

# *Route to the Indian market: Opportunities for UK manufacturing SMEs*

March 2013



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# Introduction

Indian Governments have stressed publicly that small and medium-sized enterprises (SMEs) need to be encouraged to boost the manufacturing sectors in UK and India. However, the goals the two countries are driving towards may not be quite the same.

In general, SMEs in the UK are more R&D and innovation-orientated and technology driven than their counterparts in India. Many are also part of global supply chains—not only of leading UK corporations, but also of other global OEMs in their specific subsectors. The UK Government wants to encourage them to expand into high-growth markets such as India and increase their global footprints alongside the bigger players, thereby making them more sustainable and resilient to economic cycles.

Meanwhile, Indian SMEs – especially the medium-sized ones – are raring to internationalise, and eager to access to cutting-edge technology and good practices to help them become globally competitive. Having the cost advantage of domestic production, they are keen to collaborate and invest in technologies that will help them move to the next stage.

Given the respective priorities and positioning of UK and Indian SMEs, there is clear potential for them to realise significant synergies through working together – and that doing so could help SMEs in both countries achieve their ambitions.

To help them realise this potential, the UKIBC – in collaboration with PwC – has produced this ‘route to market’ report on engineering and manufacturing SMEs in India. Our joint aim in this report is to inform UK SMEs about some key opportunities the Indian market offers and potential areas of collaboration, along with issues to be aware of and risk mitigation strategies.

Since the advanced engineering and manufacturing sector is a huge one, we have decided in this report to concentrate on three key subsectors:

- Aerospace and Defence
- Automotives
- Low Carbon Technologies

*“We hope that readers of this report find it interesting and informative. And we look forward to helping growing numbers of SMEs in India and the UK collaborate and create value together in the years to come.”*

Mukesh Rajani



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# Foreword by UKIBC



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In his most recent visit to India in February 2013, UK Prime Minister David Cameron highlighted the need to enhance collaborations between UK and Indian industry, across the value chain of both countries' manufacturing sectors to improve our mutual economic performances.

Certainly, we at the UK India Business Council (UKIBC) fully endorse this view. We feel strongly that there is significant scope for increased collaboration not only in manufacturing but in many areas including for example R&D, training, design, process, efficiency improvement, quality control, cost optimisation, international benchmarking and the sharing of good practices, and so on.

How this collaboration should work is exemplified within Milton Friedman's *The World is Flat*. Upstream activity will remain the preserve of Western economies, with 'more sophisticated tasks being done in the developed world and less sophisticated tasks in the developing world'. Such views are outdated in today's world as the relative 'sophistication' between the developed and developing economies converges. As Nirmalaya Kumar and Phanish Puranam described in their excellent *Inside India*, India is credibly poised to become a global innovation hub. It's inexorable rise as an economic power will cause innovation to migrate from the so-called 'developed' economies to the Sub-continent. And this innovation may be based on frugal engineering in existing industries or it may be of the leapfrog variety in new technologies.

With this in mind an understanding of the India market – its strengths and capabilities becomes ever more critical. The MNCs from both countries are already engaged in each other's markets and the learning process is in hand. However, given the magnitude of the opportunity and the complexity of the operating environment, we strongly feel that UK MMEs and SMEs need to explore the opportunities and assess the potential benefits from engaging in these diverse markets.

India offers an abundance of opportunities in advanced engineering, including aerospace, defence, automotive and clean energy and these are areas where the UK has expertise in spades. British-made components, equipment and machinery currently remain in high demand because of their quality, reliability and design.

Long-standing trading links might provide a welcome backdrop for British manufacturers exporting to India and there is still some residual respect for British strengths in research & development, manufacturing, process control, technology and skills in India and Indian businesses are keen to access these.

But such 'good-will' is already near the end of its shelf life, being eroded by the changing nature of what is India today as well as the competitive environment. The needs and requirements of India are evolving fast and are constantly changing with the exponential growth in the acceptance of new technology. To be successful in India today, UK businesses need to understand the changing manufacturing and engineering ecosystems within India, the developing research capabilities which support these and the increasingly value-consciousness of the Indian customer.

UK companies are encouraged to establish production facilities, supply chains and distribution hubs in India. At the same time, Indian manufacturers are keen to access technology and expertise developed in the UK to bolster their production and provide them with the international edge either through partnership, licensing agreements or outright investment.

But, let us admit, the UK has no 'divine right' to such relationships. Other nations in the West and in the Far East are actively engaging with the Indian market. Moreover, access to India continues to improve as restrictive regulations and barriers to entry are removed.

We, in the UK, need to accept that we have no 'divine right' to Indian commerce. Nor should we.

Now is the time to engage, to create dialogue and to allow objective assessment of risk and opportunity within India to make UK PLC the partner of choice for Indian companies and investors alike.

We, at the UKIBC, have already been working with a number of niche, technology-rich UK engineering and manufacturing businesses keen on accessing opportunities in the Indian market and in forming partnerships, joint ventures, technology tie-ups, new product development, collaborations to service global markets, and others.

In this report PwC, in conjunction with UKIBC have identified some of the potential areas of opportunity specifically for medium and small businesses, both those operating on a stand-alone basis and Tier 2 and 3 suppliers to the multinationals. It targets companies in the engineering and manufacturing sector – focusing on aerospace, automotives and clean energy. We hope the report will provide a clearer idea to UK SMEs for engaging better with India. The opportunities in India, unfortunately, are time limited and becoming ever more competitive both from international and increasingly domestic companies.

I very much hope that this report forms a core part of your plans for India.



# Section 1: Overview of the SME sector in India

Looking across the world, SMEs make up over 90% of total enterprises in most economies, are credited with generating the highest rates of employment growth, and account for a major share of industrial production and exports. India – where the SME sector is generally characterised as Micro, Small and Medium Enterprise (MSMEs) – is no exception, having a thriving SME community that plays a pivotal role in the country's overall industrial base.

In recent years India's MSME sector has consistently registered higher growth rates than the country's industrial sector as a whole. With its agility and dynamism, the sector has proved to be admirably innovative and adaptable in surviving the recent economic downturn.

*Current legislation states that the upper limit for investment in plant & machinery for manufacturing enterprises, and in equipment for service enterprises, are as follows:*

Classification	Manufacturing enterprise	Service enterprise
Micro	Rs 2.5 million/(US\$ 50,000)	Rs 1 million/(US\$ 20,000)
Small	Rs 50 million/(US\$ 1 million)	Rs 20 million/(US\$ 0.4 million)
Medium	Rs 100 million/(US\$ 2 million)	Rs 50 million/(US\$ 1 million)

## Size and importance

According to the 4th All-India Census of MSMEs, for reference year 2006-07, the number of MSMEs in India is estimated at about 26 million companies, providing employment to an estimated 60 million people. Of these 26 million MSMEs, only 1.5 million are in the registered segment, while the remaining 24.5 million (94%) are unregistered. In terms of their distribution across different Indian states, more than 55% of all MSMEs in India are located in just six States: Uttar Pradesh, Maharashtra, Tamil Nadu, West Bengal, Andhra Pradesh and Karnataka. Furthermore, about 7% of MSMEs are owned by women, and more than 94% of the MSMEs are proprietorships or partnerships.

In terms of their economic impact, MSMEs contribute 8% of the country's GDP, 45 % of manufactured output and 40% of exports. The labour and capital

Under India's Micro, Small & Medium Enterprises Development (MSMED) Act, 2006 the country's MSME are categorised into two classes:

### Manufacturing enterprises

The enterprises engaged in the manufacture or production of goods pertaining to any industry specified in the first schedule to the industries (Development and regulation) Act, 1951). The Manufacturing Enterprise are defined in terms of investment in Plant & Machinery.

### Service enterprises

The enterprises engaged in providing or rendering of services and are defined in terms of investment in equipment.

ratios in MSMEs and the overall growth rates in the MSME sector are much higher than among larger companies. The sector's sheer diversity in terms of its range of products and services as well as in terms of size of industry adds to its dynamism.

All of these attributes mean India's MSMEs are important for the national objectives of growth with equity and inclusion. In recent years the MSME sector has come gradually into the limelight, with increased focus from government, corporate bodies and banks. It is viewed as one of the greatest agents of growth. As a result, a combination of policy changes, investments into the sector; globalisation and India's robust economic growth have opened up several previously untapped business opportunities for this sector.

The sector itself has also started taking itself seriously. Initiatives from within the MSME community to lobby for more favourable policies and



increased credit availability are credible. The sector has also taken on board the need for technological and modernisation initiatives.

However, with economic liberalisation and changes in trade policy, MSMEs have now also started facing increased competition from foreign companies. There is a huge global market out there in which many other countries such as China, South Korea and Thailand are well established. As global competition intensifies, MSMEs are transitioning to a new business environment characterised by the emergence of global supply chains. Since MSMEs form an integral part of almost every value chain, there is a symbiotic relationship between the large corporations and their relatively smaller sized suppliers.

Even the Indian domestic market is no longer an insulated zone in a controlled economy; the competitive pressures of a free market economy are catching up in India. The domestic market has been flooded with many low-cost, bulk-produced products of reasonable quality, giving tough competition to MSMEs. With the opening-up of the economy, the MSMEs have to catch up with global standards of excellence in order to remain competitive and profitable. MSMEs are increasingly having to adapt to new standards in technology, quality and pricing to be able to survive in the marketplace.

To gain a competitive edge, enhance efficiency and manage communication, this sector is now looking very seriously for ICT enablement. Currently, small-scale industries face limited needs for ICT on account of their organisational size and structure, but companies in the medium-scale sector have started restructuring themselves to accommodate these changes. The possibility of international trade has forced many to build an online presence as well as implementing e-mail facilities. E commerce and enterprise management solutions are also been looked at by many.

### *Government policy and regulation in the SME sector*

The Indian government appreciates the role played by MSMEs in the economic and social development of the country, since the employment potential and overall growth in the MSME sector are much higher than among larger companies.

The government is also committed to preserving, protecting and promoting MSMEs to accelerate the expansion of productive employment in the country. The government is seeking to fulfil its mission by formulating policies, designing and implementing support measures in fields including credit

availability, technological upgrades, marketing, and entrepreneurship development. The main thrust of the efforts to increase the competitiveness of MSMEs is focused on areas such as technology (including quality), procurement, skills development and finance.

The Indian government has announced policy measures to foster easy and adequate availability of credit for the MSME sector. In addition to these policy packages, the Indian government has also introduced measures including the credit guarantee scheme and the performance and credit rating scheme to ensure better availability of credit to MSMEs.

The role of government policies, technology interventions and financial measures for creating a competitive MSME sector is discussed in detail in the following sections.

### *Finance*

In recent years, India has witnessed an increased flow of capital in the form of primary and secondary securities markets, venture capital, private equity, external commercial borrowings, factoring services and other sources.

The prime minister's task force set up in February 2010 has recommended several steps to encourage many MSMEs.

- The task force has asked for a target of 6% for micro enterprises under priority sector lending. The panel also recommended that in case there is a shortfall by banks in lending to SMEs, the deficit should be put in a separate fund with the Small Industries Development Bank of India (SIDBI), to ensure the required assistance to MSEs in one way or the other.
- Interest subvention will help MSMEs gain access to the credit they need at a better rate than has been previously available to them.
- The SME exchange will allow MSMEs to acquire equity or risk capital. To date, the sector has been relying heavily on debt capital.
- A uniform application form common to all banks simplifies the process of loan application of up to Rs 25 lakh. Banks should also open more MSME-focused branch offices located in different MSME clusters, which can also act as counselling centres for MSMEs. Banks may also be persuaded to adopt the banking code for MSMEs to bring about uniformity in operations.

The office of the development commissioner (MSME) has also done a lot to improve the financial

environment for MSMEs through many of its schemes.

- The credit guarantee fund scheme for micro and small enterprises provides collateral-free loans of up to Rs 50 lakh.
- The micro finance programme contributes towards security deposits required from the micro finance institutions (MFIs) or NGOs to get loan from SIDBI. The scheme is being operated in underserved states. As of 31 March 2010, a cumulative loan amount of Rs 1299.68 crore has been provided to MFIs and NGOs under the scheme, benefiting a large about of people. More than 80% of these beneficiaries are thought to be women.

### *Reserve Bank of India RBI/(Central Bank) initiatives*

The RBI has taken several measures to make credit available to the employment-intensive sector of MSMEs.

In June 2011, the RBI asked banks to ensure that lending to SMEs grows at a decent pace. According to the data provided by the RBI, bank credit to SMEs grew by 13% in May, as compared to 14.8% growth recorded in the same month last year. Banks were given instructions to step up credit to micro and small units to 55% of the total SME financing by 2012 and 60% by 2013. Also, the number of accounts needed to grow by 10% every year.

A 2% interest subsidy effective from 1 April 2011 on rupee export credit to the labour-orientated and SME sectors prevented them from slowing down in the major markets like the US. And SMEs, together with handloom and carpet manufacturers, were made eligible for cheaper bank credit, subject to a minimum interest rate of 7%, to be available up to 31 March 2012.

In August 2011, the RBI cautioned banks that the risk increases as they move down the hierarchy. Thus, banks need to balance out risk with lending activity. The RBI has suggested stepping up the credit-lending policy at the same time as developing an effective risk management mechanism.

### *Procurement*

The Micro, Small and Medium Enterprises Development Act, 2006, stipulates that to facilitate the promotion and development of this sector, the central and state governments should give preference to policies with respect to the procurement of goods and services produced and provided by MSMEs.

The proposed public procurement policy seeks a mandatory 20% share for MSMEs in all government and public sector unit purchases over a period of three years. Also, the Department of Expenditure (DOE) and the Chief Vigilance Commission (CVC) have replaced the procurement mode of all public sector units from paper-based to electronic. This has benefited MSMEs by reducing costs and enhancing efficiency.

### *Manpower*

The government has realised the importance of vocational education and upgrading the skills of the existing workforce. So it has taken initiatives to upgrade nearly 1,390 industrial training institutes (ITIs) in public private partnership mode across the nation.

The scheme supports the entrepreneurial and managerial development of MSMEs through incubators and aims to nurture innovative business ideas that can be commercialised in a year. Under the scheme, various institutions including engineering colleges and research labs are provided with funds up to Rs 6.25 lakh for hand-holding each new idea or entrepreneur.

The incubators provide technology guidance, workshops, lab support and linkages to other agencies for the successful launch of business. Further, they also guide the entrepreneur in establishing the enterprise. Under the scheme, 25 institutions have been approved for nurturing innovative business ideas nearing the commercialisation stage.

### *Intellectual property*

The scheme for building awareness of intellectual property rights (IPR) was launched to enable Indian MSMEs to gain a global leadership position. The aim was to empower them to use the tools of IPR effectively for innovative projects.

The Ministry of MSME has set up an intellectual property cell which provides a range of IP-related services such as prior art-search, validity search, patent landscape, and studies on technology development. The implementation of a proper intellectual rights regime will help SMEs gain access to new markets, avoid wasteful investment in R&D and marketing, negotiate licensing, franchising or other IP-based contractual agreements, and increase their market value to lead to other potential benefits.

### *Information availability*

'Udyami helpline', the call centre of the Ministry of MSME, has been created as a single-point facility for a

wide spectrum of information and accessibility to banks and other MSME-related organisations. Udyami provides information to first-generation entrepreneurs regarding project profiles available on the website of the ministry, the Khadi and Village Industries Commission (KVIC) and other ministries. It also gives information on the other formalities required in setting up an enterprise, for getting loans from banks, the availability of subsidies under various ministry schemes, and other needs relevant to MSME.

### *Design clinic*

The design clinic scheme for is a unique and ambitious design intervention scheme by the Ministry. The scheme's main objective is to bring the MSME sector and design expertise onto a common platform and to provide expert advice and solutions on real-time design problems, resulting in continuous improvement and value add for existing products. This model brings design exposure to the doorstep of industry clusters for design awareness, improvement, evaluation, analysis and design-related intervention.

The will help MSMEs develop product, process and business expertise through design intervention at multiple levels of interaction. The goal is to help MSME manufacturing industries move up the value chain by switching the production mode from original equipment manufacturing to original design manufacturing and hence original brand manufacturing.

The total scheme budget will be Rs 73.58 crore, out of which Rs 49.08 crore will be in the form of assistance from the Indian government at various stages. The balance amount will be contributed by the beneficiary MSMEs. The scheme aims to reach out to about 200 MSME clusters over the next two and half years. This will be achieved by organising about 200 design sensitisation seminars, 200 design clinic workshops and 400 design projects including 100 student design projects.

### *National Manufacturing Competitiveness Programme (NMCP)*

The NMCP is the flagship programme of the Government of India to develop global competitiveness among Indian MSMEs. There are 10 components under the NMCP targeted at enhancing the entire value chain of the MSME sector. It includes programmes such as the establishment of new tool rooms, benchmarking of global competitors, enhancing of product and process quality, and cost reduction through lean manufacturing techniques. The programme is to be implemented through the public-private partnership model with the close

physical and financial participation of the MSME sector.

- The first component made operational was 'marketing assistance or support to MSMEs'. The objective is to popularise bar code registration and motivate enterprises to adopt bar code certification. This will enable them to sell their products worldwide, and result in higher export price realisation. It will also enhance domestic wholesale and retail marketing.
- 'Enabling the manufacturing sector to be competitive through quality management standards (QMS) and quality technology tools (QTT)' was launched in order to improve quality and productivity in the MSME sector.
- Lean manufacturing programme (LMP) for MSMEs will help them reduce their manufacturing cost through more effective personnel management, better space utilisation, scientific inventory management, improved process flows, reduced engineering time, and so on.
- The component on 'promotion of information and communication tools (ICT)' will identify some of those SME clusters with high-quality production and export potential. It will also assist them in adopting ICT applications to achieve competitiveness in national and international markets.
- The objective of the design clinics scheme for MSMEs is to bring the sector and design expertise on to a common platform. It also aims at value-added cost effective solutions.
- The 'marketing assistance and technology upgradation' scheme for MSMEs aims to improve the marketing competitiveness of the MSME sector by improving their techniques and technology for promotion.
- The objective of 'technology and quality upgradation support to MSMEs' is to help the manufacturing MSME sector to become globally competitive. This includes advances such as upgrading their technologies, usage of energy-efficient technologies, adoption of other technologies as per global standards, improving quality and reducing the costs of production.

### *Task force to identify challenges*

A task force was set up by the Prime Minister of India in August 2009 to reflect on the concerns and issues with respect to MSMEs and formulate an agenda for necessary action.

The task force classified the common issues into six major thematic areas or sub-groups for detailed examination. These were credit; marketing; labour;

rehabilitation and exit policy; infrastructure, technology and skill development; and taxation. A separate sub-group was also constituted to look into the development of MSMEs in the north-east and Jammu and Kashmir. The task force's recommendations were broadly categorised into those where the action needed to be completed within three months, six months to one year, and those where long-term measures involving longer time duration were required.

The recommendations of the task force that have already been acted upon cover credit and capital access, infrastructure development, market development and technology adoption.

Keeping in mind the recommendations of the Task Force, the government has made many positive provisions for MSMEs in the budget for the year 2012-13.

- To improve the availability of equity to the MSME sector, the Government has set up an India Opportunities Venture Fund with SIDBI worth Rs 50 bn.
- Allocation for the Prime Minister's Employment Generation Programme increased by 23% from Rs 10.37 bn to Rs 12.76 bn.
- Under the Public Procurement Policy for Micro and Small Enterprises (MSEs), Ministries and Central Public Sector Enterprises (CPSEs) are required to make a minimum of 20% of their annual purchase from MSEs. Of this purchase, 4% is to be earmarked for procurement from MSEs owned by SC/ST entrepreneurs.
- Increase in the turnover limit from Rs 6 mn to Rs 10 mn for SMEs for compulsory tax audit of accounts and for presumptive taxation.

- Exemption from capital gains tax on sale of a residential property, if the sale consideration is used for subscription in equity of a manufacturing SME company for purchase of new plant and machinery.
- A reduction in the basic customs duty to 2.5% with concessional CVD of 6% on specified parts, components and raw materials for the manufacture of medical devices such as disposables and instruments.
- Full exemption from basic customs duty and CVD to specified raw materials for the manufacture of coronary stents and heart valves.
- A reduction in excise duty from 10% to 6% on matches manufactured by semi-mechanised units.

### *Summary: a thriving sector*

Overall, it's clear that India has a thriving and growing sector of engineering and manufacturing SMEs that plays a key role in the country's economic vitality, employment and growth. It is also a sector that is receiving increasing help and support from government and larger corporations in India, in an effort to enable Indian SMEs to compete and grow on the world stage. This is an ambition that is fully shared by Indian SMEs themselves. Put together, all of these factors point to opportunities for UK businesses to work and collaborate with SMEs in India – creating business benefits and value for both parties.

We will now go on to examine these opportunities in three key sectors: aerospace and defence, automotive, and low-carbon technologies.



## Section 2: Aerospace and defence

### *The Indian aerospace and defence (A&D) industry*

The Indian aerospace and defence industry is one of the fastest-growing in the world. In India's expanding economy, growth in civil aviation is being driven by an expanding consumer base including airlines, businesses and high net-worth individuals (HNIs). At the same time, India's defence sector has been stimulated by a Government policy to diversify the acquisition of defence assets, increased defence spending to modernise the armed forces, and an offset programme. The resulting rapid growth in this industry has attracted major global A&D companies to India.

### *Civil aviation*

India's civil aviation sector has great untapped potential. A report<sup>1</sup> published by the Centre for Asia Pacific Aviation (CAPA) in August 2012 states that India is under-prepared for the growth challenges ahead, and will require massive investments of up to US\$40 billion in developing airports by 2025, including the construction of numerous greenfield airports in non-metro cities.

The scheduled airline fleet is expected to grow from the present 430 to about 1,030 aircraft by 2020-21. Boeing and Airbus have both estimated that around 1,300 commercial and business jets will be required by the country over the next two decades to meet the increasing passenger traffic, making this a US\$150 billion market.

The aviation sector has a strong correlation to economic growth. A vibrant civil aviation sector is essential for a fast growing economy that has aspirations to sit at the 'high table' of global economic powers. With this in mind, the Indian Government recently addressed a number of issues that were impeding growth. Of these, the decision to allow foreign airlines to invest up to 49% in domestic carriers is very significant. These measures may have come a little too late for some market participants, but nevertheless open up opportunities for the future.

<sup>1</sup> Source: <http://centreforaviation.com/analysis/capa-report-india-requires-usd40bn-investment-in-50-greenfield-airports-by-2025-79925>

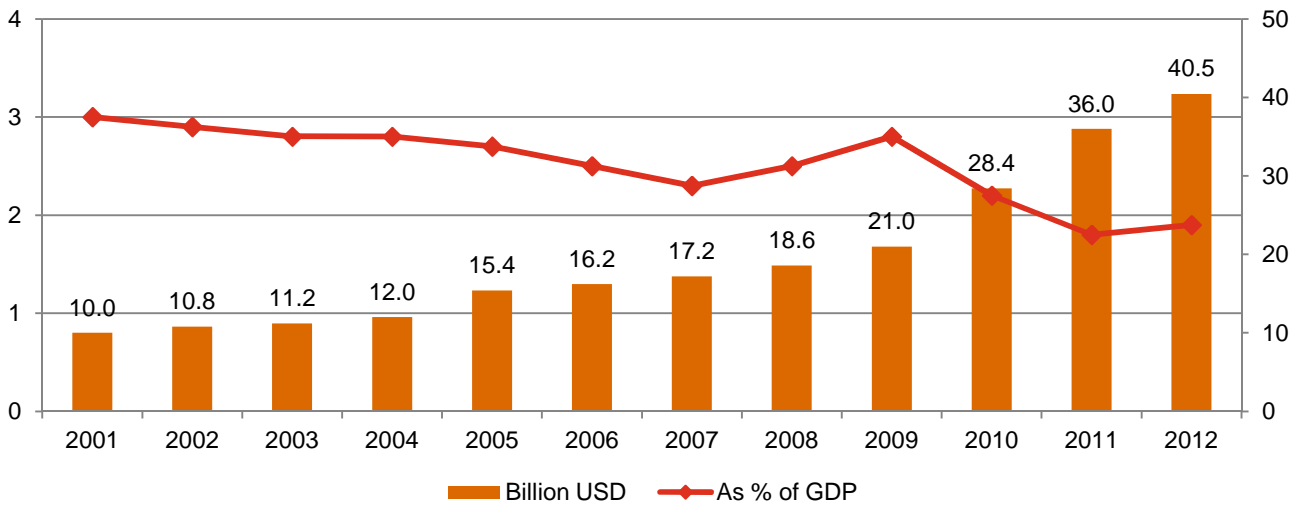
### *Defence*

As the world's largest importer, India is expected to spend US\$100 billion over the next decade on purchasing defence equipment. It is expected that defence spending will remain in the range of 1.8% to 2.0% of the GDP, and – as the nation's economy recovers – defence will account for a substantial part of Government spending. India's Defence Minister has stated that the country's ultimate goal is self-reliance, commenting: 'We want to produce equipment for the armed forces internally, domestically. We want to strengthen our defence industries in India. India needs a strong defence industrial base.'

In line with this policy goal, more and more avenues for participation in India's defence procurement programmes are gradually opening up for the private sector. After the introduction of the defence offset policy and 'Buy and Make India' category, the Ministry of Defence has issued a Defence Production Policy and a JV policy to facilitate incorporation of joint ventures between the private sector and the defence public sector undertakings (DPSUs). Further liberalisation is expected in the near to medium term. With its existing industrial base, India has the potential to become an R&D and manufacturing hub for defence equipment, playing an important role in the global supply chain.







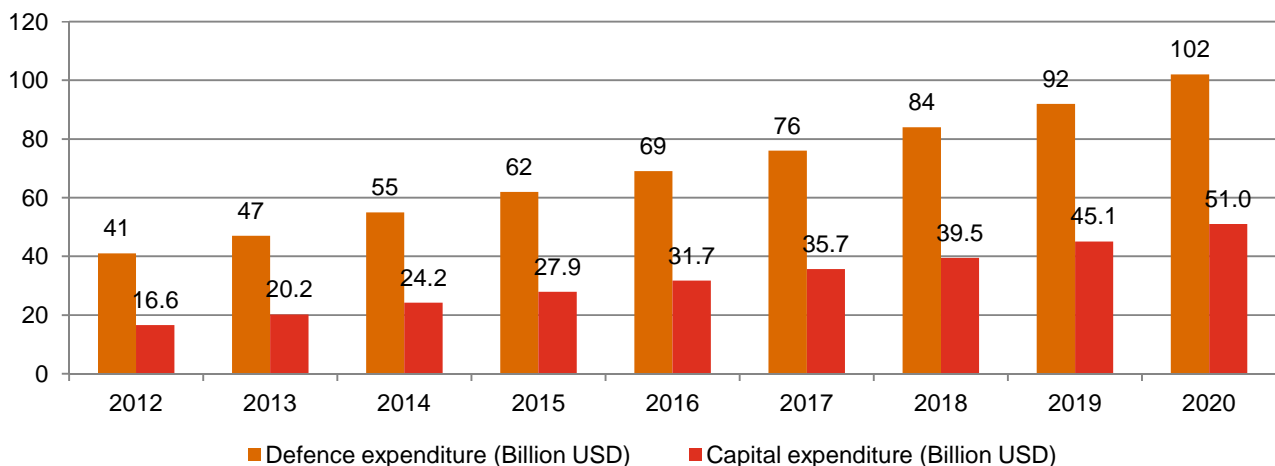
Indian defence spending, (2001-2012)

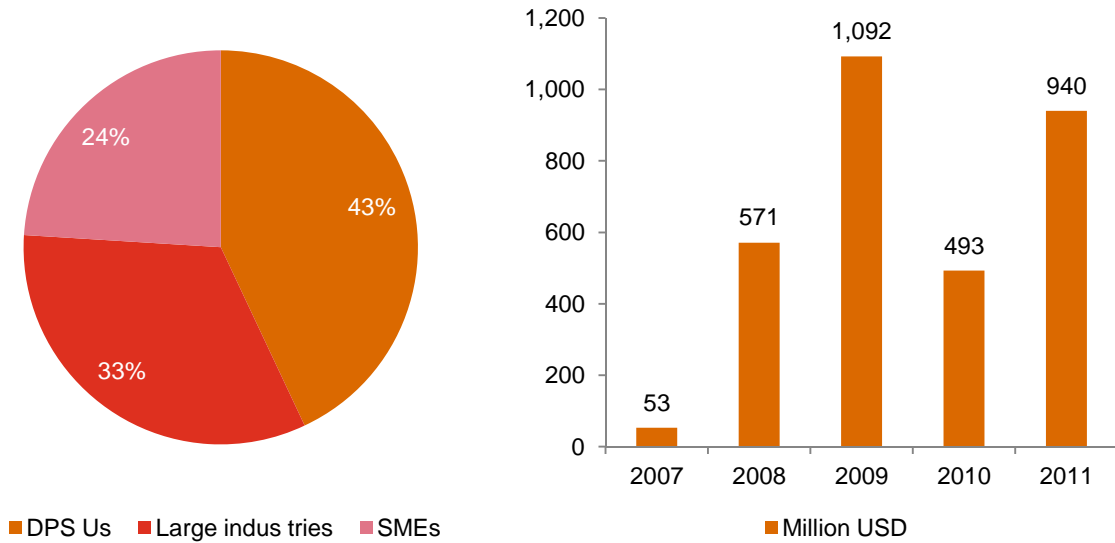
### Indian defence capital acquisition and offset programmes

The Indian A&D sector is poised for a period of high growth. The country's defence spending in the 11th Plan period (2007-12) has grown at a CAGR of 13%, while in 2012-13 the capital expenditure is expected to pass US\$16.6 billion. In the aerospace sector, India has embarked on a major defence acquisition and

development programme comprised of medium multi role combat aircraft (MMRCA), fifth generation fighter aircraft (FGFA), multirole transport aircraft (MTA), medium lift helicopters (MLH) and light utility helicopters (LUH). To keep India's long-term maritime interests in focus, the Indian Navy has also embarked upon an aggressive acquisition programme to enhance its capacities substantially, both in surface and sub-surface combat.

### Estimated spend over the next decade (2012-2020)





As far as land systems are concerned, the Indian Army’s acquisition plan in the next 10 to 15 years encompasses a wide range of equipment that includes artillery guns, rockets, missiles, combat vehicles, radars, assault rifles and smart ammunition.

India’s experience to date with offset, though limited, has brought some encouraging trends for the private sector. So far US\$3.2 billion worth of offset contracts have been signed, mainly in manufacturing, infrastructure, engineering design, development and testing, and simulators. Of these, over 55% are with the private sector. MSMEs have partnered with various foreign entities and OEMs and have delivered 24% of these offsets, worth approximately US\$ 800 million. However, it is important to note that all the offset programmes executed so far have been for the Indian Air Force and Navy.

### *Subcontracting or outsourcing by global majors*

The Indian A&D industry is emerging as an international hub for various services such as CAD, CAM and CAE, manufacturing and design engineering, testing and integration, and technical publications. The global aerospace industry spends about US\$60 billion annually on engineering services, which are increasingly being outsourced to low cost destinations. Presently, the Indian industry accounts for less than 2% of this opportunity. This is a large and important opportunity for Indian MSMEs operating in niche areas.





## The policy regime governing the A&D sector

The Indian aerospace and defence sector is governed by the following five major policies:

### 1. Defence Procurement Procedure (DPP) and offset guidelines

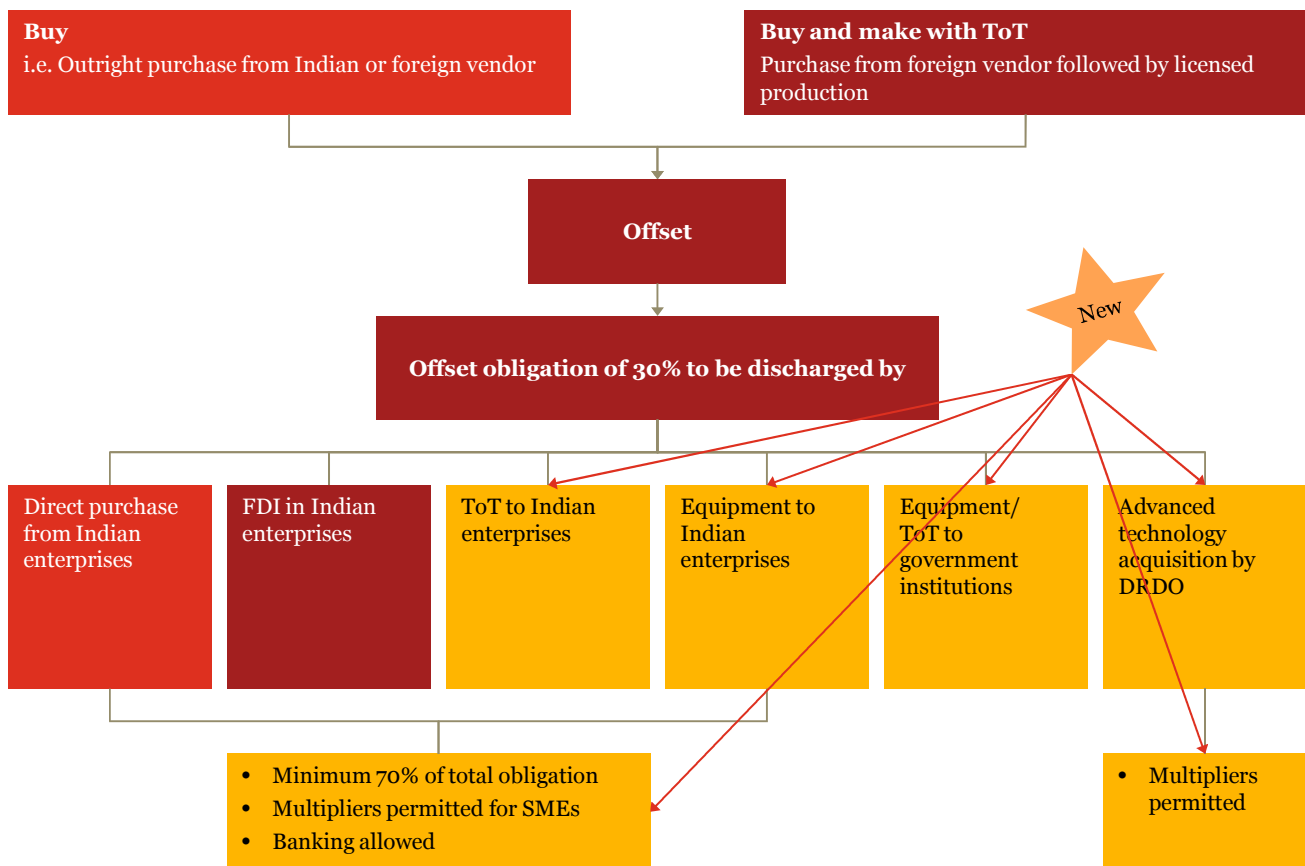
Defence procurement is governed by the DPP. First issued in 2006, the latest policy on defence procurement (DPP 2011) was released on 6 January 2011. Its aim is to incorporate procedures to expedite decision-making, simplify contractual and financial provisions, and establish a level playing field for the public and private players. The Indian government aims to ensure that the industry is able to build a

credible domestic capability for its defence forces in a fair and transparent manner within the next decade.

### 2. Offset policy

The offset policy is a part of the DPP and has undergone revisions with the DPP. The latest revision was independent of the DPP and became effective on 1 August 2012. The policy stipulates an offset requirement of a minimum 30% for procurement of defence equipment in excess of 3 billion INR. The categories of acquisition programmes to offsets are applicable as follows:

- Buy (global)
- Buy and make with transfer of technology (TOT)



The key objectives of the defence offset policy are to utilise capital acquisitions to develop the Indian defence industry through three priorities:

- Fostering development of internationally competitive enterprises.
- Augmenting capacity for research, design and development related to defence products and services.
- Encouraging development of synergistic sectors such as civil aerospace, and internal security.

The latest revision effective from August 2012 is the most significant and comprehensive revision of India's offset policy since its inception, and addresses many issues raised by OEMs and Indian industry. The Indian MoD must be congratulated for a clear attempt to streamline the offset policy and make it more transparent. Key amendments are:

1. Defining Objectives – as listed above
2. Increasing the avenues for discharge of offset obligations:

- a. Direct purchase of – or executing export orders for – eligible products manufactured by, or services provided by, Indian enterprises i.e. Defence Public Sector Undertakings, Ordnance Factory Board and private and public sector Indian enterprises.
  - b. Foreign Direct Investment in joint ventures with Indian enterprises for the manufacture and/or maintenance of eligible products and provision of eligible services, subject to the guidelines/licensing requirements stipulated by the DIPP.
  - c. Investment ‘in kind’ in terms of transfer of technology (TOT) to Indian enterprises for the manufacture and/or maintenance of eligible products and provision of eligible services. However, the offset credit shall be 10% of the value of buy back.
  - d. Investment ‘in kind’ in Indian enterprises in terms of provision of equipment through the non-equity route for the manufacture and/or maintenance of eligible products and provision of eligible services (excluding TOT, civil infrastructure and second hand equipment). However, the vendor will be required to buy back a minimum of 40% of the eligible product/service.
  - e. Provision of equipment and/or TOT to Government institutions and establishments engaged in the manufacture and/or maintenance of eligible products and provision of eligible services, including the Indian Defence Research and Development Organisation (DRDO).
  - f. Technology Acquisition by DRDO in areas of high technology.
- a. A multiplier of 1.50 is permitted where Micro, Small and Medium Enterprises are IOPs.
  - b. A multiplier of up to 3 permitted relating to technology acquisition by DRDO without any restrictions including right to export.
7. Enlarging the list of products and services eligible for offset credit to include vessels of war, special naval systems, equipment and various accessories.
  8. Defining critical technology areas. A list of Critical Defence Technology Areas and Test facilities for acquisition by DRDO through offsets has been included.
  9. Defining responsibility of Organisations:
    - a. Acquisition Wing: (i) technical and commercial evaluation of offset proposals received in response to RFPs and (ii) conclusion of offset contracts. All Offset proposals will be processed by the Acquisition Manager and approved by the Defence Minister, regardless of their value.
    - b. Defence Offsets Management Wing; formulation of Defence Offset Guidelines, monitoring, banking of offsets.
    - c. Technical Offset Evaluation Committee: scrutinising the technical offset proposals within 4-8 weeks .
    - d. Technology Acquisition Committee: assessing offset proposals relating to the provision of technology to DRDO.

Note: A minimum of 70% of the offset obligation shall be discharged by 2(a) to 2(d)

3. Enlarging the definition of Indian Offset Partner (IOP): The IOP has been defined as Indian enterprises and institutions and establishments engaged in the manufacture of eligible products and/or provision of eligible services, including DRDO. The agreement between the OEM/vendor/Tier-1 sub vendor and the IOP shall be subject to the laws of India.
4. Increasing Period for Discharge to the period of the main procurement contract plus two years.
5. Increasing the validity of Banked Credits to seven years, and allowing transfer between the main vendor and its Tier-1 sub vendors within the same procurement contract.
6. Introducing Multipliers to encourage participation by Indian MSMEs.

### *3. The industrial licensing policy*

Under the Industries (Development and Regulation) Act 1951, an industrial license (IL) is required for manufacturing defence equipment. The applicant must be an Indian company or partnership and has to apply to the Department of Industrial Policy and Promotion (DIPP). The application is considered by an inter-ministerial committee and the process takes about six months. There are a number of conditions imposed, and clarity is currently still awaited on the definition of ‘defence equipment’.

#### *4. The Foreign Direct Investment (FDI) policy*

FDI up to 26% is allowed in an Indian company manufacturing defence equipment, subject to the company obtaining an IL from the DIPP. The approval is given by the government through an application filed before the Foreign Investment and Promotion Board (FIPB) in the Ministry of Finance. This is also an inter-ministerial committee, and approval takes about six months.

Detailed guidelines for the FDI and licensing policies are given in the consolidated FDI policy that is revised twice a year, and in press notes issued by DIPP. The latest policy was issued in April 2012.

#### *5. The foreign trade policy*

The import and export of defence equipment is governed by the Director General of Foreign Trade (DGFT) in the Department of Commerce. Barring some specific items, defence equipment can be exported either after obtaining a license from the DGFT for items in the SCOMET list or after obtaining a NOC from the Ministry of Defence.

##### *The tax framework*

India has a federal tax administration regime under which the government levies taxes on income, custom duties, central excise and service tax, while state governments levy taxes such as value-added tax, works contract tax, and so on.



## Partnering with Indian MSMEs in the A&D sector

The liberalisation of India's A&D sector in the mid-nineties has resulted in a number of private players entering the sector. However, MSMEs face a number of hurdles due to the high cost of capital, inadequate certification and training opportunities, low volumes and long gestation period of projects. Specific to the A&D industry, a CII report on defence estimates that the country's defence sector currently comprises over 6,000 SMEs, supplying around 20-25% of components and sub-assemblies to DPSUs, ordnance factories, the Defence Research and Development Organisation (DRDO) and the armed forces.

Given stringent FDI norms and related ownership issues faced by most cross border partnerships, foreign entities need to focus on niche technologies and specific synergies which can navigate and overcome the challenges typical to the Indian A&D sector. The UK government can play a critical role by using GTG outreach programmes to propose collaborations in niche areas.

### Strengths and opportunities

- Innovative capabilities in niche manufacturing: Ability to innovate cost-effective methods in manufacturing.
- Ability to absorb new technologies: To boost production and reduce overhead costs.
- IT skills especially in software and design engineering: A large pool of IT and engineering design manpower.
- Lower overhead costs: Lower salaries, wages and cost-effective approach.
- India's defence spending: Import of defence equipments leading to impending offset obligation on OEMs with introduction of multipliers.
- Offset requirements propel global OEMs to work in close coordination with MSMEs. The defence sector is thus emerging as a lucrative market for MSMEs.

A further area of opportunity could be in the revenue expenditure category – the huge amount of money that the government spends in the upkeep and upgrading of existing weapon systems, aircrafts, ships, radars and so on, where British and Indian MSMEs can collaborate to provide solutions. From the viewpoint of foreign OEMs and lower-tier vendors, it is advisable to choose Indian companies with relevant experience in A&D, as well as with a sound technology base and established quality and traceability systems in place. Partnering with MSMEs also gives the added advantage of receiving a multiplier of 1.5 for all offsets discharged through them. For example, by sourcing US\$1 million of work

from Indian MSMEs, a foreign vendor will be able to discharge offset liabilities worth US\$1.5 million.

MSMEs from the UK and India can focus on co-production, knowledge-sharing, promoting joint value propositions and capability-building in order to be relevant and take advantage of 'Make' and 'Buy and Make' India opportunities. Some Indian MSMEs are gradually moving up the defence value chain by focusing on innovation, building intellectual property and adopting quality and process standards in order to offer complete sub-systems or assemblies. Companies in the UK can share domain knowledge or consider an active industry-academia partnership with leading technology institutes, in order to upgrade, design and offer tailor-made courses for the industry in India. These companies can work with Indian companies to create joint value propositions and projects including technology transfer and the sharing of best practices. The SEZ policy for the sector can play a crucial role by implementing shared facility management for testing, manufacturing and by providing developed infrastructure.

### Challenges and threats

- Nature and cost of business: Long gestation periods and capital-intensive business
- Constraints on funding: Sustaining in a highly regulated sector without access to funds
- Trained and skilled manpower: Grassroot level resources need re-training
- Access to information and markets: Limited information shared on long-term defence requirements keeping larger markets out of reach
- Access to high technology: Reluctance to share cutting-edge technology and limited R&D capabilities
- Institutional challenges: Programmes stuck in bureaucracy and red-tape
- Lack of accreditation

Foreign companies need to be aware of the major challenges the Indian MSME sector faces. The sector is capital-intensive and often suffers from underdeveloped infrastructure, and its turnaround time or product lifecycle tends to be long. The lack of skilled personnel can add to the problems around manufacturing quality and product lifecycle time.

## Conclusion

The Indian Ministry of Defence has set itself a goal of sourcing 70% of all defence equipment from Indian companies – public and private sector – by 2020. This cannot be achieved without a significant contribution by MSMEs. DPP 2011 clearly articulates the Ministry's agenda of supporting a domestic A&D industrial base with a significant role for MSMEs.



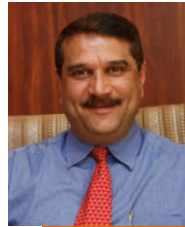
The global economic slowdown and cost pressures have increased the opportunities for Indian companies in the outsourcing of development, design and sub-assembly manufacture. Successful Indian MSMEs have innovated and adapted to cutting-edge technologies, delivered customised solutions, and maintained global standards of manufacturing quality and specifications while also retaining their cost advantages.

Companies in the UK can enter this sunrise sector. The defence offset provisions offer multipliers to foreign vendors engaging with Indian MSMEs. Furthermore, the advantages of Indian MSMEs' innovative capabilities in niche manufacturing, greater flexibility, lower overhead costs and ability to learn and absorb new technologies make them attractive partners with which to collaborate.

Though the opportunities arising from the global defence industry for Indian MSMEs are huge, there are challenges. To overcome these, MSMEs need to ramp up their capability to deal with new issues such as product development, marketing to a globalised world and adopting competitive business practices. Moreover, they need to focus on innovation, building intellectual property and adopting quality and process standards.

## References

1. Personal interviews with SIATI, Chivaro, Pushpak, Government of Karnataka
2. Government of India Ministry of Defence publications
3. CII-PwC report – 'Changing Dynamics'
4. SIPRI 2012 yearbook
5. Publications by Ajai Shukla, Senior Defence Correspondent, Business Standard
6. IDSA Publications
7. Defence Procurement Policies & Defence Production Policy (2011)
8. GoI MSME Annual Report 2011-12
9. Draft aerospace policy of Government of Karnataka
10. Government of India, Planning Commission reports



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# UK Aerospace and defence sector

## Overview of UK Aerospace and Defence Sector

The Aerospace and Defence sector is a major part of the UK economy, being particularly important for high value manufacturing. The sector is long established in a number of regions with a strong heritage in particular areas. The defence market in the UK is the 6<sup>th</sup> largest in the world, and the UK is one of the largest manufacturers of aerospace products.

### 1. Sector structure

The US\$ 57 billion (source: MoD Defence Budget 2011) Bureau for National Statistics defence sector in the UK is dominated by BAE Systems plc – the UK's largest manufacturing employer and a key supplier to the MoD. However, the scale of the MoD's spending also provides scope for a number of other large UK domiciled second tiers suppliers such as Cobham plc, Chemring plc and Babcock Group plc.

Alongside this, the UK market is one of the most open defence markets to foreign contractors, with US primes such as Lockheed Martin, General Dynamics and Raytheon, and European companies such as EADS and Thales having a strong presence.

Aerospace has a number of major suppliers to the global market, with GKN plc, Rolls-Royce, Meggitt plc and to a lesser extent Spirit AeroSystems all having a major presence. Rolls-Royce in particular is one of the largest manufacturers of aero engines globally, and has a major footprint in the UK.

Over the last few years there has been a trend for large UK based A&D companies to expand overseas – particularly in America. This has been largely achieved by acquisition – to the point where companies such as Senior Group plc are a major supplier to the aerospace industry, but largely through subsidiaries in the US.

Supplying of these companies are a huge network of SME businesses, many which are family owned and have developed to supply one or two key customers.

## 2. Strengths and weaknesses

Strengths:

- **World class companies:** A number of the major UK suppliers are world class companies, with leading market positions – providing the sector overall with a strong base and the scale to be self sustaining
- **Innovation:** Many companies, particularly the larger ones are highly innovative. For example GKN is the world leader in composite wing structures and Roll-Royce incorporates many technologies it has developed into its engines.
- **Export Relationships:** Both sides of the sector have long experience supplying export markets. The UK has been the largest exporter of defence equipment globally, with for example Saudi Arabia a major customer developed over a number of years. Similarly, the aerospace sector is heavily export led with most goods ultimately supplied to Airbus or Boeing.

Weaknesses:

- **Concentration:** The UK supply chain is highly consolidated – particularly in the Defence sector. This has led to a relative shortage of medium size suppliers, a particular problem because technology innovation has become concentrated within a few large companies.
- **Skilled labour:** A key consideration across all of UK industry, but particularly in A&D is the availability of skilled workers – particularly skilled technicians and systems engineers. This is particularly acute in the defence industry which cannot utilise the many foreign nationals graduating from British universities.

## 3. R&D

The sector continues to be a major driver of R&D spending in the UK. In the decade from 2000 to 2010 spending frequently exceeded £2 billion per year (source: Bureau for National Statistics), which makes it one of the largest constituents of overall spending in the UK.

This has been sustained in part by having the UK MoD as a highly sophisticated customer, demanding cutting edge equipment on a par with anything produced elsewhere, and by generating significant export sales to help cover the cost of the expenditure required.

In parallel, this investment has major benefits for the wider UK economy – both in providing high skilled jobs and in the bleed across A&D technology into other industries and markets.

A key issue with R&D is its concentration amongst the larger suppliers. Many SMEs, particularly in the aerospace sector are sophisticated in terms of the manufacturing they do but do not own any Intellectual Property – making them vulnerable to off shoring.

#### *4. Manufacturing*

Many UK A&D companies manufacture products in the UK. In the defence market this is an essential part of retaining national sovereignty meaning that it is unlikely to suffer the same drive to outsource as many of industries have.

However, the aerospace industry is much less restrained by global boundaries and inevitably the UK has seen a drip feed of manufacturing work moving abroad to low cost geographies such as Mexico and Asia. At this point most of this has been low value build to print type manufacturing, but there is real concern that Airbus and Boeing will look to allocate more and more supply chain spending to areas where aircraft are being bought.

A particularly sensitive topic for both aerospace and defence is in protecting the Intellectual Property developed in the industry. The quality of this is a key selling point for UK companies abroad, and provides protection against moving production to lower cost geographies. This is a particular challenge in export markets where they are generally very reluctant to transfer technology – especially if the company involved is relatively small.

#### *Major companies*

The UK's two largest companies involved in A&D are BAE Systems and Rolls-Royce:

**BAE Systems** (Sales: £17.770m, Operating Profit £1,580m) is the largest UK company involved in the sector, and is purely focused on the defence market following the sale of its stake in Airbus to EADS in 2006. The company is the largest supplier to the MoD and now the sixth largest supplier to the US DoD following a largely acquisitive expansion over the last few years.

The company is principally a platform level supplier, with products such as the Eurofighter Typhoon, Type 45 destroyer and Astute Submarine in the UK, and the Bradley fighting vehicles in the US. Following the

attempted merger with EADS the group now has a renewed focus on its export markets – many of which have a long history in such countries as Saudi Arabia and some which are relatively new, e.g. India.

**Rolls-Royce** (Sales: £11.124m, Operating Profit: £1,186m) is the second largest supplier of aircraft engines in the world, and is the largest aerospace company in the UK. Alongside its well known Trent family of commercial aerospace engines Rolls-Royce also supplies a wide range of other power equipment such as compressors and diesel engines, and is a major supplier of marine technology.

The company has grown quickly with its successful development of engines for the wide body commercial market and with an increasing focus on servicing of its engines, which now accounts for in excess of 50% of revenue.

#### *Key SME Clusters*

As previously mentioned, many SME clusters have built up around the major facilities of large manufacturers. Key clusters would be:

**South West:** built particularly around the Filton wing facility are a number of companies involved in aerospace components.

**West Midlands:** the Rolls-Royce facilities around Derby have made the West Midlands a strong regional supplier of engine components.

**North West:** BAE Systems presence at Warton where they manufacture fast jets, and the Barrow submarine facility have provided a focus for clusters built around those two facilities.

**Glasgow:** Glasgow has a strong heritage in ship building, and is where BAE Systems builds the Type 45 destroyer.

This provides a strong regional focus on different areas, but also makes regions quite vulnerable to changes in the business cycle or technology shifts in the industry. This is now being seen in the North West of England where BAE Systems Warton facility, and the companies that exist around it will supply fewer manned jets and more UAVs in the future.

#### *Government policy towards SMEs*

The Government is currently very focused on increasing manufacturing in the UK, and in particular supporting SMEs to grow. Given the low growth and need to cut Government spending, this is



predominantly focused on export growth. As a major part of the UK economy Aerospace and Defence are both a major part of this drive.

Policy has therefore been very positive, with improvements sought in areas such as export finance, support for R&D, direct assistance in export markets and the availability of investment from bodies such as the Business Growth Fund.

Government has also put in place initiatives such as the Aerospace Growth Partnership to look at supporting the industry into the future.

It is worth noting however that the UK Government does not make any direct interventions, and stops well short of the sort of support other Governments are prepared to make in the form of initiatives such as subsidised loans, direct grants and tax breaks.

## *Growth Outlook*

The defence industry in the UK faces a challenging growth environment. Most companies' developed markets are likely to be flat at best, and they are therefore looking increasingly to export markets for growth. Typically these include Brazil, the Middle East, India, Malaysia, Indonesia and Singapore as target markets – although this is a major challenge at the SME level where export markets have not been a focus previously.

Aerospace companies are positioned in a growing market, with the two main OEMs Airbus and Boeing having record order books and increasing build rates. However, the main challenge is the mobility of work to other countries. Therefore, those companies with strong IP and unique manufacturing capabilities will most likely grow strongly over the next few years whereas weaker suppliers may struggle.



### *Case study: Rolls-Royce in India*

Rolls-Royce is a world-leading provider of power systems and services for use on land, at sea and in the air, with a strong position in global markets – civil aerospace, defence aerospace, marine and energy.

As a result of this strategy, Rolls-Royce has a broad customer base comprising more than 500 airlines, 4,000 corporate and utility aircraft and helicopter operators, 160 armed forces, more than 4,000 marine customers, including 70 navies, and energy customers in more than 80 countries.

Annual underlying revenues were £11.3 billion in 2011, of which more than half came from the provision of services. The firm's announced order book stood at £62.2 billion at 31 December 2011, providing visibility of future levels of activity.

The company employs over 40,000 skilled people in offices, manufacturing and service facilities in over 50 countries. Over 11,000 of these employees are engineers.

Rolls-Royce invested £908 million on research and development in 2011, two thirds of which had the objective of further improving the environmental performance of our products, in particular reducing

emissions. Rolls-Royce supports a network of 28 global University Technology Centres globally, which connect the company's engineers with the foremost scientific research available. The company also facilitates and encourages an environment of commercial and technological knowledge transfer among its suppliers through technology sharing partnerships. This involves pro-actively encouraging suppliers to visit each other's plants and holding 'host' days where suppliers can meet with each other to share and develop different aspects of workplace best practice.

Rolls-Royce employs over 400 people in India directly and through its joint venture companies and serves customers in each of its market segments. The company also has an established and growing engineering presence in the country and is committed to developing its supply chain and manufacturing in India. To this end Rolls-Royce recently invested in an equal joint venture with Hindustan Aeronautics Limited HAL to develop components for gas turbine engines.



**Rolls-Royce**

## *Case study: AgustaWestland in India*

India is a strategic market for AgustaWestland with its expanding commercial helicopter market (oil and gas, offshore support, internal policing, Emergency Medical Services) as well as military helicopter programmes for at least 600 helicopters over the next 10-15 years. India also presents Industrial Partnership opportunities to establish AgustaWestland as a major manufacturer in India, the first step of which was the signing of a joint venture agreement with Tata Sons in 2010.

AgustaWestland's has a wholly owned subsidiary company, AgustaWestland Pvt Ltd, based in Delhi to co-ordinate its business activities in India. It also has a branch in Cochin that provides technical support to the Indian Navy's Sea King helicopters, which have been in operation since the 1980s. The fleet of Sea King Mk42B helicopters, used for anti-submarine and anti surface warfare, are due for a Mid Life Upgrade programme, which is currently being competed and is due for contract signature in the coming months. The Sea King Mk42C Utility helicopters are also due for a Mid Life Upgrade programme. The Indian Navy want to operate these aircraft until at least 2023.

In February 2010 the Indian Government signed a contract for 12 AW101 helicopters for VIP transport. The delivery of the first three aircraft took place in November 2012 to the Indian Air Force in Delhi, with the rest of the aircraft will be delivered in 2013.

Hindustan Aeronautics Limited (HAL) has a Sea King Main Gearbox repair and overhaul facility to support the Indian Navy, and AgustaWestland signed a Long Term Business Agreement with HAL in October 2010 until 2014.

In February 2010 AgustaWestland signed a joint venture with Tata Sons Ltd for final assembly, completion and delivery of AW119 commercial helicopters for the worldwide market. This company, Indian Rotorcraft Ltd., will produce the aircraft in Hyderabad where a facility is currently under construction.

AgustaWestland also has more than 40 commercial helicopters operating in India today, the first aircraft was delivered in 2005, and AgustaWestland has a growing share of this important market. Customer support is conducted at two authorised service centres, one in Delhi operated by OSS Air management and the other in Mumbai by AirWorks Ltd.

In order to ultimately manufacture helicopters in India AgustaWestland has to engage across several disciplines from supply chain development to technology collaboration and sustainable manufacturing. This will also help AgustaWestland discharge its offset obligations from the VVIP contract won in 2010 and, hopefully, other contracts going forward. Of course, the opportunities in the Indian aerospace and defence supply chain will equally enable India to build its indigenous capability through partnering with overseas companies



## *Case study: BAE India*

BAE Systems' presence in India goes back over 60 years. BAE Systems' strategic vision in this key international market is to become a major and integral part of the domestic Indian defence and security industry, leveraging our global expertise to develop technologies and solutions in India for both the Indian market and for export. Headquartered in the heart of New Delhi, the company operates two Joint Ventures in India: Defence Land Systems India, our land systems focused joint venture with Mahindra & Mahindra and BAeHAL, a joint venture with Hindustan Aeronautics Ltd based in Bengaluru, focused on providing engineering and business solutions services.

BAE Systems' vision is to create an Indian supply chain for a global company. In order to support our Indian programmes, this means suppliers working to help us meet our offset obligations whilst achieving cost efficiencies. In the long term, we seek to develop an indigenous Indian supply chain not only for our Indian customers but also for potential export markets. BAE Systems India and its joint ventures are already working to this end with a variety of Indian companies from small niche manufacturers to major conglomerates.

With a well-established network of small-to-medium sized suppliers in the UK, BAE Systems would like to harness that world-class capability for the development of our Indian business and the industry as a whole. With offsets a major driver, the best route to market for aspiring UK suppliers is through an Indian partner. Many of BAE Systems' UK suppliers, especially the smaller ones, have long and well developed relationships with the company. Such relationships, developed in the UK's mature and established A&D industry, have led to a specialised business culture with advanced techniques and unique know-how. These skills are invaluable to companies starting out in India's fast growing A&D supply chain. At the same time, working with an Indian company can bring UK suppliers opportunities with key Indian customers in both public and private sectors.

To support this aim, BAE Systems is working to provide advice and support to our current UK suppliers looking to work in India. We are also keen to support industry initiatives through both the UK-India Business Council alongside the UKTI, as well as working with ADS and the regional trade bodies. Our recommendation to suppliers who are interested in accessing the opportunities within the Indian marketplace is to contact these organisations or their local BAE Systems contact, who will be happy to help.

**BAE SYSTEMS**

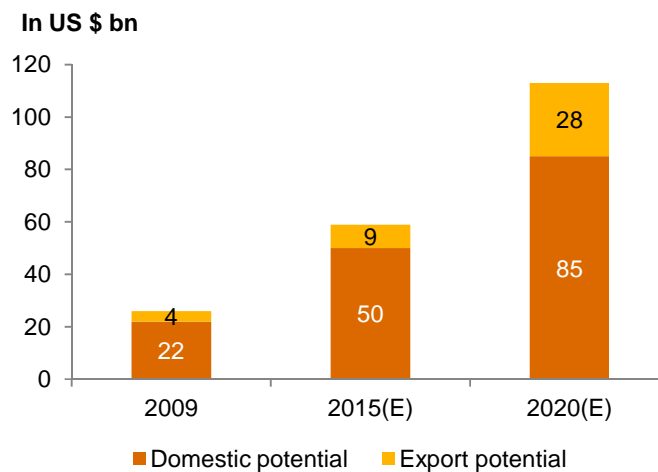
# Section 3: Automotive components

## The Indian automotive components industry

Over the past decade, the Indian auto components industry has emerged as one of India’s fastest growing and most globally competitive manufacturing sectors. According to estimates in the 12th Five-Year Plan<sup>2</sup> working group document, the Indian auto component industry has the potential to grow to over Rs 5 lakh crore (US\$110 billion) by the year 2020, primarily driven by surging in vehicle demand and production in India. Of this projected total, domestic turnover is expected to account for nearly Rs 4 lakh crore (US\$82 billion), and potential exports for of Rs 1.2 lakh crore (US\$29 billion).

India’s auto component industry has achieved great advances in recent years in terms of quality, spread, absorption of newer technologies, and skilled manpower, while maintaining reasonable prices and flexibility. Developments in the US, Europe and other global markets have now created significant opportunities for Indian component manufacturers to forge a new identity with clear strategies in R&D, supply chain and product diversification.

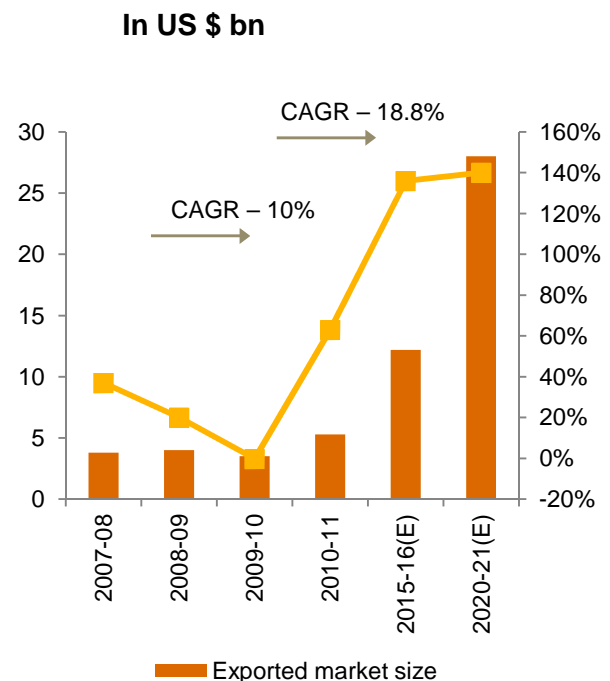
India: Auto component industry turnover



Together, the EU and North America have accounted for 58% of exports for Indian component manufacturers, as shown in the chart below. The presence in India of global automakers from Korea, Europe, Japan and US has also enabled global tier 1 auto component players to set up IPOs (International Purchasing Offices) and source components from India. As a result, component suppliers who have until now focused on designing vehicles for the domestic Indian market or other developing markets are now shifting their priorities towards creating niche brands that can compete on a global level.

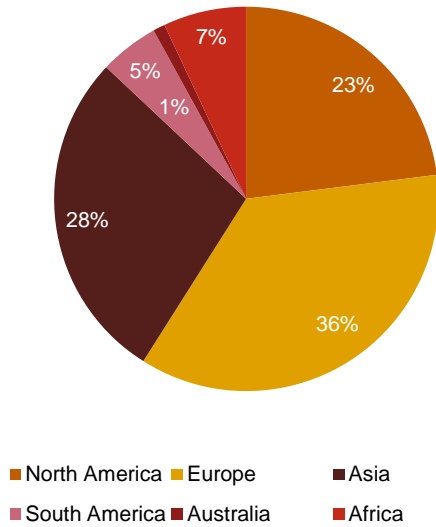
The overall Indian auto component industry has witnessed a compound annual growth rate (CAGR) of nearly 15% for the period 2007-11, and is expected to grow at 11% over the period 2011-21. Also, while the growth rate of exports has been 11% compounded annually during 2007-11, exports are expected to grow by nearly 19% during 2011-21.

India: Export market size

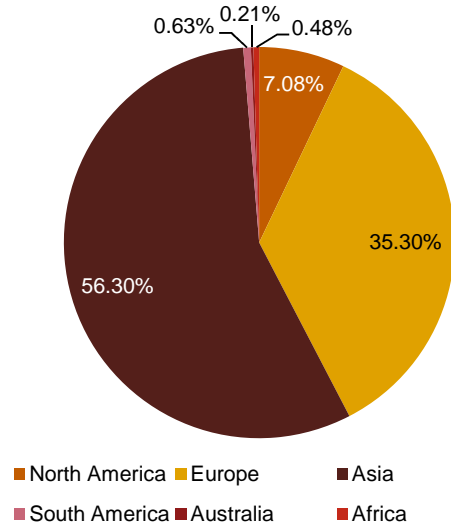


<sup>2</sup> <http://planningcommission.gov.in/plans/planrel/12thplan/welcome.html>

*India: Export market  
Split by country FY 2010-11*



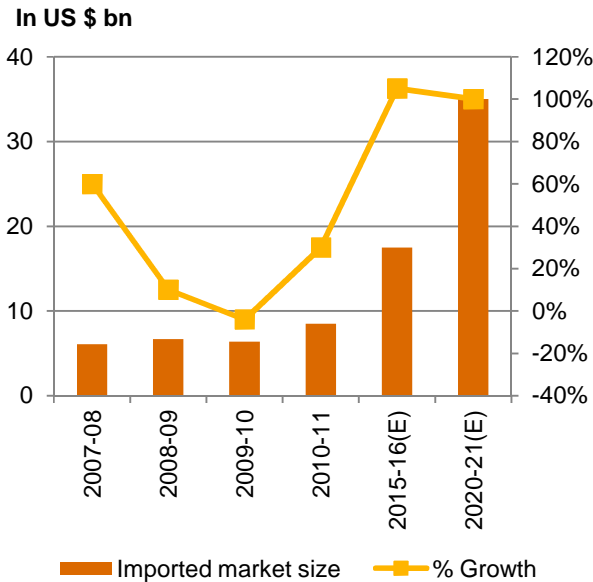
*India: Import markets  
Split by country FY 2010-11*



Source: ACMA

At the same time, robust market growth in India has also boosted capital investment in the sector, seeing it rise from US\$3.8 billion in FY 2005 to US\$12 billion in FY 2012, representing a CAGR of over 21%.

*India: Import market size*

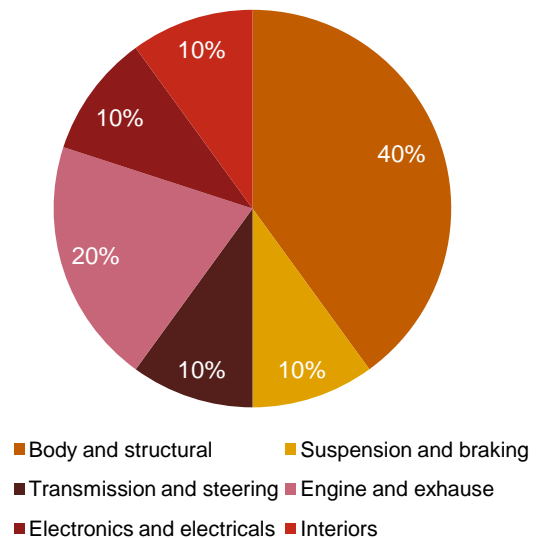


Source: ACMA

### Key segments of the Indian auto component market

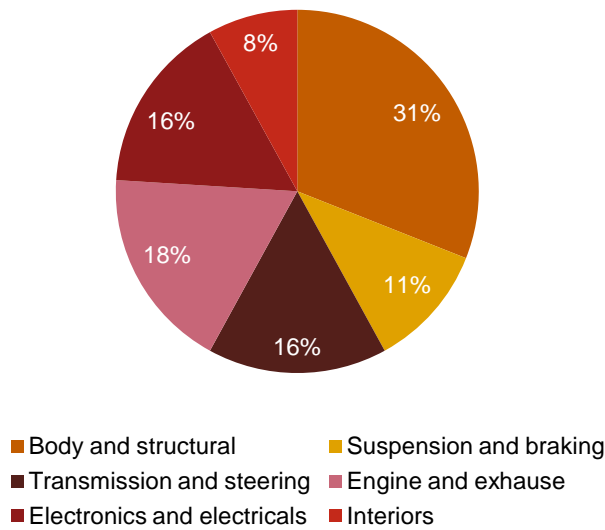
The manufacturing expertise of Indian auto component suppliers is spread across a wide range of segments such as engine components, driveline and transmission components, braking and suspension parts, and electrical components. By 2020, it is estimated that transmission and electronics' share will grow to 32% from 20% in 2011.

*India: Auto component segment mix  
2011*

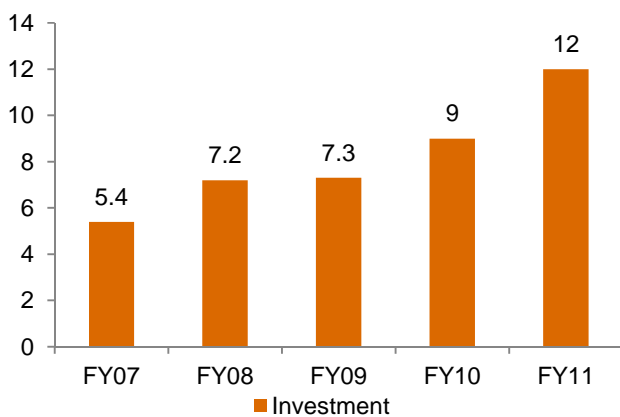




India: Auto component segment mix  
2020(E)



India: Aggregate capital investment in Auto components  
In US \$ bn



Source ACMA

## Industry dynamics and structure

Faced with constant cost pressures, global auto companies – both automakers and component suppliers – are now increasingly shifting their focus to emerging markets in the Asia-Pacific region such as China and India. This evolving scenario is proving to be an excellent opportunity for Indian component suppliers to expand significantly and make acquisitions globally. Most of the top global automotive manufacturers such as Ford, BMW, Volkswagen, Toyota, Hyundai and Mercedes now either source and/or have plans to source components from India. With engineering design and business processes also being outsourced, India is increasingly becoming a preferred destination on the global auto trade map.

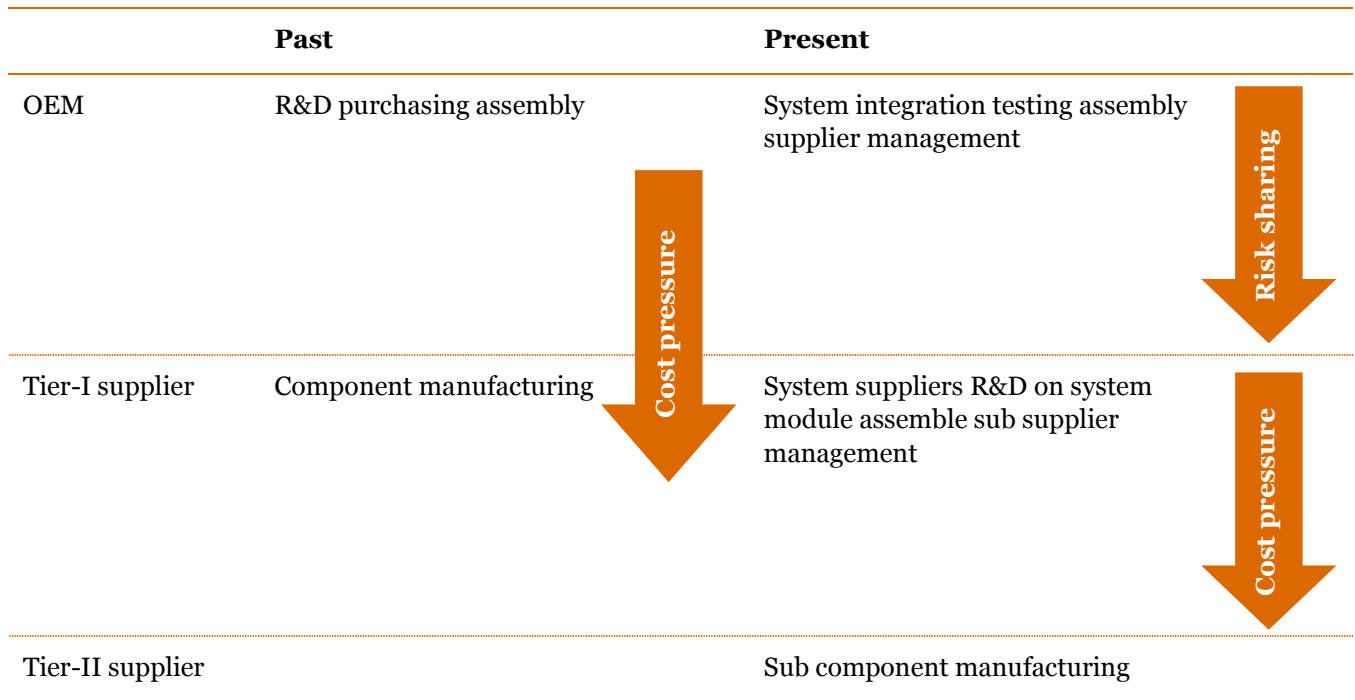
The market entry strategies commonly adopted by companies (both vehicle manufacturing and component suppliers) setting up operations in India include:

- Setting up a small business unit and ramping up operations gradually. The auto components sectors in which India enjoys a comparative advantage and where this approach is used include manufacturing of engine, drive transmission and steering components.
- Foreign companies setting up joint ventures with Indian component manufacturers to gain access to the local market and understanding of market and regulatory requirements.
- Signing long-term contracts with SMEs and gaining their confidence for further investments in business operations.
- Leveraging the Indian focus on delivering value for money to produce high quality parts or components at low prices and with low manufacturing costs.

## Supply chain structure

Historically, Indian auto component suppliers used to sell their products to automakers largely by signing annual contracts that covered only one model year. These contracts were generally elastic with respect to price and volume deliveries. Today, however, manufacturers normally award contracts for the life of a vehicle model (spanning 5-7 years), provided the supplier agrees to specific targets for productivity increases that offset price inflation for the manufacturer with lower per-unit prices. So the component supply chain is now changing into that of sub-system integrators and component manufacturers whose relationship is defined more by 'risk' than the previous factor of 'cost pressure' (see chart). This shift in the contracting model has also led to greater integration and collaboration between automakers and component suppliers.





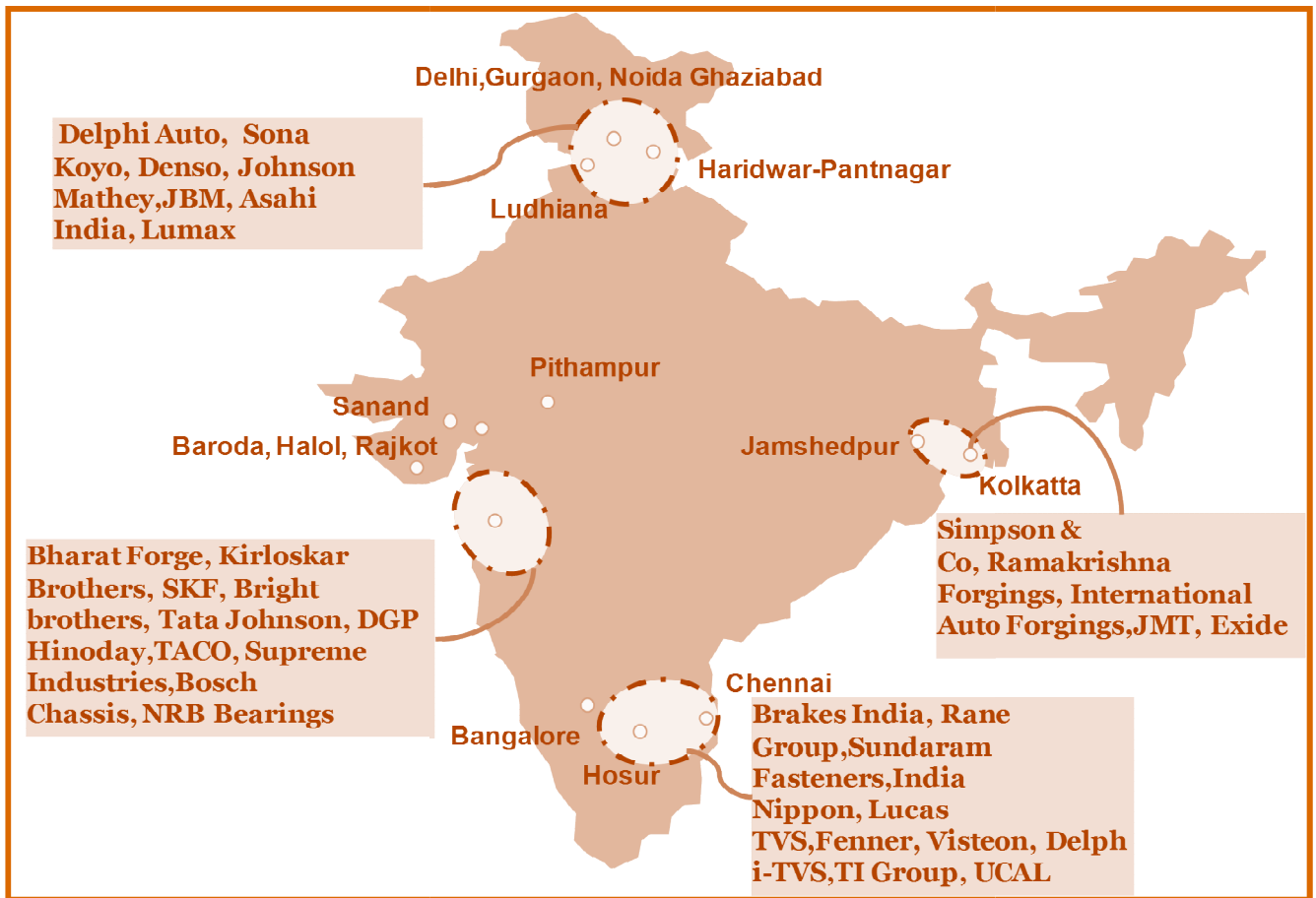
Source: SIAM

## SMEs in the auto components industry

According to ACMA, the SMEs participating in India's auto component sector include a large body of nearly 5,800 unorganised players, who outnumber by almost ten to one the much smaller grouping of nearly 600 organised companies. Around 30% of the organised players have revenues above US\$25 million. A high proportion of the market is dominated by only a handful of players in the organised segment, whereas the domestic aftermarket is largely dominated by local and foreign players.

## Key automotive component clusters

Delhi-National Capital region (NCR), Mumbai-Pune, and Chennai-Bangalore are the three major automotive clusters in India, driven by the presence of both global and domestic automakers in each region. Most of the significant component suppliers have a presence in these regions. Though there are ongoing challenges from basic infrastructure issues such as poor roads, accessibility to ports and availability of power, automakers have continued to invest in capacity, and an opportunity to widen their customer bases has attracted suppliers to set up operations across these regions.



Source: Industry Sources, PwC

The Mumbai-Pune region is not only the oldest but also the largest industry cluster, due to the presence of companies such as Tata Motors, Fiat, General Motors, Volkswagen and Mercedes Benz in the passenger cars segment; Tata Motors, Force Motors and Mahindra Navistar in commercial vehicles; and Bajaj Auto in two-wheelers. These are supported by suppliers such as Tata AutoComp, Bharat Forge, Bosch and numerous smaller component manufacturers

Following the lead set by Maruti in establishing a strong supplier base for its cars in the NCR region, many suppliers in this region have connections with Japan – generally through having Japanese origins, equity stakes or technical relationships.

The presence of global automotive players such as Ford, Hyundai and Toyota, who set up manufacturing operations in south India (the Chennai–Bangalore region) in the late 1990's, has fostered the development of component suppliers in that region. Prior to the arrival of these global players, suppliers in this region were previously dependent on Ashok Leyland and Hindustan motors.

Ever since Tata Motors decided to relocate Nano's production to Sanand, automakers such as Ford and Maruti have been queuing up to explore the possibilities of setting up units in that region. With advantages such as good availability of land and accessibility to ports coupled with the local government's proactive role and farsighted policies, the Sanand cluster looks set to become the next Detroit of India.

### *Other SME clusters*

The past decade has also seen new investment in the automotive sector spread to other emerging clusters in India. To support the development of these clusters and increase their competitiveness at a global industry level, the Indian government has taken several positive steps, one of them being identification of SME clusters by industry sector. The foundation for MSME clusters (FMC) was established in 2005 by the Entrepreneurship Development Institute of India (EDI) in Ahmedabad, with technical support from the UNIDO Cluster Development Programme in India. FMC has identified the following locations as auto component SME clusters in India:

<b>Name of the cluster</b>	<b>District</b>	<b>State</b>	<b>Products</b>	<b>No.of SME Units in the cluster*</b>
Faridabad	Faridabad	Haryana	Rubber and sheet metal components	2500
Gurgaon	Gurgaon	Haryana	Rubber, plastic molded parts and sheet metal parts	5000 MSEs (Micro sized firms about – 3000; Small sized firms –2000; Medium sized firms – 150; Large firms – 4.)
Jamshedpur	East Singhbhum	Jharkhand	Engine, transmission, suspension/braking, electrical parts	506
Hubli	Dharwad	Karnataka	Auto components and Machine tools	1000 (both small and micro)
Ahmednagar	Ahmednagar	Maharashtra	Forgings, castings, electrical components, motors, jigs and fixture manufacturing	406 (Small 185 Micro 221)
Aurangabad	Aurangabad	Maharashtra	Engine parts/chassis assemblies/sub assemblies, drive transmission/steering parts, electrical equipment, fan belts, sheet metal parts, plastic and rubber components.	650

Name of the cluster	District	State	Products	No.of SME Units in the cluster*
Pune	Pune	Maharashtra	Engine and engine parts, Steering and transmission gears, braking and suspension systems, auto electrical and auto electronics, rubber parts, plastic molded items etc., finished castings and forgings.	6000 ( 70% are micro and 30 % are small)
Jalandhar	Jalandhar	Punjab	Transmission system parts, wheel hub assembly parts, engine parts and suspension system parts	1500
Chennai	Chennai	Tamil Nadu	Engine parts, transmission/steering, suspension/braking, electrical equipment	6000
Meerut	Meerut	Uttar Pradesh	Rubber, braking, engine parts	4700
shamli	Muzaffarnagar	Uttar Pradesh	Axles wheel rim and hubs	40

**Source:  
cluster  
observatory**



## *Challenges faced by automotive component SMEs*

Auto component SMEs face many challenges in their efforts to globalise their business operations and export to other markets. While the adoption of best practices in the production and delivery of quality products has enabled a few of them to increase their customer base and acquire global companies, most of the companies in the sector face an array of challenges. These arise in areas including:

- Financial Assistance – SMEs, particularly the smallest enterprises, have inadequate access to finance due to lack of financial information and non-formal business practices. Many of these firms also lack access to venture capital and have a very limited access to secondary market instruments. The ability of the banks to service the credit requirements of the SME sector depends on underlying transaction costs, efficient recovery processes and available security. At the same time, venture capital firms are generally wary of investing in relatively young or unproven technologies, and banks are also unable to provide debt financing. In addition, there is no formal mechanism for SMEs to raise investment from capital markets. As a result they tend to either raise money through informal means or scale back on their product and services.
- Credit shortage – One of the most significant constraints that Indian SMEs still face is the low availability and high rates charged on credit. This is likely to get worse in the current context of the heat being felt by the Indian financial sector due to the financial meltdown in many European countries.
- Market Orientation – Many SMEs face a fragmented market due to their product range and are vulnerable to market fluctuations.
- Accessibility to markets and technology – SMEs lack access to inter-state and international markets, meaning their ability to gain access to advanced technology and innovations in their product line is limited. There is also a lack of awareness of the types of global best practices that are being implemented by their counterparts in other countries.
- Operational costs – The rising global cost of commodities continues to haunt local manufacturers. In addition to facing pressures from inflation, the SME sector has in many ways become a ‘talent pool’ from which skilled labour and professionals are often recruited to fill higher-paying jobs in large domestic and international companies. As a result, SMEs face higher recruitment and training costs while also having to deal with high employee attrition rates.
- Export-driven business model – SMEs in the sector lack in-house expertise to analyse hedging options and forecast exchange rate fluctuations. This, coupled with competition from other South East Asian countries (Thailand, Korea, Indonesia and so on), has forced them to re-think their business models
- Lack of access to global markets – With the liberalisation and globalisation of the Indian economy, Indian SMEs now have unprecedented opportunities on the one hand but face serious challenges on the other. While access to global markets has offered a host of new business opportunities such as the opening up of new target markets and the potential to exploit technological advantages, the challenges created by the process of globalisation are mainly related to scale of operation, technological obsolescence, an inability to access institutional credit, and intense competition in marketing.
- Basic infrastructure – To ensure the competitiveness of Indian SMEs, it is essential that the availability of infrastructure, technology and skilled manpower are in line with global trends. Most SMEs are located either in the Industrial estates set up decades ago or are functioning in the urban areas or have come up in an unorganised way in the rural areas. The state of infrastructure including power, water, roads, etc in such areas is poor and unreliable.
- Branding and marketing – SMEs’ branding and visibility tends to be very low, due to factors including their small media budgets and relative lack of participation in international buyer-seller events. To benefit fully from participating in such events, SME experts first need to undertake significant research.
- Lack of dedicated R&D, testing and design capabilities – Large number of SMEs do not have the capabilities needed to design products end-to-end. These firms also lack the necessary infrastructure to carry out R&D to match their customers’ requirements.

## *Conclusion and recommendations*

In summary, market developments in the US, Europe and other global markets have created a significant opportunity for Indian auto component manufacturers to forge a new identity with clear strategies in R&D, supply chain and product Diversification. At the same time, the Indian component industry has made great strides in recent years in terms of quality, spread, absorption of newer technologies, and skilled manpower while maintaining competitive pricing and flexibility.

However, it is now becoming accepted worldwide that sustained competitiveness in the automotive industry comes from R&D and innovation, and in this respect Indian players face a challenge. Indian suppliers spend a relatively low proportion of their total revenue on R&D, at around 1.5%, compared to global standard in the range of 5% to 6%. Also, Indian suppliers have until now focused mainly on designing vehicles for the domestic Indian market or other developing markets, but have not focused on creating niche brands that can compete on a global level.

As a result, there is now a growing need to initiate collaborative research and development among various tier 1 and tier 2 suppliers in India, with active involvement from vehicle manufacturers. This will enable the Indian industry to develop intelligent vehicles adhering to international safety standards and emission norms. They must also focus on R&D of electric and hybrid vehicles over the long term.

In India, logistics forms a major part of inventory cost estimation, which affects the cost competitiveness of the auto component industry. To compete efficiently with their global counterparts, Indian suppliers need to look beyond supply chain solutions such as Enterprise Resource Planning (ERP) and focus more on tools and techniques such as just-in-time production processes and e-sourcing.

## *Recommendations for collaboration between UK & Indian SMEs*

In light of the conclusions highlighted above, our recommendations are:

### *Recommendation 1 – Develop successful case studies around best practices being adopted by SMEs*

- There is a need to develop detailed case studies specific to SMEs, based on both inbound and outbound trade in the automotive sector in both countries, to identify target product/component segments for SMEs. In order to increase the strategic value of their partnerships with key suppliers, companies that apply best practices should select suppliers whose geographic, technical, or market strengths complement their own. They can then forge long-term alliances with key suppliers (both in India and the UK) to demonstrate their commitment to a collaborative partnership.

### *Recommendation 2 – Develop robust KPIs to guarantee quality control in keeping with business goals.*

- In response to competitive pressures and changing consumer demands, automakers today maintain increasingly high standards for quality, and apply these not only to the products they produce, but also to the materials and components they accept from suppliers. Achieving rigorously high standards for quality does not happen by chance, especially for SMEs.
- Securing high-quality products from Indian component suppliers requires precise management and rigorous monitoring. So companies in UK with world-class quality standards can help their Indian counterparts achieve world-class quality standards as well, by developing a robust set of key performance indicators (KPIs) to ensure rigorous quality control. UK-based SMEs can also ensure that they share information with their Indian counterparts regarding their corporate objectives, priorities, and new product development. SMEs in both countries can also motivate each other with rewards for achieving or exceeding KPI targets.



### *Recommendation 3 – Identify gaps between business strategy and technology capability*

- For most UK-based SMEs, the business strategy they follow is supported by – and linked with – their underlying technology strategies. In contrast, most Indian SMEs are driven more by their business strategies rather than any advanced technology. To close such gaps, SMEs should regularly bring together their business unit leaders, senior executives, and domain experts to identify where technology weaknesses exist. They should also establish an ongoing portfolio of joint business initiatives, analysing each according to its total costs, impact on overall efficiencies, inherent risks, and ability to be integrated and adopted throughout the organisation.

### *Recommendation 4 – Weigh up the pros and cons of global operations*

Gone are the days when only large corporations could do business internationally. Today, even start-ups and SMEs can advance globally before dominating their home markets. However, irrespective of their size, and before defining a path toward global expansion, smart companies first consider the unique set of factors affecting their business choices. Whether their focus is on importing, exporting, outsourcing, manufacturing overseas, or forming strategic partnerships, leading companies consider how various strategic drivers affect their business opportunities worldwide. These drivers might include:

#### *Government factors*

- Trade barriers
- Regulations affecting product design, manufacturing, operational, and labour practices
- Political and economic stability

#### *Production factors*

- Labour costs and productivity across markets
- Product development and manufacturing costs
- Infrastructure necessary to manufacture products
- Adequate distribution networks

#### *Resource factors*

- Access to natural resources necessary to create products
- Availability of labour and specialised capabilities
- Potential alliances, making necessary resources easier to obtain

#### *Cultural factors*

- Business customs
- Language
- Values, customs, and cultural tastes
- Generational idiosyncrasies of the market

### *Recommendation 5 – Use contracts to protect intellectual property (IP)*

Long-term cooperation between companies located in two different countries increases the likelihood of company trade secrets being stolen. There is always a concern that rivals may be able to pirate or reverse-engineer products. So, while it is essential to know if a country has conventional legal mechanisms in place to protect intellectual property (IP) rights, it is even more important to know if IP laws are enforced, and what legal avenues are available for addressing disagreements



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## Case study: Jaguar Land Rover in India

JLR is the UK's largest automotive manufacturing business built around two iconic British car brands with a rich heritage and powerful consumer appeal and loyalty. Additionally, JLR is at the centre of the UK automotive industry's drive to deliver technical innovation in all areas of vehicle development.

Jaguar Land Rover is part of Tata Motors, India's largest automobile company. The business has achieved significant global success in recent years as a result of unprecedented levels of investment in new products and supporting technologies, together with a focus on the differing needs of its global customer base. In the 2011/12 fiscal year, JLR achieved record profits of £1.5 billion, an increase of £392m when compared to the previous year.

Jaguar Land Rover relies upon an extensive network of suppliers of both parts and services, and increasingly includes those operating in India. JLR's global footprint has extended beyond the UK to include a local facility in its parent company's base, Pune, Maharashtra where the popular Freelander 2 vehicle is assembled for the local market, from parts imported from the UK.

JLR's strategy to enhance global sourcing will enable it to take advantage of low-cost bases in countries such as India and China. The company is taking the same approach with engineering, where it is progressively building up capability through product development activities in India. Synergies across the Tata Group are also realised through engineering and development activities undertaken in Pune.

As Jaguar Land Rover grows its global scale, managing component supply and development, as well as engineering services, will become increasingly important. This will help JLR to not only control the cost of new product development and manufacture, but also to access skills in key areas, such as vehicle electronics and software development. In India specialised clusters such as those in Bangalore and Trivandrum have developed quickly.

Developing skills in both manufacturing and development sectors is critical to the success of OEMs and suppliers alike. Investment in education at a vocational and professional skills level will be vital for both pre-employment and in-career development. Here, there are special challenges for SMEs – vital parts of the chain – as they may not have the scale to be able to establish and manage in-house programmes. Working in partnership across industry sector with OEMs, other SMEs and educational institutions to continually up-skill is critical, and this will involve establishing collaborative networks with aligned aims that must transcend simple short-term recruitment needs.

Developing the right sourcing footprint will benefit cost, technology development, and also overall carbon emissions through reduced shipping miles. UK and Indian suppliers will likely benefit from this strategy, and as a consequence of JLR's growth we are likely to see investment into India by our UK and global supply base, enabled by developments in the infrastructure and skills environment.

Manufacturing is, in many senses, the 'pull' function at the top of the supply chain that drives innovation and research and development and will be the growth engine in India for SMEs and regional facilities of global companies in India. If the national target for manufacturing as a proportion of GDP (25%) is to be met from today's base, skills development across company scale, industrial sector and all educational levels will be required.

Jaguar Land Rover see India as a market with very significant opportunities, both in sales expansion and in other areas, working with the support of our parent company, Tata Motors Limited.



## Case study: GKN Driveline in India

GKN Driveline began manufacturing in India in 1986, investing in a CVJ joint venture with Invel Transmissions, with a 40% stake. Invel was the first company in India to manufacture CVJ systems for front-wheel drive vehicles.

As a result of changes in legislation, GKN was able to take majority ownership of Invel in 1995.

In the following years the Indian motor industry grew rapidly. To meet the increased demand GKN Driveline opened new factories in the south in Gummidipundi, Tamil Nadu, in 1996 and in the north at Dharuhera, Haryana, in 1997, complementing the existing facility at Faridabad, also in Haryana. All the facilities manufactured CVJ systems.

With demand rising rapidly in the south GKN Driveline outgrew the existing facility. In 2006, an all-new manufacturing location opened in Oragadam, near Chennai, and Gummidipundi was closed.

More recently, in 2011, GKN Driveline broke ground on a new facility in Pune in the west and expanded Oragadam with the opening of a precision forge.

The new 8,000-square-metre facility at Pune will manufacture products from GKN Driveline's CVJ Systems and Trans Axles Solutions product portfolio. The £18 million factory will employ 200 people and is strategically located within 30 kilometres of a number of major GKN Driveline customers. When fully operational, the plant will have an annual production capacity of 600,000 CVJ Systems and will also manufacture differentials from GKN Driveline's Trans Axle Solutions product range.

In November 2011, GKN Driveline opened the new £6.6 million precision forge at Oragadam. The 5,000 square metre facility supplies precision forgings to GKN Driveline's Oragadam CVJ Systems manufacturing plant.

A state-of-the-art research and development engineering centre at Faridabad, and a new one opening at the plant in Pune, supported by global engineering development centres enables GKN Driveline to remain a technology leader in the Indian automotive market.

The continued expansion enables GKN Driveline to remain close and accessible to its customers in India. With the completion of the new facilities, GKN Driveline employment in India will total 1,300 people in four plants strategically located across India.

Today GKN Driveline is the leading supplier of CVJ sideshafts in India, supplying every major vehicle manufacturer in India including Bajaj, Fiat, Ford, General Motors, Honda, Hyundai, Volkswagen, Mahindra, Maruti, Piaggio, Renault, Skoda, Tata and Toyota. It has built successful relationships with key vehicle manufacturers based upon supply reliability, product integrity and consistent quality. It shares its unique application capability with customers to develop dedicated driveline solutions that meet the challenge of improved environmental performance, greater efficiency, lighter weight and enhanced reliability. GKN Driveline's business in India has grown at an annual rate of more than 15% over the past five years and India is expected to remain a high-growth market

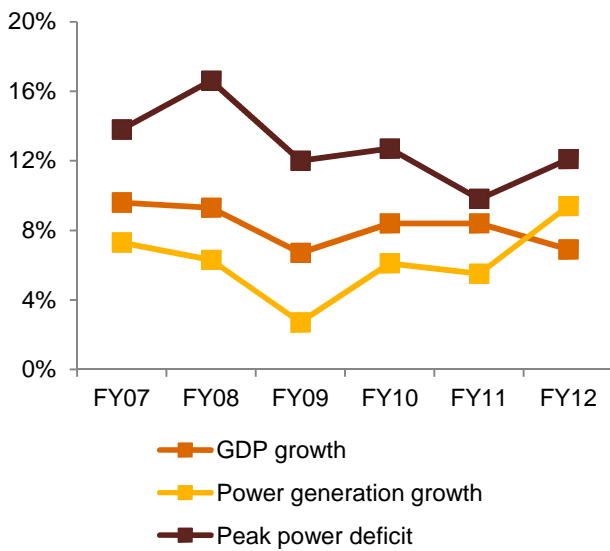


# Section 4: Clean energy

## The Indian clean energy industry

India's electricity transmission and distribution network is the third largest in the world, and its generation capacity (209 GW) is the fifth largest. However, India's rate of economic growth has recently slowed down substantially from its previous levels, due to reasons including – among others – persistent infrastructure challenges, including electricity shortages. Despite a sizeable addition of generation capacity in recent years, shortages remain, presently at 12.1% in peak demand and 11.1% in energy supply. Indeed, the shortfall is much bigger if suppressed demand, rather than un-met demand alone, is taken into account.

### Economy and energy

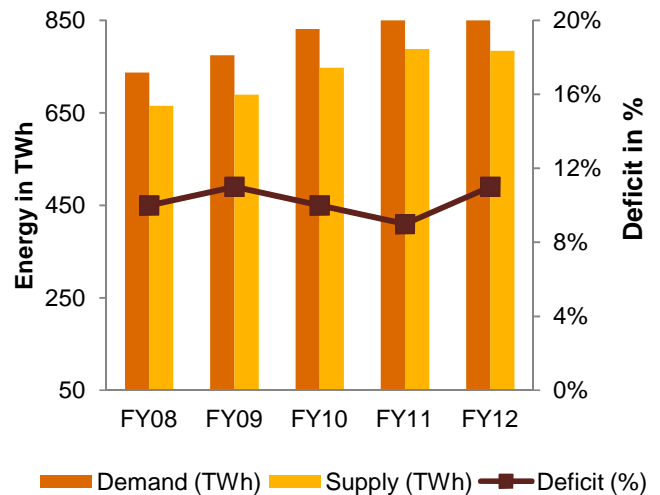


Current socio-economic trends suggest that demand for electricity will in fact accelerate further in India, necessitating the addition of new power generation capacity on an immediate basis. The significant underlying trends include:

1. Population migration from rural to urban centres in search of better livelihoods and opportunities. Urbanisation is forecast to increase from the current level of 28% of the population to 41% by 2030.

2. The provision of universal electricity access under ongoing electrification programmes. Currently the access levels are relatively low, covering 91% of villages but only 54% of households. However the actual supply is far lower than these access figures suggest, as rural supply is severely rationed.
3. Growth in incomes and living standards will gradually increase per-capita electricity consumption, which at one-quarter of the global average is currently well below similarly-placed developing countries.

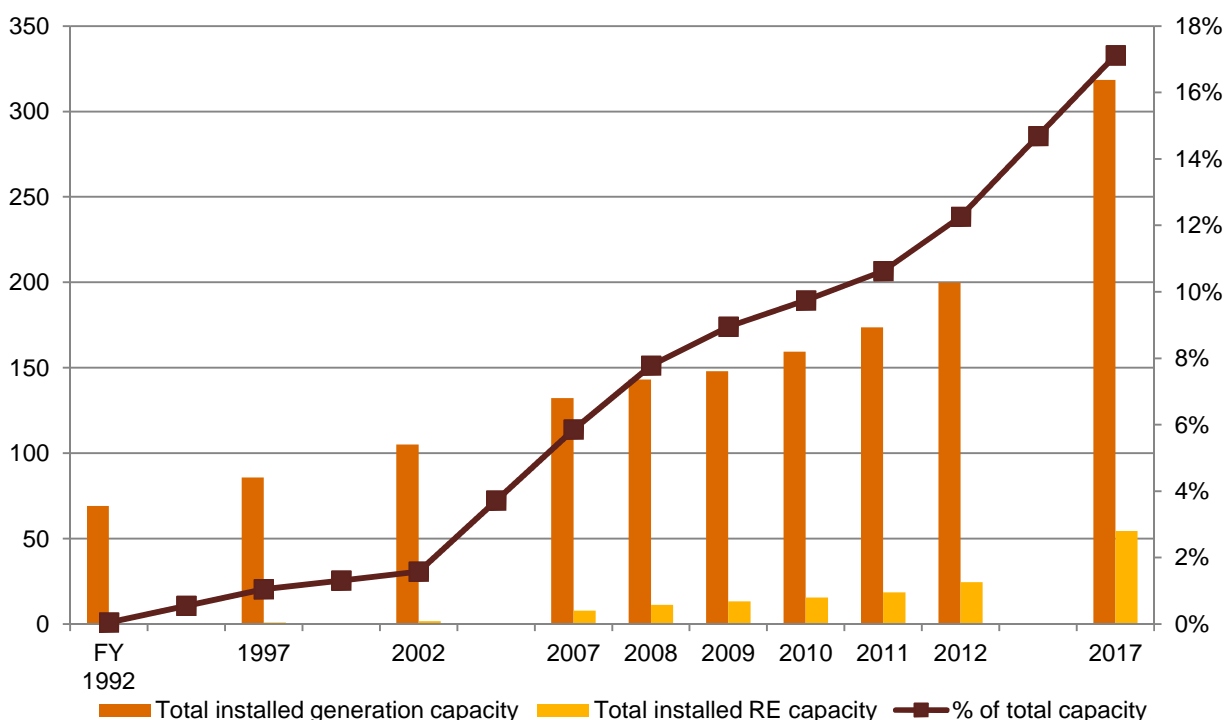
### Power demand and supply



The supply-side is also hampered by several challenges that present opportunities for improvement. For example, an earlier generation of power plants, totalling over 21 GW, has been identified for replacement or renovation. The technology used in Indian coalmines also needs to be upgraded, as productivity is well below global standards. The necessary improvement include a need for more coal beneficiation capacity – currently less than 10% of thermal coal used is washed – and better logistics solutions to reduce transportation losses.

Some steps have been taken to address these challenges. For instance, new power generation is increasingly based on super-critical technology for better energy efficiency, and inter-state transmission lines are now being designed at higher voltages, such as the 800 kV power evacuation line from East to the Northern grid. The Bureau of Energy Efficiency has also kicked off several initiatives, such as the 'PAT' scheme in Standards and Labelling, to improve efficiency of use and reduce the energy intensity of the economy.

Encouraging renewable energy is an important policy intervention in India, and several schemes at national and state government level are aimed at providing it with a robust investment climate. There is a robust case for having a higher proportion of renewable energy in the country's overall energy mix, as it helps to limit the carbon footprint; enhances national energy security, as the resource factors are local; and provides an additional source of energy to help meet growing power demand.



Given these benefits, renewable energy capacity has grown at a rapid pace over the past two decades, from about 0.5% of overall generation capacity in 1992 to about 12.25% in 2012. The past five years have seen the most intense activity, with average annual growth of 33.3%.

India's National Action Plan on Climate Change has set the renewable energy target for the year 2017 at 12% in energy terms. Based on the Planning Commission's growth estimates and an average load factor of 30% for renewable energy projects, this translates to total renewable generation capacity of 64 GW. This represents significant growth over the current renewable generation capacity of about 24 GW.

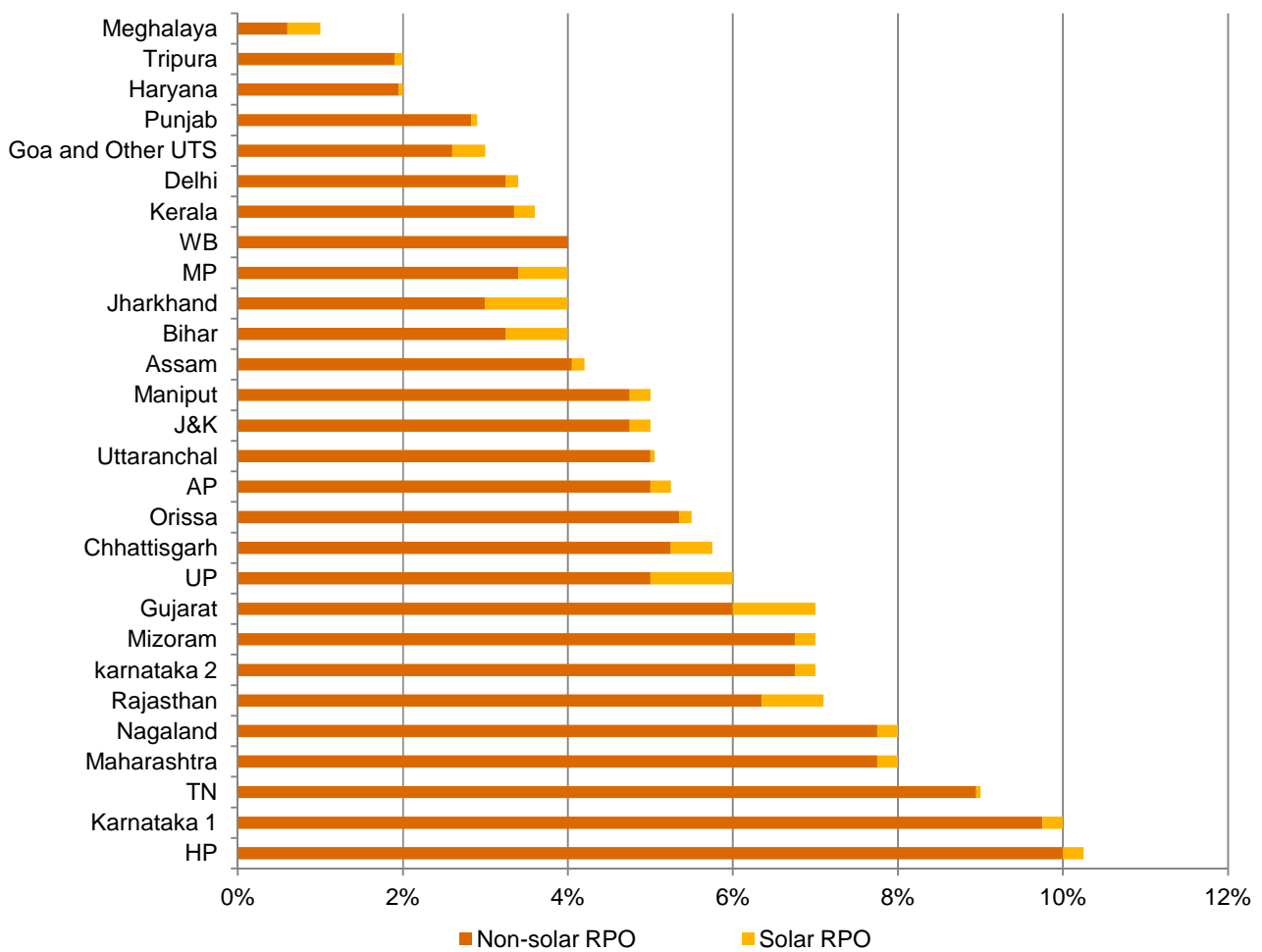
### Key policy and regulatory changes

In recent years, a number of policy, legislative, and regulatory changes have combined with administrative actions to drive a significant improvement in the outlook for renewable and clean energy. The industry structure of renewable energy is largely deregulated and competitive, dominated by private sector sponsors. A number of autonomous agencies provide the institutional support to better understand resource factors and suitable technology. Examples include the Centre for Wind Energy Technology (C-WET) Chennai for wind power; the Alternate Hydro Energy Centre at the IIT Roorkee for small hydro; and IIT Jodhpur for solar.

The Government of India’s commitment is reflected in the National Action Plan on Climate Change (NAPCC) and the eight national Missions that have been launched: (1) The National Solar Mission; (2) The National Mission for Enhanced Energy Efficiency; (3) The National Mission on Sustainable Habitats; (4) The National Water Mission; (5) The National Mission for Sustaining the Himalayan Ecosystem; (6) The National Mission for a Green India; (7) The National Mission for Sustainable Agriculture; and (8) The National Mission on Strategic Knowledge on Climate Change.

The Electricity Act 2003 ushered in significant reforms in the power sector, including in clean technology. Of particular interest to the latter are the mandatory Renewable Procurement Obligation, and the opening-up of a portfolio of sale options including feed-in tariffs, competitive retail supply to end-users via open access, and trading (either physically such as bilateral and power exchanges, or as certificates such as on the REC market). The feed-in tariff is set by the power regulators for a defined term largely on a cost-plus basis with about 16% return on equity. Also, this procurement is exempt from merit-order dispatch, meaning they are treated as ‘must run’ plants.

*Renewable procurement obligation: By state*



The Renewable Purchase Obligation (RPO) – set by the state electricity regulator for a defined term – varies across states, but averages around 4.9% of total power procurement by designated entities, against an NAPCC target of 6% for the period. To develop the solar power market, a separate RPO is now defined for it, currently targeted at 0.3%.

The designated entities include all distribution companies, but now the definitions are being widened in many states to cover all open access suppliers and large energy users as well. These designated entities sign power purchase agreements with renewable power generators at defined feed-in tariffs or simply buy Renewable Energy Certificates (RECs) from the exchange.



A renewable power generator can sell power at feed-in tariff to these designated entities. Alternatively, it can sell power at a defined average pool price to a distribution company or any third party, and earn currently traded prices on the REC market. The RECs are freely traded within a floor-and-cap price range set by the Central Electricity Regulatory Commission for a five-year term. The REC-RPO is a powerful market-driven mechanism that brings all power users the ability to buy renewable energy without their having to be located within the same geographic vicinity, thus enabling better use of local factors.

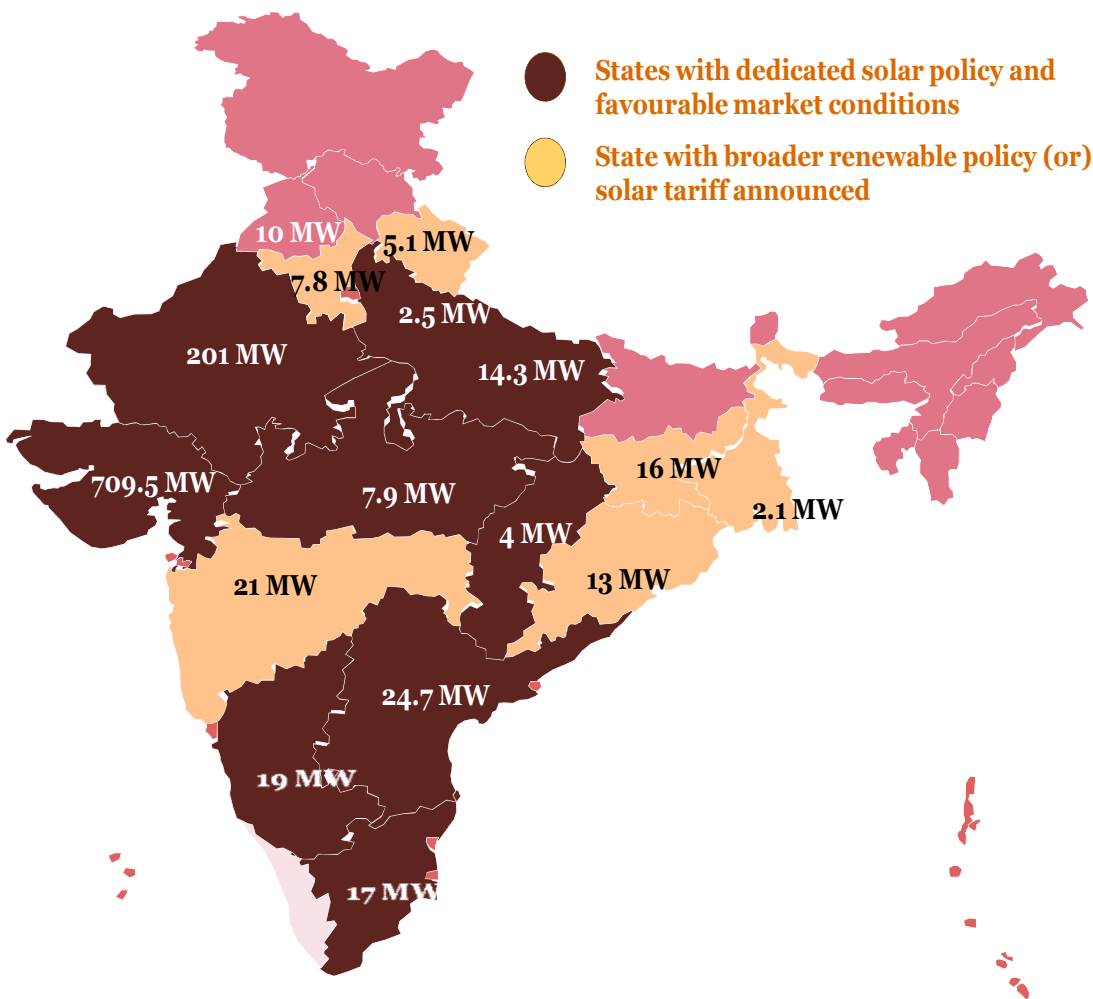
The National Action Plan on Climate Change aims to increase proportion of renewable energy to about 15% of total power generation by FY 2020. The share of the solar energy component in this obligation is planned to increase from the current 0.25% to 3% by FY 2022.

A number of additional incentives are available for renewable power generators, though the trend is to move away from subsidies and tax-credits and towards output-based incentives, such as concessional

wheeling charges, generation-based incentives, and attractive feed-in tariffs. Financing for eligible renewable energy projects is available from many sources, including commercial banks, sector lending institutions such as the Indian Renewable Energy Development Agency (IREDA), private equity investors, the capital markets, and external commercial borrowing. To date, renewable energy has attracted one-quarter of all private equity investments into the electricity sector, although as an asset-class it represents only one-tenth the sector's generation capacity, reflecting the greater confidence and growth expectations in the renewable energy segment.

### Solar energy

The National Solar Mission (NSM) aims to install 22 GW (20,000 MW grid connected, and 2,000 MW off-grid) of solar power capacity by 2022. To help achieve this, a separate solar power purchase obligation is mandated for all designated entities, starting at 0.25% (up to 2013) and rising to 3% by 2022. The REC market also trades in separate solar REC, with separately-defined floor-and-cap prices in recognition of its higher costs.



India's total solar power generation capacity has grown rapidly in the past two years to reach a commission capacity of 1,047 MW as at November 2012, with a further 610 MW expected to be commissioned by March 2013. Most investments have been made in the resource-rich regions for solar power generation, with western and southern India accounting for about 92% of total installed capacity. The off-grid market is modest, at 100 MW installed capacity, and is more dispersed across the states.

The solar sector has attracted considerable interest at the state level as well, and many states such as Rajasthan, Gujarat, Madhya Pradesh, Karnataka and more recently Andhra Pradesh and Tamil Nadu have announced aggressive state policies to attract solar power investments. The table below shows the expected capacity resulting from some of these policies.

Programme category	Capacity allocated/registered (MW)	Capacity commissioned (MW)	Under progress (MW)	Key features and issues
Migration scheme	54	48	3.5	-
National Solar Mission, Batch 1	150	130	20	3 projects (15MW) not achieved COD – Land related hurdles
IREDA Roof-top programme	100	87.8	12.2	Financial closure issues
Gujarat Solar Policy	964	709.5	254	Financial closure, Infrastructure delays
National solar mission, Batch 2	350	-	350	340 MW achieved Financial closure and under installation
REC based	-	18.1	947	In various stage – DPR, EOC
Andhra Pradesh Solar Policy	1000 (target)			Permits competitive and captive trade of solar power on open access basis Competitive bidding for 1000 MW announced
Tamil Nadu Solar Policy	3000 (target)			Expands Solar RPO to all large users with an option to procure from Solar Park to be set up on PPP basis Competitive bidding for 1000 MW announced
Other States' Policies*	285	-	285	Under Financial closure

\* States include Karnataka, Orissa and Madhya Pradesh

## *Solar Power Projects*

A number of grid-connected MW-scale solar power projects are supported under the NSM and various state solar power policies. In the NSM alone, the expected pipeline includes 6,300 MW of solar PV and 2,700 MW of solar thermal (by 2017), plus a further 12,000 MW (by 2022) of solar PV and solar thermal projects. The tender for Phase 1 (batch 1 and 2) has been very successful, attracting widespread local and overseas interest in the projects.

## *Equipment manufacturing*

Given the emerging market opportunity at both the national and state level, and to meet the local content requirement in some technologies, a number of solar cell and module manufacturing projects have been initiated. It is expected that the equivalent of about 5 GW of solar manufacturing capacity could come up by 2022, including 2 GW of capacity for poly-silicon material. The Ministry of New and Renewable Energy (MNRE) estimates that manufacturing capacity for 2,500 MW of solar cells and modules and 2,500 MW equivalent capacity of components and subsystems of solar thermal power plants will be required by the end of FY2017 alone.

In contrast, the current cumulative manufacturing capacity of 90 operating companies is barely 800 MW in cells and 1,500 MW in modules. To help meet this need, it is expected that a new incentive scheme – Special Incentive Package Scheme 2 – will be offered, providing a 25% capital expenditure grant to support the setting-up of local solar semiconductor plants.

## *Solar parks and projects*

Gujarat and Rajasthan have established solar parks to facilitate solar power project investments and reduce the common costs, such as land acquisition, establishing road connectivity or setting up transmission facilities. Given the success of these parks, a few other states are taking steps to follow suit. The tenants also benefit from the availability of better solar resource data and the fact that the EPC companies are already present on the site.

## *Off-grid solar energy*

Many of India's rural areas are still not grid connected, or suffer less than reliable supply. Off-grid solar energy applications, ranging from home lanterns to village-level mini-grids, have emerged as a viable alternative. The central and state governments are offering incentives to encourage such applications, and multilateral agencies are involved in supporting better dissemination of these technologies and supporting the ecosystem needed for these ventures.

There are opportunities in commercial off-grid solar energy supply as well. This targets specific types of process industrial units that can adopt solar powered solutions for low to medium heat and non-motive load for applications in industries such as breweries, food processing, dairies and electroplating. This helps them reduce their carbon footprint and the long-run costs of the power consumed.

## *Key barriers to solar energy*

While the investments in solar PV and solar thermal are encouraging so far, they have been largely financed by sponsors on the strength of their balance sheets. These technologies have secured commercial financing as well, but the lenders have tended to be wary and have adopted a conservative wait-and-watch attitude – i.e., go slow on further lending until ongoing projects are commissioned.

Their main concern is over performance, and specifically whether the project sponsors have done adequate due diligence into the resource factors; whether the technology imported suits local conditions and is able to operate at rated levels in them; and whether the project implementation is up to the mark. Given the lack of a track record for large-scale solar plants, these concerns are understandable. It is likely that multilateral financing institutions will step in to offer long-term project financing to develop this sector.

Transmission links are often a further challenge, given the low load-factors and thus higher unit costs that users have to pay. In some states, such as Gujarat and Rajasthan, new lines have been financed, and on a national scale there are plans to establish green transmission corridors. The regulatory framework could emerge as a key challenge as it varies from state to state, and there are concerns that incumbent utilities may act to restrict competitive open-access sales.

## *Bio-energy*

Given its tropical climate and large rural economy, India has long experience with bio-energy sources. In late 2011 the Government of India announced a proposal for a 'Biomass Mission' to support the biomass supply chain and set up bio-energy installations of 16,000 MW by 2020. The details of this proposal are yet to be worked out, but a number of models already exist, and the challenges to be addressed are well known.

One of the foremost of these challenges is the availability of affordable biomass feed-stock, which is affected by changes in crop cultivated, rainfall, and local sustenance use. In response, biomass plants have the option of setting up plantations to meet part of their feedstock requirement.

Storage and transportation are further key challenges, and bio-energy plants are constrained by these considerations in their site decisions. Another challenge is the seasonal availability of feedstock, and the multiple uses it has in the rural economy, including for fodder and fuel. To an extent biomass plants overcome this hurdle by transporting feedstock from a wider area with a different cropping pattern. Overall, it is the transport and storage facilities that are the weakest link today, and there is scope to set up stand-alone or integrated storage and logistics facilities.

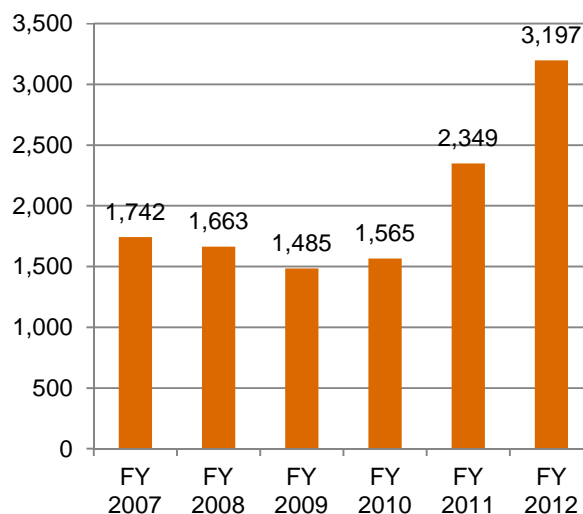
### Key barriers to bio-energy

The biomass sector has remained largely unorganised due to limited understanding of the resource profile. The Biomass Atlas is meant to bridge this information gap, but it needs further detail and to be kept refreshed to support investments. Given these shortcomings, its current assessment of the biomass available for feedstock at 18,000 MW may not be reliable.

The need for fossil fuel support is a further deterrent, as it represents a sizeable additional cost for the project developer. The feedstock prices themselves have been very volatile depending on farm conditions such as the area sowed, rainfall, crop productivity and so on, and current regulations do not permit pass-through of actual prices.

## Wind power

### Annual wind capacity added (MW)



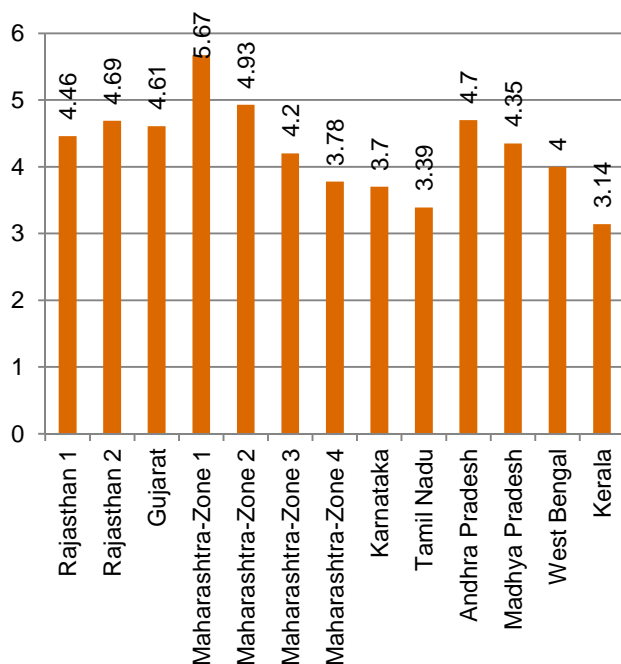
Wind power generation dominates India's renewable energy sector, accounting for about 70% of installed capacity. India's wind power capacity passed 18 GW in October 2012 and is the fifth largest in the world. This is still well below the onshore resource potential, which has been estimated at 48 GW, and which studies are now revising upward to 100 GW and almost 800 GW based on the extractable capacity of higher-rated turbines, greater hub-heights and better use of land area.

The wind power capacity added annually in India has grown robustly in the recent years, with annual growth of about 25% over the past decade, although the current year has been slack on account of the removal of tax credits that have so far attracted financial investors. However, the tide has now turned in favour of IPP investors, who now are responsible for the major part of capacity addition. Investment has also been boosted in recent years by falling capital costs and improved feed-in tariffs in many states.

One outcome of these trends is that more effort is now being spent on technical studies and collation of wind monitoring data, and thereafter in better project management, which has in turn improved the capital efficiency of wind power projects. The business model is changing too, as the previous emphasis on turnkey development gives way to a more unbundled approach, with specialists in different areas such as wind site development, turbine sales, balance of plant, logistics, and maintenance coming to the fore in their respective areas, bringing in further efficiency and innovation. Currently, the most attractive area is early stage projects, with sponsors seeking to extract value from all stages of development.

We expect to see continued growth in the Indian wind power market. To meet the NAPCC and state-level RPO targets, extra capacity of about 5.8 GW will have to be added each year. Capacity of this magnitude can only be added by large IPPs, and wind-rich states, such as Tamil Nadu, Gujarat, Maharashtra, Karnataka, Rajasthan and Andhra Pradesh have refined their policies to reflect these changes in the industry.

### Wind tariffs across states (in INR/KWh)



Rajasthan 1 = Districts of Jaisalmer, Jodhpur, Barmer  
 Rajasthan 2 = rest of the state  
 Maharashtra wind zones are classified on the basis of  
 Wind power density

A significant recent development in the Indian wind power market has been the achievement of grid-parity in the traditional wind power states. This has come about with wind capital costs declining, while fossil fuel generation has become more expensive due to rising global commodity prices and a higher proportion of imported coal. Grid-parity has also helped the policy and regulatory regime to become more mature and commercially orientated. To attract investment into marginal areas, the traditional wind power states such as Rajasthan and Maharashtra are now offering higher tariffs commensurate with lower wind power density regions in the state, thus helping wind power development to expand into previously untapped areas.

To permit wind power plants to participate in the competitive power market, the Indian Electricity Grid Code permits a certain level of intermittency (+/- 30% of schedule) for inter-state sales. This should create demand for wind forecasting services and for real-time trading desks.

The equipment supplier market has seen a significant churn in recent years. While there are 16 active WTG manufacturing companies in India, just four of them – Suzlon, Enercon, Regen Powertech, and Gamesa – were responsible for about 90% of the total capacity added last year. New equipment is permitted subject to its passing specified testing and certification conducted by C-WET. Other suppliers include GE, Vestas, Kenersys, WindFin BV (through a JV with Shriram EPC), AMSC-WINDTECH, Wind Technik Nord (JV with Siva Windturbines), Winwind Oy among others. The total manufacturing capacity, at three-shift operation, is about 10 GW.

### Offshore wind

The offshore wind segment is at a fairly embryonic stage of development in India, and some early explorations are being conducted to assess its suitability and potential. It is understood that MNRE is working on a scheme to add 4.5 GW offshore capacity along the country's 7,500-km coastline. Tamil Nadu is installing a 100-metre wind mast in Dhanushkodi to explore the resource potential. C-WET believes that Tamil Nadu alone may have offshore potential of about 1 GW north of Rameswaram and another 1 GW south of Kanyakumari, based on some assessments undertaken by a Scottish agency. It is expected that offshore wind power experience from Denmark and the UK could further help shape this opportunity in years ahead.

### Key barriers to wind power

Wind energy is among the most mature renewable energy technologies in India, which means it has the benefit of a more tested resource data and better regulatory capture. A few barriers that exist today are reactions to its rapid growth: for example, in some states high delivery of wind power in certain parts of the year has resulted in their being backed to maintain grid stability. To address this issue, the STU is planning for high capacity transmission links to transfer surplus wind power to other parts of the country.



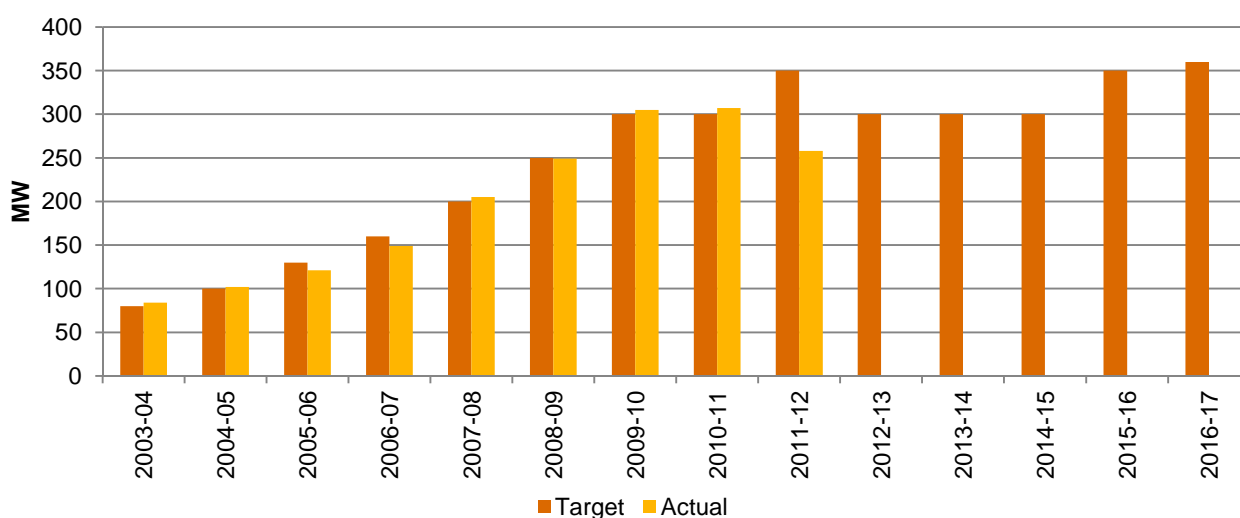
In certain other states that are less resource-rich, the regulators have not pressed hard for RPO compliance by the procuring utilities, effectively taking away the market. It is expected that the regulators will soon get stricter, and this trend has already been noted in some states that have levied penalties for a failure to procure the mandatory RPO. The REC market will also revive as the compliance becomes more rigorous and as the prevailing rules for the REC market are rationalised. In general, however, policymakers and regulators have been directionally consistent and progressive in addressing regulatory and investment

barriers, as they work towards reaching the goal of 15% renewable energy generation by 2020.

### Small hydro power

Small hydro power generation, defined as hydro projects of less than 25 MW rated capacity, is considered as renewable energy, and is popular among renewable energy investors. Small hydro projects offer a source of energy that is still reasonably affordable, use mature and well understood technology, and generally do not raise any significant resettlement and rehabilitation issues.

SHP – Yearly capacity addition



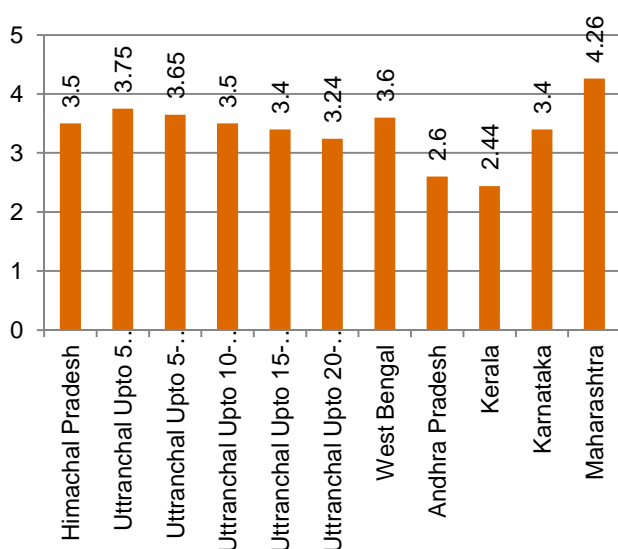
The Small Hydro Power (SHP) segment represents a relatively small proportion of the total hydro power capacity in the country. The installed capacity under large and medium hydro power projects is about 39.3 GW, while that under SHP is about 3.4 GW. Likewise, of the overall hydroelectric power potential of about 150 GW (equivalent to 84 GW at 60% load factor), the SHP potential is estimated to be about 15 GW.

However, this still represents a sizeable potential opportunity, and barely a fifth of it has been tapped. The states of Himachal Pradesh, Uttarakhand, Jammu and Kashmir, Karnakata, and Arunachal Pradesh have the bulk of small hydro capacity, although SHP sites are prevalent in almost all the states of the country. Himachal Pradesh, for example, has a small hydro potential of 2,268 MW, of which only 508 MW is developed so far.

SHP projects are relatively easier to develop, as they are largely run-of-the river with few of the deforestation or resettlement challenges that affect the larger projects. A techno-economic clearance is not required for projects up to Rs. 2.50 billion (US\$40 million) in project cost, which is within the range of most SHP projects. The MNRE extends limited seed capital to qualifying mini projects, along with support for resource assessment for small hydro sites and preparation of project reports. It also offers other facilities such as support for performance testing.

An SHP project can contract to sell power through any of the three options: firstly, to power utilities at the notified feed-in tariff; secondly, to power utilities at average pool cost while monetising the earned RECs in the market; or thirdly, direct to end consumers or traders through open access. The feed-in tariffs in various states (see chart) are set for the term of a given project, but revised rates are notified from time to time to allow new SHP projects to recover their costs (set on a normative basis) and earn a reasonable rate of return on capital

Small hydro tariffs (INR/kWh)



Hydro projects along the Himalayan region, including small hydro projects, suffer from the challenges of geology and hydrology risks that are specific to this area. The development of cascade projects and high sedimentation rates poses challenges that are now being addressed in upcoming projects. Still, small hydro projects have attracted wide private sector interest given their inherent advantages in providing a more reliable, cost effective, long-term source of supply. The prominent hydro mechanical equipment suppliers include BHEL, Boving Fouress, Jyoti Ltd, Alstom, Kirloskar, HPP Energy, Voith-Siemens. Major EPC players include BHEL, Boving Fouress, Alstom & Voith Hydro.

### Key barriers to small hydro power

Despite the wide private sector interest and active participation in the auction of new hydro sites in various states, SHP project implementation has been slower than desired. Some of this delay was to be expected, as many developers are now engaged in undertaking site assessment and geo-technical studies in order to prepare the detailed project reports. These sites are naturally on remote hilly terrain, and therefore lack access roads and require construction of roads and transmission lines to the closest pooling point. As a result they involve more time and effort to assess and develop.

Land acquisition can also be a challenge. The typical SHP project can be built on a small area, and the acquisition cost is reasonable, about 1% to 2% of the project cost, but difficulties may be faced in the procedural aspects of land acquisition. On the positive

side, the state has strong incentives to support project progress as it stands to earn a sizeable royalty, often 12% to 18% of the output or as offered by the successful bidder.

Indeed, the real challenges to SHP projects may lie elsewhere, more likely in gaining access to capital and expertise. For their size, small hydro projects are capital intensive and local project sponsors often lack the bandwidth to develop them. The experience required to develop a small hydro power portfolio is also in limited supply, especially in the private sector, as historically the policy focus has been to pursue larger hydro projects. These limitations can be addressed more readily in the future, and we see growing interest among overseas funds and strategic investors in India's hydro sector.

### Energy efficiency

One of the key components of the NAPCC's Mission is the NMEEE (National Mission for Enhanced Energy Efficiency), which – as conceived by the Bureau of Energy Efficiency – seeks to promote the policy and regulatory framework, financing, and business models to create and sustain the market for Energy Efficiency. To achieve this, the Mission has four programmes:

- Perform, Achieve and Trade (PAT) scheme: A market-based mechanism for cost-effective gains in energy efficiency in large industries through tradable certificates.
- Market Transformation for Energy Efficiency (MTEE): To encourage the move to energy-efficient appliances in defined sectors.
- Energy Efficiency Financing Platform (EEFP): To evolve models to finance demand-side management programmes in all sectors by monetising future energy savings.
- Framework for Energy Efficient Economic Development (FEEED): To develop financial instruments to promote energy efficiency.

The NMEEE has given a strong boost to efforts to improve energy efficiency in the country, as have other activities of the Bureau of Energy Efficiency (BEE), the nodal agency established to implement energy efficiency goals under the Energy Conservation Act 2001. As per its mandate, the BEE works to promote energy efficiency across public and private sectors in a wide range of areas, including power generation, buildings, equipment and appliances, and mobility.

### *PAT scheme*

The BEE announced the Energy Conservation Rules 2012 (Perform, Achieve and Trade rules) in March 2012 covering 478 'Designated Consumers' across various sectors, including power generation, cement, iron and steel, fertiliser, aluminium, paper and pulp, textile and chlor-alkali production. The energy intensity in these sectors is higher than global standards, and the objective is to use a cap-and-trade programme to recover this inefficiency. The baseline and targets are assigned in terms of Specific Energy Consumption (SEC) in Tons of Oil Equivalent per Ton of Product, and those improving on set targets earn credits that can be traded.

The PAT scheme encourages companies to take steps including investing in efficient processing technologies, improving waste heat recovery, introducing efficient motors and drives, and installing smart lighting. The Ministry of Power estimates the potential electricity savings at 183.5 GWh per annum, corresponding to 148.6 million tons of avoided CO<sub>2</sub> emissions.

### *ESCO-based markets*

Energy Service Companies (ESCOs) play a useful role in facilitating the adoption of energy efficient technologies and services, typically on performance contracting basis, with returns linked to the energy savings achieved. The model is gaining acceptance and is being adopted in government and commercial buildings, agriculture, and municipality sectors. The current market size for ESCO in India is relatively small, but growing rapidly. Earlier, the ADB estimated the market under ESCO system of performance contracts at INR 140 billion (US\$3.1 billion, 2004).

The scope for ESCOs has increased in recent years, with new projects tendered on PPP basis for purposes such as managing street-lighting provisioning for urban local bodies. Also, with consumer retail tariffs going up by 15% to 35% across various states in the past two years, the value of potential energy savings has also appreciated. There is scope for global ESCO companies to bring in new technical skills, capital, and ideas and best practices from their work elsewhere.

### *Buildings and appliances*

The energy conservation building code is a guiding tool for developers. The opportunities today lie in improving standards through the ESCO route, and in providing energy-efficient building materials for walls, doors, floor and roofs, natural lighting, ventilation, and design of structures.

In the appliances segment, India has initiated a robust Standards and Labelling programme for most categories of household appliances including refrigerators, fans and air conditioners, and inverters. In order to sustain the gains to date and gradually improve standards, these initiatives will need to be continued in the future, through initiatives such as raising awareness and setting up more testing facilities, and continued improvements in standards and monitoring.

### *Key barriers to energy efficiency*

The main barriers to energy efficiency include a lack of familiarity with energy efficiency opportunities and the historically lower value of savings – although this is now changing rapidly, with significantly higher retail tariffs reflecting the higher costs of primary energy and removal of some cross-subsidies. Even knowledgeable buyers may be stymied by their organisational processes, as the typical procedures for capital budgeting or investment appraisal are not suited to reflect these savings. Furthermore, the focus has often been on seeking energy efficiency interventions with shorter pay-back periods. Given the nature of their business, ESCOs have found it hard to arrange financing for their capital and operational requirements.



## Summary – Clean energy in India

The clean energy sector in India has come a long way, from its origins as a mainly policy and incentive-driven industry to a broader market-orientated approach with robust private sector participation. The investment climate and business outlook in clean technology sectors remain attractive and healthy – in stark contrast to the challenges faced today by the fossil fuel-based generators – resulting in the industry attracting considerable attention from investors and funds. Significantly, the share of renewable energy capacity has increased from about 0.5% in 1992 to 12.3% in 2012.

The scope for future growth is robust, and is driven by multiple factors including government policy (with respect both to climate change and concerns over energy security), energy shortages, and the achievement of grid parity on marginal cost basis for most of the renewable technologies. There is also a natural cost advantage, as resource factors in India are closer to the load centres, the resource potential is reasonably reliable, and the development costs are lower. The market is also growing with wider RPO coverage, and smart investors are capturing early-stage sites to enhance value recovery.

The market needs to grow at least three-fold to meet the 15% RPO target set by 2020. In the medium-term (2012-17), the current renewable capacity of 25 GW (excluding large hydro) is expected to grow by a further 23.5 GW.

The prospects appear evenly good across all the asset classes. The wind power segment is being encouraged by the recognition of a much larger resource potential. Hydro power has seen strong private sector entry, ranging from EPC firms to large energy users seeking to hedge against fuel inflation. Solar projects have attracted wide interest from multilateral and bilateral institutions, export credit agencies and individual corporate investors.

A significant challenge is to ensure the supply of equipment, technology, and capital to meet this demand. The private sector players that dominate this space are now looking to enhance their bandwidth by attracting new overseas suppliers, partners, and investors.



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