

## **ELECTRONICS INDUSTRY IN INDIA**

## 1. INDUSTRY OVERVIEW

### 1.1 Historical Developments

The Electronics Industry in India took off around 1965 with an orientation towards space and defence technologies. This was rigidly controlled and initiated by the government. This was followed by developments in consumer electronics mainly with transistor radios, Black & White TV, Calculators and other audio products. Colour Televisions soon followed. In 1982-a significant year in the history of television in India - the government allowed thousands of colour TV sets to be imported into the country to coincide with the broadcast of Asian Games in New Delhi. 1985 saw the advent of Computers and Telephone exchanges, which were succeeded by Digital Exchanges in 1988. The period between 1984 and 1990 was the golden period for electronics during which the industry witnessed continuous and rapid growth.

From 1991 onwards, there was first an economic crises triggered by the Gulf War which was followed by political and economic uncertainties within the country. Pressure on the electronics industry remained though growth and developments have continued with digitalisation in all sectors, and more recently the trend towards convergence of technologies. After the software boom in mid 1990s India's focus shifted to software. While the hardware sector was treated with indifference by successive governments. Moreover the steep fall in custom tariffs made the hardware sector suddenly vulnerable to international competition. In 1997 the ITA agreement was signed at the WTO where India committed itself to total elimination of all customs duties on IT hardware by 2005. In the subsequent years, a number of companies turned sick and had to be closed down. At the same time companies like Moser Baer, Samtel Colour, Celetronix etc. have made a mark globally.

### 1.2 Current Scenario

In recent years the electronic industry is growing at a brisk pace. It is currently worth US\$ 32 Billion and according to industry estimates it has the potential to reach US\$ 150 billion by 2010. The largest segment is the consumer electronics segment. While is largest export segment is of components.

The electronic industry in India constitutes just 0.7 per cent of the global electronic industry. Hence it is miniscule by international comparison. However the demand in the Indian market is growing rapidly and investments are flowing in to augment manufacturing capacity.

The output of the Electronic Hardware Industry in India is worth US\$11.6 Billion at present. India is also an exporter of a vast range of electronic components and products for the following segments

- Display technologies
- Entertainment electronics
- Optical Storage devices
- Passive components
- Electromechanical components

- Telecom equipment
- Transmission & Signaling equipment
- Semiconductor designing
- Electronic Manufacturing Services (EMS)

This growth has attracted global players to India and leaders like Solectron, Flextronics, Jabil, Nokia, Elcoteq and many more have made large investments to access the Indian market. In consumer electronics Korean companies such as LG and Samsung have made commitments by establishing large manufacturing facilities and now enjoy a significant share in the growing market for products such as Televisions, CD/DVD Players, Audio equipment and other entertainment products.

The growth in telecom products demand has been breathtaking and India is adding 2 million mobile phone users every month! With telecom penetration of around 10 per cent, this growth is expected to continue at least over the next decade. Penetration levels in other high growth products are equally high and growth in demand for Computer/ IT products, auto electronics, medical, industrial, as well as consumer electronics is equally brisk. Combined with low penetration levels and the Indian economy growing at an impressive 7 per cent per annum, the projection of a US\$150 Billion+ market is quite realistic and offers an excellent opportunity to electronics players worldwide.

### 1.3 Electronic Manufacturing Services

India is well-known for its software prowess. But on the hardware front, the progress is rather slow. However, the country has been making gains in this sector also. Already, 50 Electronics Manufacturing Services (EMS)/Original Design Manufacturers (ODMs) providers are operating in India, ranging from global players including Flextronics and Solectron to indigenous firms including Deltron, TVS Electronics and Sahasra. Further moves by international players are expected to add production in India in the coming years.

India's contract-manufacturing business is expected to nearly triple in revenue over the next five years, a development that will present both opportunities and potential pitfalls for the worldwide electronics supply chain. Revenue generated by Electronics Manufacturing Services (EMS) providers and Original Design Manufacturers (ODMs) in India will expand to \$2.03 billion in 2009, rising at a CAGR of 21 per cent from \$774 million in 2004. Indian EMS/ODM revenue grew by 20.8 per cent to reach \$935 million in 2005.

Obvious allure of locating electronics production in India is the nation's low labor costs. Labor costs for conducting electronics manufacturing in India are between 30 to 40 per cent less than in the United States or in Western Europe. Other equally important benefits from operating in India include a fast-growing domestic market, an excellent education system, the nation's technology parks and the recent improvements in the country's transit and utility infrastructure.

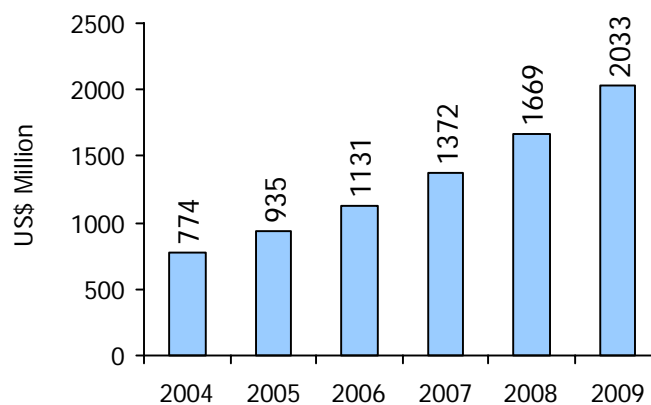
However, the Indian contract-manufacturing industry is not expected to pose a significant threat to China's position as the epicenter of electronics manufacturing in the short term. India's contract manufacturing activities primarily serve the nation's indigenous demand.

OEMs primarily outsource manufacturing to cater to the Indian domestic market, although export of Indian-assembled electronic goods does occur. In the longer term, i.e. 2009 onward, it is predicted that India may compete with the Chinese providers in select products as the nation's share of the global electronics market increases.

For OEMs, using contract manufacturing services in India can help them penetrate the local market. However, OEMs face specific risks associated with using contract manufacturers in India. Fluid exchange rates combined with volatile oil and component prices lead to unpredictable costs. Changing government policies along with shifting government regimes also contribute to an unpredictable political environment. Doing business in India is often disjointed, with an inefficient bureaucratic system that causes frequent delays. However, for OEMs able to manage these risks, the opportunity in India is significant.

The semiconductor fabrication segment has a small existing base in India with only two fabrication units, which both are developing chips for the defense and strategic sectors. However, semiconductor suppliers are expanding their manufacturing activities in India to serve the growing contract-manufacturing industry in the nation. As evidence of this trend, groundbreaking commenced on a 200 mm fabrication unit in Hyderabad operated by Nano-Tech Silicon India Ltd.

#### Electronic Contract Manufacturing Revenue



Source: *Electronic Industries Association of India*

Recent trends show that an increasing number of engineering and design activities are also being outsourced to EMS companies and they are becoming ODMs (Original Design manufacturers) and also provide final system integration and logistical support

E&Y have projected that India can target a share of 1 per cent in North America, 2 per cent in Western Europe, 4 per cent of Asia and 5 per cent of Rest of the World of the Electronics Manufacturing Services market. Thus India can target 2.2 per cent of the world-wide electronics EMS market of US\$497 Billion by 2010 which works out to a potential of US\$11 Billion.

The recent acceleration in EMS activity is mainly due to rapid growth in the electronic Hardware market in all segments particularly rapid growth has taken place in Telecom Infrastructure Equipment, computers, Consumer & Hand held devices.

<b>Top Ten EMS Companies</b>		
<b>Company</b>	<b>Revenue (US\$ Million)</b>	<b>Market share (%)</b>
SCI system	5,367	17.4
Solectron	2,934	9.5
Celestica	2,600	8.5
Jabil Circuit	833	2.7
Avex Electronics	717	2.3
Nm Steel	680	2.2
Venture Manufacturing	569	1.9
Manufacturers Services Ltd.	475	1.5
Flextronics International	463	1.5
Bull Electronics	425	1.3
<b>Total Top Ten</b>	<b>15,063</b>	<b>49.0</b>

## 1.4 The Growth Drivers

Behind the impressive growth of the electronics industry is the robust and consistent growth in Electronic Hardware market of approximately 25 per cent due to a stable economy & large middle class of 350 million people. The fastest growing segments are demand for telecom services particularly cell phones, internet subscribers & growth in demand for it products with increasing penetration of computers, falling prices & Government support to rapidly encourage usage of IT in all sectors. Within next 5 years penetration of telephone users (both landline & mobile) is projected to increase from 100 to 500 per thousand while PC's increase from 10 to 30 per thousand. Some of the other factors are

- Highly talented workforce, especially for design and engineering services with good communication skills.
- Rising labor costs in China.
- Presence of global Electronics Manufacturing Services (EMS) majors in India and their plans for increased investments in India.
- More outsourcing of manufacturing by both Indian and global Original Equipment Manufacturers

## 1.5 Production Trend of Different Segments

### 1.5.1 Consumer Electronics

Consumer electronics (durables) sector continues to be the main stay of the Indian electronic industry contributing about 32 per cent of the total electronic hardware production. By the end of 2005-06, the market for consumer durables (including entertainment electronics, communitarian and IT products) was Rs 180 billion (US \$4.5 billion). The market is expected to grow at 10 to 12 per cent annually and is expected to reach Rs 60 billion (US\$13.3 billion) by 2008. The urban consumer durables market is growing at an annual rate

of seven to 10 per cent, the rural durables market is growing at 25 per cent annually. Some high-growth categories within this segment include mobile phones, TVs and music systems.

### ***1.5.2 Computer Industry***

With sound macroeconomic condition and buoyant buying sentiment in the market, PC sales touched 6.5 million units during 2006-07. The high growth in PC sales is attributed to increased consumption by Industry verticals such as Telecom, Banking and Financial Services, Manufacturing, Education, Retail and BPO/IT-enabled services as well as major e-Governance initiatives of the Central and State Governments. Significant consumption in the small and medium enterprises and increased PC purchase in smaller towns and cities was witnessed during the year. It is expected that increased Government focus on pan-India deployment of broadband at one of the lowest costs in the world will soon lead to accelerated PC consumption in the home market.

The growing domestic IT market has now given impetus to manufacturing in India. The year witnessed not only capacity expansion by the existing players, but also newer investments in hardware manufacturing. India is also high on the agenda of electronics manufacturing services companies.

### ***1.5.3 Control, Instrumentation and Industrial Sector***

This is now a matured industry sector in the country at least as far as various application segments is concerned. State-of-art and reliable SCADA, PLC/Data Acquisition systems are being applied across various sections of the process industry. Latest AC drive systems from smaller to very high power levels also find application in large engineering industries like steel plants and/or metal industries. World class UPS systems are being manufactured in the country to cater to the need of the emerging digital economy. However, it appears there is really no manufacturing base in the country for the whole range of the latest test and measuring instruments which are invariably procured from outside. A good number of Indian companies in the control and instrumentation sector are able to acquire orders for export systems through international competitive bidding.

However, the creation of knowledge base in the country through industrial R&D in this critical sector has not been improving as desired. There is still lack of needed R&D activities by the industry looking at the global market. On the part of Department of Information Technology some of the latest technology development and applications in this area include Intelligent SCADA Systems for monitoring and control of Mini Hydel plants, Advanced Traffic Control System for urban transportation, Intelligent Power Controllers for improvement of quality of electric power, etc. These systems have been successfully developed and applied in real field conditions.

### ***1.5.4 Communication & Broadcasting Sector***

The telecommunication industry has gained tremendous recognition as the key driver for all round development and growth. With about 256 million telephone subscribers (as on

February, 2007) India has emerged as one of the largest in the world and second largest in Asia.

The share of private sector in telecom industry has increased to more than 57 per cent and the contribution of mobile telephony has gone upto 63 per cent on December, 2007. Buoyed by the better-than-expected teledensity in 2005 (11.4 per cent against 8.6 per cent in 2004) due to the mobile boom in India, Department of Telecommunications (DoT) has revised the upwards the target of 22 per cent teledensity by 2007.

Broadband connectivity is holding tremendous potential in the country. It is expected that the number of broadband subscribers would reach 20 million by 2010.

India has emerged as the second largest market for mobile handsets. Following the unprecedented growth in the mobile market, a number of companies are planning to set up production base for mobile hand sets in the country for meeting local as well as export markets.

Direct to Home (DTH) broadcast service has gained more and more popularity during 2005. DTH service is available through National Broadcaster and private DTH service provider. Better quality digital broadcast reception is now available almost everywhere in the country to the common people on their TV sets through the use of small dish antenna and a Set-Top Box (STB).

### ***1.5.5 Strategic Electronics***

Though the government has started the process of getting private sector involved in the production of strategic electronics equipments, the private involvement is at its nascent stage. The estimated market for strategic electronics in India during 2005-06 was Rs.32 billion and 95 per cent of this was done by the public sector unit Bharat Electronics Limited (BEL).

### ***1.5.6 Electronic Components***

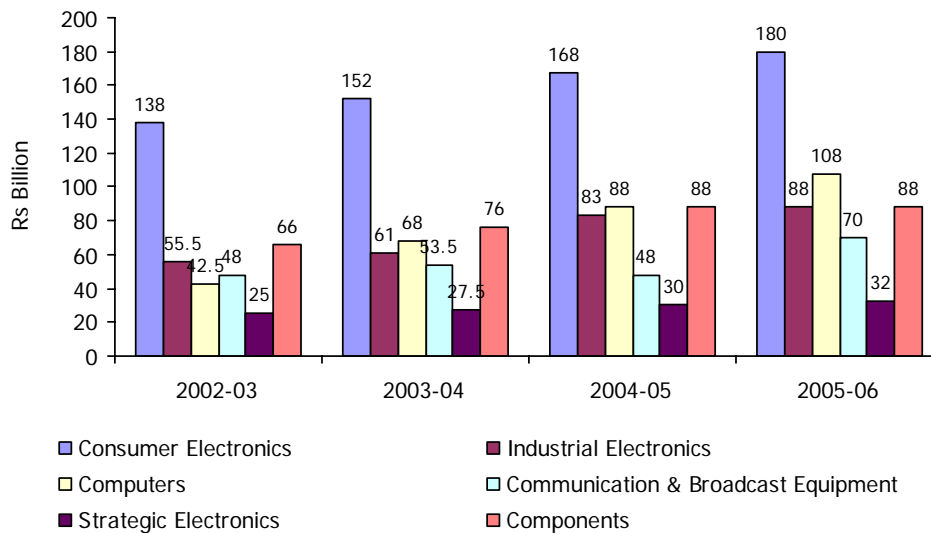
The total production of components was estimated at Rs. 88 billion during 2005-06. The colour picture tube production is likely to be around 11 million, a decline from 11.2 million in the last year. The production of B&W picture tubes declined further due to decreased market for B&W TVs.

The components with major share in the export are CD-R, CPTs, PCBs, DVD-R, connectors, semiconductor devices, ferrites, resistors, etc.

Significant developments took place during the year in the area of colour picture tubes and colour glass parts. Another CPT manufacturer successfully launched manufacture of pure flat tubes, leading to availability of flat tubes from three indigenous sources. The CPT units continued expansion of capacities to improve further their global competitiveness. Two more lines were commissioned during the year, one for manufacture of large size flat colour

picture tubes and the second for small size. Two more lines are likely to come up next year. Keeping pace with the downward trend in prices of color TVs, the prices of CPT's also fell.

### Production Trend of Different Segments



Source: ELCINA Directory of Indian Electronics Industry, 2006-07

One of the CPT manufacturers successfully developed a prototype of the 42 Plasma Display Panel. This marked a major achievement of a milestone in the area of developing from green field a Technology development initiative in a Hi Tech area. The focus of development was in optimizing the Plasma Display Cell design to achieve the desired parameters of Contrast and Brightness, achieving high speed response times and parallelly designing the Scan and sustain driver boards to match the Panel parameters. A fully functional video Controller was also designed and developed to match the Logic Circuits of the PDP Panel. In the year 2006, the company plans to begin selling commercially the PDP Panels developed completely in-house and the focus there on will be to create low cost products through Technological breakthroughs.

The color glass parts manufacturer implemented major expansion of its capacity to meet increased local requirement due to substantial growth in CPT production. The unit also started manufacture of glass parts for pure flat tubes as the demand for such tubes increased due to one more unit launching production during the year. Both the existing manufacturers of B/W glass parts continued the production of colour funnels in their existing lines. They were also planning to make large investment to set up manufacturing facilities for colour panels in near future.

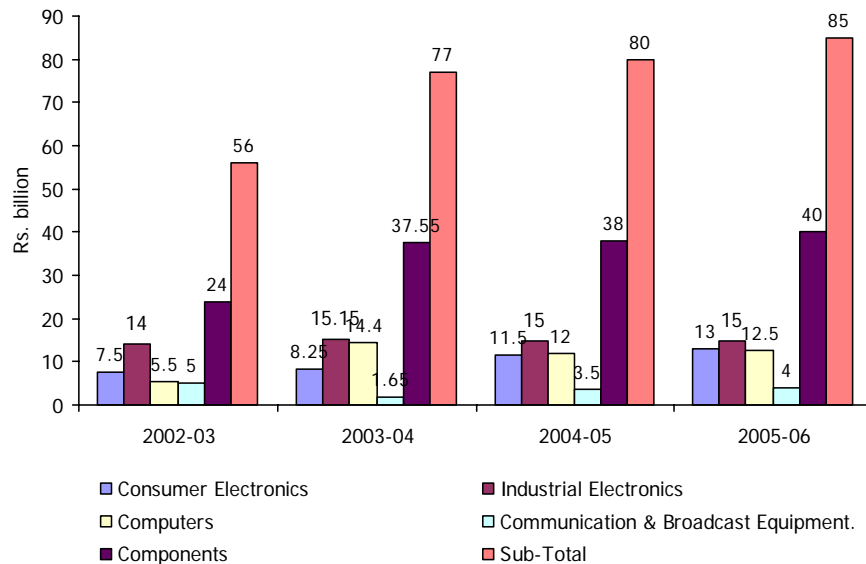
A number of existing units imported capital goods under various schemes for expansion of their capacities in PCBs, connectors, cable assemblies, colour picture tubes, compact disc, glass parts for colour picture tubes, etc.

The serviceable market for professional grade components such as PCBs, semiconductor devices, connectors, wound components, antennas, etc., is likely to go up due to launch of manufacture of mobile handsets in the country.

### Electronics Exports

During the year 2005-06, electronics and IT exports are estimated to be Rs. 1,117 billion, as compared to Rs. 881.80 billion in 2004-05, showing a phenomenal growth of 27 per cent. The software and services industry continues to show a robust growth and the total value of software and services export are estimated at Rs. 1032 billion (US\$ 23.4 billion) in the year 2005-06, as compared to Rs. 801.80 billion (US\$ 17.7 billion) in the year 2004-05, an increase of 32 per cent in dollar terms and 29 per cent in rupee terms.

**India's Growing Electronics Export**



Source: ELCINA Directory of Indian Electronics Industry, 2006-07

## 2. MAJOR PLAYERS

### 2.1 *Solectron*

Solectron Centum Electronics Limited is the leading Indian company offering state of art solutions for Frequency Control Products (FCP), Electronic Manufacturing Service (EMS) and Hybrid Micro Circuits (HMC). Solectron has a manufacturing unit and design centre in Bangalore and a post manufacturing centre in Mumbai. The EMS operation focuses primarily on the domestic market. For the year 2005 the revenue was US\$ 10 million with a net profit of US\$ 2 million.

### 2.2 *Flextronics*

Flextronics entered India in 2001 when it purchased a Motorola facility. Flextronics maintains a Bangalore facility with 18,000 sq ft and 297 employees. The products manufactured are engine management Ccrd, TV tuners, set top box, energy meters, cellular phone, networking cards and WLL wall sets.

### 2.3 *Jabil Circuits*

Jabil Circuit operates a 51,000 sq. ft. plant in Pimpri, which the provider took over from Philips in 2002. The Pimpri plant manufactures TV analog monitor cards and certain audio products for Philips. All production today is for the Indian market. In December 2004, **Jabil Circuit** opened a 175,000-square-foot facility in Ranjangaon that offers printed circuit board assembly, enclosure integration, and distribution and repair services, along with in-region design service support. The site serves the consumer, instrumentation, networking, peripherals and telecommunications industries.

### 2.4 *Samtel Group*

The Samtel group is the largest Indian integrated manufacturer of a wide range of display devices like Colour and B&W TV picture tubes, tubes for avionics, medical and industrial applications, CRT glass, electron guns, heaters and cathodes, deflection yokes and engineering services. Samtel has registered many patents for developments in video display technology. It is an ISO 9000, UL and ISO 14000 certified company. Samtel has acquired a facility in Germany to manufacture high tech, high resolution CRTs for demanding applications such as aircraft avionics, medical monitors and a variety of industrial applications through a continuous focus on R&D.

Another major player and exporter in this segment is Hotline Group which manufactures B/W and Colour Picture Tubes.

### 2.5 *Moser Baer India Ltd.*

In the Optical Storage Device segment, Moser Baer India Ltd., is today the world's third-largest optical CD maker in an industry dominated by Japan and Taiwan. MBIL supplies to a

number of branded players like Sony, Verbatim, TDK, Maxell, Imation, Samsung etc, and has collaborative R&D programs as well as reciprocal training programs with these world class companies.

## **2.6 *Hical Magnetics***

India has several world class companies manufacturing electromechanical and wound components. These include MNCs as well as Indian companies such as Hical Magnetics, a QS9000 company, which designs and manufactures professional grade transformers. Hical also offers world class design services for the state-of-the art power converters and qualification services for both power converters and magnetics. Hical has also established a subsidiary in USA with focus on giving Design, Engineering and Sales support to their North American customers.

## **2.7 *Tyco Electronics***

Tyco Electronics, an MNC, with a modern facility in Bangalore specialises in high grade connectors such as fibre optic interconnection systems and smart card connectors.

## **2.8 *Midas Communications***

Another example is the development of CorDect technology, India's very own Wireless Local Loop technology, jointly developed by Midas Communication Technologies, TeNeT group, IIT Madras and US based Analog Devices Inc. Based on the Digital Enhanced Cordless Telecommunications standard specified by the European Telecommunications Standards Institute (ETSI), CorDect provides cost-effective, simultaneous high-quality voice and data connectivity in both urban and rural areas.

## **2.9 *Elin Electronics Ltd***

A major player and pioneer in the Entertainment electronics segment is Elin Electronics Ltd, manufacturing Tape Deck and CD Mechanisms. The company also manufactures AC & DC Micro Motors for OEM's and provides Contract Manufacturing Services.

## **2.10 *Cadence Design***

Electronic Chip Design is another growth area for the electronics industry, which can provide support for growth of manufacturing as well as greater value addition. World leaders such as Cadence have set up shop in India and more and more companies are relocating design centres due to technical skills available here.

### **3. REGULATORY ENVIRONMENT**

#### **3.1 Implementation of ITA-I under WTO**

India has been successfully promoting reforms in all the constituents of the Internet, Communication and Entertainment sector. Being a signatory to the Information Technology Agreement (ITA-I) of the World Trade Organization and with effect from March 1, 2005 the customs duty on all the specified 217 items has been eliminated.

Industrial Licensing has been virtually abolished in the Electronics and Information Technology sector except for manufacturing electronic aerospace and defence equipment.

There is no reservation for public sector enterprises in the Electronics and Information Technology industry and private sector investment is welcome in every area.

Electronics and Information Technology industry can be set up anywhere in the country, subject to clearance from the authorities responsible for control of environmental pollution and local zoning and land use regulations.

#### **3.2 Foreign Investment Policy**

A foreign company can start operations in India by registration of its company under the Indian Companies Act 1956. Foreign equity in such Indian companies can be up to 100 per cent. At the time of registration it is necessary to have project details, local partner (if any), structure of the company, its management structure and shareholding pattern. Registration is a kind of formality and it takes about two weeks. It can forge strategic tie up with an Indian partner.

A joint venture entails the advantages of established contracts, financial support and distribution-marketing network of the Indian partner. Approval of foreign investments is through either automatic route or Government approval.

Foreign technology induction is encouraged both through FDI and through foreign technology collaboration agreement. Foreign Direct Investment and Foreign technology collaboration agreements can be approved either through the automatic route under powers delegated to the Reserve Bank of India (RBI) or otherwise by the Government.

#### **3.3 Foreign Trade Policy**

In general, all Electronics and IT products are freely importable, with the exception of some defence related items. All Electronics and IT products, in general, are freely exportable, with the exception of a small negative list which includes items such as high power microwave tubes, high end super computer and data processing security equipment.

Export Promotion Capital Goods scheme (EPCG) allows import of capital goods on payment of 5 per cent customs duty. The export obligation under EPCG Scheme can also be

fulfilled by the supply of Information Technology Agreement (ITA-1) items to the DTA provided the realization is in free foreign exchange.

The import of second hand computers including personal computers and laptops are restricted for imports.

### **3.4 SEZ Scheme**

Special Economic Zone (SEZ) is a specifically delineated duty free enclave and shall be deemed to be foreign territory for the purposes of trade operations and duties and tariffs. SEZ unit may import/procure from the DTA without payment of duty all types of goods and services, including capital goods, whether new or second hand, required by it for its activities or in connection therewith, provided they are not prohibited items of imports.

The units shall also be permitted to import goods required for the approved activity, including capital goods, free of cost or on loan from clients. SEZ unit may, on the basis of a firm contract between the parties, source the capital goods from a domestic/foreign leasing company. SEZ unit shall be a positive Net Foreign Exchange earner. Net Foreign Exchange Earning (NFE) shall be calculated cumulatively for a period of five years from the commencement of production.

As per the “Special Economic Zones Rules, 2006”, notified by the Department of Commerce, in case a SEZ is proposed to be set up exclusively for electronics hardware and software, including information technology enabled services, the area shall be ten hectares or more with a minimum built up processing area of 1,00,000 square meters.

### **3.5 Export Oriented Units**

Special schemes are available for setting up Export Oriented Units for the Electronics/IT Sector. Various incentives and concessions are available under these schemes. The schemes are:

- Export Oriented Unit (EOU) Scheme
- Electronics Hardware Technology Park (EHTP) Scheme
- Software Technology Park (STP) Scheme
- EOU/EHTP/STP Schemes

Units undertaking to export their entire production of goods and services, except permissible sales in the Domestic Tariff Area (DTA), may be set up under the EOU, EHTP or STP Scheme for manufacture of goods, including repair, re-making, re-conditioning, re-engineering and rendering of services. Trading units, however, are not covered under these schemes.

100 per cent Foreign Direct Investment is permitted through automatic route for the units set up under these schemes. These units may import and/or procure from the DTA or bonded warehouses in DTA, without payment of duty, all types of goods, including capital goods, required for its activities, provided they are not prohibited items of import in the

IITC(HS). The units shall also be permitted to import goods including capital goods required for the approved activity, free of cost or on loan/lease from clients.

An unit under any of these schemes may, on the basis of a firm contract between the parties, source the capital goods from a domestic/foreign leasing company without payment of customs/excise duty. This unit shall be a positive net foreign exchange earner. Net Foreign Exchange Earnings (NFE) shall be calculated cumulatively in blocks of five years, starting from the commencement of production.

Supplies of Information Technology Agreement (ITA-1) items and notified zero duty telecom/electronic items effected from EOU/EHTP/STP units to DTA will be counted for the purpose of fulfillment of positive NFE.

The Software Technology Parks of India (STPI) scheme has played a pivotal role in catalyzing the growth of this sector and supporting its rapid proliferation across the country. The tax holiday has helped attract much needed investments (MNC and Indian) in the sector and the virtual model has allowed firms to avail benefits without constraints on their choice of location – encouraging entrepreneurship and integrated growth.

Although the existing term of the STPI scheme is nearing its end (in 2009) the Government intends to continue the benefits offered, by introducing similar provisions in the Special Economic Zones (SEZ) policy – and further relaxing the minimum area requirements (to qualify for an SEZ status), for the IT-BPO sector..

## 4. CHALLENGES AND OPPORTUNITIES

### 4.1 Challenges

Major challenges facing the Indian electronic manufacturing market are an infrastructure that needs to be improved at the earliest possibility, easing of foreign investment procedures, which is underway, and a restructured government tariff that now makes domestically manufactured goods more expensive than imported goods with zero tariff.

There are also other problems, which are hampering the growth of the Indian electronics industry. Some of them are:

- Lack of World-class infrastructure.
- Lack of clear-cut government policy for the industry.
- Very little expenditure in Research and Development area.
- Power of Marketing not harnessed to the maximum

### 4.2 Opportunities

While the Electronics sector in India is currently small, there are several advantages that India offers that can be effectively leveraged to achieve higher growth. These can be categorised under three heads:

- Manpower
- Market Demand
- Policy and Regulatory Support

#### 4.2.1 *Abundant Availability of Man Power*

India produces over 500 PhDs, 200,000 engineers, 300,000 non-engineering postgraduates and 2,100,000 other graduates each year. The Indian Institute of Technology (IITs) and The Indian Institute of Management (IIMs) produce graduates and post graduates with best-in-class skills and capabilities in technical and management fields. India's capabilities in IT and engineering make it an attractive location for sourcing engineering services such as Research & Development (R&D) and design.

#### 4.2.2 *Competitive Labour Costs*

India's cost of skilled labour is among the lowest in the world. For example, average labour rate per employee in the electronics sector is about \$3,000 per year. Labour cost as a percentage of value added is only 21 per cent in India as compared to 23 per cent in China and 30 per cent in Taiwan. Taking advantage of this many MNCs have set up manufacturing bases in India for domestic consumption as well as exports.

Many multinational companies in the electronics sector have leveraged India's manpower advantage to grow in the domestic market, as well as source products and services from India. Examples include:

#### 4.2.2.1 *Kodak*

Kodak has a camera manufacturing and assembly plant near Bangalore, which produces over four million units per year. Around 60 -70 per cent of this centre's products are exported to the US, Europe, West Asia and the Far East in 2003.

#### 4.2.2.2 *Siemens*

Production cost arbitrage has prompted the company to increase production and hence exports from the Goa factory. Siemens Goa plant is used as a manufacturing hub for catering to the international market. The Goa factory will become the hub for manufacturing X-ray tubes as it can save 30 per cent of the cost.

#### 4.2.2.3 *Motorola*

Motorola's Global Telecom Solutions Sector (GTSS) designs, develops, manufactures and supplies infrastructure equipment for wireless communications systems worldwide. GTSS India operates a "Centre of Excellence" for providing network services for customers in India as well as in the Asia Pacific Region. Motorola India Electronics Ltd. develops software for Motorola's worldwide businesses.

Motorola Global Software Group (GSG), the R&D arm is involved in all the major developments of the company. Motorola India's operations are established as a source of software and chip design and as a source of excellent capital for Motorola globally. Motorola's two chip designing units around Delhi and a third one in Hyderabad are 100 per cent export units meeting the company's global requirements.

#### 4.2.2.4 *Electrolux*

Electrolux has set up its R&D centre with an investment of US\$ 8.6 million. It is the headquarters of its South Asian Association for Regional Cooperation (SAARC) countries, excluding Sri Lanka. This centre will be the regional hub for developing new technologies and products.

#### 4.2.2.5 *Samsung*

Samsung invested US\$ 11 million in setting up an R&D centre in India. Samsung R&D Centre at Noida helps the company customise its CTV range as per the preference of Indian customers.

### **4.2.3 *Favourable Demand Conditions For Growth***

India has been experiencing a strong growth in the demand of consumer products and durables in recent years, driven by consumer demographic trends. This has facilitated growth in the electronics sector both directly and indirectly.

Some of the key trends that have a positive impact on the sector are:

- Growing consuming class (defined as people having annual income of US\$ 980 (INR 45000 or above) that has greater disposable income and propensity to spend. It has been estimated by NCAER that this group will constitute over 80 per cent of the population of India by 2009-10
- Lifestyle changes such as greater exposure to global trends and increasing affinity for convenience and lifestyle products
- Increasing urbanisation, emergence of nuclear double income families
- Low penetration levels of most consumer durables. For example, in 2002, only 66 per cent of middle-income households had a TV set, only 28 per cent of the urban households possessed a refrigerator, while just a little over 15 per cent owned an air cooler. Despite a population of more than 1 billion people, only 16 million computers were used in India in March 2005.
- Increased government and private industry spending on sectors such as defence and aerospace. The Indian aviation sector, for example, has placed orders for more than 350 aircrafts with a list price of about US\$ 26 billion.
- In recognition of India's domestic market potential, Samsung has selected India as one of the top six strategic markets in the world along with the US, China, Russia, Germany and Thailand.

Growth in demand of consumer durables such as CTVs, VCD / MP3 players and PCs directly benefits the sector. Also the demand for products such as automobiles, white goods, air-conditioners, textiles, etc, leads to growth in the electronics sector as these products contain a significant number of electronic components. At the same time, consumer demand has boosted growth in India's overall manufacturing sector as well, which, in turn, has a positive impact on industrial electronics.

On the whole the domestic market in India is very attractive from the point of view of the electronics sector, and current trends indicate high growth potential for the sector in the future.