

# I. AN OVERVIEW

## 1. INTRODUCTION

The Department of Scientific and Industrial Research (DSIR) is a part of the Ministry of Science and Technology, which was set up through a Presidential Notification, dated January 4, 1985 (74/2/1/8 Cab.). The mandate of DSIR includes indigenous technology promotion, development, utilization and transfer. Shri Kapil Sibal is the Union Minister for Ministry of Science & Technology and Ocean Development.

The Allocation of Business for the Department is as follows:

- All matters concerning the Council of Scientific & Industrial Research
- All matters relating to National Research Development Corporation (NRDC)
- All matters relating to Central Electronics Limited (CEL)
- Registration & recognition of R&D units
- Technical matters relating to UNCTAD & WIPO
- National Register for Foreign Collaborations
- Matters relating to creation of a pool for temporary placement of Indian scientists & technologists.

The primary endeavour of DSIR is to promote R&D by the industries, support a larger cross-section of small & medium industrial units to develop state-of-the art globally competitive technologies of high commercial potential, catalyze faster commercialization of lab-scale R&D, enhance the share of technology intensive exports in overall exports, strengthen industrial consultancy &

technology management capabilities and establish user friendly information network to facilitate scientific and industrial research in the country. It also provides a link between scientific laboratories and industrial establishments for transfer of technologies through National Research Development Corporation (NRDC) and facilitates technology development in select areas through Central Electronics Limited (CEL).

The above objectives are sought to be achieved through the following during the Tenth Plan:

- a) Technology Promotion, Development and Utilization (TPDU) Programmes
- b) Council of Scientific & Industrial Research (CSIR)
- c) Consultancy Development Centre (CDC)
- d) National Research Development Corporation (NRDC)
- e) Central Electronics Limited (CEL)

## 2. TECHNOLOGY PROMOTION, DEVELOPMENT AND UTILIZATION PROGRAMMES

The scheme “Technology Promotion, Development and Utilization (TPDU) Programmes” has been formulated by merging following *Ninth Plan* schemes as per the recommendation of the Planning Commission under zero based budgeting exercise.

- *Research & Development by Industry (RDI)*
- *Programme Aimed at Technological Self-Reliance (PATSER)*

- *Scheme to Enhance the Efficacy of Transfer of Technology (SEETOT)*
- *APCTT*

Programmes and activities under the scheme are centered on promoting industrial R&D, development and commercialization of technologies, acquisition, management and export of technologies, promotion of consultancy capabilities, etc. The specific components of the TPDU programme are:

- Industrial R&D Promotion Programme
- Technology Development and Innovation Programme
- Technology Management Programme
- International Technology Transfer Programme
- International Cooperation Programme
- Consultancy Promotion Programme
- Technology Information Facilitation Programme
- Gender Budget Cell
- Publicity and Promotion
- Information Technology & e-Governance

## 2.1 Major Achievements

### *Industrial R&D Promotion Programme*

DSIR is the nodal Department for granting recognition to in-house Research and Development centres of industry. As on 31<sup>st</sup> December 2005, there were 1205 in-house R&D centres with valid DSIR recognition. Of these centres, 128 in-house R&D centres incurred an annual expenditure of over Rs. 5 crores each and 271 in-house R&D centres incurred an annual expenditure in the range of Rs. 1 crore to Rs. 5 crores. During the year 2005, 66 in-house R&D centres were accorded fresh recognition and 261 in-house R&D units were accorded renewal of recognition.

During the year 2005, 19<sup>th</sup> National Conference on in-house R&D in industry was organised; DSIR National Awards were presented to 11 industrial units. A publication on “Outstanding in-house R&D Achievements (2005)” and 4 issues of “In-house R&D in Industry Update” were brought out. Scientific research foundations in the areas of medical, agriculture, natural & applied sciences and social sciences seek DSIR approval as Scientific and Industrial Research Organisations (SIRO) under the DSIR scheme of granting recognition to SIROs. The approved SIROs are eligible for availing customs duty exemption on imports and central excise duty exemption on indigenous purchase of essential scientific & technical instruments, apparatus, equipment (including computers), accessories, spare parts thereof and consumables, required for research and development activities.

During the year 2005, 29 new SIROs have been accorded DSIR recognition. 3 certificates for accelerated depreciation allowance on plant & machinery set-up based on indigenous technology, involving an investment of Rs. 3058.05 lakhs; 540 essentiality certificates for claiming customs duty exemptions on imports, amounting to Rs. 3700 lakhs and 99 essentiality certificates for claiming central excise duty exemptions on indigenous purchases, amounting to Rs. 283 lakhs were issued by DSIR.

DSIR is the nodal Department for registration of public funded research institutions, universities, IITs, IISc., RECs/NITs, for availing customs duty exemption and central excise duty exemptions under notifications 51/96-Customs and 10/97-Central Excise. During the year 2005, 9 such institutions were registered with DSIR; and 180 institutions were granted renewal of registration.

Secretary, DSIR, who is designated as the Prescribed Authority under section 35(2AB) of Income-tax Act, 1961, approved in-house

R&D centres of 52 companies during the year. Agreements of co-operation for research & development were also signed with these companies. R&D expenditure of 47 companies were reported to DGIT (E) in Form 3CL.

### ***Technology Development and Innovation Programme***

The programme has two sub-components: Technology Development and Demonstration Programme to support technology development efforts of industry - R&D system and Technopreneur Promotion Programme (TePP) to nurture the innovative spirit of individuals.

The component programme on Technology Development and Demonstration aims at catalyzing and supporting activities relating to technology absorption, adaptation and demonstration including capital goods development, involving industry and R&D organizations. Under the programme, research, development, design & engineering projects for absorption and up-gradation of imported technology as well as development & demonstration of new and improved technologies have been supported. While DSIR support has been catalytic and partial, bulk of the financial contribution in any project has been from the industry.

The Department, under this programme has so far supported about 166 R&D projects of Industrial units. These projects cover products and processes in various important industries such as metallurgy, electrical, electronics, instrumentation, mechanical engineering, earth moving & industrial machinery, chemicals & explosives. 103 projects have so far been completed and over 30 technologies developed under the scheme have been commercialized or under commercialization. During the year, 63 Technology Development Demonstration projects supported under the scheme were reviewed for progress. There are 34 companies paying royalty/ lump-sum as per the terms of agreement.

Technology Development projects have strengthened the linkages with more than 25 national research laboratories/ institutions such as NAL, Bangalore; RRL, Trivandrum; IICT, Hyderabad; CMRI, Dhanbad; IIP, Dehradun; C-DAC, Pune; Institute of Plasma Research, Ahmedabad; ER&DC, Trivandrum; Dalmia Centre for Biotechnology, Coimbatore; CMTI, Bangalore; which have been collaborating with industry in the specific research, design, development & engineering (RDDE) projects of high techno-socio-commercial impact. The Scheme has been found successful in synergising the R&D efforts of industry and national research organizations.

The Technopreneur Promotion Programme (TePP) is a novel programme to extend financial support to individual innovators for converting their innovative ideas into working prototypes/models. Jointly operated by DSIR and Technology Information, Forecasting and Assessment Council (TIFAC) of the Department of Science and Technology (DST), TePP endeavours to tap the vast innovative potential of the citizens of India. So far, 122 projects of individual innovators were supported by DSIR (59) and TIFAC (63). Some of the successfully developed TePP projects during the year were TARGETs by Sol-Gel Technique, ROBOT for fire fighting, Fabrication of a Portable X-ray Body Imaging Assembly and Catalytic manufacture of Ace Anisole etc.

### ***Technology Management Programme***

During the year, several analytical, technology status and development studies, including those on Nanotechnology; Isabgol; Minor Forest Produce based industries in Andhra Pradesh, Uttar Pradesh, Uttracanchal and Gujarat have been completed or are being undertaken. Studies and cases on technology and innovation management that have been completed or being undertaken include those covering technology management practices in the automotive sector and technology audit of

the handicraft artisan units in the coastal districts of Karnataka. Studies on minor forest based industries in select States, and others are in progress. Studies - including analytical, status, case as well as research based ones, on emerging aspects of technology and innovation management - have been taken up on need basis. With a view to strengthen networking and enhance technology management capabilities in industry including small and medium enterprises, academic institutes, state level enterprises and consultancy / research organizations; a number of activities have been taken up. Several activities, spanning the interests of industry, faculty, researchers, students, Government bodies and entrepreneurs have been initiated in association with different agencies. Various programmes have been envisaged in collaboration with industry and industry associations, State level technical consultancy organizations, research institutions, academic institutes including IIMs & IITs; and on-going activities are being continued. Programmes covering various aspects of Technology Management, Transfer, Intellectual Property and Knowledge Management are being organized on need basis. Efforts to disseminate important findings and information of relevance to the subject have been intensified. An electronic newsletter to enhance technological creativity and interest in technology development among various target groups has been launched. In addition, portals dedicated to technology management aspects have been launched.

### ***International Technology Transfer Programme***

Under the International Technology Transfer Programme (ITTP), major activities completed or in progress during the year include: organisation of INDIATECH 2005 (9<sup>th</sup> Technology Trade Pavilion) at India International Trade Fair (IITF) 2005, Pragati Maidan, New Delhi; continuation of support to the activities of Technology Export

Development Organisation (TEDO) in the second phase; continuation of support to the Centre for International Trade in Technology at IIFT in the second phase; support to a project on Promoting high Technology Co-operation and Trade between India and CIS Countries in association with Department of Commerce; continuation of support to the Technology Trade Facilitation Centre at National Research Development Corporation; organisation of a Clinic-cum-Awareness Programme for Design Intervention in Industry Clusters at Aurangabad (Auto and Electrical Appliances cluster); organization of third International Design Awareness-cum-Training Programme on Strategic Design Intervention for Developing Economies; organization of second International Awareness-cum-Training Programme on Packaging Conversion Technologies; compilation of “Exportable Technologies from SMEs in the States of Andhra Pradesh, Karnataka, Punjab, Haryana, HP, J&K, Gujarat, Rajasthan, Tamilnadu and Kerala; and compilation of a “Compendium on Technology Exports” – containing data up to 2004-05. All these efforts seem to have catalyzed the technology intensive and high value added exports. The percentage of such exports, in the overall exports, has steadily increased over the years. A large segment of exporting community has been trained and sensitized towards high value added exports.

### ***International Cooperation***

DSIR continues to play the role of being the focal point for the APCTT. The Government of India continued to provide institutional support of US\$ 200,000 in Indian Rupees to the APCTT for both the host facilities and local costs. A programme support of US\$100,000 in Indian Rupees was contributed towards the APCTT Regional Programme on National Innovation Systems. During 2005, the activities of APCTT were directed towards technology capacity - building, promotion and management of

innovation as well as sub-regional and regional networking.

DSIR continues to be the focal point for UNESCO in India and is a member of UNESCO's Asia Pacific Information Network (APIN).

During the year, the Department deputed several officers to represent in various national/regional/international meets.

### ***Consultancy Promotion Programme***

The programme relating to consultancy promotion essentially aims to strengthen consultancy capabilities for domestic and export markets. During the period under report, the Food Processing Technologies and Services Centre (FPTSC) at Kanpur was under operation. Besides, a study on Consultancy Needs for improving performance/ upgradation of Textile Mills in UP was completed through UPICO. Study on Consultancy Capabilities for Small Hydropower Development in India through IIT, Roorkee was under progress. During the year, Consultancy Development Centre (CDC) was made an autonomous institution of DSIR. Also, technical inputs/ support was provided to Consultancy Engineers Association of India (CEAI) and other consultancy promotion organizations.

### ***Technology Information Facilitation Programme***

The broad objective of this programme is to generate endogenous capacities for the development and utilization of digital information resources for providing inputs to S&T research. The strategy under this programme is to concentrate on Indian content on S&T avoiding duplication of efforts ensuring minimum overlapping; maximum utilization of existing facilities and utilize internet technology. During the year under report, programmes such as Development of National Websites/ Servers; Indian Digital Library of Theses and R&D

Publications; Database development, Documentation of Traditional Knowledge and Folk Wisdom; Open Archives initiative - An alternative to Scholarly Communication etc. were supported.

### ***Information Technology & e-Governance***

As a new initiative during the Tenth Plan, IT & e-Governance unit was formed for progressive implementation of e-Governance and establishing an IT enabled work environment. The IT action-plan of the Department includes infrastructure development; networking; IT training; Office automation; e-Reports and Website. Central Information System 'CINFOSYS' is created to provide information on projects supported under various programmes of the TPDU scheme. This is a comprehensive, central information system and is accessed through INTRADSIR.

### ***Gender Budgeting Cell***

In pursuance to the recommendations of the Inter – Departmental Committee set up under the Chairmanship of Secretary (Expenditure) to consider issues regarding Gender Budgeting, the Department has established a "Gender Budgeting Cell". Some of the activities taken up during the year are i) Training Programmes on Content Development and Management ii) Instruments for Spectral Analysis of Communication Channels at High Frequency and iii) Production of Grape Flakes .

### ***Publicity and Promotion***

The department is making concerted efforts to create awareness among industry, R&D establishments, academia, consultants and public in general, about the incentives and support mechanisms available under the departmental programmes and schemes with a view to encourage more and more agencies and individuals to take advantage of the facilities provided by the department.

Some of the programmes during the year were

- i) Printing of four-page brochure in respect of all the Departmental programmes in Hindi as well as English. Additionally, 24-page booklets in respect of the above programmes were printed in English
- ii) 12 audio visual documentary films on DSIR initiatives
- iii) Four one-day TPDU workshops organized at Indore, Coimbatore, Bhubaneswar and Guwahati.

Department also has a website, namely, [www.dsir.gov.in](http://www.dsir.gov.in) The website contains information about the Schemes / Programmes, guidelines and various application formats. The website is updated regularly and hosts information about forthcoming events, publications released etc.

### **3. AUTONOMOUS INSTITUTIONS**

#### **3.1 COUNCIL OF SCIENTIFIC & INDUSTRIAL RESEARCH (CSIR)**

Council of Scientific & Industrial Research, a premier autonomous R&D organization is a multidisciplinary, multi-locational set-up, comprising of 38 laboratories and 47 regional centers and it has completed sixty-two years of its existence. Nourished, fostered and supported by successive governments, since its inception, CSIR is now recognized internationally as an institution, which is moving speedily towards achieving global excellence without diluting local relevance. In India, it symbolizes a culture that links science with society through technology and industrial manufacture.

As the nation's strongest holder of intellectual property rights, CSIR leads the way for protecting traditional knowledge strength while adding to the new IPR capital. CSIR was ranked the first amongst major PCT applicants from developing countries. CSIR has also continued to promote excellence in science and is the only S&T organization, which had nurtured and supported human tech from 16 to 65 years of age, through numerous schemes on human resource for scientific research. CSIR helped usher India into a

scientific milieu, creating and nurturing talent in science, innovation and technology.

#### **SIGNIFICANT DEVELOPMENTS**

##### ***SARAS takes to skies***

SARAS, India's first indigenously developed, multi-role civilian aircraft will serve as a feeder airline (as executive transport and light cargo carrier) and for air taxi operations. It would also be used in remote sensing, aerial research, coast guard, border patrol, air ambulance and other services. It can take off and land from short semi-prepared runways and is therefore ideally suited for operations in difficult terrains and would help in providing connectivity, especially in the North East India.

##### ***A new TB vaccine***

Tuberculosis (TB) is the leading infectious killer of youth and adults. One third of the world's population is currently infected with the causative organism, *Mycobacterium tuberculosis*, a gram-positive bacterium. A candidate vaccine has successfully been evaluated in the form of live *Mycobacterium habana* in animals.

##### ***TB molecule breakthrough***

As a result of private-public partnership programme, launched by New Millennium Indian Technology Leadership Initiative (NMITLI), a new molecule, 'sudoterb' for the treatment of TB has been developed, for which clinical trial has been started. This is the first new molecular strain discovered after Rifampycin in 1963. The molecule, which may help reduce the treatment time from eight months to two months, is especially well suited for poor.

##### ***A biomarker for the diagnosis of visceral leishmaniasis***

IICB identified the increased presence of disease specific biomarker (glycotype) on erythrocytes of patients with visceral leishmaniasis (VL). The over expression of

this biomarker has helped in the development of erythrocyte binding assay to monitor the clinical status of VL patients, which can detect VL even under field conditions. The potential of this discovery has been quickly identified by World Health Organisation (WHO) for its global application and the technology has recently been transferred to an Indian company (Zephyr Biomedical, Goa).

#### ***VaxiPred - Computer aided vaccine design***

VaxiPred, an innovative immuno-informatics tool enabled computer aided vaccine design has been released. This research tool contains components, which synergistically and seamlessly combines the best of research in immunology and immuno-informatics, the offshoot of information technology. VaxiPred is primarily the result of premier research in vaccinology at IMTECH, which has been adequately backed and supported by use of state-of-the-art in information technology by Bio Mantra.

#### ***ISFET (Ion - Sensitive Field - Effect Transistor) - based glucose biosensor***

CEERI has developed ISFET based glucose biosensor, which comprises an ion-sensitive field-effect transistor (ISFET) - a metal-oxide-semiconductor field-effect transistor (MOSFET) with the metal gate replaced by a chemical membrane ( $\text{SiO}_2\text{-Si}_3\text{N}_4$ ) responsive to hydrogen ions, producing a solid-state pH-micro-sensor. This has the advantage over conventional biosensor in terms of smaller size, robustness, easy cleaning, minimal need for maintenance, and fast response.

#### ***Optical fibre amplifier***

For the first time in India, an optical amplifier for light wave telecommunication network has been developed by CGCRI using erbium-doped optical fibre (EDF) and power semiconductor pump laser source. This device has the potential for use in the propagation of "Fibre to Home" technology in the country.

#### ***Traditional knowledge protection***

Two NISCAIR journals, Indian Journal of Traditional Knowledge (IJTK) and Medicinal and Aromatic Plant Abstracts (MAPA), have become part of Non Patent Literature (NPL) of the PCT Minimum Documentation. For the first time journals from a developing country have been included in the coveted list of 'prior art search journals'. Inclusion of IJTK in the list is yet another feat towards achieving the basic objective of Traditional Knowledge Digital Library (TKDL) for prevention of grant of wrong patents through misappropriation of our traditional knowledge.

#### ***Computer - aided microscopic inspection system for medicinal plants***

A computer-aided microscopic inspection system, which avoids some of the shortcomings of the conventional microscopic inspection methods, has been developed. The system, HERBAS (Herbs Authentication System) consists of a computer, microscope, digital camera, printer and custom-developed application software. The application software running on the computer allows the user to capture the microscopic images through the digital camera and utilizes them appropriately.

#### ***Excelling in scientific & industrial research output***

Over 2650 basic research papers have been published in internationally peer-reviewed journals with average impact factor per paper of nearly 1.90. CSIR was granted 237 patents abroad. The 60% share in the total US Patents granted to Indians, excluding NRIs and foreign assignees, belongs to CSIR.

Other CSIR's scientific breakthroughs involves research from CCMB involving determining "Role of cyclin E in cell fate in the central nervous system of *Drosophila melanogaster*, that has led to understanding

the mechanism of critical role of cyclin E in the nerve cell fate determination which will help in gene therapy for neural disorders; IICB study - "Micronuclei as Biomarkers of Carcinogen exposure in populations exposed to arsenic through drinking water in West Bengal, India: A comparative study in three cell types"; and Study from ITRC - "Modulation of P-glycoprotein-mediated multidrug resistance in K562 leukemic cells by indole-3-carbinol".

### 3.2 Consultancy Development Centre

The Consultancy Development Centre (CDC) came into being as a registered society in January 1986, and is functioning from its office at India Habitat Centre Complex since May 1994. The CDC was approved as Autonomous institution of Department of Scientific & Industrial Research (DSIR) in December 2004. The Governing body consists of representatives of consultancy organizations, R&D institutions, Government Departments, Academic institutions, Public sector units etc. CDC had a membership of 997 as on 31.12.2005 representing various types of consultancy organizations and individuals connected with the consultancy. The CDC has concentrated mainly on development of human resources, providing computerized data/information services, and strengthening of technological and managerial consultancy capabilities including promoting consultancy exports through the Consultancy Promotion scheme.

In order to enhance technological and managerial capabilities as well as the export capabilities of consultants, programmes have been arranged for consultants at national and international levels, which have proved to be useful to promote consultancy business. CDC has been identified to be a nodal agency for Technical Consultancy Development Programme for Asia and the Pacific (TCDPAP) by ESCAP. CDC has been nominated to function as the secretariat for

TCDPAP up to 2008 by the General Council of TCDPAP.

The 8<sup>th</sup> batch of the trainees of the postgraduate degree (MS) programme in Consultancy Management in association with BITS, Pilani, was started during 2004-05 and in parallel, the 7<sup>th</sup> batch continued. In order to enhance technological and managerial capabilities as well as the export capabilities of consultants, CDC has been identified to be a nodal agency for Technical Consultancy Development Programme for Asia and the Pacific (TCDPAP) by ESCAP.

The 8<sup>th</sup> National Consultancy Congress on "Sustainable Development: Role of Consultants" was held during 16 -17 January 2006 at India Habitat Centre, New Delhi. The Hon'ble Minister of State for Statistics and Programme Implementation (Independent Charge), Shri Oscar Fernandes inaugurated the conference and gave away awards to winners of the National Awards for excellence in consultancy services - 2005.

The Centre conducted a total 44 Skill Building Programmes till December 2005. The 9<sup>th</sup> batch of MS Programme in collaboration with BITS, Pilani commenced in August 2004 with 47 students. During the year, Centre obtained 6 ISO 9000 Facilitation Projects and NABL Facilitation Projects till December 2005. The Centre obtained 6 study assignments till December 2005. During the year, two issues of Newsletter "Consultancy Vision" were brought out. CDC has been disseminating information on consulting opportunities through its e-News letter namely "Consultancy Business Opportunities - A fast Announcement Service".

CDC has earned revenue of about Rs. 116 lakhs till December 2005 from programmes, assignments, and services rendered to various agencies, membership, etc. The Expenditure till December 2005 is Rs. 135 lakhs.



## 4. PUBLIC SECTOR ENTERPRISES

### 4.1 National Research Development Corporation (NRDC)

Due to the sustained, hard and dedicated work of its executives and the staff, the Corporation continued to earn profits. During the year the Corporation earned a gross profit of Rs. 12.60 lakhs against Rs. 19.35 lakhs in the previous year. The Gross income of the Corporation from all sources, including premia and royalties, but excluding Grants-in-Aid, was Rs.413.27 lakhs as compared to Rs. 439.93 lakhs in the previous year.

During the year 2004-05, the Corporation entered into Memorandum of Understanding / Agreement with the following organisations for assignment of technologies developed by them:

- G.B. Pant University of Agriculture & Technology, Pantnagar
- Marathwada Agricultural University, Parbhani
- Punjab Agricultural University (PAU), Ludhiana
- Electrical Research and Development Association (ERDA), Vadodara
- Dr. I. J. Babbar, Delhi
- National Institute of Rock Mechanics, Kolar Gold Fields, Karnataka
- Karnataka State Sericulture Research & Dev. Institute, Bangalore
- Process cum product Development Centre, Sports Goods Complex, Meerut
- Kolkata University, Kolkata
- Central Glass & Ceramic Research Institute, Kolkata
- Barkatullah University, Bhopal
- MP Council for Science & Technology, Bhopal

- The Corporation signed 48 licence agreements in the following areas during the year compared to 25 licence agreements in the previous year.
- Green Roof Strong Prop
- Biopesticide based on Bascillus Thuringensis Var Israelensis- VCRV B17
- Test Kit for Microbiological Quality of Drinking Water
- Crystoscope for Determination of Optimum time of Fertile Oestrus in Cows and Buffaloes
- Area Specific Mineral Mixture to increase the Productivity of Bovines for Tarai and Hills of Uttaranchal and for the State of U.P.
- Ultra fine and nearly Mono dispersed in organic Nano Particles as Novel Non-viral Vectors for efficient Gene Delivery
- Vaccine for Viral Disease caused by Pests Des Petits Ruminants (PPR) incorporating vaccine Strain
- Casia Tora Gum from Caisa Tora and Additive from Casia Tora Gum and Tamarind Kernel Powder for Oil Well Drilling Industry and Textile Industry
- Microprocessor Based Solid State Control System (For 40 HP Mine Haulers)

The foreign exchange earnings of the Corporation amounted to Rs. 28.24 lakhs in 2004-2005 as compared to Rs. 10.20 lakhs during the previous year.

The Corporation provided cash awards amounting to Rs.7.70 lakhs for eight inventions and announced two WIPO Gold Medals, one for the invention “A Whole-Blood Agglutination Assay for On-Site Detection of Human Immunodeficiency Virus Infection (HIV)” and another the “best

woman inventor of the year 2004” award for the invention “Process for the Extraction of Ecdysteroid (Sampoorna) from Caryophyllaceae family of Plants” on the occasion of Technology Day i.e. 11<sup>th</sup> May 2004.

#### **4.2 Central Electronics Limited (CEL)**

The Company is the nation's pioneer and largest manufacturer of Solar Photovoltaic products and is among the top few producers of crystalline silicon solar cells/modules in

the world. It is the only indigenous manufacturer of strategic item Phased Control Module (PCM), which is a building block for phased array radar. The Company also has a leading position in the area of Railway Electronics and Cathodic Protection Systems.

During the year (till 31<sup>st</sup> October), CEL's production was Rs. 44.62 crores and sales were Rs. 44.99 crores. The total exports during the year have been Rs.15.20 Crores (till October), as against Rs.10.54 Crores in 2004-05 (till October)