

Low-carbon business guide: India



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Chapter 1: Overview, background, premises

1.1. Why low carbon development in India is necessary?

As India aims to regain its economic growth momentum at the rate of about 9%, the demand for energy, particularly commercial energy, is expected to rise rapidly. Energy use, as well as its implications such as increasing dependence on fossil fuels, is a subject of growing interest and concern in the country today. The rich–poor divide is quite evident in the patterns of energy consumption. Non-commercial fuels are still predominant sources of cooking, particularly in rural areas, and have adverse effects on air quality and human health. The Government of India, in its Twelfth Five Year Plan (2012-17) approach, has focused on increasing the availability and affordability of, and access to, various forms of cleaner energy (Planning Commission 2012).

According to the Integrated Energy Policy, as compared to 2003-04 levels, to deliver a desired growth rate through 2031-32, India needs to increase:

- Primary energy supply by 4 to 5 times
- Electricity generation capacity by 6 to 7 times

Energy security will be a major concern for driving low carbon development in India. TERI's projections based on detailed quantitative modelling indicate that on a business as usual basis India could be importing 750 million tonnes of oil and 1300 million tonnes of coal in the fiscal year 2031-32. This calls for clean energy intervention both in terms of diversifying the energy mix and in terms of energy conservation. At the global level too, countries and their governments are realizing the importance of moving towards sustainable use of energy to reduce the risks associated with climate change and to improve human well-being.

Extensive use of fossil fuels for industrial development during the last century has been the largest contributor to carbon dioxide emissions. While this form of energy use is likely to continue, at least in the near future, enhancing efficiency in generation and consumption of energy would be the main strategy for development with minimized greenhouse gas emissions. Energy choices today would shape the course of development in the coming decades.

1.2 How are the low carbon development strategies articulated in Indian policy?

The Twelfth Five Year Plan of India recognizes that the country “needs to adopt a low carbon strategy for inclusive growth in order to improve the sustainability of its growth process, while carbon mitigation will be an important co-benefit. Any such strategy must ensure that the focus is not just on low carbon development, but on increasing productivity that effectively lowers the use of fossil fuels.” At the 15th Session of the Conference of Parties (COP 15) to the United Nations Framework Convention on Climate Change, India along with their BASIC partners drafted the “Copenhagen Accord and has pledged to reduce the emissions intensity of their GDP by 20- 25% by 2020 in comparison to their respective 2005 levels

The Energy Conservation Act of 2001 provides a legal mandate for the implementation of the energy efficiency measures through the institutional mechanism of the Bureau of Energy Efficiency (BEE) in the Central Government and designated agencies in each state. The National Action Plan on Climate Change (NAPCC) identifies measures that promote our development objectives while also yielding co-benefits for addressing climate change effectively. It outlines a number of steps to simultaneously advance India's development and climate change-related objectives of adaptation and mitigation.

The National Mission on Enhanced Energy Efficiency (NMEEE), one of the eight missions of the NAPCC was launched to scale up implementation of energy efficiency in India. The flagship of the Mission is the Perform, Achieve and Trade (PAT) mechanism, which is a market-based mechanism to make improvements in energy efficiency in energy-intensive large industries and facilities more cost-effective by certification of energy savings that could be traded.

The objective of the scheme is to set targets for energy efficiency improvement for each industrial unit/establishment, which is a designated consumer (DC) under the Energy Conservation Act. There are eight DCs considered under the scheme, namely Aluminium, Cement, Fertilizer, Pulp and paper, Iron and steel, Power, Textile, and Chlor-Alkali.

Policy articulation for low carbon development in India

- The Twelfth Five Year Plan of India recognizes that the country needs to adopt a low carbon strategy for inclusive growth.
- Under the Copenhagen Accord, India has pledged to reduce the emissions intensity of their GDP by 20- 25% by 2020 in comparison to their respective 2005 levels.
- The Energy Conservation Act of 2001 provides a legal mandate for the implementation of the energy efficiency measures.

In order to enhance the cost effectiveness of this mechanism, facilities which achieve savings in excess of their mandated reduction would be issued Energy Savings Certificates (ESCerts) for the savings which are in excess of their mandated target. These certificates can be used by other facilities for compliance if they find it expensive to meet their own reduction target. The targets are plant specific with a lower target for the efficient units and a higher target for the inefficient ones (BEE 2011).

The Indian government has recognised the importance of lowering the country's greenhouse gas emissions as part of an international effort to limit global warming. India has stated voluntary targets to reduce its greenhouse gas emissions per unit of economic output by 20-25% by 2020 compared to 2005 levels, as part of the Copenhagen Accord.

1.3 Why a focus on low carbon development in the industrial sector in India is important?

India's industry sector is an amalgamation of both large industries that are at par with world standards and scale, as well as small units that function in isolation and are constrained in being able to access and make gainful use of knowledge, processes and mechanisms that allow technological progress.

The industry sector plays an important role in the Indian economy in terms of its contribution to economic growth, trade, and as a provider of livelihoods. With economic growth as planned by the Indian government to bring the country out of the poverty trap and development needs spreading wide across enhanced provision of infrastructure and facilities for improved education, health, improved connectivity, access to housing, water and sanitation, the Indian economy is at a phase where sustained growth in industrial activity is necessary and imminent.

Accordingly, industrial activity is likely to impose increasing demands on water, energy, and raw material inputs as manufacturing sectors expand their capacities rapidly. The challenge, however, is to be able to bring about this expansion in capacities in a manner that is resource-efficient and addresses sustainability considerations from all perspectives – social, economic, and environmental.

The industrial sector is the largest user of commercial energy in India, accounting for 38% of the country's total commercial energy use during 2009-10 (IEA 2011). Industrial fuel use (including non-energy uses) grew from 45.7

Mtoe in 1984/85 to 76 Mtoe in 2001/02 to 137.8 Mtoe in 2009/10. The industrial sector¹ contributed about 16% of India's GDP in 2010/11 (Economic Survey 2012).

Indian industrial sector in context of low carbon development

- Industrial sector is also one of the largest CO₂ emitting sectors in India. Industrial sector accounted for 22 percent of the total GHG emissions or 412.55 million tons of CO₂-eq in 2007.
- The top two GHG emitting industries, cement and iron and steel together accounted for about 60 % of the total GHG emissions from the Industry sector. Around 31.5 % or 129.92 million tons of CO₂-eq emissions from the industries sector was from cement industries.
- The Iron and steel industries emitted 117.32 million tons of CO₂-eq. and accounted for 28.4 % of the total emissions from the industrial sector.
- Use of non-energy products contributed 12 percent of the total CO₂-eq from this sector and the emissions equalled 49.36 million tons of CO₂-eq (Planning Commission 2011).

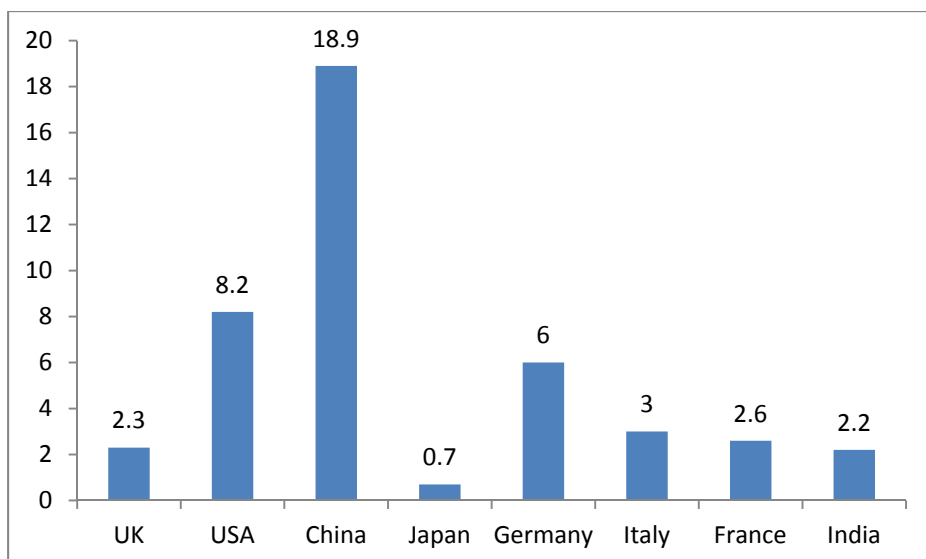
1.4 What is the outlook of industrial sector in India?

India has become one of the fastest growing economies in the world over the last two decades, undoubtedly aided in this performance by economic reforms. The striking aspect of India's recent growth has been the dynamism of the service sector, while, in contrast, manufacturing has been much less robust, contrary to the experience in other emerging market countries, where manufacturing has grown much faster than GDP; this has not happened in India. Consequently, manufacturing sector's contribution to the GDP has stagnated at 16 per cent, raising questions about India's development strategy, especially its implications for generating adequate employment. Additionally, employment in manufacturing declined in absolute terms from 55 million to 50 million between 2004-2005 and 2009-10, after having grown by 25 per cent between 1999-2000 (44 million) and 2004-05 (Planning Commission 2011).

Figure 1 shows the share of manufacturing sector's GDP in the world total. The share of the manufacturing sector in the world's Industry GDP continued to be stagnant, a trend now observed for nearly three decades and remained relatively lower than other emerging and developed economies.

Figure 1: Manufacturing output as a percentage of world total for 2010

¹ According to the Central Statistical Organization, Ministry of Statistics and Programme Implementation, Government of India, the industrial sector is subdivided into manufacturing, mining, and electricity.



Source: UN National Accounts database

The manufacturing sector averaged a growth of 7.7 per cent (till 2009–10) during the Eleventh Plan (refer to Table 1). Growth peaked at 10.3 per cent in 2007–08 and then started decelerating. The decline in manufacturing growth was primarily responsible for the slowdown in GDP in 2011–12.

Table 1: Rate of growth of GDP at factor cost at (2004-05) prices

Sectors	2007-08	2008-09	2009-10	2010-11*	2011-12**
Agriculture, Forestry and Fishing	5.8	0.1	1	7	2.5
Industry	9.7	4.4	8.4	7.2	3.9
Mining and Quarrying	3.7	2.1	6.3	5	-2.2
Manufacturing	10.3	4.3	9.7	7.6	3.9
Electricity, Gas and Water Supply	8.3	4.6	6.3	3	8.3
Construction	10.8	5.3	7	8	4.8
Services	10.3	10	10.5	9.3	9.4
GDP at Factor Cost	9.3	6.7	8.4	8.4	6.9

Source: Central Statistical Organisation

Note: *QE is Quick estimates and **AE is advanced estimates

Employment in manufacturing increased from 44 million to nearly 56 million between 2000–01 and 2004–05. However, employment in manufacturing reduced by 5 million between 2004–05 and 2009–10 (Table 2). The net increase in employment over the decade 2000–01 to 2009–10 was around 6 million, that is, a 13 per cent increase over 10 years. Manufacturing in India contributes to only 11 per cent of total employment. This compares unfavourably to other emerging economies where the share of employment in manufacturing range from 15 per cent to 30 per cent.

Table 2: Sector-wise employment in millions

Sectors	1999-2000	2004-05	2009-10
Agriculture	237.67	258.93	244.85
Manufacturing	44.05	55.77	50.74

<i>Mining</i>	2.17	2.64	2.95
<i>Electricity, Gas & water supply</i>	1.13	1.3	1.25
<i>Construction</i>	17.54	26.02	44.04
Services	94.2	112.81	116.34
Total	396.76	457.47	460.22

Source: Central Statistical Organisation

One hundred and eighty-three million additional income seekers are expected to join the workforce over the next 15 years. Agriculture cannot be expected to provide more jobs. Manufacturing must provide a large portion of the additional employment opportunities required for India's increasing number of job seekers. Unless manufacturing becomes an engine of growth, providing at least 70 million additional jobs, it will be difficult for India's growth to be inclusive. Since the pattern of development of the manufacturing sector so far has not delivered the desired growth in output and employment, a change in strategy is required.

National Manufacturing Policy

The National Manufacturing Policy introduced in 2011 aimed at increasing the manufacturing sector growth to 12–14 per cent over the medium term to make it the engine of growth for the economy. The underlying objectives that the policy aims to achieve are

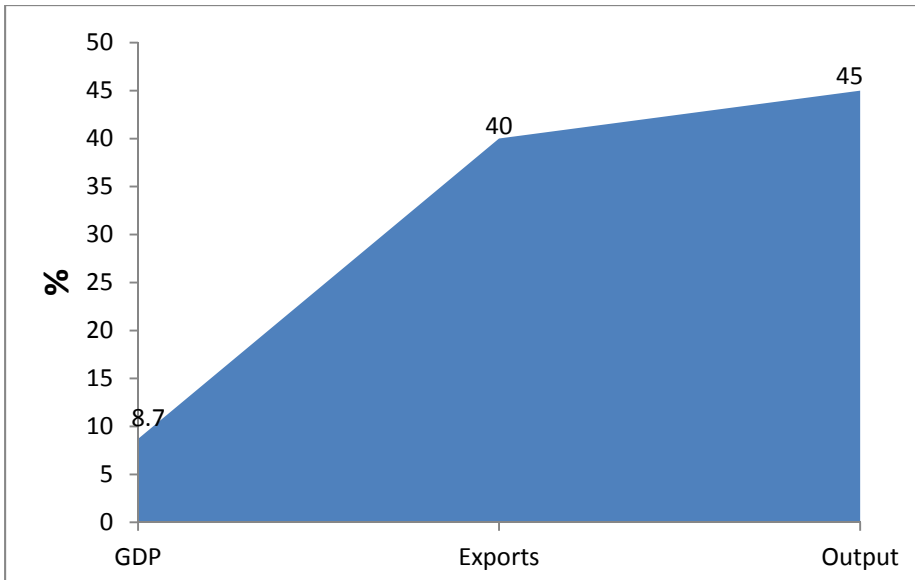
- Increase the rate of job creation in manufacturing to create 100 million additional jobs by 2025. Emphasis should be given to creation of appropriate skill sets among the rural migrant and urban poor to make growth inclusive.
- Increase 'depth' in manufacturing, with focus on the level of domestic value addition, to address the national strategic requirements.
- Enhance global competitiveness of Indian manufacturing through appropriate policy support.
- Ensure sustainability of growth, particularly with regard to the environment.

Comparison with the performance of other countries shows that the countries that managed to catch up with the earlier industrialised, high-income countries were the ones whose governments proactively promoted structural change. Industrial policy, and with a special focus on manufacturing, is back on the national agendas of many countries and we need to consider what lesson we can draw given our particular circumstances. In other words, the critical question now is not whether there should be an industrial policy but what should be the architecture of the industrial policy (Planning Commission 2011).

1.5 How is the MSME (Micro, Small and Medium Enterprises) sector placed in the Indian economic landscape?

MSMEs have been playing a pivotal role in country's overall economic growth, and have achieved steady progress over the last couple of years. This sector contributes 8.7 per cent of the country's GDP, 45 per cent of the manufactured output and 40 per cent of its exports. The MSMEs provide employment to about 60 million persons through over 26 million enterprises producing over six thousand products accounting for 8.7% of the GDP. The contribution of MSME's towards India's GDP has increased consistently from 5.9% in 1999-2000 to 8.7% in 2010-11. Figure 2 shows the share of MSME sector in GDP, exports and manufactured output.

Figure 2: Share of MSME sector in GDP, exports and manufactured output.



Source: Annual Report for MSME 2010

1.6 What is the energy consumption scenario in MSME cluster in India?

Figure 3 shows the mapping of energy consumption in different MSME clusters in India. The aggregation of energy consumption in MSME sector would require a concerted and regular data collection system at cluster, regional and national levels. Further studies at cluster and sub-sector level, and manufacturing/ production output data will be necessary to map the total energy consumption of MSME sector. This mapping exercise would require involvement of various state level stakeholders like State Designated Agencies (SDAs), District Industries Centres (DICs), DISCOM, etc.



Figure 3: Energy consumption in

different MSME clusters: 2009/10

Source: TERI 2012

1.7 What approach was used to understand the viewpoints of stakeholders in the joint TERI-IGES exercise?

The study team undertook a structured questionnaire-based survey of 17 firms in the **Mandi Gobindgarh Iron & Steel cluster** (Punjab) and 16 firms in the **Surat Textile cluster** (Gujarat) for detailed data collection to assess needs related to policy and technology needs in the clusters with respect to energy saving initiatives.

Mandi Gobindgarh is known as Steel Town of Punjab. The cluster comprises of 273 small and medium scale steel re-rolling units supported by around 500 traders and allied industries like induction furnaces, foundries, pipe plants etc. The cluster entails an approximate investment of Rs 5700 million in plant and machinery and per plant capital investment is in the range of Rs 5 – 30 million. Due to dominance of non-mechanized pusher type furnaces, the industry is labour intensive providing direct and indirect employment to over 1 lakh people.

The Surat cluster accounts for over 18% of the total manmade (synthetic) fibre exports and 40% of manmade fibre production in the country. The products primarily comprise synthetic sarees & dress materials and cotton dress materials. There are about 400 textile processing units in the cluster, operating over 600,000 power looms and providing employment to around 1.2 million workers. Of the 400 units in the cluster, around 330 are integrated units

with facilities for both dyeing and printing, while the remaining 70-odd units have only dyeing facilities. Annexure 1 gives the questionnaire that was used for the industry stakeholders in the two clusters.



Energy efficient steam turbine

Source: Sameeksha

1.8 What is the key motivation factors driving the MSME sector in India to undertake energy efficiency initiatives?

Regulations in Indian MSME sector have provisions for promotion of technology upgrading and application of new clean technologies. Examples include the Credit Link Capital Subsidy Scheme (CLCSS) and Technology Upgradation Fund Scheme (TUFS).

In the clusters, where the study team undertook consultation, motivation for energy efficiency measures in the MSME sector is depicted below in Figure 4 & 5. Productivity gains and energy savings cited as a common reason as a motivation for energy efficient practices across the two clusters.

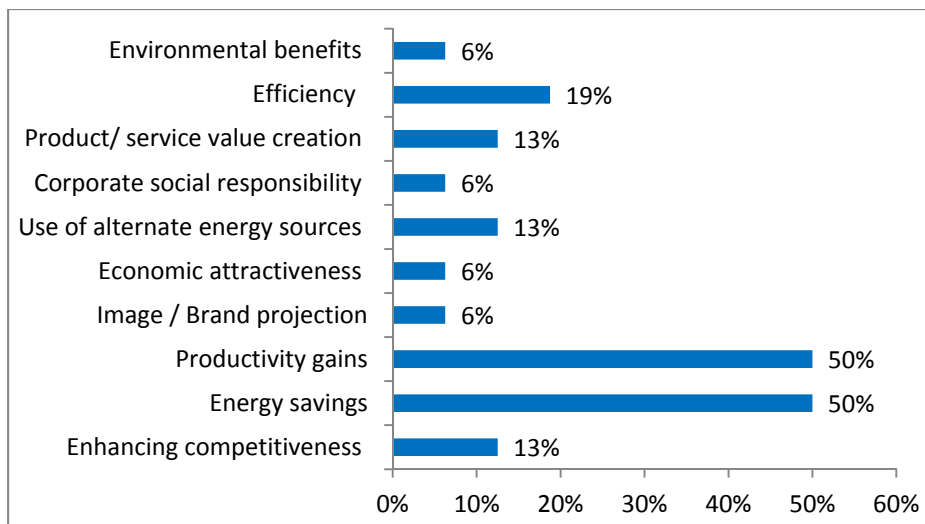


Figure 4: Motivation for energy efficiency measures in the surveyed Textile MSME cluster

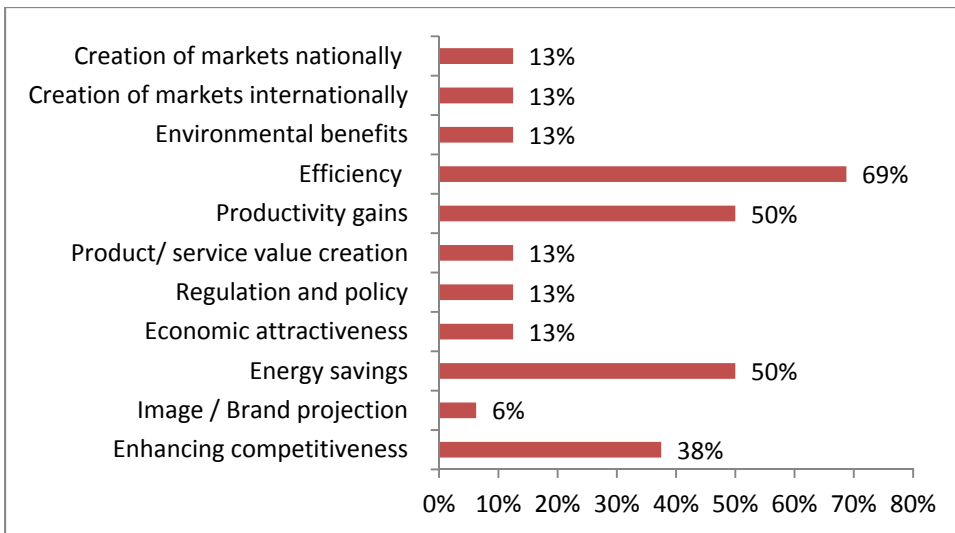


Figure 5: Motivation for energy efficiency measures in the surveyed Iron & Steel MSME cluster

1.9 What are the key challenges being faced by the MSME sector in India?

The MSME sector has largely remained a neglected and under-serviced sector from a technology and knowledge support point of view. Some of the major challenges faced by the MSME sector include the following.

- Outmoded technology levels and lack of access to modern technological solutions.
- Very few programmes to support technology development.
- Lack of skilled manpower for manufacturing, services, and marketing.
- Absence of local service providers (LSPs) to sustain energy-efficient technologies.
- Lack of access to global markets.
- Inadequate infrastructure facilities.
- Procurement of raw materials at competitive prices.

Despite the importance of MSME sector in Indian economy, it is largely a neglected and under-serviced sector from the technology and knowledge support point of view. MSMEs in countries such as India help in efficient allocation of resources by implementing labour intensive production processes, given the abundant supply of labour in these countries, wherein capital is scarce. Some of the major challenges faced by the sector are use of obsolete and resource inefficient technologies, limited access to technology and product innovation, lack of awareness of best practices, weak institutional support framework, limited knowledge sharing and technical capacity and inability to attract and retain quality manpower. These constraints have a negative impact on the competitiveness of MSME sector, significantly affecting their ability to reduce operational costs, increase productivity and adapt to external challenges. Most of these needs can be addressed through technology upgradation and building the capacities of stakeholders.

Key challenges in energy savings projects in the MSME clusters consulted in the study are listed below in Table 3. A survey of 17 firms in the Mandi Gobindgarh Iron & Steel cluster (Punjab) and 16 firms in the Surat Textile cluster (Gujarat) was undertaken using structured questionnaire for detailed inputs to assess energy efficiency aspects and the technology needs in the sector. High cost of financing is considered as a major barrier for energy saving projects in the clusters.

Table 3: Challenges in the iron & steel and textile MSME clusters

Challenges	Iron & Steel (% respondents)	Textile (% respondents)
------------	---------------------------------	----------------------------

High costs (including high interest rates) of financing	75%	81%
Lack of awareness / understanding of such projects	44%	19%
Lack of commercialization	13%	NA
Sustainability issues not prioritized by financial decision makers	13%	6%
Taxation policy not conducive	44%	6%
Inadequate government coordination	31%	NA
Inadequate legislation measures	25%	6%
Procedural complexities	25%	6%
Lack of subsidies	13%	6%

1.10 What support does the MSME sector in India require?

The MSMEs would require external support for technology development, demonstration and adoption as their capacities are generally low. Cluster-specific intervention programs will be required to address this issue in MSME sector. MSMEs can make a substantial contribution to achieving a low carbon economy, provided the barriers to the growth of the MSME sector, can be addressed appropriately. The requirements of this sector are; easy access to finance, the need for a skilled workforce, adopting energy-efficient and clean technology, support services, social equality, addressing environmental concerns, and the need for innovation.

In both the surveyed clusters as depicted in Figure 6 & 7, training and capacity building measures were perceived in the areas of technological know-how and human resource skill development and upgradation.

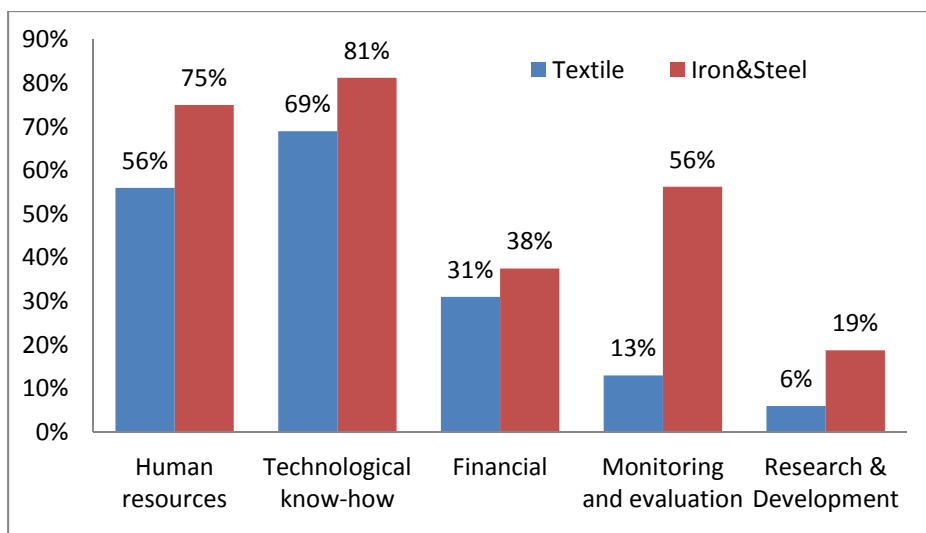


Figure 7: Needs for training and capacity building measures in the surveyed Iron & Steel MSME cluster

1.11 What are the emerging aspects for promoting low carbon development in MSMEs?

The consultative process examined key aspects for promoting low carbon development in the two MSME clusters of Mandi Gobingarah and Surat. The findings are summarized in Table 4. Given the characteristic of the Indian MSME sector, interventions in traditional financing sectors will be important for financial sustainability of low carbon initiatives. Moreover, since most technologies come from domestic suppliers, the need for developing indigenous technologies through R & D collaboration between India and Japan will be important. Incentive structures also will play an important role in facilitating energy conservation in MSME clusters.

Table 4: Aspects for promoting low carbon development in the surveyed MSME clusters

Aspects	Textile cluster (Surat)	Iron & Steel cluster (Mandi)
Nature of financial support expected	Subsidies	Subsidies
Nature of policy support required	Guidelines & regulation	Incentives
Nature of technical support required	Technology	Technology
Most applicable source of financing	Debt financing (traditional banks)	Debt financing (traditional banks)
Nature of financial analysis (quantitative)	Payback period	Cost-benefit analysis
Nature of financial analysis (qualitative)	Needs based	Needs based

Financial innovation needs felt	Traditional banking and market mechanisms	Market mechanisms
Source of technology	Domestic technologies	Domestic technologies
Source of awareness on energy saving technologies	Direct contact with technology provider	Direct contact with technology provider

1.12 What are the technology needs in the surveyed clusters?

In the textile cluster use of variable frequency drives for fans of humidification plants and steam economy in drying machines were the key technology needs identified (Table 5).

In the iron & steel cluster increase in hot blast temperature and ensure proper coking coal blend, energy efficient fans for dust extraction systems and use energy efficient regenerative burners in reheating furnaces were the key technology needs identified (Table 6).

Table 5: Technology needs in textile cluster

Use of variable frequency drives for fans of humidification plants	50%
Use of smaller wrap diameter spindles	6%
Installation of radio-frequency driers	13%
Use of renewable energy, specifically solar thermal	6%
Applications for generating low-grade heat recovery	19%
Steam economy in drying machines	44%
Heat pumps (electric and gas)	31%
Low pressure drop suction filters for fans	13%
High-efficiency steam generation and distribution	Expert inputs

Table 6: Technology needs in iron & steel cluster

Increase in hot blast temperature and ensure proper coking coal blend	50%
Energy efficient fans for dust extraction systems	25%
Low pressure drop suction filters for fans	6%
Recuperative burners	13%

Heat pumps (electric and gas)	13%
Use energy efficient regenerative burners in reheating furnaces	25%

1.13 What are the key areas of cooperation between India and Japan?

The key areas of cooperation between India and Japan include:

- India and Japan has cooperated on areas including clean energy, infrastructure, intellectual property rights, investment promotion, trade and commerce, and tourism.
- The India-Japan Energy Dialogue is a relevant bilateral forum for low carbon development in the field of clean energy.
- Cooperation between the countries have been in the form of financial and technical assistance with agreements such as Comprehensive Economic Partnership Agreement (CEPA) playing an important role.
- In future the possibility of the bilateral offset credit mechanism could continue to play an important role

Table 7: Bilateral cooperation between India and Japan

Area	Description	Source
Clean energy	India-Japan Energy Dialogue to explore the possibilities of cooperation in the field of energy efficiency and implementing projects through regional energy efficiency. Initiatives on renewable sources of energy and projects with the New Energy and Industrial Technology Development Organisation (NEDO).	Joint Statement by the Republic of India and Japan on the Enhancement of Cooperation on Environmental Protection and Energy Security. Available from http://www.pib.nic.in/newsite/erelease.aspx?relid=30331 ; last accessed 8 November
Infrastructure	Bilateral cooperation especially in the form of technical expertise in infrastructure sector with special reference to road construction. Japanese agencies involved include Japan Bank for International Co-operation (JBIC) and Japan International Cooperation Agency (JICA)	Ministry of Road Transport & Highways Press Release; available from http://pib.nic.in/newsite/erelease.aspx?relid=79526 ; accessed on 28 October 2013
Intellectual Property Rights	The two Governments to continue to co-operate in capacity building activities in intellectual property, including in developing human resources	Ministry of Commerce & Industry; available from http://pib.nic.in/newsite/erelease.aspx?relid=28199 ; last accessed on 28 October 2013

Investment Promotion	<p>Investment cooperation in the framework of India's "National Manufacturing Policy" for enhancing bilateral investment and trade which would drive growth of both countries.</p> <p>Governments of the two countries are working to formulate an Action Plan to promote two-way investments between India and Japan based on three pillars ; (1)India-Japan business partnership (2) Cooperation with Central and State Governments on Investment promotion and Facilitation and (3) Improvement in business environment. Initiatives such as Delhi-Mumbai Industrial Corridor (DMIC) project and Chennai-Bengaluru Industrial Corridor (CBIC) project</p>	<p>Ministry of Commerce & Industry; available from http://pib.nic.in/newsite/erelease.aspx?relid=99270; last accessed on 28 October 2013</p>
Trade and Commerce	<p>Comprehensive Economic Partnership Agreement between the Republic of India and Japan lays down the provisions and areas of bilateral economic cooperation between Japan and India. The free trade agreement seeks to abolish import duties on most products, increase access for Indian professionals and contractual service suppliers to the Japanese market and liberalise investment rules.</p>	<p>Comprehensive Economic Partnership Agreement (CEPA); available from http://commerce.nic.in/trade/ijcepa_basic_agreement.pdf; last accessed on 28 October 2013</p>
Tourism	<p>Working together and explore new opportunities in tourism sector especially in the field of human resource development, exchange of tour operators, investment in the tourism sector and exchange of information related to tourism sector</p>	<p>Ministry of Tourism Press Release; available from http://www.pib.nic.in/newsite/erelease.aspx?relid=92178; accessed on 28 October 2013</p>

Source: Compiled from various sources

Chapter 2: Policy Aspects

2.1 What is the context of innovation and policy interventions for the India MSME sector?

Technological innovation is a key factor in a firm's competitiveness. It is essential for firms wanting to develop and maintain a competitive advantage and/or gain entry into new markets (Becheikh, et al. 2006). An empirical study on Indian SMEs has brought out the crucial role of technological innovation in building up the competitiveness of SMEs not just in the domestic market but more importantly with reference to the international market (Bala Subrahmanya 2012).

According to the study, Indian MSMEs by and large carried out only incremental technological innovations. Most of the innovative MSMEs initiated technological innovations due to customer pressure and product innovations were largely confined to changing product designs/shapes/dimensions to suit customer requirements. Alternatively, process changes involved raw material replacement, among others, to achieve cost reduction or quality improvement or both. Overall, enhancing firm level competitiveness was the major objective of SME innovations in India.

Enumerated below are some general observations and findings with regard to technology innovation and commercialization of Indian MSMEs:

- 1) **Technical capability:** MSMEs in general face innumerable constraints for undertaking innovations – of them the most prominent one is technical capability. Even where MSMEs have some internal technical competence, they often find the need for external support. The study indicated only those firms look for and obtain external support that have internal technical capability and greater need for external support in the form of comprehensive (both product and process) innovations and more frequent innovations. MSMEs which have obtained external support produced better innovation performance in the form of a larger share of innovated products in total sales.
- 2) **Nature of origin:** There are MSMEs which have emerged as a start-up to implement the innovative ideas of an entrepreneur or to exploit the identified market opportunities, called as entrepreneurial firms. These firms have better innovation performance which may be attributed to flexibility, better adaptability and receptivity, effective internal communication, simple organizational structure, quick decision making, etc. (Harrison and Watson, 1998). Also, there are MSMEs which have come up mainly as a means of employment by taking advantage of government sponsored incentives and sometimes due to the assured market from a large firm and are constrained in their innovation capacity.
- 3) **Form of organization:** Given the dominance of micro segment, accounting for 94.4% of working enterprises of MSME sector and the fact that there is a complete dominance of proprietary enterprises in case of micro segment (91.77% of micro enterprises are proprietary concerns), it has been found that individual proprietorship firms did not achieve innovation performance as much as partnership or private limited firms.

Majority of firms in the surveyed clusters as depicted in Figure 8, considered domestic technologies as the primary source of energy savings technologies while the need for international technologies were relatively higher in the textile sector vis-a-vis iron & steel sector.

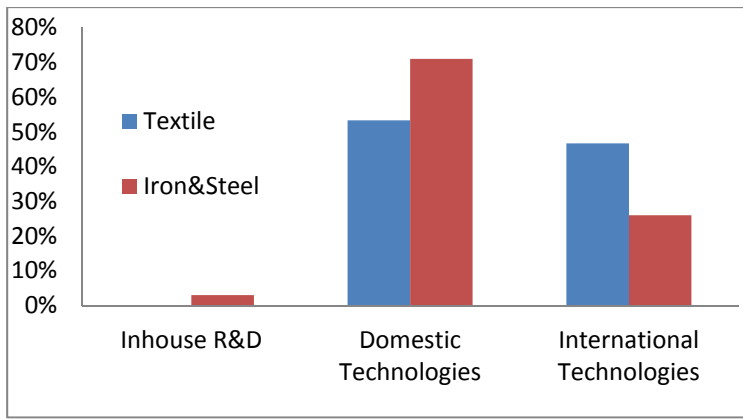


Figure 8: Source of technologies for energy savings technology development and upgrading in the surveyed MSME clusters

In the surveyed clusters, majority of the firms went for process innovation in the form of incremental changes in the existing processes to bring about energy efficiency (see, Figure 9).

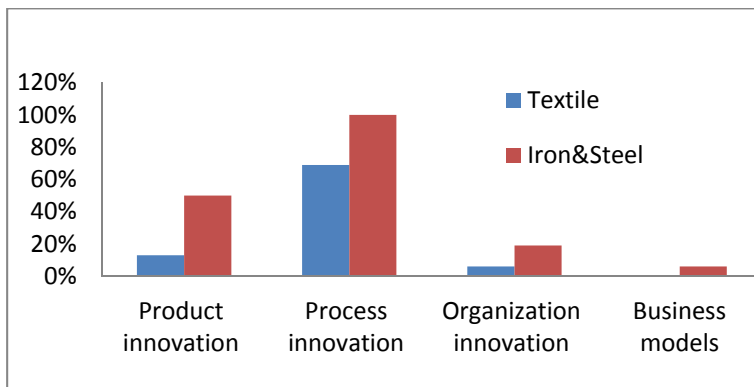


Figure 9: Energy savings related innovation activity undertaken in the surveyed MSME clusters

Direct contact with technology provider, industry associations and trade fair & conference were the major source of awareness for energy saving technologies (see, Figure 10)

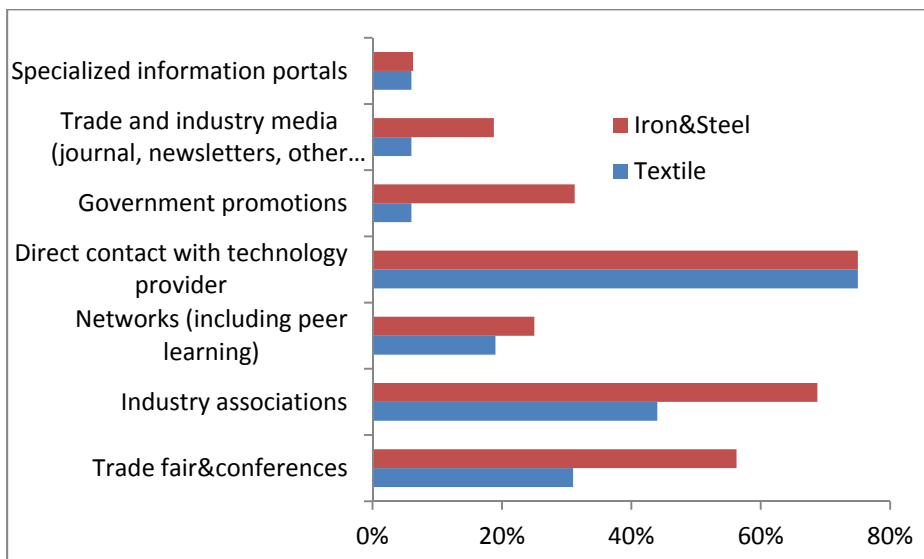


Figure 10: Source of awareness for energy-saving technologies in the surveyed MSME clusters

2.2 What are the key challenges faced by the MSMEs in India with regard to technology innovation and what is the role of government in addressing these challenges?

Table 8 provides a brief description of issues and challenges faced by MSMEs in their technology commercialization endeavours and the role of government in addressing those (Bhardwaj et al. 2013):

Table 8: Issues and challenges in the commercialization of technologies by MSME sector in India and the support provided by the government

Issues	Challenges	Government support
Access to appropriate technologies	<p>Post liberalization, MSMEs have to continuously upgrade their technologies to manufacture cost-competitive and high quality products to maintain sustainable competitive advantage over their rivals.</p> <p>MSMEs, established as well as start-ups, possess limited resources to conduct in-house R & D and develop own technological capability.</p> <p>Low level of awareness among MSMEs regarding the crucial role of innovation in enhancing their firm level competitiveness.</p> <p>Need to commercialize new technologies acquired from Indian government-funded Research and Technology Organizations (RTOs) and from academic institutes by leveraging several support schemes of Indian government.</p>	<p>Ministry of MSME initiated National Manufacturing Competitiveness Programme (NMCP) of 2005 supports the adoption of energy efficient technologies reducing energy consumption. NMCP scheme also supports setting-up of Carbon Credit Aggregation Centres (CCA) for introducing and popularising clean development mechanism (CDM) in MSME clusters. The scheme also provides partial support for adoption of Information and Communication Technology (ICT) tools and applications, establishment of new mini tool rooms, implementation of lean manufacturing techniques, and for enhancement of designing expertise</p>
Getting affordable finance to commercialize technologies	<p>Traditionally, MSMEs use debt commercial Banks. Risk capital providers (RCPs) have been reluctant to fund MSMEs' technology commercialization endeavours due to non-corporate structure and small size of MSMEs. In recent years, RCPs have been investing Venture Capital or Private Equity Funds in IT or service sector MSMEs due to perception of higher financial returns.</p> <p>However, manufacturing MSMEs find it difficult to tap risk capital due to relatively longer payback period as perceived by RCPs</p>	<p>Government supported Small Industries Development Bank of India (SIDBI) support MSME sector companies for potential socio-economic benefits and for regionally balanced growth.</p> <p>To access risk capital, 'Over-the-Counter Exchange of India' (OTCEI) was launched in 1990 and 'BSE Indonext' in 2007.</p> <p>Bombay Stock Exchange (BSE) has set-up an exchange for SMEs titled BSE--SME Platform. Similarly, National Stock Exchange (NSE) has also launched its new trading platform named 'Emerge' for SMEs. NSE would mentor the SME sector companies for getting listed on NSE-Emerge.</p> <p>Ministry of MSME sponsors a scheme titled the "Credit Linked Capital Subsidy Scheme" (CLCSS), which aims at facilitating technology upgradation by providing upfront capital subsidy to units in MSME sector. CLCSS also assists MSMEs in upgrading quality control/test facilities.</p> <p>DST's Technology Development Board (TDB) has several</p>

		<p>programmes in the form of loan or equity and/or in exceptional cases, grant to assist SME sector companies in technology commercialization. TDB also provides seed support fund through identified Technology Business Incubators (TBIs), Science & Technology Entrepreneurs' Park (STEP), to assist entrepreneurial firms to upscale/nurture lab scale technologies. This fund helps in upscaling an innovative idea/technology to a level at which it can access finance from normal sources like Financial Institutions.</p> <p>DST's Technology Information, Forecasting and Assessment Council (TIFAC) in collaboration with SIDBI. Programme provides loan assistance upto Rs. 100 lakhs at not more than 5% simple interest per annum and can cover upto 80% of the estimated approved project cost.</p> <p>Department of Scientific & Industrial Research (DSIR) also operates programmes like Technology Development and Demonstration Programme (TDPP) and Technopreneur Promotion Programme (TePP) to support technology upscaling and commercialization</p>
Competing in new IPR regime	<p>Need to develop capability to identify patentable IP, modus operandi of securing and maintaining IPRs.</p> <p>Also, need to develop capability to harness IP available with external agencies like Research and Technology Organizations (RTOs) as well as its own IP by striking mutually beneficial linkages</p>	<p>NMCP scheme aims at strengthening of Intellectual Property Rights (IPR) related capabilities of the MSMEs by conducting IP awareness programmes, pilot studies, interactive seminars/workshops, short term and long term trainings; filing of national and international patent applications; filing the application for Geographical Indication (GI) registration; setting up of 'IP Facilitation Centre for MSME'; and for conducting exchange programme with international agencies.</p> <p>Federation of Indian Micro and Small & Medium Enterprises (FISME) has set-up three IP Facilitation Centre (IPFCs), with the support of Indian government's National Manufacturing Competitiveness Commission, in 2011-12 at New Delhi, Bangalore and Hyderabad to spread awareness about IP and provide guidance about securing IPRs among MSMEs.</p>
Marketing of technology-derived products	<p>Marketing is one of the challenging areas for MSMEs due to lack of information, scarcity of resources and unorganized way of selling / marketing.</p>	<p>NMCP scheme provides partial support for improving packaging techniques, for training on modern marketing techniques, for conducting competition studies, for participating in exhibitions, and for adopting good corporate governance practices. Also, NMCP attempts to enhance competitiveness of MSMEs by assisting them in getting quality related certifications from national and international bodies so that products and services provided by MSME sector companies can enhance their market reach.</p> <p>Ministry of MSME also assists MSMEs in market development to promote exports, and in getting bar codes to enhance the marketing competitiveness of MSEs in domestic as well as international market, Ministry of MSME's National Small Industries Corporation (NSIC) also assists MSME in marketing through schemes such as consortia and tender marketing, single point registration for government purchase, B2B web portal for marketing, marketing intelligence etc.</p> <p>Department of Industrial Policy and Promotion (DIPP) also operate schemes to boost export competitiveness of industry, including SMEs.</p>
Infrastructural bottlenecks	<p>Need for infrastructural support to create industrial clusters by means of science & technology</p>	<p>Department of Science & Technology, Ministry of Information Technology, and Ministry of Food Processing etc. have been supporting various STEPs and TBIs.</p>

	<p>parks (STEPs), technology business incubators (TBIs), and technology corridors (TCs) etc. plays vital role in creation and growth of technology-led entrepreneurial firms.</p>	<p>Ministry of MSME also undertakes a programme to assist micro and small enterprise cluster development.</p> <p>India has approximately 120 TBIs with 53 supported by the National Science & Technology Entrepreneurship Development Board (NSTEDB), 40 supported by Ministry of Information & Communication Technology and 30 supported by other government departments/ banks/financial institutions/private sector (www.nstedb.com).</p> <p>Further state governments have also instituted schemes to establish infrastructure to nurture growth of MSMEs sector. Government of Andhra Pradesh offered several concessions to the private firms, including biotechnology – based SMEs, intending to locate their operations in "Genome Valley". Also, financial and technical aid has been extended by Government of Andhra Pradesh and other government agencies to SMEs in the pharma cluster, for example, those engaged in bulk drug production.</p>
Getting specialized human resource	<p>SMEs find it difficult to hire and maintain manpower having capability to understand nuances of commercializing new technologies, and to manage technical, market and other business issues related with technology commercialization due to paucity of resources</p>	<p>Several institutes and R&D centres established by different ministries of Indian government provide continuous programmes aimed at upgrading the capabilities, skills and knowledge of manpower deployed in MSME sector. Ministry of Labour and Employment (MLE) sponsors several skill development programmes for manpower employed by industry, including MSMEs, through government institutes and reputed private institutes accredited by a Board/ University/Government Authorized Council. One of the schemes of the MLE involves upgradation of government Industrial Training Institutes (ITIs), which are one of major source of manpower for MSMEs.</p> <p>NMCP scheme supports programmes conducted by Indian Institute of Technologies (IITs), National Institute of Technologies (NITs), Engineering Colleges and other appropriately identified organizations for entrepreneurial and managerial development of SMEs.</p>

In the Iron & Steel cluster, lack of access to appropriate technology was seen as the major barrier for adoption of energy savings measures. In the textile sector, the technical ability to systematically choose technology based on cost and benefits was recognized as the major barrier for adoption of energy savings measures (see, Figure 11).

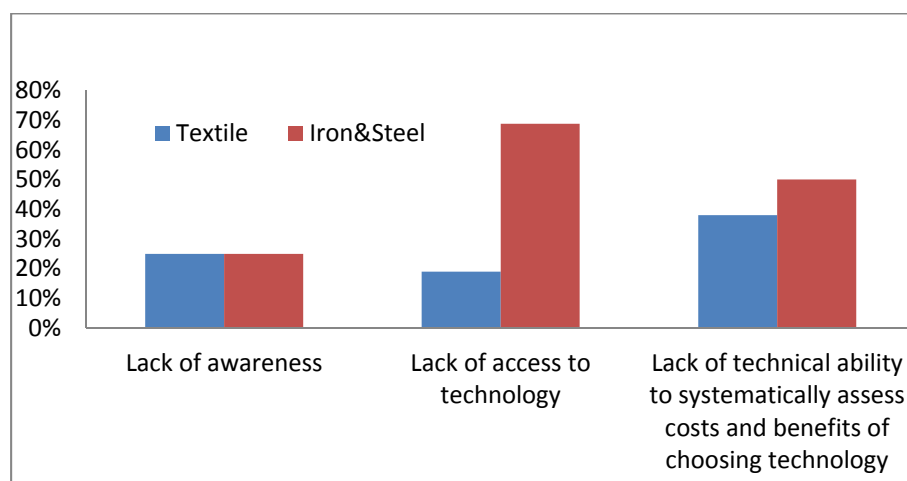


Figure 11: Barriers to adoption of energy savings measures in the surveyed MSME clusters

2.3 What are the models for technology transfer?

The traditional or conventional models of technology transfer in India would mean capital imports of machinery and equipment from industrialized countries; or at most some kind of a foreign direct investment. However in a recent paper (Lema, R., & Lema, A. 2012) these conventional methods of technology transfer has been questioned particularly for emerging countries like India. In fact the paper suggests and as the following diagram illustrates there is an increase in unconventional methods like collaborative research and development between overseas as well as Indian partners. In addition what makes the paper pertinent is the fact that the analysis of the paper had a focus on green or low carbon technologies while dealing with the issue of technology transfer.

It is important to note that the study defined technology transfer as a broad set of processes covering flows of equipment, know-how and experience between various types of actors (IPCC, 2000, p. 3) and it also while analysing the mechanisms for technology transfer did not look at domestic transfers but only at mechanisms of technology transfer at an international level. It was earlier believed that technology developed in advanced economies could easily be transferred into the host country; however this notion has changed (Shamsavari, 2007; Kulkarni, 2003) and diffusion of technology is an active and creative process as well. Therefore there is perhaps an equal amount of creativity involved in adopting technology and adapting it to local conditions. The analysis in the paper (Lema, R., & Lema, A. 2012) suggested that India did not rely solely on external green or low carbon technology. In fact in-house effort and investment in innovation was also a key determinant of the speed and depth of technological learning.

Therefore, technology transfer from say Japan to India will be a collaborative effort with a degree of cooperation which has increased and will increase in the times to come. Technology transfer will no longer be a transfer of equipment, but will be increasingly more towards co-operation and collaborations.

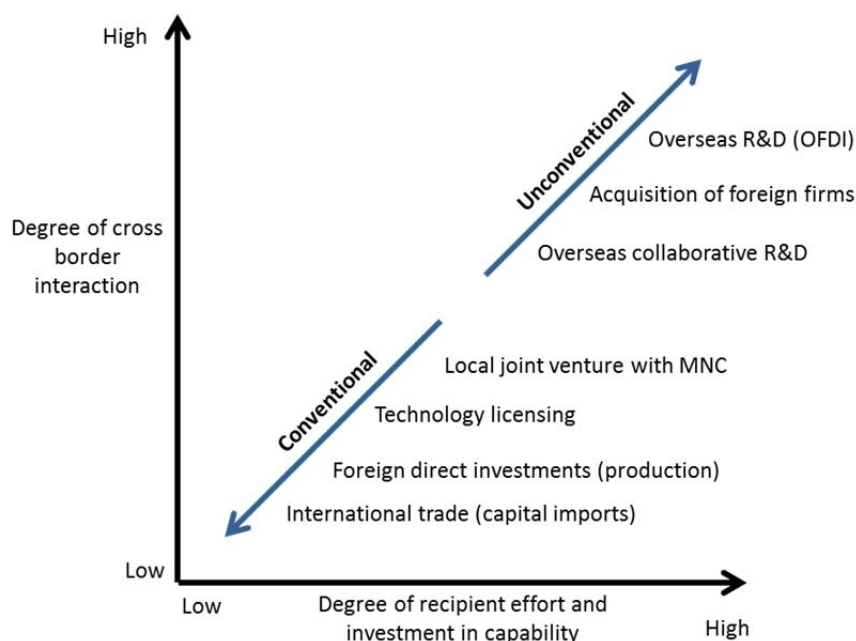


Figure 12: Conventional and unconventional technology transfer mechanisms

2.4 What are the key politico-economic factors facilitating technology integration from overseas in India?

The key politico-economic factors facilitating technology integration from overseas in India include:

- Foreign Direct Investment has been a key factor which has facilitated technology integration from overseas in India.
- The Bilateral Investment Promotion and Protection Agreement (BIPA) of the Indian government is designed to create conditions which are favourable for fostering greater investments bilaterally.
- Services and infrastructure sectors have attracted seen most traction in terms of India-Japan bilateral investments.
- As on 2007, Japan ranks third in terms of technical collaborations after the United States and Germany.

It can be said that based on the liberalized policies which started in the year 1991, the growth in technology transfers have increased year after year. The government of India has simplified rules and regulations facilitating an enabling environment that allow for foreign technology based on needs of the Indian economy. There are four channels of technology flow from overseas:

- Foreign direct investment
- Reverse engineering
- Non-commercial channels such as aid-driven development projects
- Technology license agreements and joint ventures

A key factor that has facilitated technology integration from overseas in India is the foreign direct investment (FDI) which has expanded in post-1991 reforms era. According to the Department of Industrial Policy and Promotion (DIPP), the cumulative FDI and the cumulative FDI equity inflows in India from April 2000 to September 2013 was USD 306,889 million and USD 204,658 million respectively. Table 9 presents top investing countries in FDI equity inflows

Table 9: Share of top investing countries in FDI equity inflows

Rank	Country	2011-12 (INR)	2012-13 (INR)	2013-14* (INR)	Cumulative inflows (INR)	Cumulative inflows (USD)	% of total inflows
1	Mauritius	46710	51654	15541	35666	76292	37
2	Singapore	24712	12594	14163	104345	21952	11
3	United Kingdom	36428	5797	11954	92413	19432	9
4	Japan	14089	12243	2194	72289	14920	7
5	United States	5347	3033	2938	53861	11626	6
6	Netherlands	6698	10054	6382	48768	10025	5
7	Cyprus	7722	2658	1789	34117	7185	4
8	Germany	7452	4684	2992	28504	6018	3
9	France	3110	3487	920	17785	3730	2
10	United Arab Emirates	1728	987	1054	12361	2591	1

*Until September 2013

Source: DIPP (2013a)

The Bilateral Investment Promotion and Protection Agreement (BIPA)² of the government of India is a bilateral treaty which is defined as an agreement between two countries (or States) for the reciprocal encouragement, promotion and protection of investments in each other's territories by the companies based in either country (or State). The purpose of the bilateral agreement is to create conditions which are favourable for fostering greater investments by the investors of one country in the territory of the other country.

Top sectors that attracted FDI equity inflows (from April 2000 to August 2013), from Japan, are listed in Table 10. Table 11 presents details of country-wise technology transfer approvals from 1991 to August 2007.

Table 10: Top sectors that attracted FDI equity inflows (from April 2000 to August 2013) from Japan

Sector	FDI share (%)
Services sector	19
Construction Development: Townships, housing, built-up infrastructure and construction development projects	11
Telecommunications	6
Computer software & hardware	6
Drugs and pharmaceuticals	6

Source: DIPP (2013b)

Table 11: Details of country-wise technology transfer approvals from 1991 to August 2007

Rank	Country	Technical collaborations approved (units)	Technical collaborations approved (%)
1	United States	1750	22.19
2	Germany	1103	13.99
3	Japan	861	10.92
4	United Kingdom	856	10.85
5	Italy	484	6.14
6	Other countries	2832	35.91
	Total of all countries	7886	100

Source: DIPP in Subbarao (2008)

² http://business.gov.in/legal_aspects/bipa.php

2.5 What are the key institutional challenges towards technology transfer?

The key institutional challenges with regard to technology transfer include:

- Well-enforced environmental regulations, reformed legal systems and adequate protection of IPRs key to overcoming institutional challenges to technology transfer.
- India has a plethora of laws and regulations for the protection of the environment and an institutional set-up to address the imperatives of energy conservation and enhanced energy efficiency.
- An IPR regime at par with international standards and efforts at enhanced enforcement contribute to a robust institutional framework for technology transfer in India.

Institutional challenges such as insufficient legal protection and inadequate environmental codes and standards along with other barriers such political and economic barriers, trade and policy barriers etc. manifested differently in developed countries, developing countries and economies in transition have been recognized to present impediments to technology transfer in the context of climate change (IPCC, 2000). It recommends the adoption of certain measures by governments such as well-enforced regulations, codes, standards; reforming legal systems and protecting IPRs among others to overcome the institutional challenges.

It has been amply demonstrated that the existence of an appropriate framework of environmental regulation in the receiving country represents an important variable in the facilitation of technology transfer, with strong environmental regulations offering incentives for a favourable market for climate technologies and a stimulus for firms to acquire and implement new technologies (Less and Milan, 2005; Corvaglia). India has a plethora of laws and regulations for the protection of the environment, with one of the key laws being the Environment Protection Act of 1986. It is an umbrella legislation with the objectives of protection of the environment, improvement of environment and prevention of hazards to human beings, other living creatures, plants and property. The sweep of the Act is very broad, and within the broad framework of this Act, a series of rules, notifications and other secondary legislation have been enacted in a number of areas. The Indian Supreme Court has been very proactive, with key environmental principles such as precautionary principle, polluter pays principle, public trust law doctrine, inter-generational equity etc. interpreted as part of the fundamental right to life guaranteed in the Indian Constitution in a number of judicial pronouncements. The National Green Tribunal Act of 2010 lays down the framework for the setting up of a dedicated environmental court- the National Green Tribunal to ensure further effective and expeditious disposal of cases related to environmental protection, forests and natural resources.

The institutional and policy environment in India has recognized energy conservation and energy efficiency improvements as indispensable to meeting its commitment to address climate change and has taken up a number of initiatives to evolve institutional capacity and effectively establish procedural norms and practices in the sector. The most noteworthy institutional development has been the setting up of the Bureau of Energy Efficiency (BEE), a statutory body under the Energy Conservation Act of 2001 to facilitate, coordinate, and administer EE activities. The BEE was created to eliminate the institutional void in the EE sector with the goals of systemically reducing energy intensity of the Indian economy, strengthening the delivery mechanism in the country, and providing leadership to the key agents involved in EE activities. Under the Act, the Central Government in consultation with the BEE is to specify the norms for processes and energy conservation standards for equipment, appliances which consume, generate, transmit or supply energy. The Ministry of Power launched the Standards and Labelling Program and the Energy Conservation Building Code (ECBC) in 2006 and 2007 respectively, making noteworthy advances towards building an institutional infrastructure to regulate efficiency.

Another institutional challenge which has received a lot of attention in the context of transfer of climate technologies has been the intellectual property rights regime in the recipient country. A contentious issue in the climate change negotiations, developed countries continues to maintain that IPRs are indispensable to ensure innovation for technology development and deployment. Their primary contention is that weak IPRs in developing countries constitute the biggest barrier to technology transfer. On the other hand, the central premise of the developing country position is that a strong IPR regime can hinder access of developing countries to technology. Nevertheless, many developing countries like India have IPR regimes compatible with international regimes and have taken steps towards strengthening enforcement (this is discussed in detail in section 4.1 on IP, patents and legal protection towards technology transfer).

Chapter 3: Financial Aspects

3.1 How Indian MSMEs are placed with regard to financing requirements?

In the surveyed MSME clusters, debt financing is the major source for financing energy savings projects (see, Figure 13). Given the nature of the cash flows and revenue stream in EE projects, debt is possibly a good instrument to handle energy efficiency projects particularly for the MSME sector.

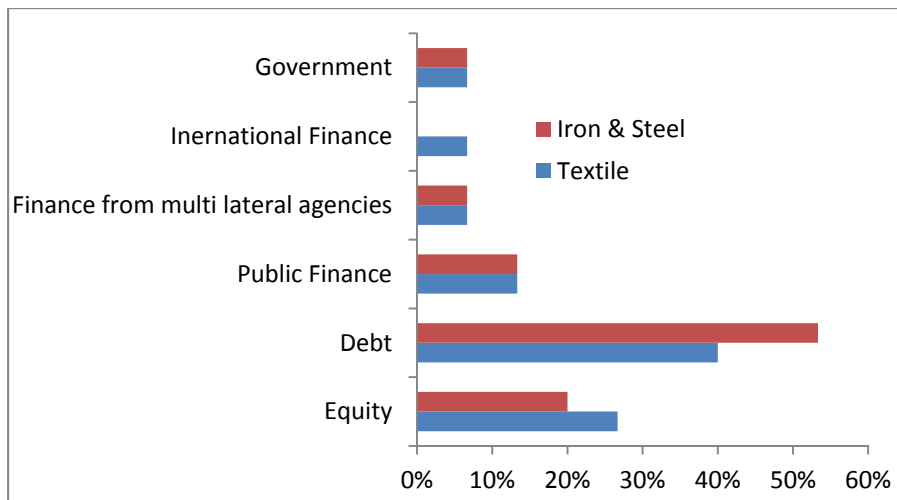


Figure 13: Kind of financing mechanism as the most prominent source for financing energy savings projects

3.2 What are the key financial institutions and actors in the MSME sector in India?

For the MSME sector given its importance, financial institutions and relevant policy bodies have created various structured finance solutions to help and finance different needs and aspects of the MSME sector. The MSME sector gets both public and private finance. The distinction made here is thus - Private finance is financial resource allocation which has been made primarily for investments, and sometimes even governments can provide money as investments. Public finance is essentially public money made available for low carbon technology; they can be in the form of actual budgetary resource allocation or in terms of incentives and tax breaks. Concessional loans made by the government will also be a part of public finance. We also find that in India there are specialized banks for this sector, like the Small Industries Development Bank of India (SIDBI); there are even unique financing solutions for this sector in India, like the cluster financing solutions as quite a few of the MSMEs in India are a part of a geographical area known as a cluster.

While the commercial banks provides mostly working capital, the MSME sector generally requires funds of two types viz. long term fund for investment in fixed assets for setting up new unit or expansion/modernization of existing unit and secondly, working capital or short term funds to manage day-to-day operations of their businesses. The long term credit funds are mainly provided by the institutions like Small Industries Development Bank of India (SIDBI), Commercial Banks, State Financial Corporations (SFCs), Non-Banking Financial Companies (NBFCs) etc. and in a limited measure, from other sources like Foreign Direct Investment, Venture Capital and Private equity (VC/PE) funds, etc. Similarly, the working capital needs of the sector are largely met by the banking sector, including Scheduled Commercial Banks (SCBs), Regional Rural Banks (RRBs), Urban Co-operative Banks (UCBs), National Small Industries Corporation (NSIC), factoring companies, etc.

For technology related aspects and in particular energy efficiency various schemes are in place and the Bureau of Energy Efficiency (BEE) in India plays an important role here. SIDBI also has a line of credit/finance solution for matters related to technology and modernization.

Role of Small Industries Development Bank of India (SIDBI)

Small Industries Development Bank of India (SIDBI) acts as the principle financial institution for the promotion and development of the Micro, Small and Medium Enterprise (MSME) sector and also co-ordinates the functions of the institutions engaged in similar activities.

SIDBI has been identified as a Nodal Agency for the releasing of assistance, monitoring, interface and coordination with financial Institutions, banks and the government. In understanding the need to adopt modern technological processes and undertake capacity expansion of MSMEs, SIDBI has drawn out the following schemes:

- Technology Up-gradation Fund Scheme for The Textile Industries (TUFS)
- Credit Linked Capital Subsidy Scheme (CLCSS)
- Integrated Development of Leather Sector Scheme (IDLSS)
- FPTUFS – Scheme for Food Processing Industries
- Technology and Quality Upgradation Support to Micro, Small and Medium Enterprises

An illustrative example for financing technology upgradation in the MSME sector: Technology Upgradation Fund(TUF) Scheme for the MSME Textile Sector

The TUF Scheme was launched by the Ministry of Textiles, GoI on April 1, 1999; and SIDBI is the nodal agency for the SSI (small scale industries) in the textile and cotton ginning and pressing sector. The Government of India continued the Technology Upgradation Fund Scheme for the textiles & jute industries with effect from 01.04.2007 upto 31.03.2012. The scheme had a specific objective to upgrade technology in the MSME textile sector. A reimbursement of 5 per cent on the interest charged by the lending agency on a project of technology upgradation in conformity with the Scheme was given. There were various clauses such that the policy purpose was well served and the scheme also covered for external currency transactions, like it had a cover for foreign exchange rate fluctuation and a forward cover premium not exceeding 5% for all segments except for new stand alone or replacement/modernization of spinning machinery, the foreign exchange rate fluctuation and forward cover premium in this case was set at 4 per cent.

Role of SIDBI: to implement the TUF Scheme, co-option of PLIs (primary lending institutions); also examine the eligibility from TUFS point of view and to channel subsidy to its co-opted PLIs or release of subsidy to its assisted units.

Objective of the Scheme: Upgrade & modernize the Indian Textile Industry by encouraging it to undertake and adopt modern technological process & or undertake capacity expansion.

The Scheme covers the following segments: Wool scouring and combing; Synthetic filament yarn texturizing, crimping and twisting; Spinning; Viscose Staple Fibre & Viscose Filament Yarn (VFY); Weaving, knitting including non-woven, fabric embroidery Garment/Made-up manufacturing/Design studio; Processing of fibres, yarns, fabrics, garments and made-ups; Silk reeling and twisting; Technical Textiles & Non-wovens; Cotton Ginning & Pressing

3.3 What are the financial guidelines towards development of MSME sector in India?

The Government of India has enacted the Micro, Small and Medium Enterprises Development (MSMED) Act, 2006 in terms of which the definition of micro, small and medium enterprises is as given below. Enterprises engaged in the manufacture or production, processing or preservation of goods as specified in Table 12.

Table 12: MSME definition as specified in MSMED Act, 2006

Category of Enterprise	Investment in Plant and Machinery for Enterprise engaged in manufacturing	Investment in Equipment for Enterprise engaged in providing services
Micro Enterprise	Not more than Rs. 2.5 million	Not more than Rs. 1 million
Small Enterprise	More than Rs. 2.5 million, but less than Rs. 50 million	More than Rs. 1million, but less than Rs. 20 million
Medium Enterprise	More than Rs. 50 million, but less than Rs. 100 million	More than Rs. 20 million, but less than Rs. 50 million

In case of the above enterprises, investment in plant and machinery is the original cost excluding land and building and the items specified by the then Ministry of Small Scale Industries. Thus the categorization of MSMEs in India is primarily on a financial basis, or more specifically on the size of investments of plants and machinery.

Reserve Bank of India (RBI) is the central bank in India, and has issued an extensive advisory for the development of the MSME sector. Some of the key points are given below³:

- **Banks have been advised to achieve a 20 per cent year-on-year growth in credit to micro and small enterprises (MSMEs).**
- **The MSME sector has also been given the status of a 'priority' lending sector.** Priority sector lending include only those sectors as part of the priority sector, that impact large sections of the population, the weaker sections and the sectors which are employment-intensive such as agriculture, and Micro and Small enterprises.
- Public sector banks have been advised to open at least one specialized branch in each district; **as on March 2013 there are 2032 specialized MSME branches.** There are also stringent rules for banks to supply credit to MSMEs with special emphasis for micro enterprises.

In order to ensure that sufficient credit is available to micro enterprises within the MSME sector, banks should ensure that⁴:

(a) 40 per cent of the total advances to MSME sector should go to micro (manufacturing) enterprises having investment in plant and machinery up to INR 1 million and micro (service) enterprises having investment in equipment up to INR 0.4 million;

(b) 20 per cent of the total advances to MSME sector should go to micro (manufacturing) enterprises with investment in plant and machinery above INR 1 million and up to INR 2.5 million, and micro (service) enterprises with investment in equipment above INR 0.4 million and up to INR 1 million. Thus, 60 per cent of MSME advances should go to the micro enterprises.

From the point of view of technology upgradation some of the important financial aspects are:

- All categories of loans should henceforth be priced only with reference to the Base Rate (a formula driven benchmark interest rate promoted by the Indian central bank; this will help MSMEs to lower their cost of capital).
- Banks are mandated not to accept collateral security in the case of loans upto INR 1 million extended to units in the MSME sector.

³ Complete details can be availed at: <http://www.rbi.org.in/scripts/FAQView.aspx?Id=84>

⁴ For details, the Master Circular RPCD.MSME & NFS.BC.No.5/06.02.31/2013-14 dated July 1, 2013 on 'Lending to Micro, Small and Medium Enterprises (MSME) Sector, may please be seen.

- Ministry of MSME, Government of India and SIDBI have set up the Credit Guarantee Fund Trust for Micro and Small Enterprises (CGTMSE) in order to facilitate flow of credit to the MSME sector without the need for collaterals/ third party guarantees. The main objective of the scheme is that the lender should give importance to project viability and secure the credit facility purely on the primary security of the assets financed. CGTMSE would provide cover for credit facility up to INR 10 million which have been extended by lending institutions without any collateral security and/or third party guarantees. A guarantee and annual service fee is charged by the CGTMSE to avail of the guarantee cover.
- Credit Guarantee scheme (CGS) seeks to reassure the lender that, in the event of a MSME unit, which availed collateral- free credit facilities, fails to discharge its liabilities to the lender, the Guarantee Trust would make good the loss incurred by the lender up to 85 per cent of the outstanding amount in default
- There are guidelines for delayed payments options too which is to the benefit of the MSME sector

3.4 What are the unique aspects about MSME financing in India? (Cluster financing)

In the surveyed MSME clusters, the need for financial innovation in order to promote energy efficiency in the clusters was perceived as very important (see, Figure 14).

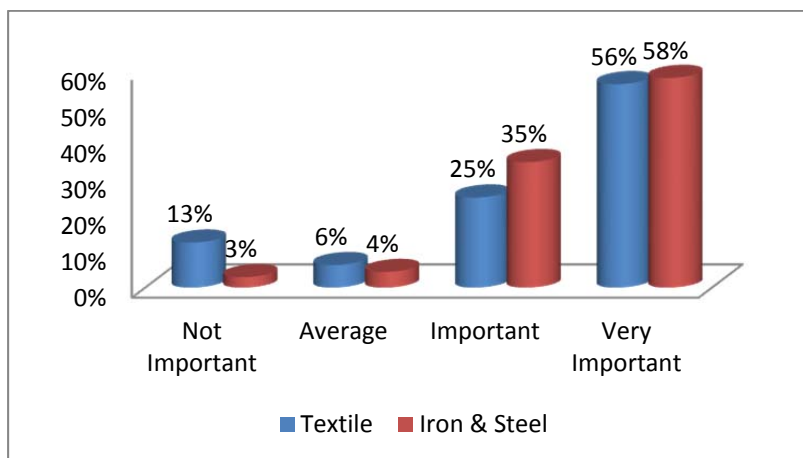


Figure 14: Role of financial innovation to promote energy savings projects

Cluster financing for MSMEs

As noted earlier that since most of the MSMEs in India are geographically grouped together in clusters, cluster based financing or simply cluster financing is an important aspect in financing of MSMEs. Cluster based approach to lending is intended to provide a full-service approach to cater to the diverse needs of the MSME sector. This may be achieved through extending banking services to recognized MSME clusters. A cluster based approach may be more beneficial:

- in dealing with well-defined and recognized groups;
- availability of appropriate information for risk assessment;
- monitoring by the lending institutions; and
- reduction in transaction costs for lending institutions

Banks in India have been advised to treat MSME as a thrust area and increasingly adopt the same for MSME financing. United Nations Industrial Development Organisation (UNIDO) has identified 388 clusters spread over 21

states in various parts of the country⁵. The Ministry of Micro, Small and Medium Enterprises has also approved a list of clusters under the Scheme of Fund for Regeneration of Traditional Industries (SFURTI) and Micro and Small Enterprises Cluster Development Programme (MSE-CDP) located in 121 Minority Concentration Districts. Accordingly, banks have been advised to take appropriate measures to improve the credit flow to the identified clusters.

Banks in India have also been advised that they should open more MSME focused branch offices at different MSME clusters which can also act as counselling centres for MSMEs. Each lead bank of the district may adopt at least one cluster.

3.5 What are the key issues and critical gaps in MSME financing in India?

The most critical problem in financing is especially in the early stages; also for finance availability to make businesses more adaptable and for modernization. It is in this second issue that energy efficiency also faces critical challenges in financing⁶.

- Challenges to finance energy efficiency: Lack of proposals and availability of business models.
- Problems in availing early stage finance
- Entrepreneur's lack of 'know how' with regard to providing information in prescribed formats of the financial institutions
- Dearth of availability of grants, schemes etc. given the large number of applicants
- Lack of financing for service products through easy finance options
- Lack of thinking amongst the financial institutions/investors to provide complete solution from the conceptualization of enterprise to its successful operations
- Lack of availability of funds supporting the enterprises focusing on rural areas

3.6 Are there any cases of external collaboration aimed at improving access to finance for MSME enterprises in India?

Access to finance is still a major challenge, for MSMEs especially those in the unorganized sector. Businesses such as a Delhi based textile exporters, suffer from a lack of capital and face difficulty getting a loan due to a lack of collateral security. This is despite all the guidelines and provisions to make loans available for MSMEs without collateral. Micro enterprises instead avail funds from friends or relatives, expensive private financiers with interest rates varying between 36% - 200% p.a. or their own savings and private assets. *Consequently, they are unable to make big investments such as purchasing modern machinery and equipment and to scale up their business.*

To address this financing gap, in 2010, GIZ and Small Industries Development Bank (SIDBI) partnered with Satin Credit care Network Limited, a leading micro finance institution in North India, to demonstrate the scaling up of credit from micro finance to micro enterprise financing⁷. The pilot targeted the informal sector by introducing an innovative financial product and delivery model for the upstream apparel supply chain, operating in the industrial areas of Govindpuri, Sangam Vihar and Tughlakabad Extension in Delhi. It successfully demonstrated that the availability of credit has enabled micro enterprises to improve their production capacities, as well as production efficiency. Many were able to utilize loans to increase their productive assets and to meet their working capital

⁵ RBI website: <http://www.rbi.org.in/scripts/FAQView.aspx?Id=84>; last accessed Dec. 2013

⁶ Source: UNDP 2012, Synthesis of important discussions on financing value chains and micro, small and medium enterprises; stakeholder consultations

⁷ GIZ (2013). *Strengthening Indian MSME*, Newsletter, MSME Umbrella Programme, GIZ New Delhi, Feb. 2013

requirements. Consequently, they have been able to employ more skilled manpower and generated higher revenues and profits.

Encouraged by the results of this GIZ and SIDBI now aim to bring micro enterprise financing to the next level and are launching a joint initiative to disseminate the learning from this pilot to Regional Rural Banks, Urban Cooperative Banks and Non-banking Financial Institutions.

3.7 What policy measures are encouraging overseas investments in low carbon technologies in India?

The most important policy framework that exists in India relevant to low carbon pathways is the National Action Plan on Climate Change (NAPCC). Several missions form the NAPCC and address specific areas namely - solar energy, enhanced energy efficiency, sustainable habitat, water, sustaining the Himalayan eco-system, green India, sustainable agriculture and strategic knowledge for climate change which include assessment of the impact of climate change and actions needed to address climate change⁸. Enhanced energy efficiency is one of the missions; it is formally named as the National Mission for Enhanced Energy Efficiency (NMEEE).

The above was with respect to the policy front, and from these guiding policies there are two examples of funds available in India from public finance sources, the first fund is from domestic public finance sources and is known as the National Clean Energy Fund and the other from international sources Global Environment Facility (GEF); these two examples are elaborated below:

National Clean Energy Fund: This fund was devised to ‘ameliorate the negative environmental consequences and increased pollution levels associated with industrialisation and urbanisation’. This fund was announced as a part of the Union Budget of 2010-11.

The essential purpose of the fund is for financing research and innovative projects in clean energy technology. The fund recognizes that while it must be ensured that the principal of a “polluter pays” remains the basic guiding criteria for pollution management, there should also be a positive thrust for development of clean energy. For this the finance minister had in the budget speech had proposed to levy a clean energy cess on coal produced in India at a nominal rate of INR 50 per tonne, which will also be applicable to imported coal. The fund is operational however most of the resource allocation is for renewable energy financing or providing concessional loans for renewable energy providers⁹.

Global Environment Facility (GEF)

The GEF provides grants for projects related to biodiversity, climate change, international waters, land degradation, the ozone layer, and persistent organic pollutants.

1991 onwards GEF has provided \$11.5 billion in grants and leveraging \$57 billion in co-financing for over 3,215 projects in over 165 countries. With the Small Grants Programme (SGP), the GEF has also made more than 16,030 small grants directly to civil society and community based organizations, totalling \$653.2 million.

In terms of the funds allocated from the GEF to India it is summarized in the table below. The Bureau of Energy Efficiency (BEE) is one of the partner organizations of the GEF in India (Table 13).

Table 13: Total GEF financing in India (USD)

Number of projects	Total GEF financing	Total co-financing
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⁸ Source: <http://pib.nic.in/newsite/erelease.aspx?relid=58313>

⁹ Source: <http://pib.nic.in/newsite/erelease.aspx?relid=58419>; last accessed Oct. 2013

National projects	60	413431048	3276078120
Regional and global projects	17	143802671	250321460
GEF small grants programme	312	7869868	10719226

Source: http://www.thegef.org/gef/sites/thegef.org/files/publication/India%20-%20Fact%20Sheet%20ready_Final.pdf (GEF October 2012) <accessed October 2013>

Bureau of Energy Efficiency (BEE)

The Government of India set up Bureau of Energy Efficiency (BEE) in 2002. This was done under the provisions of the Energy Conservation Act, 2001.

BEE's mission is to assist in developing policies and strategies with a thrust on self-regulation and market-based mechanisms. The most important objective of the BEE is to reduce energy intensity of the Indian economy and sustained adoption of energy efficiency in all sectors.

BEE's role is to co-ordinate between different stakeholders, recognize, identify and utilize the existing resources and infrastructure, in performing the functions in the Energy Conservation Act that has been assigned to it¹⁰.

World Bank – GEF Project – Financing Energy Efficiency at MSMEs

With respect to energy efficiency in the MSME sector, 'World Bank – GEF Project – Financing Energy Efficiency at MSMEs' is an important project.

BEE plays an important role in this GEF project of the World Bank. SIDBI is another important partner.

The project aims to improve energy efficiency and reduce emissions of green-house gases in MSME clusters in India.

There is a grant agreement (signed in 2010) under which the total GEF funding made available to SIDBI was USD 9.05 Million and had to be utilized over a period of four years. In addition to the grant to SIDBI, GEF has also provided a grant of USD 2.25 Million to the Bureau of Energy Efficiency (BEE) for implementation of energy efficiency at MSMEs in India. A Project Management Unit in SIDBI had been setup at New Delhi to channelize the grant to the targeted beneficiaries.

In this project, SIDBI would be focusing on five energy intensive clusters namely foundry cluster at Kolhapur, forging at Pune, limekilns at Tirunelveli, chemical at Ankleshwar and mixed sectors in Faridabad in India.

This was done through provision of assistance for completion of energy audits, preparation of detailed project reports and support in mobilization of financing from the Indian local banks to ensure that the identified energy efficiency measures are implemented. SIDBI also would provide broad support to BEE to implement energy efficiency in additional 25 clusters where the initiatives are being undertaken by BEE.

The project focus is on four key activities:

- Activities to build capacity and awareness for energy efficiency in MSMEs
- Activities to increase investments in energy efficiency in MSMEs
- Programme knowledge management
- Project management.

¹⁰ Source: Website: <http://www.bee-india.nic.in>

Chapter 4: Regulatory aspects

4.1 How is the legal environment with respect to technology transfer in India?

An enabling legal environment which is able to accomplish a fine balance between the interests of local industry and foreign counterparts is crucial for facilitating technology transfer to developing countries. As already discussed in the section on institutional challenges, key components of a conducive legal environment are environmental regulations and legislation targeted at achieving energy conservation and energy efficiency. The Environment (Protection) Act of 1986 with its umbrella- like reach on all aspects of the environment and the Energy Conservation Act of 2001 are key legal enactments in this regard (which have already been discussed earlier on).

The intellectual property rights (IPR) regime is another aspect of the legal environment which has a direct bearing on the issue of technology transfer and has been the subject matter of a contentious debate between developed and developing countries, particularly in the context of the climate change negotiations. India has in place an IPR regime at par with international standards which has also been subject to enhanced efforts at strengthening in recent years. This should reasonably put to rest apprehensions by firms in the developed countries seeking to transfer IPR protected technologies. The issue is being discussed in detail in the subsequent section.

Key components of an enabling legal environment for technology transfer include

- Environmental regulations and legislation targeted at achieving energy conservation and energy efficiency.
- IPR regime at par with international standards
- Clearer investment norms and organized financial markets
- Progressive taxation regime and broadening customs base

Within the generational shift in financial sector reforms in India, there has been an approach of the government to come up with clearer investment norms and fostering an enabling legal environment. The government had passed the SARFAESI Act in 2002 and it continues to contribute to investment push in small and medium sector of manufacturing. Whilst pushing for expansion of easy credit to the entrepreneur it also secures assets of financial institutions, thereby contributing to healthy credit off-take and organised loan market. Backed by DRTs the investment fostering loan environment continues to organise further, under the braid meaning of market lead growth. Seized of these sentiments, the government in India has also come up with the Land Acquisition, Rehabilitation and Resettlement bill as comprehensive legislation to safeguard interests of stakeholders whilst pushing for growth. Segments such as SMEs which are less subject to the type of permissions sought by mega projects are more driven by demand conditions and GDP growth and equally by entrepreneurial and enabling environment. Taxation and customs are major contributors to this enabling environment. With a new Direct Tax code proposed as also organising indirect taxes on the lines of a single GST, India is pushing for a progressive taxation regime which aims at a healthier tax to GDP ratio. With the MSME contributing to 40% of GDP, there are clear benefits that the MSME can obtain whilst contributing to healthy contribution to growth of the country. There has been a further renewed push of the incumbent policy makers to push for expansion of banking to rural centres and in that sense Indian financial sector is open for further opportunities for entrepreneurial off take.

2.1 IP, patents and legal protections towards technology transfer

Highlights in the current regime in India related to intellectual property rights, patents and legal protection include:

- India is a party to the TRIPS Agreement- the primary international treaty governing IPRs and also a member of a number of international conventions and agreements on IPRs.
- A series of amendments effected to the Indian Patents Act to make it TRIPS compliant, resulting in IP protection at par with international standards.
- Persistent efforts at strengthening enforcement and enhancing capacity of the Indian Patent Office.
- Spurt in patent applications in recent years both by Indian and foreign applicants (with Japan filing the second highest number of patent applications after the United States) indicate enhanced faith in the Indian IPR regime.

Intellectual Property Rights (IPRs) including patents constitute an important yet contentious aspect of the debate on technology transfer from firms in the developed to the developing world. This, according to Ockwell et.al (2008), in the particular context of clean technology transfer, basically stems from two conflicting political discourses of economic development and technology diffusion prevailing in the developed and developing countries respectively. In their opinion, while developing countries see clean technology transfer as a means of enhancing their technological capacity and contributing to their economic development, developed nations' motivation is to achieve rapid and widespread diffusion of these technologies to reduce emissions. This is further aggravated by apprehensions in the developed world about the weakness of IPR regimes and their poor enforcement in developing countries. This apprehension is, however, unfounded in most cases and based on 'myths' and misperceptions as many developing countries have IPR regimes based on international standards and have gone about strengthening enforcement and resolving other issues (Harvey and Morgan, 2007; Barpujari and Nanda, 2013).

Japanese firms seeking to transfer low carbon technologies to Indian entities can expect to find a conducive IPR regime in India, where their IPRs including patents can be expected to be protected at par with international standards. The Indian IPR regime predates independence in 1947, with some of the key enactments going back to the period of British rule and closely modelled on the relevant British laws. Post-independence, need was felt for a new patent law taking into account the changed political economy of the country, leading to the enactment of the Patents Act of 1970. Under this Act, there was no product patent for pharmaceuticals, food and chemical based products, which were covered by process patents only. The term of patent for process patents in pharmaceuticals was 7 years from the date of application of the patent and 5 years from the date of grant of patents, whereas for all other matters the patent was for a fixed period of 14 years.

India became a party to the TRIPS (Trade Related Aspects of Intellectual Property Rights) Agreement in April, 1994 and following this, a thorough revision of the IPR regime, particularly the patent regime has taken place along with the enactment of new legislation to protect different kinds of IP. The TRIPS is the primary multilateral agreement governing IPRs in the world, prescribing minimum standards of protection for national legislation. Three sets of amendments were made to the Indian Patent Act-in 1999, 2002 and 2005, in order to achieve TRIPS compliance before 2005 (the transition period granted to India for introducing product patent protection). The term for both product as well as process patent is now 20 years.

In addition to TRIPS, India is also the member of a number of international conventions and agreements on intellectual property which include the Paris Convention for the Protection of Industrial Property, 1883; the Berne Convention for the Protection of Literary and Artistic Works, 1896; the Budapest Treaty on the International Recognition of the Deposit of Microorganisms for the Purposes of Patent Procedure, 1977; the Nairobi Treaty on the

Protection of the Olympic Symbol, 1981; the Patent Cooperation Treaty, 1970; the Rome Convention for the Protection of Performers, Producers of Phonograms and Broadcasting Organizations, 1961; and the Washington Treaty on Intellectual Property in respect of Integrated Circuits.

As far as enforcement is concerned, IPR enforcement is subject to the provisions of the Code of Civil Procedure, the Indian Penal Code, and the Civil and Criminal Rules of Practice. The Code of Civil Procedure provides for civil remedies and enforcement through civil courts, while penal remedies are provided in the Indian Penal Code. India adheres to the common law tradition with judicial precedents of the Supreme Court being binding on the lower judiciary. Statutory enforcement mechanisms are provided in the IP laws, governing patents, trademarks, copyrights etc. Under the Patent (Amendment) Act of 2005, the patentee may file an action for patent infringement in either a District Court or a High Court. The relief that a court may grant in a patent infringement suit, would be either damages or account of profits. Post TRIPS, in 2002, a significant amendment was introduced with respect to enforcement of patents in the form of section 104-A. This section effects a reversal of the burden of proof to the defendant in case of process patents, which is believed to lead to a higher rate of success for the patent holder and acts as a deterrent to potential infringers (Venkataramani, 2007).

The Intellectual Property Office (IPO) in India, in recognition of the importance of IP both as 'a tool to protect creativity and generate revenue, as well as to build strategic alliances for socio-economic and technological growth', has been engaged in persistent efforts to strengthen the IPR regime (Annual Report 2011-2012 of the Office of the Controller General of Patents, Designs, Trade Marks and Geographical Indication). The IPO has recently expanded the Examiner workforce to handle the enhanced patent applications and it has also ensured enhanced search facilities through the IPATS, an advanced Search Engine powered for integrated search through different databases. Recently, the Indian Patent Office has started functioning as International Searching Authority and International Preliminary Examining Authority under the Patent Cooperation Treaty, facilitating international patents.¹¹

Efforts in strengthening the working of the Patent Office have corresponded with a spurt in patent applications over the years, both by Indian and foreign applicants, indicative of enhanced faith in the Indian IP regime. A closer look at the foreign applications filed through the Patent Cooperation Treaty (PCT) National Phase route indicate that the number of such applications filed during the year 2011-12 was 29193, which was about 6.39% higher than the previous year, with the United States (9137) followed by Japan (3980) being leaders in patent applications. Interestingly, apart from other developed countries, India has signed an MOU with Japan in 2006 to enhance bilateral co-operation in the field of intellectual property with the common objectives of improvement of IPR systems, establishment of transparent and streamlined procedures concerning intellectual property and promotion of public awareness of protection of intellectual property. This initiative for the acknowledged 'benefit of their respective industry and citizens' is expected to further remove IPR barriers and ensure better protection of Japanese IP, thereby facilitating technology transfer.

In the surveyed MSME clusters, lack of clear understanding was the major issue with regard to intellectual property rights in the Iron & Steel sector while lengthy and cumbersome IP procedures emerged as the major issue in the textile cluster (see, Figure 15).

¹¹ <http://ipindiaservices.gov.in/isaweb/agreement.pdf>, accessed on October 23, 2013

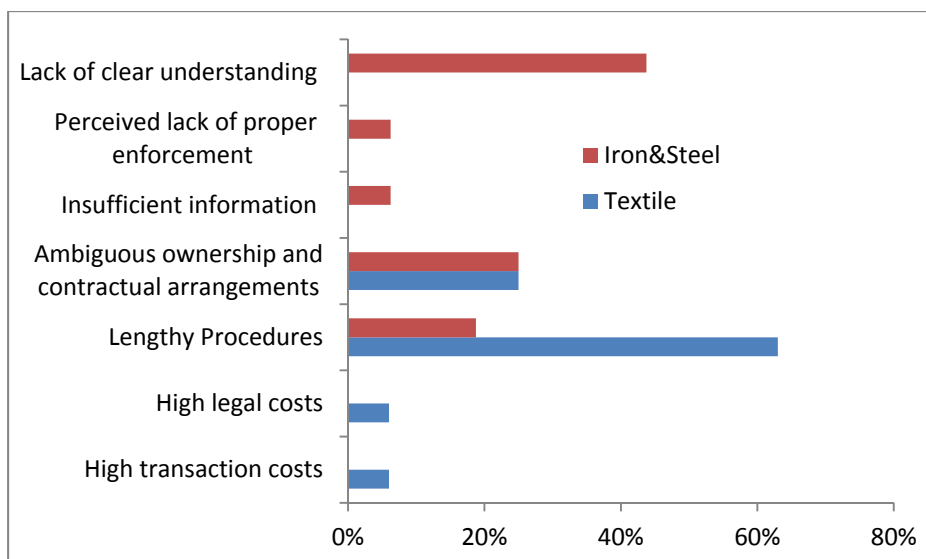


Figure 15: Key issues associated with Intellectual Property Rights in the surveyed MSME clusters

4.2 What are the investment norms, taxation, customs and land laws in India?

The investment laws in India are centred around financial institutions of governance, institutions of credit lending and extensions and broad based sectorial guidelines as arrived by the **Foreign Investment Promotion Board**, under the Ministry of Finance. These are further supported by legislative framework that involves the following laws supported by respective by-laws:

- RBI Act
- FEMA Act
- Credit Extension guidelines of financial institutions such as SIDBI
- SARFAESI Act and rules as amended
- DRT Act
- SIDBI guidelines
- Companies Act 2013
- Minor Acts including Sale of Goods Act, Lease Licenses and Easements, FEMA

As a central bank, the role of the RBI includes supervision of the banking network and operations in its jurisdiction, public debt through the public debt act, foreign exchange management apart from developmental role of the bank in achieving national growth objectives.

Table 14: FDI in India: A timeline

Pre-1991	FDI was allowed selectively up to 40% under FERA
1991	35 high priority industry groups were placed on the Automatic Route for FDI up to 51%
1997	Automatic Route expanded to 111 high priority industry groups up to 100%/ 74%/ 51%/50%
2000	All sectors placed on the Automatic Route for FDI except for a small negative list
Post 2000	Many new sectors opened to FDI; viz., insurance (26%), integrated townships (100%), mass rapid transit systems (100%), defence industry (26%), tea plantations (100%), and print media (26%). Sectorial caps in many other sectors relaxed

This year marks the twentieth anniversary of the dramatic opening up of the Indian economy. The past two decades have witnessed a huge transformation across sectors such as industry, external trade, banking and finance. This is also a period when the economy has become globalized, in terms of flows of goods and services, investments, capital, people, technology and ideas. In the area of foreign exchange the country has certainly moved away from an older paradigm of managing scarcity, to a more liberal and flexible regime. In fact there has been occasional concern that the recent stock of foreign exchange is excessive for the country. As the **trade to GDP ratio has steadily climbed to almost 40 per cent, the inward flow of foreign direct investment has also risen substantially**. The accumulated stock of foreign exchange reserves is largely attributable to non-debt creating inflows.

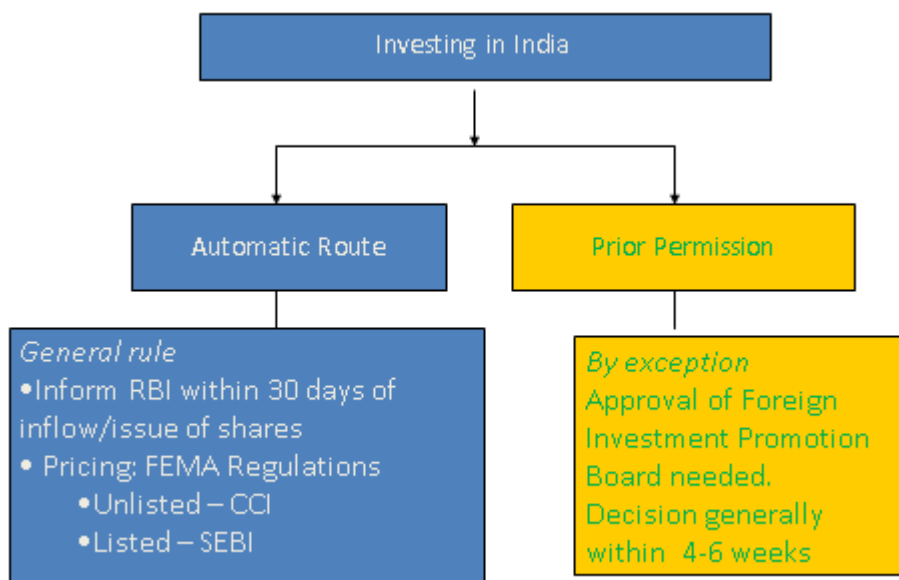


Figure 16: Investment and regulation in India

In order to facilitate cross border transactions involving foreign exchange, and to better reflect India’s growing and robust international engagement, a major legal transition took place. In 1999 India’s Parliament passed a new law “FEMA” which replaced the older version of FERA 1973. In the nomenclature itself, the word “Control” was replaced by “Management”. As such, FEMA governs any transactional relationship between a resident and a non-resident entity. The rules under FEMA broadly indicate that (a) all current account transactions should be enabled and facilitated; and, (b) specified capital account transactions be enabled, with necessary references to the approving authority. **FEMA also gave substantial delegated powers** to Authorised Dealers for better functioning of FEMA. FEMA has now been in existence for more than a decade. **Various experiences both positive and negative have been gathered during this period**. There has been a major concern that the application of FEMA to transactions between individuals (as against corporates), has been unnecessarily burdensome. It is as if the functioning of a law, which was aimed at liberalizing has become constrained by excessive regulation. It has **still been felt that the control mind-set, and substantive policy issues should be de-linked from procedural issues**. This has been visited by various sub-committees of the RBI and thereby the foreign exchange management rules have been revisited further. FEMA is charged with this tax compliance. The Committee is of the considered view that the procedural “knots” in the system need to be untied to enable the present forex liberalization to be effective and in the absence of untying of these knots, any further forex liberalization will not be meaningful.

The **new Companies Act 2013** looks at fraud with newer and more punitive approach. It improves upon the 60 years old earlier statute and brings fraud as a definition in the companies at itself, away from the strict purview of fraud within the legal domain. This expansion in terms of definition creates a more efficient legal regime. The purpose of this has been to bring down economic crimes and in that sense the companies act is a welcome addition to the

already firming up investment scape in India. **Whistle-blower** mechanisms have also been introduced as a formal setup. This new statute also has provisions based on Corporate Social Responsibility and Indian industry is currently at various stages of seeking clarity on the scope of **CSR activity** that industry can engage in.

The **Serious Fraud Investigation Office (SFIO) is now a statutory body** with power to arrest for offences specified as fraud. The penalties are not compoundable, and are more severe now. A **National Financial Reporting Authority** has been mandated to regulate auditors, and has extensive powers to investigate professional or other misconduct by any member or firm of chartered accountants. An interesting development is that of class action suits related rights that have now been granted to shareholders, in a way diluting the requirement of locus standi under traditional legal regime.

The **banking sector has been striving to achieve international standards** and is progressively complying with the international prudential norms and standards. Despite all this there are various areas there are concerns that Indian banks do not enjoy a level playing field with their international counterparts. In that regard there has been observed that the Indian banks have pursued partnerships with foreign banks to leverage better customer confidence and with the **BASEL III capitalisation and risk mitigation norms** now coming into decision making in the Indian banking space, retail banking is now better poised to provide investment support to MSMEs.

The **Securitisation Act empowers the banks and FIs to move on its own against a borrower** whose assets are secured, and who has made some kind of default in repayment of the same. The provisions of this Act shall have effect notwithstanding anything inconsistent therewith contained in any other law for the time being in force or any instrument having effect by virtue of any such law . Thus after complying with the statutory provisions in the said act the banks can take possession of the secured assets of the borrower or liquidate assets so as to release NPAs in an efficient manner. Impact on Banking other than freeing up the blocked assets of banks, securitisation can transform banking in other ways as well. The growth in credit off-take of banks has been the reasonable high in the last decade.

Chapter 5: Building Collaboration with Indian MSMEs: Key Recommendations

Key Recommendations

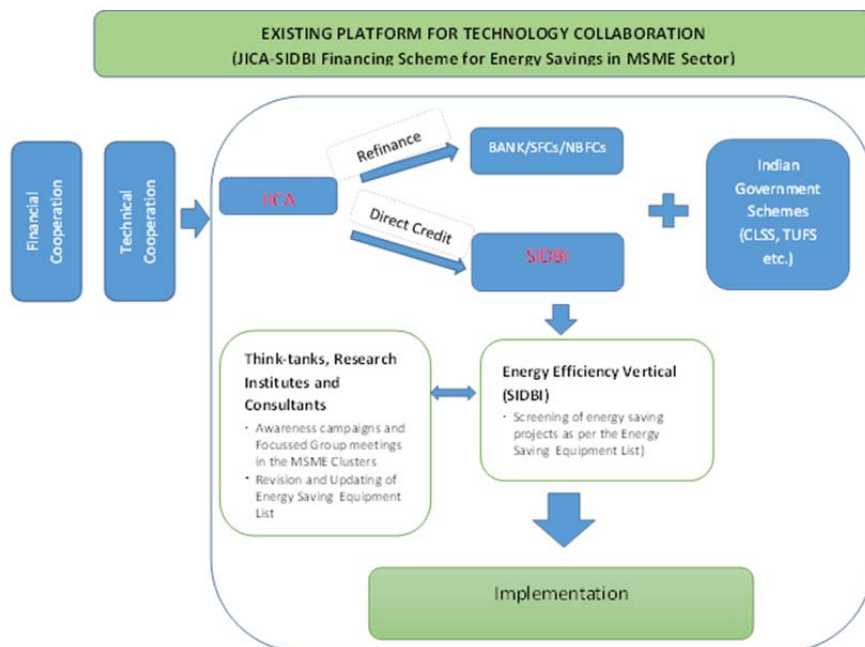
- Developing an integrated cluster technology capacity building platform for low carbon development by involving the following actors:
 - Government agencies
 - Overseas industry players
 - Legal and financial Institutions
 - Local industry associations/ chamber of commerce
 - Technical institutions
- A mandate of such integrated institution can be to impart:
 - Training and human resource development
 - Provision of technical support
 - Monitoring and evaluation
- Business/ networking portals (B2B/ B2C)
- Programmatic interventions to promote energy efficiency through provision of subsidies and banking instruments
- Support development of indigenous technologies through horizontal technology transfer collaboration



As an attempt to examine the possible ways of encouraging greater collaboration between the domestic Indian industries and overseas technology players, this guidebook examines the existing mechanisms and possible options. In this context a brief analysis of the efforts undertaken by SIDBI jointly with Japanese overseas financial institution (JICA) is presented along with a recommendation of a platform that could play more active role in coordinating and implementing overseas collaborative projects.

India-Japan technology collaboration in the MSME sector has huge potential as it presents a natural demand supply model. There is a notable demand for advanced technologies among the Indian MSME's while the lack of domestically available support is creating a critical hurdle for the sector. In terms of fuel usage, productivity, employment etc., the MSME sector deserves special attention. Integrating advanced low carbon technologies from overseas players such as Japanese Industry will present mutually beneficial business opportunities.

The existing platform that provides opportunities for collaboration has players such as JICA and SIDBI apart from various domestic financial institutions. However, there are inherent challenges for these platforms which limit the collaboration of domestic industry with overseas players. To some extent there is a need to give greater visibility to the domestic industry for the potential players from abroad in order to facilitate enhanced cooperation in the energy efficiency front.



JICA - SIDBI Financing Scheme for Energy Saving Projects in MSME Sector

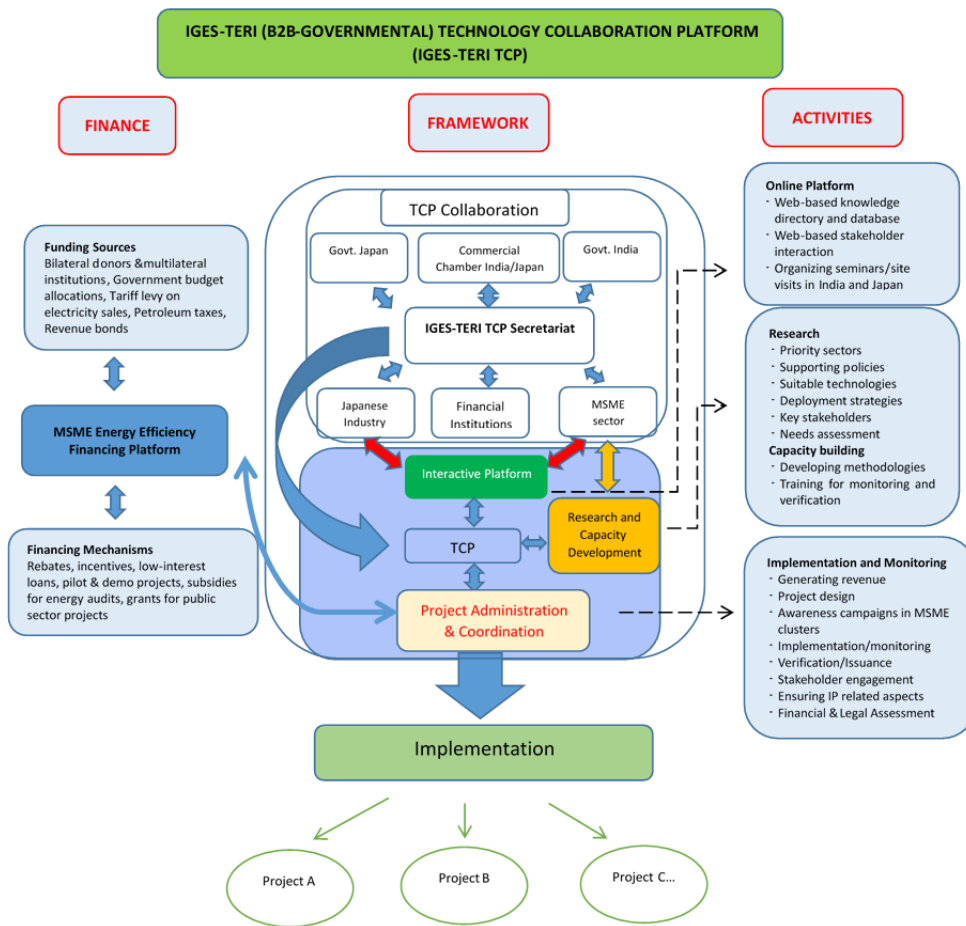
- To facilitate energy saving investments in plant and machinery to reduce energy consumption, enhance energy efficiency, reduce CO2 emissions, and improve the profitability of the MSME units in the long run, it encourages MSME units in India to undertake energy saving investments in plant and machinery. It funds new and improved technologies and processes for energy saving in the new as well as existing MSME units.
- Minimum loan amount – Rs.1 Million; Interest rate – As per credit rating and 0.75% below the normal lending rate; Repayment period – Need-based, usually up to 7 years.
- Energy efficiency project on registration under CDM also eligible for CERs.
- Funding available through refinancing agencies which include select commercial banks and NBFCs.

Some key observations on the energy efficiency (EE) initiatives in the MSME sector

- Erratic and evolving responses of the industry to investment in EE
- Investment in EE is not a one-time investment decision but is staggered
- Not much focus on micro enterprises
- Incongruity in the distribution of financing on a regional and sectorial basis
- Need for providing hand holding support for technology adoption at the unit-level
- Skill development and capacity building of the entire ecosystem supporting the MSME sector will accelerate uptake of energy efficient technologies
- Need for more collaborative research program with other countries to get access to latest energy efficient technological development
- Barriers to adoption of non-traditional renewable energy options

IGES-TERI (B2B-Governmental) Technology Collaboration Platform (IGES-TERI TCP)

The guidebook presents an alternative mechanism to the existing approach, by a joint IGES-TERI platform, aiming at giving a strategic impetus to the technology collaboration in India's MSME sector through by building a nexus between B2B and government-to-government collaboration.



This platform is aimed at bringing several of stakeholders who would play an active role in technology collaboration between domestic industries in India and overseas players. This platform aims to fill the gap existing in the presently active platforms or approaches in linking the domestic industry with international technology players.

Main Features of the Proposed Platform

Financial mechanism

- A MSME Energy Efficiency Financing Platform can be created at the national level involving governments, regulators, and/or donor agencies for financing EE projects in MSME sector. A wide range of financing approaches can be used to deploy funds for EE projects.
- The platform will establish collaboration with domestic financial institutions and involve stakeholder from government agencies and the industry.
- The financial mechanism will be drawn from the existing platforms
- Explore possible financial sources such as climate fund or other international funding sources as it may apply

Research and Capacity building

- The platform will actively involve in research to continuously improve the understanding about industry and the applicability of any overseas collaboration.
- The platform will also involve in designing capacity building programs and implementing
- An all-round innovation support extended through R&D public service platform is imperative for promoting energy efficiency initiatives in the MSME sector. In this regard, the network of SIDBIs Technology Resource

Centres can be revamped to provide multiple support services providing technical literature, management decision making support, entrepreneurial advice, equipment sharing, scientific figure sharing but also services of technology transfer, industry testing, system optimization and customization of solutions for individual MSMEs, and professional technology to MSME

Interactive platform for Japan-India Technology platform

- The interactive platform aims to allow in-depth engagement between Indian and Japanese stakeholders, notably from private and government sectors, to promote technology cooperation and capacity building in the MSME sector. The platform, having IGES and TERI as the secretariat, will facilitate the interaction by three means.
 - Web-based knowledge directory and database for providing information on know-how and business models for the technology transfer and deployment;
 - Web-based stakeholder interaction (e.g. webinars, online directory): This will be useful in maintaining the network outside meeting rooms.
 - Organizing seminars/site visits in both India and Japan: the visits will create opportunities to understand the Japanese technologies and their application opportunities in India. Site visits may include participation to relevant trade-fairs or exhibitions.

Project administration and coordination

- The project administration & coordination division shall perform the following set of activities for enhancing energy efficiency in the MSME units: generating revenue, project design, awareness campaigns in MSME clusters, implementation/monitoring, verification/issuance, stakeholder engagement, ensuring intellectual property IP related aspects, financial & legal assessment, and providing handholding support from technology adoption at the unit level.
- For energy efficiency in the MSME sector to scale up there is a need to administer the public finance in a better way. A case in point is the Partial Risk Guarantee Fund (PRGF) which does exist in policy under National Mission on Enhanced Energy Efficiency (NMEEE) and with Bureau of Energy Efficiency (BEE) as the implementing authority. However, there are still no funds made available for PRGF. The inertia in public finance which possibly is the seed financing method for MSME needs a better process in implementation. A scheme like PRGF is possibly a good area for international cooperation apart from the concessional credit line.
- As most of the MSMEs in India are geographically grouped together in clusters, cluster based financing or simply cluster financing is an important aspect in financing of MSMEs. A cluster based approach may be more beneficial: in dealing with well-defined and recognized groups; availability of appropriate information for risk assessment; monitoring by the lending institutions; and reduction in transaction costs for lending institutions

References

- ADB (2009). *Improving Energy Security and Reducing Carbon Intensity in Asia and Pacific*. Mandaluyong City, Philippines: Asian Development Bank
- Bala Subrahmanya, M H (2012). "Technological Innovation in Indian SMEs: Need, Status and Policy Imperatives". *Current Opinion in Creativity, Innovation and Entrepreneurship*, Vol. 1, Issue 2, November 2012
- Barpujari, I., N. Nanda, 2013, "Weak IPRs as Impediments to Technology Transfer: Findings from Select Asian Countries", *Journal of Intellectual Property Rights*, Vol. 18, September, pp.399-409
- Becheikh, N., R Landry and N Amara (2006). "Lessons from Innovation Empirical Studies in the Manufacturing Sector: A Systematic Review of the Literature from 1993-2003", *Technovation*, Volume 26, Issue 5/6, pp 644-664.
- Bhardwaj, S., K Jain and S V Joshi (2013). "Technology commercialization by Micro, Small and Medium Enterprises (MSMEs) in Indian context: challenges and governmental support systems". *Indian Journal of Economics and Business*, New Delhi, Vol. 12. Issue 1, p. 57-71
- Corvaglia, M.A. (undated), South- South technology transfer addressing climate change, http://www.nccr-climate.unibe.ch/conferences/climate_economics_law/papers/Corvaglia_MariaAnna.pdf
- DIPP (2013a). *Factsheet on Foreign Direct Investment (FDI) (from April 200 to September 2013)*. Department of Industrial Policy & Promotion, Ministry of Commerce & Industry, Government of India
- DIPP (2013b). *FDI Synopsis on Country Japan (as on 31.08.2013)*. Department of Industrial Policy & Promotion, Ministry of Commerce & Industry, Government of India
- Harvey I, J Morgan, *Intellectual property rights in China: Myths versus reality*, Third Generation Environmentalism Limited, London (2007).
- IEA (2011). *World Energy Outlook 2011*. International Energy Agency. Paris: IEA
- Intergovernmental Panel on Climate Change, 2000, *Methodological and Technological Issues in Technology Transfer: Summary for Policymakers*, A Special Report of IPCC working Group III
- Less, T.C., S. McMillan, 2005, *Achieving the successful transfer of environmentally sound technologies: trade-related aspects*, OECD Trade and Environment Working paper No. 2005-2, Paris: OECD.
- Mckinsey and Company (2012). *India: taking on the green-growth challenge*.
- MoCF (2012). *Annual Report 2011/12*. Ministry of Chemicals and Fertilisers, Government of India. New Delhi
- MoSPI (2011). *Energy Statistics 2011*. Ministry of Statistics and Programme Implementation. New Delhi
- Ockwell DG, R Haum, A Mallett, J Watson, *Intellectual property rights and low carbon technology transfer: conflicting discourses of diffusion and development*, paper for submission to 2008 BIEE Conference, www.sussex.ac.uk/sussexenergygroup/documents/ockwell_et_al_conflicting_discourses_of_dev_diffusion.pdf
- Planning Commission (2006). *Integrated Energy Policy: report of the Expert Committee*. New Delhi: Planning Commission, Government of India
- Planning Commission (2011). *Report for the Twelfth-five year plan (2012-17) Economic sectors. Volume –II*. Government of India: New Delhi
- Planning Commission (2011). *Report for the Twelfth-five year plan (2012-17) Economic sectors. Volume –II*. Government of India: New Delhi

Planning Commission (2011). Report of the Working Group on Pulp and Paper Sector for the Twelfth Five-year Plan. Government of India. New Delhi

Planning Commission (2012). Report of the Working Group for the twelfth Five-year Plan (2012–17). Government of India. New Delhi

Planning Commission (2012). Sub- Group on Flow of Private Sector Investments for MSME Sector: Executive Summary. Government of India: New Delhi

Planning Commission (2012). Sub- Group on Flow of Private Sector Investments for MSME Sector: Executive Summary. Government of India: New Delhi

Subbarao, S (2008). *International Technology Transfer to India an Impedimenta & Impetuous*. W.P. No. 2008-01-07, Indian Institute of Management (IIM) Ahmedabad (January 2008)

TERI (2012). TERI Energy Data, Directory and Yearbook TEDDY 2011/12. The Energy and Resources Institute. New Delhi: TERI

TERI (2013). TEDDY (TERI Energy Data Directory and Yearbook 2012-13. The Energy and Resources Institute: New Delhi

Venkataramani S, Patent enforcement measures in India (2007), <http://www.legalserviceindia.com/articles/peainindia.htm>