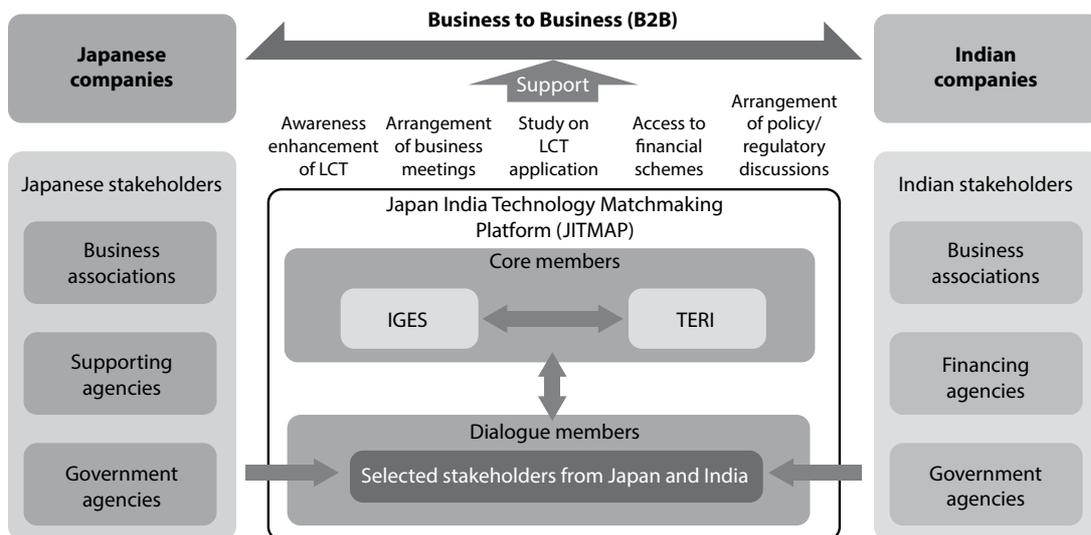
In order to address the challenges mentioned earlier and to ensure synergy among the multiple actors, JITMAP members (core members and dialogue members) coordinate and collaborate

<sup>2</sup> Activities in Gujarat State in particular are supported also by Hyogo Prefectural Government, Japan through the activities of the IGES Kansai Research Centre as they have signed a Memorandum of Understanding (MOU) with the State Government of Gujarat.

among each other to provide the required support to catalyse the business to business (B2B) matching mainly, and not only, in the form of: awareness enhancement, networking (arrangement of business meetings and onsite feasibility studies), access to financial schemes, and arrangement of policy and regulatory discussions (Figure 2).

### Awareness enhancement to overcome information and knowledge gap and to improve limited technical capacities of end-users

In order to enhance the awareness of Japanese and Indian businesses about ‘seeds’ and ‘needs’ and to ensure ‘online’ matching of B2B, business to financing agencies (B2F) and business to policymaker (B2P), JITMAP provides three types of database systems available technologies in Japan; stimulating policies (in India and Japan); and stimulating financing programmes (in India and Japan). Those databases are shared, along with the case studies and useful links, online and can be easily accessed through the JITMAP website (<http://jitmap.org/>).



**Figure 2** JITMAP promotes technology matching

Besides online sharing, information is exchanged also through various dissemination workshops and training programmes. Awareness workshops and training programmes proved to be vital to enhance the awareness and improve the capacity about using the technologies and the related best operating practices; therefore, the ready-to-use equipment are often provided in combination with the necessary knowledge for their operation and maintenance.

As example, IGES and TERI, with the support of JITMAP dialogue member from Gujarat, namely Gujarat Energy Development Agency (GEDA) and Gujarat Industrial and Technical Consultancy Organization Limited (GITCO), organized an awareness workshop<sup>3</sup> about Japanese compressed air systems and energy-efficient belts. It turned out that around 90% of the participants were not aware about the existence of Japanese suppliers of these technologies in India. IGES and TERI, with the support of JITMAP dialogue member in

<sup>3</sup> Details available at <https://www.iges.or.jp/en/business/20180830.html>

Maharashtra, namely Maharashtra Energy Development Agency, organized a training programme<sup>4</sup> in Pune. Participants expressed that it has substantially improved their technical capacity, especially on the best operating practices.

### Networking support to facilitate the access to and communication with top decision makers

The JITMAP dialogue members are selected from those who have substantial expertise, resources, and wide network with businesses, financing agencies, and government officials; therefore, they are able to facilitate the access and communication of Japanese businesses with a wider set of Indian counterparts, by using their network to arrange business meetings and by arranging on-site visits to study LCT application. For instance, 5 Japanese companies were matched with more than 40 Indian end-users through feasibility studies and onsite business meetings.

<sup>4</sup> Details available at <http://www.jitmap.org/files/Training-of-Trainers-Workshop-Pune.pdf>

## Financial support to alleviate the relatively higher comparative cost of Japanese LCT

For Japanese LCT to compete in the Indian market, key measures should be taken by the Japanese businesses themselves to lower the cost, such as considering to partially or totally manufacture their products in India, benefitting various existing initiatives including 'Make in India', 'Japan Industrial Township', 'Japan Plus'. JITMAP intends to support businesses on this regard mainly through facilitating the access of the Indian end-users to existing financing schemes, if financial support is needed. In addition, it explores with its dialogue members the possibility of providing (within the capacity and feasibility) preferential treatment to companies that are served under the platform in terms of free of charge feasibility studies, assistance to develop bankable proposals, preferential interest rates, discounts in upfront cost, etc. By doing so, JITMAP could contribute in lowering the transaction cost and ultimately the overall cost of LCT while ensuring a win-win situation to all the actors involved. It is worth mentioning that no request for financial support has been received yet, hence the feasibility of the above intention is still to be checked.

### Progress so far under JITMAP

Activities under JITAMP have been increasing over the last three years, thanks to the support of MOEJ and Hyogo Prefectural Government and the involvement of more JITMAP dialogue members. JITMAP has proved to be able to promote the matching of Indian and Japanese businesses and create business opportunities (Figure 3). For instance, 5 Japanese companies<sup>5</sup> were matched with more than 40 Indian end-users through feasibility studies and onsite business meetings. As a result, best operating practices and technologies were implemented at 15 sites, and a number of business opportunities

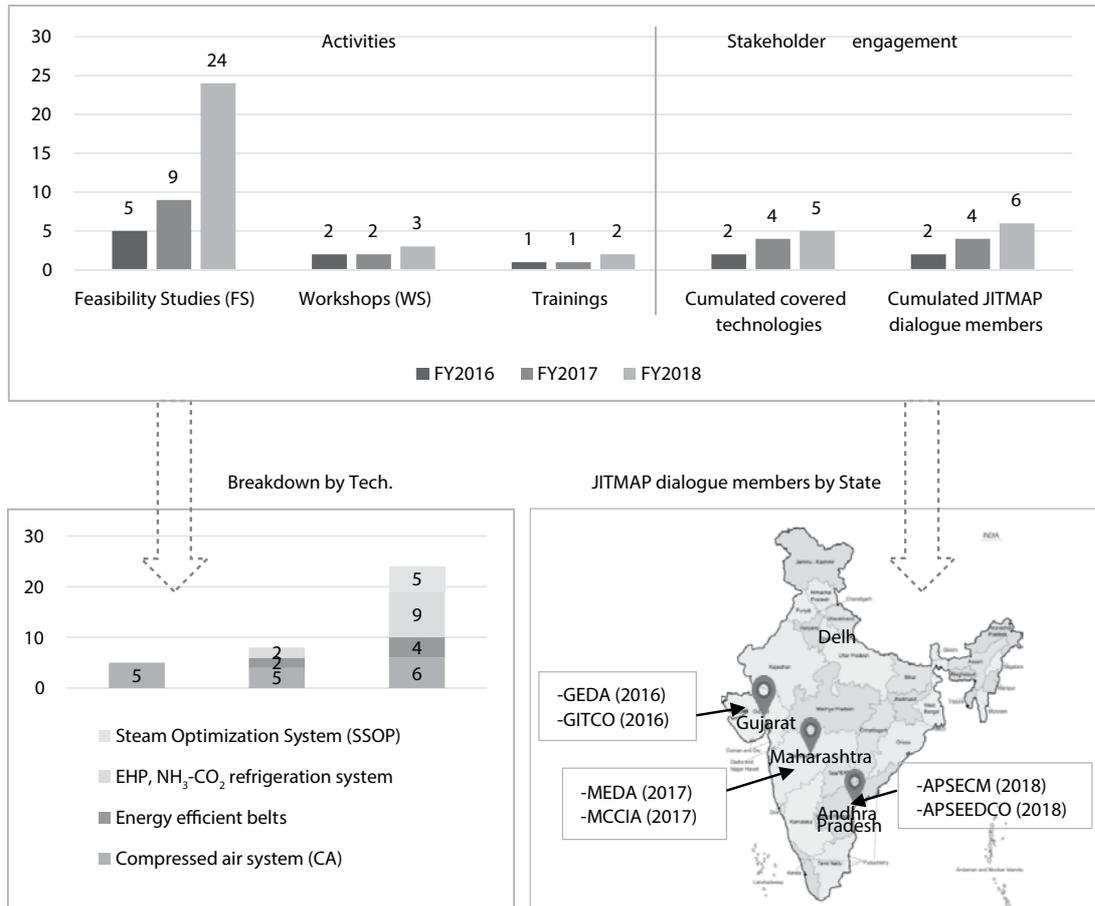
<sup>5</sup> Mayekawa MFG. Co. Ltd., Hitachi IES Co. Ltd., Kobelco Compressors India Pvt. Ltd., TLV International, INC., Bando Chemical Industries Ltd.

were created and are being followed-up. The capacities of more than 150 Indian energy auditors, energy managers, and workers were enhanced through 4 training programmes. The awareness of more than 300 end-users was enhanced through 8 dissemination workshops. Last but not the least, 6 leading government agencies and business associations from Gujarat, Maharashtra, and Andhra Pradesh have joined JITMAP as dialogue members.

JITMAP has proved to be able to promote the matching of Indian and Japanese businesses although it is still on a trial basis. To what extent JITMAP will continue to operate will depend largely on to what extent it will be recognized and supported by the key stakeholders in India and Japan. To strive for such recognition, JITMAP will continue to identify opportunities for Japanese companies through cluster screening, energy audits, feasibility studies, demonstration projects, and disseminations activities. To this end, special focus will be on increasing the number of Japanese companies to be served under JITMAP, while continuing to co-work with the currently served ones. Equally important is to increase the number of JITMAP's dialogue members, especially financing providers, while strengthening the partnership with those who have already joined. JITMAP activities are to be coupled with multiyear project(s) to ensure the continuity of its operation in short term, while exploring the possibilities of making it a financially self-sustained platform in the mid-long term through financial contribution from interested stakeholders.

### Conclusion

India, with its rapidly growing economy and burgeoning energy needs, presents a huge market for the Japanese LCT. The number of Japanese companies present in India has steadily increased over the last decade; however, significant market potential remains untapped due to a number of barriers. The paper focused just on three of them, which have been identified based on IGES and TERI activities in India. The paper acknowledged the efforts of various actors working to overcome



**Figure 3** JITMAP: Activities and progress

those barriers, and proposed a complementary approach in the form of JITMAP which has proved to be able to promote the matching of Indian and Japanese businesses. It holds promise for facilitating LCT transactions between Japan and India. There is a good scope to scale-up its activities and to replicate it as a model for LCT cooperation between other developed and developing countries.

### Acknowledgements

The authors would like to thank Prof. Yutaka Suzuki, Mr. Toshizo Maeda, Ms. Mika Tachibana and Ms. Aditi Khodke (from IGES), Mr. Girish Sethi (from TERI). Special thanks goes to all representatives of JITMAP dialogue members in

Gujarat, Maharashtra, and Andhra Pradesh and to all the Japanese experts for their contribution to shaping JITMAP. The responsibility of any omissions or inaccuracy in the content of this paper are solely of the authors.

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