



# Annual Report 2021-22

**Ministry of Heavy Industries**  
**Government of India**  
**Udyog Bhawan, New Delhi-110 011**  
**Website : [heavyindustries.gov.in](http://heavyindustries.gov.in)**



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# Ministry of Heavy Industries (MHI)

## VISION

To have a globally competitive, green & technology-driven heavy industry manufacturing sector, including automotive and capital goods sectors, which propels growth and job creation.

## MISSION

To facilitate Auto, Heavy Electrical & Capital Goods Sectors to be globally competitive, growth oriented and profitable and to provide all necessary support to CPSEs to improve their overall performance.



# Introduction

## 1.0 Overview of the Ministry of Heavy Industries

**1.1** The Ministry of Heavy Industries functions under the charge of Cabinet Minister (Heavy Industries). There is a Minister of State (Heavy Industries) also. The Ministry promotes the development and growth of three sectors i.e. Capital Goods, Automobile and Heavy Electrical Equipment in the country; administers 24 Central Public Sector Enterprises (CPSEs) and 4 Autonomous Organizations.

**1.2** The list of CPSEs and their current status is given in the **Annexure-II**. The CPSEs under the Ministry are engaged in manufacturing, consultancy and contracting services. The CPSEs under the Ministry manufacture a wide range of products viz. Boilers, Gas/Steam/Hydro Turbines, Industrial Machinery, Turbo Generators and Consumer Products such as Tea and Salt. The Ministry also looks after the Machine Building Industry and caters to the requirements of equipment for Basic Industry such as Steel, Mining, Non-Ferrous Metals, Power, Fertilizers, Refineries, Petrochemicals, Shipping, Paper, Cement, Sugar, etc. The Ministry supports the development of a range of Intermediate Engineering Industry such as Castings, Forgings, Diesel Engines, Industrial Gears and Gear-Boxes. The Allocation of Business to the Ministry of Heavy Industries is given at **Annexure-I**.

**1.3** The Ministry maintains a constant dialogue with various Industry Associations in the Capital Goods, Automobile and Heavy Electrical Equipment Sector and encourages initiatives for the growth of industry in these areas. The Ministry also

assists the industries in achieving their growth plans through policy support, and other interventions such as advocating rationalization of tariff, promoting technological collaboration, research & development activities etc.

**1.4** The Ministry of Heavy Industries is headed by a Secretary to the Government of India, who is assisted by a team of officers and staff with an overall sanctioned strength of 229 as on 01.01.2022 (excluding Minister's staff). The Ministry is also supported by an Integrated Finance Wing, headed by an Special Secretary & Financial Adviser (SS&FA). The Organogram Chart of the Ministry of Heavy Industries is at **Annexure-III**.

## 2.0 Performance of Industry

**2.1** The Index of Industrial Production (IIP), one of the core economic indicators, is a short-term indicator for measuring growth of industrial production in the country. Based on the production data sourced from various Ministries/Departments including DPIIT, present series of IIP with base year 2011-12 is released by National Statistical Office, Ministry of Statistics & Programme Implementation every month. Present series of IIP with base year 2011-12, launched in May 2017 contains 407 item-groups covering Mining, Manufacturing and Electricity sectors. Manufacturing sector carries about 70 per cent weight in IIP. DPIIT is a major data source for manufacturing sector items as it provides data for more than seventy percent of its total item-groups. The production data is collected from establishments through a web-based system every month.

**2.2** As per the IIP growth indicated in Table 2.1, it is apparent that industrial growth hovered between 3.3 and 4.6 percent during 2015-16 to 2018-19. With the outbreak of COVID-19 and the

nation-wide lockdown initiated in March 2019 to check the pandemic, industrial growth slowed down to -0.8 percent in 2019-20 and further slipped to -8.4 percent in 2020-21.

**Table: 2.1: Annual Growth of IIP since the year 2015-16**

(figures in percent)

Industrial Sectors/ Categories	Weight	2015- 16	2016- 17	2017- 18	2018- 19	2019- 20	2020- 21	2021-22 (Apr-Oct*)
<b>Sector</b>								
Mining	14.37	4.3	5.3	2.3	2.9	1.6	-7.8	20.5
Manufacturing	77.63	2.8	4.4	4.6	3.9	-1.4	-9.6	21.2
Electricity	7.99	5.7	5.8	5.4	5.2	1.0	-0.5	11.4
<b>Use-based Category</b>								
Primary goods	34.05	5.0	4.9	3.7	3.5	0.7	-7.0	14.8
Capital goods	8.22	3.0	3.2	4.0	2.7	-13.9	-18.6	35.3
Intermediate goods	17.22	1.5	3.3	2.3	0.9	9.1	-9.4	27.0
Infrastructure/construction goods	12.34	2.8	3.9	5.6	7.3	-3.6	-8.7	31.2
Consumer durables	12.84	3.4	2.9	0.8	5.5	-8.7	-15.0	28.5
Consumer non-durables	15.33	2.6	7.9	10.6	4.0	-0.1	-2.2	7.2
Overall IIP	100.00	3.3	4.6	4.4	3.8	-0.8	-8.4	20.0

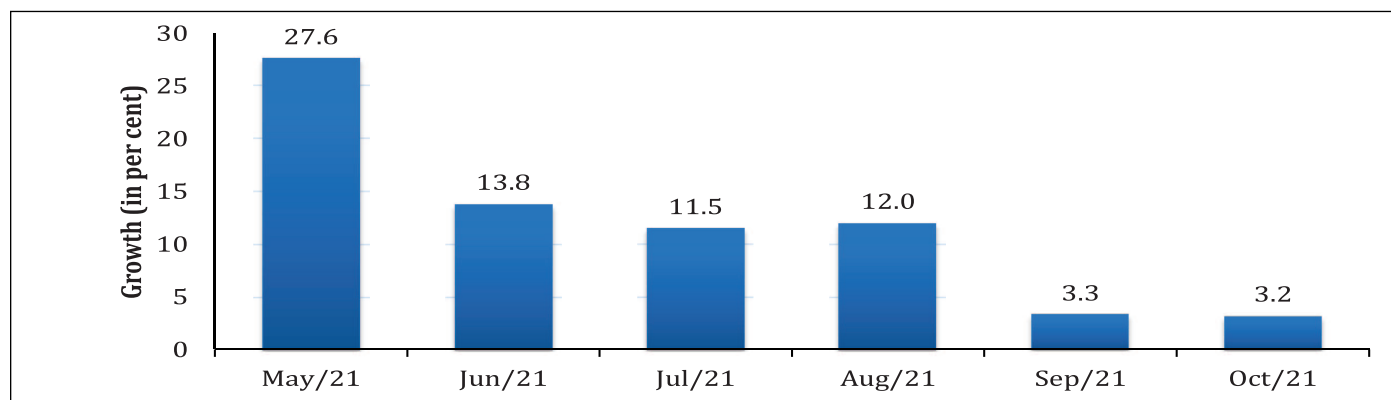
\*Provisional

Source: National Statistical Office, MoSPI

### 2.3 Industrial Growth during 2021-22

The economy was quickly reviving from the ill-effects of the first wave of COVID-19 during the last two quarters of 2020-21 and just then, it was hit by the second wave of COVID-19 pandemic in April-June 2021. However, due to very low base of 2020, IIP growth remained high during 2021-22.

**Figure 2.1: Annual Growth of IIP in 2021-22 (till October 2021) over 2020**



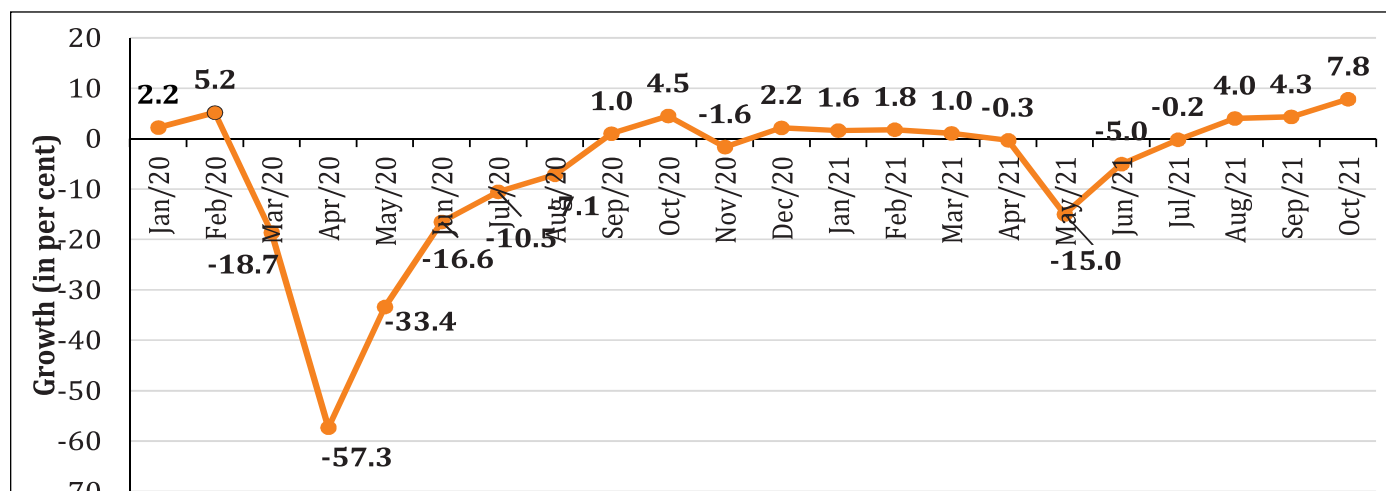
Source: National Statistical Office

**2.4** Since 2020 was not a normal year, the comparison of IIP for 2021-22 is made with the Pre-COVID period (corresponding month of 2019) to depict the realistic growth scenario. Figure 2.2 shows that the industrial



sector growth which nosedived in May 2020, had made a V-shaped recovery thereafter in 2020-21 and further contracted in Apr-June 2021 period due to 2<sup>nd</sup> wave of COVID-19 outbreak. It is evident that the loss of growth momentum by the second wave was not as severe as experienced at the time of initial wave of pandemic. Industrial output again recovered and surpassed the pre-COVID level since August 2021 with the massive vaccination drive and favourable policies.

**Figure 2.2: Growth of IIP in 2020 and 2021 over Pre-COVID (corresponding month of 2019)**



Source: Office of the Economic Adviser, DPIIT \*provisional

**2.5** Among industry-groups, Manufacture of food products, Manufacture of textiles, Manufacture of other non-metallic mineral products, Manufacture of basic metals, Manufacture of computer, electronic and optical products and Other manufacturing were leading the overall recovery of the manufacturing sector in 2021-22. Consistent growth of exports and surge in domestic demand enabled the recovery. On the other hand, industry-groups namely, Manufacture of leather and related products, Manufacture of machinery and equipment, Manufacture of motor vehicles, trailers and semi-trailers and Manufacture of other transport equipment showed tapered or declined growth.

### 3.1 The Ministry of Heavy Industries has been allocated the following subjects/ Industrial Sectors:

- Heavy Engineering Equipment and Machine Tools Industry:
- Heavy Electrical Engineering Industry
- Automotive Sector, including Tractors and Earth Moving Equipment.

### 3.2 19 Sub-sectors under the 3 broad sectors are as under:-

- Boilers
- Cement Machinery
- Dairy Machinery
- Electrical Furnace
- Freight Containers
- Material Handling Equipment
- Metallurgical Machinery
- Mining Machinery
- Machine Tools
- Oil Field Equipment
- Printing Machinery
- Pulp and Paper Machinery
- Rubber Machinery
- Switchgear and Control Gear
- Shunting Locomotive

- xvi) Sugar Machinery
- xvii) Turbines & Generator Set
- xviii) Transformers
- xix) Textile Machinery

### 3.3 CPSEs under the Ministry of Heavy Industries:

**3.3.1** There are 24 Central Public Sector Enterprises (CPSEs) under the administrative control of the Ministry of Heavy Industries (MHI), out of which 15 CPSEs are operational and 1 is under revival. Remaining 8 CPSEs are under closure. Besides these, there are 17 CPSEs under liquidation, which are within the purview of the Official Liquidator/Insolvency Professional. The List of these CPSEs is in **Annexure-II**.

**3.3.2** The total investment (Gross Block) in the 16 operating CPSEs under the administrative oversight of the Ministry was ₹ 9182.42 crore as on 31.03.2021. Details given at **Annexure-IV**. The total number of employees in the roll of these CPSEs is 51856. The number of SC employees are: 8702, ST: 6884, OBC: 20283 and PWD employees are 947. (**Annexure-V**).

**3.3.3** Out of the 16 operating CPSEs, 10 are making profit and the remaining 6 are incurring losses. Details of production and profit is given below:

#### Production/Profit of operating CPSEs

(₹ in crore)

	2019-20 (Actual)	2020-21 (Actual)	2021-22 (Anticipated)	2022-23 (Tentative)
Production	26382.62	21259.30	27202.55	34854.55
Profit (+)/ Loss(-)	-969.86	-3,909.11	-737.60	-270.36

(CPSE-wise details of production, profit/loss are in **Annexure-VI & VII** respectively).

**3.3.4** The loss making enterprises suffer from a number of factors including poor order book, shortage of working capital, surplus manpower, obsolete plant and machinery, difficulty in adjusting to changing market conditions, products profile/ technology and fierce competition etc. Several of these loss making CPSEs have problems of large work force and huge overheads, far above the industry norms. In this context, salary/wage bill and social overheads as a percentage of turnover are given in **Annexure-VIII**.

**3.3.5** The order book of CPSEs under the Ministry, as on 01.10.2021, stands at ₹ 132,445.19 crore (**Annexure-IX**). Details of export performance of CPSEs under DHI are given in **Annexure-X**. Details of Government equity, net worth and accumulated profit/loss of these CPSEs are given in **Annexure-XI**.

### 4.0 Details of Budget Estimates and Audit observations of CAG

Details of Budget Estimates (BE), Revised Estimates (RE) and Actual Expenditure for 3 years of the Ministry is at **Annexure-XIII**. Statement of important audit observations from Comptroller & Auditor General of India Report for 2020-21 related to Ministry of Heavy Industries is at **Annexure-XIV**.

### 5.0 Meetings of Parliamentary Committee:

During the year Ministry of Heavy Industries has convened three meetings of Department-related Parliamentary Standing Committee (DRPSC) on Industry relating to Electric & Hybrid Mobility – Prospects and Challenges in Automobile Industry, Working of the Ministries and Disinvestment/Closure of CPSEs.

Three meetings of Consultative Committee under the Chairmanship of Hon'ble Minister of Heavy Industries relates to Capital Goods Sector-Enhancing Competitiveness, Promotion of Electric Vehicle and E-Mobility were also convened.

## CPSEs under Ministry of Heavy Industries

# 2

The CPSEs under the Ministry have played a vital role in the industrial development of the country. Ranging from heavy electrical engineering equipment, the CPSEs cater to diverse sectors of the economy including civil construction, heavy machinery, precision tools, consultancy, tea plantation etc. A brief write up on the performance of CPSEs during 2021-22 under the Ministry is given below:

### 2.1 Andrew Yule & Co Ltd. (AYCL)

Andrew Yule & Co. Ltd. (AYCL) has achieved production worth ₹ 188.41 crore against the Budgetary Target of ₹ 174.44 crore, Sales worth ₹ 168.55 crore against the Target of ₹ 175.52 crore and Net Profit (PBT) of ₹ 21.72 crore against the Budgetary MoU target of ₹ (-) 32.25 crore up to September, 2021. AYCL has achieved 107.34% of the Production Target and 96.02% of Sales Target up to the month of September, 2021. The order book position is ₹ 118.57 crore up to the month of September, 2021 against the target of ₹ 94.85 crore.

### 2.2 Hooghly Printing Company Ltd.

Hooghly Printing Company Ltd. (HPCL) is a wholly-owned subsidiary of Andrew Yule & Co. Ltd (AYCL). The Committee of Secretaries (CoS), in September, 2018, recommended closure of its operations and merger of assets and liabilities into its holding company. HPCL's operations were closed from 25 January, 2019. The employees of HPCL were transferred to its parent company-AYCL. Hooghly Printing Company Ltd. (HPCL) has been merged with AYCL effective from 4<sup>th</sup> June, 2021. Status of Hooghly Printing Company Ltd.

(HPCL) in the Ministry of Corporate Affairs Portal is also shown as 'Amalgamated'.

### 2.3 Bharat Heavy Electricals Limited (BHEL)

Established in 1964, BHEL is India's largest engineering and manufacturing enterprise in the energy and infrastructure sector. BHEL is a leading power equipment manufacturer globally, serving its customers with a comprehensive portfolio of products, systems and services to its customers in the areas of power-thermal, hydro, gas, nuclear & solar PV, transmission, transportation, defence & aerospace, oil & gas, and water.

A resilient workforce of 31,206 employees (as on 30<sup>th</sup> September 2021) is the driving force behind BHEL's journey over the years.

BHEL's pan-India presence includes a network of 16 manufacturing facilities, 2 repair units, 4 regional offices, 8 service centres, 3 active joint ventures, 15 regional marketing centres, 3 overseas offices and capability of project execution at more than 150 project sites across India and abroad.

The worldwide installed base of power generating equipment supplied by BHEL exceeds 193 GW. Also, BHEL has installed more than 1000 thermal, hydro, nuclear, gas and solar PV based power generating sets in the country. BHEL has also commissioned 200+ electric substations and 5 major HVDC projects in the country. Till date, BHEL has installed around 11 GW power generating capacity in overseas markets.



*Solar module manufacturing facility at EDN, Bengaluru*

## **Contribution to the economy**

### **Power Sector**

BHEL secured an order inflow of Rs 9,000 Crore in Power Sector. Significant utility orders received in the year were:

- FGD Packages: NTPL / Tuticorin and TANGEDCO / North Chennai Stg III
- Boiler Modification Package: TANGEDCO / Udangudi
- Supply of Reactor Headers: 32 nos. from NPCIL (Fleet Mode Procurement)

### **Spares and Services**

- UPRVUNL Anpara-D (Complete set of Generator Stator, Generator Rotor & Exciter, LP Rotor, HPT Module and various turbine spares)
- Jindal Power Limited (ESP Restoration)

- DVC Mejia (Combustion Modification Package)

Till date, for Main plant packages of Thermal Projects, BHEL has secured orders for 56 sets of Supercritical Steam Generators (SGs) and 51 sets of Supercritical Turbine Generators (TGs) in the country.

### **Major Orders received in 2021-22 upto September 2021**

- Standalone order for Chimney Package for WBPDC's Sagardighi TPP Unit 5
- Order for 4×125 MW Kaleshwaram LIS Link IV (Pkg. 1) / Prathima Infrastructure Limited (Pump-Motor works)
- Major order for supply of 12 Steam Generators for NPCIL's 700 MWe Pressurized Heavy Water Reactors (PHWRs) to be installed in Fleet Mode at various locations within the country.





*BHEL has commissioned the pumping units for Kaleshwaram LIS, Telangana - world's largest LIS project*

### **Industry Sector**

In Industry Sector, BHEL secured orders around Rs 4,000 Crore during 2020-21 in a challenging business environment.

During 2021-22, BHEL bagged orders around Rs 2,000 crores in Industry Sector till September 2021 in wide variety of products & systems.

### **Transportation:**

#### **Achievements during 2020-21**

First ever order for 700 HP Diesel Electric Locomotive from Arcelor Mittal Nippon Steel India.

First time manufactured and supplied Traction Alternators type TA9906AZ and Traction Motors type TM4504AZ for 3000 HP Cape Gauge Locomotives, exported to Mozambique against order from RITES.

#### **Achievements during 2021-22 upto September 2021**

- Received order of 16 sets of IGBT based 3

Phase Propulsion equipment for MEMU from MCF, Raebareli. New customer added.

- BHEL signed MoUs with SIEMENS Mobility-Germany, and SIEMENS Ltd-India, to jointly address the opportunities in upcoming light rail rolling stock segment (MetroLite) in India.

### **Renewable Energy:**

#### **Achievements during 2020-21**

- Received the prestigious order for EPC of a 5 MW Ground mounted solar power plant at Nalanda University, Bihar.
- Over 170 MW solar PV plants commissioned during FY 2020-21.

#### **Achievements during 2021-22 upto Sept-21**

- Around 72.5 MWp solar PV plants have been commissioned during FY 2021-22 upto September 2021.



*India's largest 25MW NTPC Simhadri Floating Solar PV Plant commissioned by BHEL*

- Notably, 25 MW NTPC Simhadri SPV plant is currently India's largest floating SPV.
- **Energy Storage Solutions:** Electric vehicle chargers, electric powertrain, lithium ion battery packs, electric vehicles.
- **Defence & Aerospace:** Strategic equipment for Indian defence forces including Super Rapid Gun Mount & Integrated Platform Management System for naval ships, propellant tanks and its parts for launch vehicles of ISRO.

#### **Transmission:**

##### ***Achievements during 2020-21***

- Largest single order of Cast resin Dry Type Transformers for replacement of Polychlorinated Biphenyl (PCB) Transformers from Bhilai Steel Plant, Bhilai.
- First ever standalone orders for MV Switchgear from BGR Energy for Switchyard extension works at NPCIL Tarapur; and Electrical Balance of Plant (eBoP) from NHPC

##### ***Achievements during 2021-22 upto September 2021:***

- POWERGRID Raigarh - Pugalur +/-800 KV, 6000 MW, HVDC Project: Power flow established in Bipole-2.
- Successfully commissioned Powergrid SS-19 - 765kV Aurangabad.

#### **Electric Mobility, Energy Storage, Railway Electrification, Water Business:**

##### ***Achievements during 2020-21:***

- Delhi-Chandigarh highway is the 1<sup>st</sup> highway in the country which has been made e-vehicle friendly with successful commissioning of 20 Nos. Solar Based EV Chargers by BHEL.
- Received order for 25KW Solar based EV Charging Station (1 no. DC001 and 1 no. AC001 EV Charger) at Atal Incubation Center-Entrepreneurship Management Process International (AIC-EMPI) from AIC-EMPI.



- BHEL signed MoU with:
  - IOCL for co-operation in setting up EV charging stations at IOCL outlets.
  - EESL to develop network of Smart Grid based Distribution Transformer Monitoring System (DTMS).

#### **Achievements during 2021-22 upto September 2021:**

- BHEL has started offering Pressure Vacuum Swing adsorption (PVSA) based Oxygen Concentrators (500 LPM & 1000 LPM) to supplement the Nation's efforts of battling the Covid-19 Pandemic.
- Solar Based EV (SEV) charging station at Karna Lake Resort, Karnal inaugurated by Hon'ble Minister of Heavy Industries, Dr. Mahendra Nath Pandey, on 18th August 2021 in the presence of Secretary(MHI) and CMD-BHEL.

#### **Industrial products:**

#### **Achievements during 2020-21:**

- Secured milestone order for single largest Fractionator Column (9.5 m Dia, 60 m long and 650 MT weight) from HRRL, Barmer.
- First ever order from Wuhan Engineering Corporation Limited for Compressors for Coal Gasification Plant at TFL, Talcher

#### **Achievements during 2021-22 upto September 2021:**

- Order for Recycle Gas Compressor for Diesel Hydro Treating (DHDT) unit at IOCL Barauni from CB&I India Pvt. Ltd. First ever order of BHEL from M/s CB&I (McDermott).

**Captive Power projects:** Around 119.5 MW worth of Captive Power Plants were commissioned by BHEL in FY 2020-21, while 75 Mw of Captive Power Plants have been commissioned during FY 2021-22 till September 2021.

#### **Financial Performance:**

The nationwide lockdown, consequent to spread of Covid 19 pandemic globally caused disturbance & slowdown of the economic activity. In FY 2020-21, BHEL incurred a loss of ₹ 2,717 Crore as against a loss of ₹ 1,473 Crore in FY 2019-20, mainly due to lower revenue, higher material cost and additional merit based provisioning of about ₹ 1,800 Crore. BHEL secured orders worth ₹ 13,472 Crore in FY 2020-21.

The adoption of strategic cost reduction methodologies has led to registering overall reduction of ₹ 694 Crore in other miscellaneous expenses during the year.

#### **2.4 BHEL-Electrical Machines Limited (BHEL-EML)**

The Cabinet Committee on Economic Affairs (CCEA) had approved Ministry of Heavy Industry's proposal for take-over of 51% share of BHEL in BHEL-EML by State Government of Kerala at a cost of Rs.1/- . Approval of CCEA to sell off BHEL's 51% stake in BHEL-EML to the State Government of Kerala and waiver of working capital loan of ₹ 3.00 Crore along with accrued interest thereon given by BHEL to BHEL-EML, was conveyed to BHEL on 11.05.2021. Subsequently, with the signing of "Agreement of Sale" between BHEL and State Government of Kerala and approval of the same by Board of Directors of BHEL-EML, BHEL transferred its 51% share held in BHEL-EML to the State Government of Kerala and its representatives on 11.08.2021.

#### **2.5 Braithwaite, Burn & Jessop Construction Company Limited (BBJ)**

The Braithwaite Burn and Jessop Construction Co., Ltd. (BBJ) was incorporated on 26.01.1935 under the Companies Act by contributing share investment of three major engineering companies of Eastern India namely, Braithwaite & Co. Ltd. (40%), Burn & Co. Ltd.

(30%) and Jessop & Co. Ltd. (30%). The company became a 'Government company' consequent upon transfer of its entire shares to its erstwhile holding company viz. Bharat Bhari Udyog Nigam Ltd. (BBUNL), under the Companies Act, 1956 and became a wholly owned subsidiary of BBUNL w.e.f. 14.08.1987.

The company Bharat Bhari Udyog Nigam Ltd was incorporated on 17.09.1986. Consequent to the order of the Government of India the BBJ was merged with its holding company Bharat Bhari Udyog Nigam Ltd.(BBUNL), w.e.f. 01.04.2015. Further, BBUNL was renamed as "The Braithwaite Burn and Jessop Construction Company Limited" (BBJ) w.e.f. 18.11.2015. BBJ was not referred to BIFR. However, to make the company a viable enterprise on a sustainable basis, the financial restructuring proposal of BBJ was approved by the Government of India in July 2005. Since then, the company is continuously achieving Net Profit & positive Net Worth. BBJ pays dividend regularly to Govt. of India since FY 2009-10.

## 2.6 Bridge & Roof Company (India) Limited (B&R)

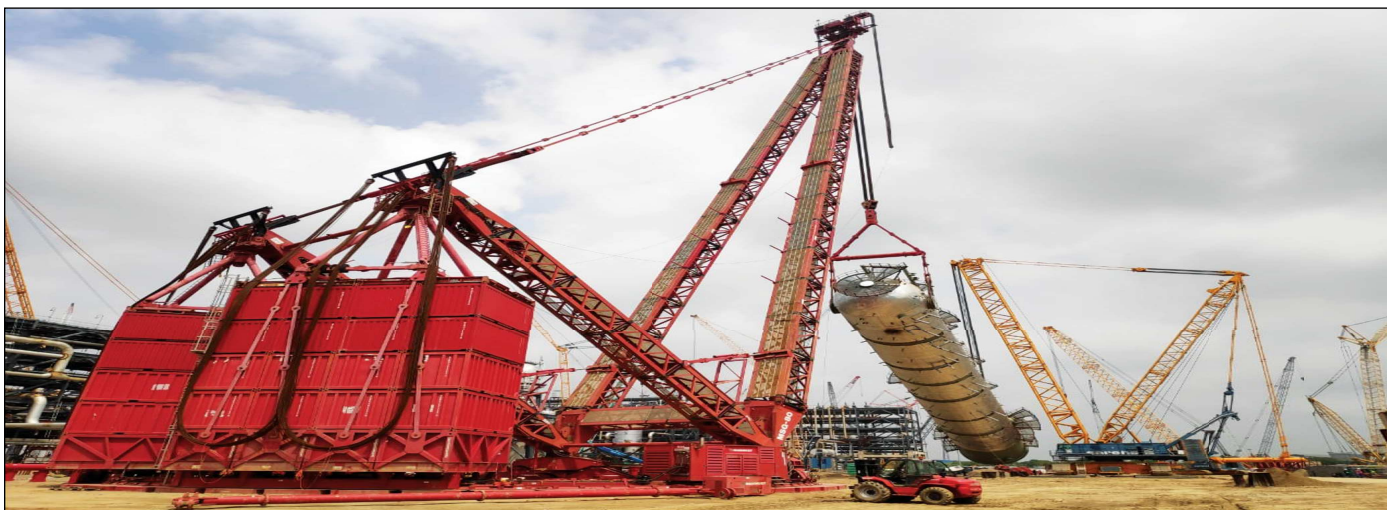
Bridge & Roof Co. (India) Ltd. (B&R) was set up in 1920 as a subsidiary of Balmer Lawrie & Company Limited. Subsequently, it became a Government

Company in 1972 under the Ministry of Petroleum & Natural Gas. In June, 1986, the administrative control of B&R was transferred to the Ministry of Heavy Industries and Public Enterprises and it was subsequently brought under the fold of the holding company, M/s. Bharat Yantra Nigam Limited (BYNL), Allahabad, in 1987. Consequent to the decision taken by Government of India, BYNL ceased to be the Holding Company of B&R from 06.05.2008 and B&R came directly under MHI. The Company's capital restructuring and strengthening proposal was approved by GOI on 02.09.2005.

B&R is a premier construction and engineering company in the field of Civil and Mechanical Construction and Turnkey Projects in various sectors such as hydrocarbon, power, aluminium, steel, railways, etc.

The company has been making profits since 2007-08 and was awarded Miniratna category-I in 2010. B&R's performance during the last few years has been quite good. Turnover of the company during the year 2020-21 was ₹ 2708.84 crores with PBT of Rs. 7.80 crores.

B&R is under strategic disinvestment which is being regularly monitored.



*Erection of 1370 MT equipment by 3200 MT crane and 1600 MT trailing crane at Bathinda Refinery of HPCL-Mittal Energy Ltd. [B&R Project]*





*135-meter span Suspension Pedestrian Steel Bridge on Govindghat to Ghangharia Road at KM 10 in Chamoli District for PWD, Uttarakhand [B&R Project]*



*Planning, Designing and Construction of Hostels under Anwesha Scheme at different places for ST & SC Development Dept, Govt. of Odisha [B&R Project]*



*Construction of Super Specialty Hospital at Indore for Ministry of Health & Family Welfare under PMSSY Scheme [B&R Project]*

## 2.7 Richardson & Cruddas (1972) Limited (R&C)

Richardson & Cruddas (1972) Ltd. (R&C) was taken over from the private sector in 1973. The Company is a schedule C company and fully owned by the GOI. It has four operating units; two at Byculla and Mulund in Mumbai, one each at Nagpur and Chennai, and is engaged in the field of Fabrication & Erection of Steel Structures, Fabrication of Pressure Vessels, Boiler Drums, Hot Pressed Dished Ends, Transmission line towers, providing environmental engineering laboratory services and maintaining townships. The turnover for the year 2020-21 of the company stood at ₹ 34.24 crore with PBT of ₹ 18.41 crore. Union Cabinet approved the financial restructuring of the company on 21.09.2016, implementation is underway.

## 2.8 Bharat Pumps & Compressors Limited (BPCL)

Bharat Pumps & Compressors Ltd. (BPCL) was incorporated in 1970 with a manufacturing facility at Naini, Allahabad in U.P. The company is engaged in the manufacture and supply of heavy duty pumps & compressors and high pressure seamless and CNG gas cylinder/cascades to cater to the needs of sectors like oil exploration & exploitation, refineries, petro-chemicals, chemicals, fertilizer and downstream industries.

Cabinet Committee on Economic Affairs, in its meeting held on 27<sup>th</sup> October, 2016 gave 'in-principle' approval for strategic disinvestment in respect of BPCL. However, the disinvestment process was not successful.

The Government on 09.12.2020, approved closure of Bharat Pumps and Compressors Limited (BPCL) by offering VRS/VSS package to their employees and disposal of its assets. All the employees of BPCL have been given VRS. The action for transfer of land and other immovable and moveable assets is in advanced stage.

## 2.9 Tungabhadra Steel Products Ltd. (TSPL)

The Company was established at Hospet, Karnataka in 1960 as a Joint Enterprise of the Government of India with the Governments of Karnataka and Andhra Pradesh. The Company had facilities for design, manufacture and erection of hydraulic structures, penstocks, buildings, structures, transmission line towers, EOT & gantry cranes etc. CCEA approved closure on 22.12.2015 and subsequently on 18.01.2018 accorded approval for relieving of employees on VRS, disposal of movable and immovable assets and settlement with regard to all debtors and creditors of the company.

At present TSPL has closed its operations and all the employees have accepted the VRS & relieved. The closure of TSPL is at advanced stage and most of the regulatory requirements are already complied with. All movable assets have been disposed off. The Company has filed form STK 2 with ROC on 07.01.2021 for striking off the name of the company from Register maintained by the Registrar of Companies. In the meantime, TSPL resubmitted the e-form STK-2 with Registrar of Companies, Bangalore on 23.07.2021 with sought clarifications. The matter is being pursued regularly by the Ministry.

## 2.10 Hindustan Cables Ltd. (HCL)

HCL was set up in 1952 at Rupnarainpur for the manufacture of underground telephone cable (polythene Insulated Jelly Filled Cable Optical Fibre Cable). Due to introduction of wireless technology, there was sharp reduction of business of the company. HCL started making losses since 1995-96. As total net worth of the company eroded, HCL was referred to BIFR in November 2002. There was complete stoppage of production and internal generation of fund since 2005-06. BIFR in its hearing on 22.06.2010 concluded for winding up. Union Cabinet in their meeting dated 28.09.2016 directed to close the



company offering of VRS/VSS at 2007 notional pay scales. Actions are being taken for disposal of immovable assets to implement the decision of the Cabinet.

### 2.11 Heavy Engineering Corporation Limited (HEC)

HEC Ltd., Ranchi was incorporated on 31st December, 1958 with the primary objective of achieving self-sufficiency and self-reliance in the field of design and manufacture of equipment and machinery for iron and steel industry and other core sector industries like Mining, Metallurgical and Engineering Industries. It has three manufacturing units and one turnkey project division viz.:

#### Heavy Machine Building Plant (HMBP)

- This unit manufactures wide range of equipment for Steel Plants like Blast Furnaces and Rolling Mills etc., Material Handling Equipment like EOT Cranes and Wagon Tippers, etc, equipment for Mining industries like 5 & 10 Cum Excavators, Crushers, Drag Lines and Mine Winders etc. In addition, it also executes order of technological structurals from various sectors

#### Heavy Machine Tools Plant (HMTP)

- It manufactures complete range of Heavy Machine Tools including CNC Heavy Duty Machine Tools and Special Purpose Machine Tools required for Railways, Defence, Power and other sectors.

#### Foundry Forge Plant (FFP)

- It manufactures various types of Heavy & Medium Castings, Forging and Rolls for Power, Nuclear and other sector besides B.G. Crank Shaft for Railways. This unit also acts as a feeder unit for HMBP and HMTP.

### Turnkey Project Division

- It undertakes turnkey projects in the areas of Low Temperature Carbonisation Plants, Coal Handling Plants, Coal Washeries, Sintering Plants, Continuous Casting Plants and Raw Material Handling System etc.

Deteriorating health of equipment/facilities coupled with acute shortage of working capital has been badly affecting the performance since 2013-14. In addition, execution of old orders further affected the cost and company started incurring operating loss. Efforts like outsourcing also did not help due to issue of timely payment to vendors. On account of increase in turnover there has been decrease in operating loss during 2020-21 as compared to 2019-20. Production and Turnover during the year 2020-21 had been Rs.252.43 crore and Rs.202.76 crore respectively against Rs.158.29 crore and Rs.132.68 crore respectively during 2019-20. Operating loss during 2020-21 has been Rs.224.75 crore against ₹ 405.37 crore during 2019-20.

### 2.12 HMT Limited

HMT Limited, one of India's premier Engineering conglomerates was incorporated by the Government of India in the year 1953, with the objective of producing machine tools required for building an industrial edifice for the country. A manufacturing unit was established at Bengaluru in collaboration with M/s Oerlikon of Switzerland. Over the years the Company diversified into manufacture of various products like Watches, Tractors, Printing Machines, Food Processing Machinery, Presses, Bearings etc and established manufacturing facilities for these products across the country, at Bengaluru, Hyderabad, Ajmer, Kalamassery near Cochin, Pinjore near Chandigarh, Tumakuru near Bengaluru, Ranibagh near Nainital, Srinagar in Kashmir and Aurangabad.

To meet the challenges of globalisation consequent to the initiation of New Economic Policies of the Indian Government and in keeping with contemporary business models, the Company was restructured in the year 2000 with the formation of subsidiaries based on its various business portfolios under the ambit of a holding company. HMT Limited (HMTL) became a Holding Company having six subsidiaries with formation of three new subsidiaries namely HMT Machine Tools Limited (HMTMTL), HMT Watches Limited (HMTWL), HMT Chinar Watches Limited (HMT CWL) along with existing subsidiaries namely HMT Bearings Limited (HMTBL), HMT (International) Limited (HMTI) and Praga Tools Limited. The Tractors Business and Food Processing Machinery business were managed directly by HMT Limited – Holding Company. Subsequently, Praga Tools Limited was merged with HMT Machine Tools Limited in the year 2007.

CCEA approved closure of HMTWL, HMT CWL and HMTBL in its meeting on 6th January 2016. During October 2016, the Union Cabinet also approved closure of the HMT Tractor Division (Closure process of these entities is in progress). Consequent to the above closure decisions, the Holding Company – HMT Limited now directly manages only the Food Processing Machinery Division at Aurangabad and Auxiliary Business Division at Bangalore, while HMT(I) and HMTMTL are its two operational subsidiaries.

HMT Limited, the Holding Company manages the Food Processing Machinery Business directly. The Food Processing Machinery Division is located at Aurangabad in Maharashtra and the unit manufactures a variety of machinery for Milk Processing and other food processing applications. In order to encash the brand equity of HMT Watches, the Company has now taken up assembly and sale of Watches and Clocks, by outsourcing of components which is being done at Auxiliary business Division, Bengaluru.



*The Floral Clock at the HMT Heritage Centre & Museum Jalahalli, Bengaluru*





*Launch of "AMRUT" Series of watches at the HMT Heritage Centre & Museum, Jalahalli, Bengaluru on 15th August 2021.*

### 2.13 HMT Machine Tools Limited (HMTMTL)

HMT Machine Tools Limited, a Technology-Driven Company, comprises of six manufacturing units and a centralised Marketing Division with corporate headquarters at Bengaluru. The six manufacturing units are located at Bengaluru (Karnataka), Pinjore (Haryana), Kalamassery (Kerala), Hyderabad (2 Nos.) (Telangana) and Ajmer (Rajasthan) and the Marketing Division has a countrywide marketing and sales network to cater to the sales & service needs of the customers. HMTMTL manufactures metal cutting & metal forming machines including printing machines and Die-casting machines, catering to both domestic and export markets. The Company also provides services for reconditioning and refurbishing of machines of HMT as well as other makes. The Company has the distinction of supplying machines and equipment for special applications in Space, Atomic Energy & Defence Sectors, Railways, etc.

### 2.14 HMT (International) Limited (HMTI)

Incorporated in 1974 as a wholly owned subsidiary of HMT Limited, HMT(I), a Mini-Ratna Company, is the

export arm of HMT Group and also caters to import requirements of the Group. HMT (I) is regarded as one of the best export houses in the country with a global network of over 38 countries and it also sells products of other Indian Manufacturers, undertakes turnkey engineering projects and has made a niche for itself in the setting up of Vocational Training Centres, IT training Centres, SME Development Centres, Industrial Training Centres, Entrepreneur Training and Development Centres etc in various countries. Major thrust is given for implementation of Turnkey projects in the area of Tool Rooms and Training Centers.

### 2.15 Instrumentation Limited, Kota (ILK)

Instrumentation Limited (IL) Kota was set up in 1964 as a 100% government owned CPSE to cater to the growing Control & Instrumentation (C&I) needs of the Core Industrial Sectors viz. Power, Steel, Oil Refinery etc. and help achieve self reliance in this field. The company had its Registered Office & Headquarters at Kota, Rajasthan and manufacturing plants at Kota and Palakkad, Kerala. The Palakkad Unit is manufacturing control valves, butterfly valves, power cylinders,

actuators etc. for process industries and is accredited with ISO 9001:2015, ISO 14001:2015 and ISO 45001:2018 certifications.

The Instrumentation Limited was a sick unit and referred to BIFR in 1994. Looking into all the aspects (including revival and merger), the Union Cabinet on 30.11.2016 approved the closure of the Kota Unit of Instrumentation Limited and gave in-principle approval for the transfer of Palakkad Unit of Instrumentation Limited to the Government of Kerala (GoK).

The Kota unit of Instrumentation Limited closed on 18.4.2017 and the payment of salary, wages, VRS/VSS and other admitted dues of employees has been completed. After closure of Kota Unit, the Registered Office & Headquarters has been shifted to Jaipur, Rajasthan.

## 2.16 Rajasthan Electronics & Instruments Ltd. (REIL)

Rajasthan Electronics & Instruments Limited (REIL), Jaipur is Schedule 'C', "Mini-Ratna" and ISO 9001 & ISO 14001 certified Central Public Sector Enterprise. It was set up in 1981 as a Joint Venture of Government of India through Instrumentation Limited, Kota (ILK) and Government of Rajasthan through Rajasthan State Industrial Development and Investment Corporation Limited (RIICO) with 51% and 49% ownership respectively. The company has diversified its product range to Solar Photo-Voltaic modules/systems, Industrial Electronics, Security Surveillance system and Information Technology.

Pursuant to the approval of the Government of India in February, 2016, REIL has been delinked from ILK by transferring the entire shareholding to the President of India, thus making it an independent Central Public Sector Enterprise.

REIL addresses the needs of the rural sector through Solar Photo-Voltaic, milk testing and quality related needs to the milk cooperative and dairy industry and

automation solution and Information Technology & Communication application for e-governance, dairy vertical, small business and Government Sector. The focus is on supporting rural India through electronics, renewal energy and IT solutions. The recent addition is to set up infrastructure to promote e-mobility under the FAME scheme of Government of India.

The company has aligned its business activities towards the National missions of the Government such as National Solar Mission, National Dairy Plan, Make in India, Skill India, FAME India and Digital India, etc.

## 2.17 Scooters India Limited (SIL)

Scooters India Limited, Lucknow, set up in 1972 with a second hand plant bought from M/s. Innocenti of Italy, is engaged in manufacturing and marketing of three wheelers.

SIL was declared as a sick company on 11<sup>th</sup> August, 1992 and came under the purview of Board for Industrial and Financial Reconstruction (BIFR). A revival proposal was approved by the Cabinet in their meeting held on 31.01.2013.

The Cabinet Committee on Economic Affairs in their meeting held on 27.10.2016 approved the disinvestment of 100% shareholding of Government of India in Scooter India Limited (SIL). Accordingly, the process of strategic disinvestment was carried out as per guidelines of Department of Investment and Public Asset Management (DIPAM). However, the disinvestment process became unsuccessful due to non-availability of bidders. Subsequently, the Core Group of Secretaries on Disinvestment (CGD) in its meeting held on 28.11.2019 recommended that the proposal of DIPAM for closure of SIL may be processed for the approval of appropriate authority.

The Government on 20.01.2020, approved closure of Scooters India Limited (SIL) by offering VRS/VSS package to their employees and disposal of its assets. All the employees of SIL have been given VRS. The

action for transfer of land and other immoveable and moveable assets is in advanced stage.

## 2.18 Cement Corporation of India Ltd. (CCIL)

Cement Corporation of India Ltd. (CCI) was established in 1965 with the principal objective of setting up cement factories in the public sector to achieve self-sufficiency in cement production and to remove regional imbalance. It has units spread over 7 States/ Union Territories, located at Mandhar and Akaltara in Chhatisgarh; Nayagaon in Madhya Pradesh; Kurkunta in Karnataka; Bokajan in Assam; Rajban in Himachal Pradesh; Adilabad and Tandur in Telangana; Charkhi Dadri in Haryana. The Company became sick and was referred and registered with BIFR as a sick company in 1996. A revival package for CCI was approved in 2006 with expansion/ up gradation and modernization of three operating plants i.e. Rajban in Himachal Pradesh, Bokajan in Assam and Tandur in Telangana and closure/sale of seven non-operating plants.

During the period, up-gradation of railway line of Bokajan unit, from meter gauge to broad gauge line has been completed. Technology up-gradation measures have been taken up in all the three units. Capacity expansion of Bokajan unit by installing a separate line of 1200 tpd clinkerisation stream which encompasses the latest technology has been taken up. Other related activities such as construction of road, strengthening of ropeway, installation of pollution control equipment etc. are also being taken up. Utilization of pet coke as an alternative fuel has been started in priority at Rajban units. CCI has installed additional pollution control equipment comprising of ESPs and Bag Filters. CCI is also actively engaged in tree plantation work in all its units with a view to maintaining ecological balance.

The Cabinet Committee on Economic Affairs on 27.10.2016 approved, in principle, for the strategic disinvestment of CCI. Accordingly the process of disinvestment of CCI is underway.

## 2.19 NEPA Ltd.

NEPA Limited, Nepanagar, Madhya Pradesh was incorporated as a private enterprise on 26th January 1947 by M/s Nair Press Syndicate Limited under the name of "The National Newsprint and Paper Mills Limited" for production of newsprint. Government of India (GoI) took over the controlling interest of the company in 1958. GoI holds 97.82% equity shares in the capital of Nepa Limited. The name of the company was subsequently changed to Nepa Limited in February 1989. The company holds a license for the production of newsprint and writing & printing paper. The Nepa Limited has an installed capacity of 88,000 tonnes per annum (TPA).

The company was referred to the Board for Industrial and Financial Reconstruction (BIFR) in 1998 as its net worth had been completely eroded by accumulated losses as per annual results of 31st March, 1997. The production of the company stands suspended since July, 2016. The Company is currently undergoing a Revival and Mill Development Plan (RMDP) approved by the Cabinet.

## 2.20 Hindustan Paper Corporation Ltd. (HPC)

HPC was incorporated on 29.05.1970 as a wholly owned Govt. of India enterprise with an objective to establish new pulp & paper and newsprint mills in India. HPC has three subsidiaries and two major integrated pulp and paper mills under its management and control in Assam. These are (i) Hindustan Newsprint Limited, (ii) Nagaland Pulp and Paper Co. Ltd (NPPC Ltd), Nagaland and (iii) Jagdispur Paper Mills Ltd. HPC has two units namely Nagaon Paper Mills (NPM) and Cachar Paper Mills (CPM).

Hindustan Paper Corporation Limited (HPC) is presently undergoing liquidation as per the directions of National Company Law Tribunal (NCLT), New Delhi orders dated 02.05.2019 and the orders of the



National Company Law Appellate Tribunal (NCLAT) dated 29.05.2019.

## 2.21 Hindustan Newsprint Ltd. (HNL)

Hindustan Newsprint Limited (HNL), a wholly owned subsidiary of Hindustan Paper Corporation Limited (HPC) was incorporated on June 7, 1983 with the main objective of taking over the business of the erstwhile Kerala Newsprint Project (KNP), a unit of HPC. The Registered Office of HNL is at Newsprint Nagar, District Kottayam, Kerala. It is located at Newsprint Nagar, District Kottayam, Kerala and has an installed capacity of 1,00,000 tonnes per annum (TPA) of newsprint. HNL was producing standard Newsprint grades of 42GSM, 45 GSM and 48.8 GSM of quality, which was at par with the best available in the market. The operations of HNL stand suspended since 01.01.2019 due to various reasons. The NCLT Kochi Bench, on 28.11.2019 directed initiation of Corporate Insolvency Resolution Process (CIRP) against HNL under the Insolvency and Bankruptcy Code, 2016 and appointed a Resolution Professional for HNL.

The NCLT, Kochi Bench on 29.01.2021 had approved the resolution plan submitted by the Kerala Industrial Infrastructure Development Corporation (KINFRA) and had directed that the resolution applicant together with its nominees shall hold 100% share holding in the restructured share capital of the corporate debtor (HNL) under the new management. The resolution plan approved by the NCLT is presently under implementation.

## 2.22 Hindustan Photo Films Manufacturing Co. Limited (HPF)

Hindustan Photo Films Manufacturing Co. Limited (HPF) was incorporated on 30<sup>th</sup> November, 1960 with the aim to make the country self-reliant in the field of photo sensitive products. The company commenced commercial production in 1967. The company started

incurring continuous losses since 1992-93 and operations of the company came to standstill from April, 2013.

On its Net Worth, becoming negative on 31.03.1994, the company was referred to BIFR in 1995. BIFR vide order dated 30.01.2013 ordered for winding up of the Company. The CCEA in its decision dated 28.02.2014, inter-alia, decided for VRS at 2007 notional scale for all the employees and taking action for closure of the Company. All the employees have left the Company. The Hon'ble High Court of Madras vide its order dated 29.08.2016 has accepted the BIFR order of winding up of the company, however the Official Liquidator has not taken over the charge of the Company.

In the meantime, Debenture Trustee Canara Bank has filed an application in the Hon'ble Madras High Court in CP 114/2003 with a request to transfer the present Company Petition to the NCLT, Chennai for speedy disposal of the Company Petition. The winding up proceedings were transferred to NCLT, Chennai vide Madras High Court order dated 18.05.2020. NCLT, Chennai by its order dated 07.01.2022 initiated the Corporate Insolvency Resolution Process of the company under IBC, by appointment of an Interim Resolution Professional.

## 2.23 Hindustan Salts Limited (HSL)

Hindustan Salts Limited (HSL) was incorporated on 12th of April, 1958 under the Companies Act, 1956 with 100% shareholding of the GoI. The Authorized Capital of HSL is ₹ 60.00 Cr and paid-up Capital is ₹ 52.05 Cr. Company is presently engaged in production of Salt, Liquid Bromine and Magnesium Chloride.

It has two units, one at Kharaghoda, Gujarat wherein Company has one plant of annual capacity of 525 MT for manufacture of Bromine from left out waste material left out after production of Common Salt (i.e. virgin bittern) and one plant for production of Magnesium Chloride of installed capacity 5000 MT. It



has another unit at Mandi, Himachal Pradesh wherein Company is engaged in mining of rock salt at Darang, which is presently used as animal lick.

## 2.24 Sambhar Salts Limited (SSL)

Sambhar Salts Limited (SSL) is a subsidiary of Hindustan Salts Limited, was incorporated on 30.09.1964 under the Companies Act, 1956 wherein GoI holds 60% shareholding through HSL and 40% by the Govt. of Rajasthan. The Authorized Capital of SSL is ₹ 2.00 Cr and paid-up Capital is ₹ 1.00 Cr. SSL is engaged in production of salt and has about 90 Sq. Miles of production area spread over three Districts of Rajasthan i.e. Jaipur, Ajmer and Nagaur.

## 2.25 Engineering Projects (India) Limited. (EPIL)

Engineering Projects (India) Ltd. (EPI) was incorporated in the year 1970 with the main objective to undertake turnkey projects and consultancy services in India and abroad. EPI is the first Indian Company to undertake large civil and industrial projects abroad. EPI is a profit making, Mini Ratna Category-II Central Public Sector Enterprise in Contract & Construction and Technical Consultancy Services sector under the administrative control of the Ministry of Heavy Industries with 99.98% shareholding by the Government of India and PSUs. EPI has Pan-India presence having its Regional/ Zonal Offices at different geographical locations viz. New Delhi, Mumbai, Kolkata, Chennai, Guwahati, Hyderabad, Bhubaneshwar and Vishakhapatnam to undertake its operations across India besides project sites spread all over the country as well as in Oman and Myanmar. As on 30.09.2021, EPI has completed 594 projects in India and 33 projects abroad.

EPI is engaged in the field of execution of large and multidisciplinary industrial & construction projects on turnkey basis in the areas like Civil and

Structural Work, Metallurgical sector, Water Supply and Environmental Engineering, Defence, Housing, Townships, Hospitals & Institutional Buildings, Coal & Material Handling Systems, Industrial & Process Plants, Oil and Petrochemicals, Transmission Lines/ Sub Stations, Irrigation, Dams & Canal works, Roads & Highways, Shore Protection Works, Airports, Sports Stadia, Mining projects, Border Management, Flue Gas Desulfurization projects & Railways etc.

EPI provides integrated services from concept to commissioning. The services rendered by the Company include the specialized activities such as Feasibility Studies & Detailed Project Reports, Design and Engineering, Supply of Plant & Equipment, Quality Assurance, Construction & Erection, Trial run and Commissioning, Operation, Maintenance and Overall Project Management in almost all areas of engineering, consultancy & construction.

EPI is focusing its efforts on high value technological and infrastructure projects, securing Project Management Consultancy (PMC) contracts, diversification into new areas. EPI has earned net profit for the 19 years and it has paid dividend to the Government consecutively for 13 years. EPI has secured "Execution of various projects funded under RKVY RAFTER in Coastal Districts of Karnataka" valuing ₹ 1100 crs. from Department of Fisheries, Bangalore. EPI also secured "PMC Works for Ekalabya Model Residential School (EMRS) at various locations in Gujarat, Maharashtra and Andhra Pradesh" total valuing ₹ 720 crs. from National Education Society for Tribal Students, Ministry of Tribal Affairs, New Delhi and "Construction of Rail Over Bridges (ROBs) Works in various locations for Ministry of Railways" total valuing ₹ 929 crs. (approx). EPI at present is executing 119 projects for various reputed clients in different sectors.

# Heavy Electricals Engineering, Heavy Engineering and Machine Tool Industries

## 3.1 Heavy Engineering and Machine Tool Industries

### 3.1.1 Background

3.1.1.1 The Heavy Engineering and Machine Tool sector is a part of the Capital Goods sector. The sector comprises of plant and machinery, equipment / accessories required for manufacture / production, either directly or indirectly, of goods or rendering services required for replacement, modernization, technological upgradation and expansion. It also includes packaging machinery and refrigeration equipment.

3.1.2 The Heavy Engineering and Machine Tool sector consists of the following major sub-sectors:

- i. Machine Tools
- ii. Dies, Moulds and Press Tools
- iii. Plastic Machinery
- iv. Earthmoving and Mining Machinery
- v. Metallurgical Machinery
- vi. Textile Machinery
- vii. Process Plant Equipment
- viii. Printing Machinery
- ix. Food Processing Machinery

3.1.3 As per the present estimates, the Capital Goods industry contributes about 12% to the total manufacturing activity in India which translates to about 1.5% of GDP. This sector is crucial for the development of the country's economy for the following reasons:

- a. Capital Goods are considered essential for the development of domestic manufacturing capabilities from a national self-reliance perspective
- b. Capital Goods sector through a multiplier effect has a strong bearing on the growth and employment in the user industries as it provides critical inputs, i.e. machinery and equipment for the entire manufacturing sector and other related sectors.

3.1.4 The policy environment for the heavy engineering and machine tool sector is briefly detailed as under:

- a. No industrial license is required for the sector;
- b. FDI up to 100% permitted on automatic route (through RBI) except from the countries having land borders with India;
- c. Quantum of payment for technology transfer, design and drawing, royalty, etc. to the foreign collaborator is not restricted
- d. There is no restriction on imports and exports.

## 3.2. Overview of the Sub-Sectors

A brief status of the sub-sectors is detailed below:

### 3.2.1 Machine Tools

The Machine Tool industry is considered as the mother industry as it supplies machinery for the entire manufacturing sector. The manufacturers of machine tools are mostly SMEs, few of them are mid-sized manufacturers which have an annual turnover varying between ₹ 300-500 crore. The types of machine tools currently manufactured are general/special purpose machines, standard Computer Numerical Control (CNC) machines, gear cutting, grinding, medium size machines, electrical discharge machining (EDM), presses, press brakes, pipe bending, rolling, bending machines, etc.

### 3.2.2 Dies, Moulds and Press tools

The Indian tool room industry consists of commercial tool makers engaged in design, development and manufacturing of tooling in the country. In addition to commercial tool makers, several Government tool rooms–cum-training centers are also operating. The key tool room locations are Mumbai, Bengaluru, Chennai, Pune, Hyderabad and Delhi NCR.

### 3.2.3 Plastic Processing Machinery

The plastic machines being manufactured are injection moulding machines, blow moulding machines and extrusion moulding machines, etc. Product technologies are at par with the leading brands of the developed world. The global leading manufacturers/technologies have manufacturing presence in India through their wholly owned subsidiaries or through technology license arrangements.

### 3.2.4 Earthmoving, Construction and Mining Machinery

The Indian Earthmoving, Construction and Mining

Machinery produces backhoe loaders, compactors, mobile cranes, pavers, batching plants, crawler crane, transit mixer, concrete pump, tower cranes, hydraulic excavators, dumpers, mining shovel, walking draglines, dozers, wheel loaders, graders, drilling equipment, tunneling machine, etc. The global leading manufacturers/technologies have manufacturing presence in India through their wholly owned subsidiaries or through technology license arrangements.

### 3.2.5 Textile Machinery

A majority of the units engaged in the manufacture of textile machinery in the country are small and medium manufacturers. Major textile machineries include weaving machines, spinning machines, winding machines, processing machines, synthetic fiber machines, etc. High end technology machines other than in the spinning segment are mostly being imported.

### 3.2.6 Printing Machinery

A majority of the units engaged in the manufacturer of printing machinery are small and medium manufacturers. Major printing machines manufactured locally are web offset printing machines, UV coating curing machine, flexographic printing machine, screen printing machines, wire stitching machine, lamination machine, etc.

### 3.2.7 Food Processing Machinery

A majority of the units engaged in the manufacture of food processing machinery are small and medium manufacturers. Major food processing machinery manufactured in India are peelers, sorters, graders, pulpers, grinders, mixers, cookers, fryers, dryers, pulverizers, soya milk machines, food grain and coffee millers, bakery machinery, forming-filling- sealing machine, milking and dairy machines, juicing line, etc.

### 3.3 Production, Import and Export Statistics

The production, import and export data for the sub-sectors is detailed as under:

#### a) Production data

(₹ in crore)

S. No.	Sub sector	2016-17	2017-18	2018-19	2019-20	2020-21	CAGR (5 Year) (Base Year 2015-16)
1.	Machine Tools	5803	7294	9612	6152	6602	6.91%
2.	Dies, Moulds and Press Tools	14750	16068	13600	13682	12294	-3.90%
3.	Textile Machinery	6650	6900	6865	5355	5093	-4.99%
4.	Printing Machinery	13986	12968	12390	12678	10058	-6.85%
5.	Earthmoving and Mining Machinery	25000	31800	38900	31020	29021	9.42%
6.	Plastic Processing Machinery	3000	3375	3100	2350	3710	6.56%
7.	Food Processing Machinery	15246	15600	8750	NA	NA	-
8.	Process Plant Equipment	19500	18400	27400	29250	NA	-
9.	Heavy Electrical Equipment Sector	159221	175525	190132	180368	168949	3.12%

\*NA= data not available / not received from Capital Goods Industry Associations

Source: ( Industry Associations namely IEEMA, IMTMA, TAGMA, AFTPAT, PMMAI, PPMMAI, TMMA & IPAMA)

#### b) Import data

(₹ in crore)

S. No.	Sub sector	2016-17	2017-18	2018-19	2019-20	2020-21	CAGR (4 Year) (Base Year 2015-16)
1.	Machine Tools	6173	7752	12390	10288	5965	0.06%
2.	Dies, Moulds and Press Tools	1200	1350	5500	6356	6000	16.46%
3.	Textile Machinery	10098	10687	10834	9273	80.96	-4.71%
4.	Printing Machinery	7734	8322	8922	8969	6814	0.68%
5.	Earthmoving And Mining Machinery	4200	5500	5600	4812	1166	-20.18%
6.	Plastic Processing Machinery	2300	2600	1304	914	1860	-1.44%
7.	Food Processing Machinery	3686	3900	4742	4487	1965	-12.25%
8.	Process Plant Equipment	11925	10600	4200	4650	NA	-
9.	Heavy Electrical Equipment Sector	55291	55608	71570	67967	58336	1.56%

Source: Capital Goods Industry Associations viz. (i) IMTMA (ii) TAGMA (iii) TMMA (iv) IPAMA (v) PMMAI (vi) ICEMA (vii) AFTPAT

Note: The base year for CAGR is 2015-16.

NA: data not available / not received from Capital Goods Industry Associations

### c) Export data

(₹ in crore)

S. No.	Sub sector	2016-17	2017-18	2018-19	2019-20	2020-21	CAGR (4 Year) (Base Year 2015-16)
1.	Machine Tools	361	354	673	768	531	12.39%
2.	Dies, Moulds and Press Tools	1700	1600	1100	1138	973	-15.80%
3.	Textile Machinery	2438	2939	3665	2556	3307	7.06%
4.	Printing Machinery	1332	1235	1180	1230	1012	-5.82%
5.	Earthmoving and Mining Machinery	3700	4800	5300	3583	1816	-11.78%
6.	Plastic Processing Machinery	900	1100	247	335	1348	14.00%
7.	Food Processing Machinery	2178	2560	2686	2737	4555	15.66%
8.	Process Plant Equipment	9291	8950	7450	8330	NA	-
9.	Heavy Electrical Equipment Sector	39280	41677	52910	60698	63839	10.60%

Source: Capital Goods Industry Associations viz. (i) IMTMA (ii) TAGMA (iii) TMMA (iv) IPAMA (v) PMMAI (vi) ICEMA (vii) AFTPAL.

Note: The base year for CAGR is 2015-16.

NA: data not available / not received from Capital Goods Industry Associations

## 3.4 Schemes and Policy Interventions

### 3.4.1 Scheme for Enhancement of Competitiveness in the Indian Capital Goods Sector

The Government of India through the Department of Heavy Industry has launched a scheme for “Enhancement of Competitiveness in the Indian Capital Goods Sector” in November 2014. The objective of the Scheme is to address the various constraints faced by the sector. Under the Scheme financial assistance is provided for setting up of Centres of Excellence (CoE) for research and development at reputed universities / R&D Institutes by collaborating with industry, research institutes and the Government. The scheme also provides financial assistance for technology transfer under Technology Acquisition Fund Program (TAFP) to capital goods manufacturing units. Besides, the scheme also provides financial assistance for creating common Industrial Integrated Infrastructure Facility (IIIF) such as machine tool industrial parks and Common Engineering Facility Centres (CEFC) and

Test & Certification Centres (T&CC) for earthmoving, construction and mining machinery.

### 3.4.2 Centres of Excellence (CoE) for Technology Development

3.4.2.1 Under the Scheme, grants are given for setting up Centres of Excellence (CoE) for technology development at reputed academic and research institutions. Central assistance is given by way of one-time grant-in-aid not exceeding 80% of the project cost subject to a maximum of ₹ 100 crores for each CoE. The balance 20% is required to be invested by the Industry and participating organizations.

3.4.2.2 Eight CoEs have been established which have successfully developed 25 new indigenous technologies in the fields of machine tools, textile machinery, earth moving machinery, nano and sensor technologies, through Industry-Academia cooperation. These prototypes are being prepared for commercialization. The details of the technologies developed are given in Table below. These technologies



once commercialized will reduce import dependence and will enhance the technology generating capacity of India's capital goods sector. These CoEs are being developed in collaboration with industry partners at:

- (i) Central Manufacturing Technology Institute (CMTI), Bengaluru
- (ii) IIT Madras / Advanced Manufacturing Technology Development Centre (AMTDC)
- (iii) PSG College of Technology, Coimbatore
- (iv) Si'Tarc, Coimbatore
- (v) IIT Kharagpur
- (vi) M/s Heavy Engineering Corporation (HEC), Ranchi
- (vii) IISc Bengaluru
- (viii) IIT Delhi.



*Welding Technologies developed by Centre of Excellence at PSG College of Technology, Coimbatore*



*Thermal Compensation System for CNC Turning Centre developed by Centre of Excellence at IIT, Madras*



*Additive Manufacturing for High Performance Metallic Alloys developed by Centre of Excellence at IISc Bengaluru*



*5-axis Multi Tasking machine developed by Centre of Excellence at IIT, Madras*



*Orbital Motion Abrasive Cutting Machine developed by Centre of Excellence at IIT, Madras*



5 Cubic Meter Hydraulic Excavator - HEX 400 developed by Centre of Excellence at HEC Ranchi

**Table: Details of the Technologies Developed in Phase-I of the Scheme**

S. No.	Project Title	Technology	USP/ Novelty	Project Authority
1.	CoE at CMTI, Bangalore by TMMA for development of shuttle less rapiers looms of 450 RPM	Development of shuttle less rapiers looms of 450 RPM and 550 RPM	<p>a) Innovate &amp; Make in India: 1st high speed Shuttleless rapier loom (450rpm) to be successfully designed &amp; developed in India.</p> <p>b) Enabling Indian Textile Machinery Manufacturers to compete in the local &amp; global market with indigenously developed, state of the art technology in High speed shuttleless looms.</p> <p>c) Saving of foreign exchange: As per the data published by TMMA, an annual foreign exchange outflow of Rs 600 crores is incurred towards import of this machine.</p>	CMTI, Bangalore
2.	CoE at IIT, Madras for development of 11 advanced technologies for Machine Tools & Production Technology	a. Development of 5-axis Multi-tasking Machine	Multi-tasking machine capable of performing multiple machining operations like turning, milling, grooving, gear cutting / hobbing, boring, drilling, reaming, grinding, fly cutting, threading, etc. in a single setup. The technology is not available in India and is imported at huge cost. The development of the machine caters to a wide sectors such as automotive, oil and gas, power generation equipment manufacturers, defence and aerospace, railways, textiles and will ensure import substitution.	IIT Madras
		b. Development of 5-axis Universal Machining Center	Technology developed is a Mother Machine with rotary hydrostatic table and 5-axis simultaneous machining capability to machine in a single setup. These machines include technologies that are first in class indigenous development which cater to wide sectors such as automotive, oil and gas, power generation equipment manufacturers, defence and aerospace, railways, die and mould making industries.	



S. No.	Project Title	Technology	USP/ Novelty	Project Authority
		c. Development of Orbital Motion Mechanism for Abrasive Cutting	Technology for cutting of materials for metallographic inspection without thermal damage and cutting induced stresses. Smooth cut surface generation for easy post processing. Technology is a substitute for import variants.	
		d. Development of Direct Drive Abrasive Cutting Machine	Technology for cutting of materials for metallographic inspection with smooth cut surface, free of vibration effects for easy post processing. Technology is a substitute for import variants.	
		e. Development of Automated Multi-station Grinding Polishing Machine	Technology for automated polishing of specimen to be subjected for metallographic inspection. Technology to replace manual machines widely used in the Indian Industry sector and increase quality, consistency and productivity of the inspection process. Technology is not available in India and will create a niche sector for these class of machines.	
		f. Development of 5 kW axis drives and 25 kW spindle drives for machine tool applications	Machine Tool drives being developed in this project is not indigenously developed in India till date, due to lack of know-how. The developed know how includes (1) Drive architecture for synchronous and asynchronous motors (2) Communication interface between drive / controller and motor and, (3) Control algorithm for current / voltage / position control. The drive developed has a large market in India, since it is a vital component in all CNC Machine tools. The technology developed will reduce import content, drain of foreign exchange and improve the capability of indigenous manufactures.	
		g. Development of Hydrostatic Systems (Guideways and Spindles) for Machine Tools	<p>Import Substitute: Hydrostatic Guideways and spindles developed in this project are currently not being manufactured in India due to the lack of manufacturing know-how. Most of them are imported from Germany, USA and Japan. The completion of this project would fill the gap and make the technology available to the Indian Machine Tool Industry. The developed technology is a critical sub-system for the development of high precision machines and will enable the indigenous development of ultra-precision and ultra-high precision machine tools.</p> <p>Low cost: Another USP is the low cost of the product which will be as low as one third of the import cost of the product from international market.</p>	



S. No.	Project Title	Technology	USP/ Novelty	Project Authority
		h. Automation of Grinding Process Intelligence	<p>1. Entry into Industry 4.0: Current trend in Manufacturing is implementation of Smart Manufacturing and Industry 4.0. This project aims to uncover the technology behind smart manufacturing and automation for Grinding Process enabling Indian Machine Tool Industry to foray into Industry 4.0 and equip themselves with the Smart Manufacturing techniques being used internationally.</p> <p>2. Process Intelligence: Current technologies available commercially are only with respect to the machine and factory intelligence. Process intelligence is not being developed due to the lack of knowledge of process science. This project will fill the gap by incorporating the process science into automation software.</p>	
		i. Thermal Compensation Strategy in CNC lathes	Thermal error contributes to more than 70% of the errors (about 40 $\mu$ m) originating in a machine tool. The developed technology provides a thermal compensation algorithm to predict and compensate the thermal error of a CNC machine tool, i.e. from 40 $\mu$ m to 5 $\mu$ m. The developed technology will improve the consistency of the machining quality of machine by 90% thereby reducing the correction and rejection costs. The technology enables the machine to be “Smart Machine” tool and is one. The developed algorithm provides a framework to (1) map thermal errors, (2) develop prediction algorithm for thermal error compensation, (3) an implementation methodology and hardware for integration with machine tool. Currently the technology has been exclusive to imported machine tools and comes packaged as part of a machine tool. The developed framework enables the technology to be implemented in a wide variety of machine tools at a low cost.	
		j. Development of Low Cost Machine Tending Robot	Machine Tending Robots developed in this project will have high business potential as the cost will be lower than imported, increases the productivity due to unattended operation. Helps proliferation of robotics in Indian manufacturing sectors and technical universities at affordable cost, generates foreign exchange savings and improve the capability of indigenous manufacturers.	

S. No.	Project Title	Technology	USP/ Novelty	Project Authority
		k. Development of Ultra Precision Micromachining Center	Ultra-Precision Micro machining centre developed in this project is a high precision machine with niche application areas including health care - dental implants, jewellery, watch components, aerospace - micro dies and moulds. These machines are currently not being manufactured in India due to the lack of manufacturing know-how. Most of them are imported from Germany, Swiss and Japan. The developed knowhow will provide a platform for development of ultra-precision and ultra-high precision machines. The completion of this project would fill the gap and make the technology available to the Indian Machine Tool Industry.	
3.	CoE at PSG College of Technology for development of three Welding Technologies	1. Automated Welding Systems for Specific Industrial Application; 2. Intelligent Welding Power Supply System with waveform shaping Techniques; 3. Alloy design for Welding Simulation & Analysis for Development of New Welding Electrodes & Filler Metals.	Development of Welding automation products, power sources and consumables towards import substitution.	PSG College of Technology, Coimbatore
4.	COE at Coimbatore by Si'tarc on Smart Submersible (6 inch) Pumping Solutions for Industrial and Water Supply Applications	Development of Smart Submersible (6 inch) Pumping Solutions for Industrial and Water Supply Applications	Technology to operate submersible motor at higher speed, 4000 rpm and above using BLDC technology. With this advanced technology Indian Pumps can compete in the world market on better technology rather than on price alone.	Si'tarc, Coimbatore
5.	COE at HEC Ranchi Development of 5 Cubic Meter Hydraulic Excavator - HEX 400	Development of 5CuM Hydraulic Excavator - HEX 400	Electronically controlled hydraulic system. External pilot line is eliminated for controlling the main control system. Precise controls of system.	HEC, Ranchi
6.	COE at IISc Bangalore by SID for Additive Manufacturing for High Performance Metallic Alloys	Development of additive manufacturing machines based on electron beam/plasma/laser technologies	Additive Manufacturing Technologies for a) High performance super metallic alloys b) Metal powdering technologies c) Mass production for CG industry d) Medical grade materials	IISc, Bangalore

S. No.	Project Title	Technology	USP/ Novelty	Project Authority
7.	COE at IIT-Kharagpur along with a common facility namely Innovation Lab at IIT-Kharagpur, West Bengal	(1) Non-metallic Inclusions (NMI) and its control, new steel products through energy efficient EAF;	It is a process technology and not much research on “inclusion” exists.	IIT, Kharagpur
		(2) Multi- sensor integrated robotic system for hazardous jobs in manufacturing industry-	The equipment targeted would help in improving consistency and reliability of sampling and measurement along with enhancing worker’s safety.	
		(3) Exploring solutions for various technological challenges in metal additive manufacturing technology and sharing the relevant know how with the Indian heavy engineering industries-	The projects are about exploring solutions for various technical challenges in metal additive manufacturing technology and sharing the relevant knowhow with Indian heavy industry.	
		(4) (a) Selection of raw materials for additive manufacturing applications in relation to the design requirements; (b) Life cycle analysis of additive manufacturing process for different materials-	Both the projects are related to additive manufacturing. The projects are about exploring solutions for various technical challenges in metal additive manufacturing technology and sharing the relevant knowhow with Indian heavy industry.	
		(5) Remote monitoring and real time control of defects in friction stir welding process and preventive health monitoring of friction stir welding machine	It is a sensor based process helping in online inspection, correction of defects etc.	
		(6) Digital manufacturing and industrial internet of things for enhanced supply chain co- ordination, quality and maintenance-	Under the project, a small digital manufacturing lab will be set up, which would help the MSMEs to experience and understand the advantages of this set up.	
8.	Centre of Excellence for Automated Guided Vehicle in Textiles by IIT Delhi	Design and development of robot for sliver can transfer from one machine to designated machine	The objective of the project is to automate the can transfer process in the textile industry.	IIT Delhi
9.	TAFP by HMT MTL on Development of Four Guideway CNC Lathe	Development of Four Guide way CNC Lathe	Analysis of Head stock for Heavy Duty CNC four Guideway Lathe with weight carrying capacity 20Ton, 75 kW spindle power and more with Admit between centre 6000mm confirming ISO test standards. Developed as “Make In India” initiatives. Indigenously developed in INDIA in association of Fraunhofer, Germany for analysis of Head stock for load carrying capacity of 20 Ton.	HMT, Bangalore

S. No.	Project Title	Technology	USP/ Novelty	Project Authority
10.	TAFP by HMT MTL on Develop Turn Mill Centre with Y axis SB CNC30TMY and integrate high precision C axis on the Main Spindle	Development of a Turn Mill Centre with Y axis SB CNC30TMY and integrate high precision C axis on the Main Spindle	The Machine has been developed under “Make In India” first Turn Mill Centre with C-Axis produced in India by HMT with Design & Development for C-axis by Fraunhofer, Germany .	HMT, Bangalore
11.	TAFP by Allied Engineering Pvt. Ltd on Manufacturing of Heavy Duty High Reliability Electrical Specialised Power Cables	Manufacture of heavy duty electrical specialised power cables	The objective of the project was to set up a flexible manufacturing system for specialized heavy duty electrical power cables. AEW had major interventions in Cable design & Material selection, Conductor processing technology and Insulation technology which are the critical parameters required for speciality power cable technology. It shall have the following techno-socio-economic benefits – employment generation, skill development of manpower, and overall up-liftment in quality of life by using better technologies, additional tax generation, saving in forex and enhancing nation’s global competitiveness by exports.	Allied Engineering Pvt. Ltd, Delhi
12.	TAFP by PTC Industries Ltd on development & commercialization of Titanium Casting with Ceramic Shell-ing Technology	Development of the first ever titanium casting facility in India	The objective of this project is to set up the first ever Titanium Casting manufacturing facility in India. Titanium Castings have wide applications in Heavy Industries like Energy & Nuclear Power, Oil, Gas & Petrochemical, Marine & Shipping, Aerospace & Defence. This is the latest and most advanced technology for producing Titanium cast components in the world available with very few companies worldwide	PTC Industries Ltd., Lucknow
13.	TAFP by IPM Pvt. Ltd on Robotic Laser Cladding Technology for Hydro Turbines using Tungsten Carbide Powder	Development of Robotic Laser Cladding Technology for hydro turbines using tungsten carbide powder	The proposed technology shall provide a cutting-edge solution to erosion faced by the underwater hydro turbine components, thereby saving the annual loss to Indian hydro power industry due to outage and the amount spent annually on new imported hydro turbine components. The USP of the new technology in comparison to conventional technology include: 3X life; Faster turnaround time; Faster repair Speed; Highly Energy Efficient ; Coating Possible In Difficult to Reach Areas; Higher Erosion & Wear Resistance; Environment Friendly Technology.	IPM Pvt. Ltd., Delhi

### 3.4.3 Common Engineering Facility Centre (CEFC)

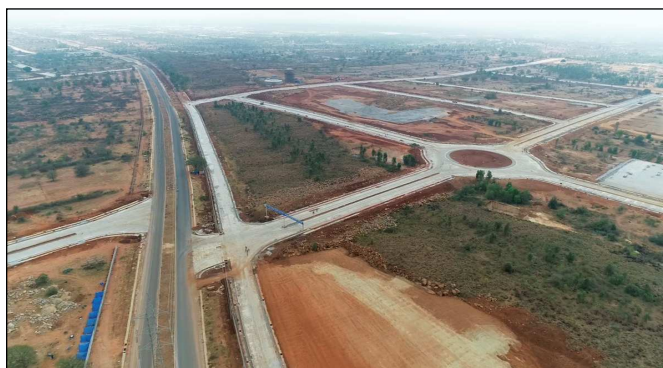
3.4.3.1 Common Engineering Facility Centres (CEFC) under the scheme would enable Machinery manufacturers to create infrastructure facilities such as common precision machining, heat treatment, quality control, skill infrastructure design and other such common facilities required of industrial clusters level in the region. Central assistance is given by way of a one-time grant-in-aid not exceeding 80% of the project cost for setting up of Common Engineering Facility Centres and balance 20% is required to be invested by the Special Purpose Vehicle.

3.4.3.2 Nine such CEFCs have been established as detailed below:

- (i) Training & Skill Development Centre at HMT Machine Tool, Bengaluru
- (ii) CEFC by HEC, Ranchi
- (iii) CEFC at Bardoli, Surat for Textile Engineering by Science and Engineering Technology Upliftment (SETU) Foundation
- (iv) Industry 4.0 Demo-cum-Experience Centre at Pune by Samarth Udyog Technology Forum (SUTF)
- (v) Industry 4.0 Demo-cum-Experience Centre at IIT Delhi by IITD-AIA Foundation for Smart Manufacturing (IAFSM)
- (vi) Industry 4.0 Demo-cum-Experience Centre at IISc Bengaluru
- (vii) Industry 4.0 Demo-cum-Experience Centre at CMTI, Bengaluru
- (viii) Design and Training Centre for Steel Plant Equipment at Bahadurgarh (Haryana) by Korus
- (ix) Modernization of Precision Metrology Lab at CMTI, Bengaluru.

### 3.4.4 Integrated Industrial Infrastructure Facility (IIIF)

3.4.4.1 Under the Integrated Industrial Infrastructure Facility (IIIF) component, the Tumakuru Machine Tool Park (TMTP) with an area of about 540 acres is being set up in Karnataka. The park is being established by an SPV formed by the Karnataka Industrial Areas Development Board (KIADB), Govt. of Karnataka and the Department of Heavy Industry, Government of India at an estimated cost of approximately ₹ 421 crores. This machine tool park shall provide the infrastructure for setting up about 150 machine tool manufacturing units and shall facilitate locating the component and machinery manufacturers at one place. This park thus aims to make the sector cost effective, encourage the manufacture of hi-tech machine tools, enhance export capability and attract more investment. TMTP has about 343 acres of allotable land and so far 33 plots with 118 acres of land have been allotted to eligible investors.



*Aerial View of Tumakuru Machine Tool Park, Karnataka*



*Integrated Machine Tools Park near Tumakuru, Karnataka*



### 3.4.5 Technology Acquisition Fund Programme (TAFP)

The Technology Acquisition Fund Programme (TAFP) helps the capital goods industry to acquire and assimilate specific technologies readily available for acquisition. Under TAFP capital goods sector units are supported by way of a grant of up to 25% of the cost of technology acquisition of each technology with a ceiling of Rs.10 crore. Under TAFP, five foreign manufacturing technologies have been acquired pertaining to CNC Lathe technologies, Titanium Castings, High Voltage Cables and Laser Cladding of hydro-turbine blades.

### 3.4.6 Development of web based open manufacturing technology innovation platforms

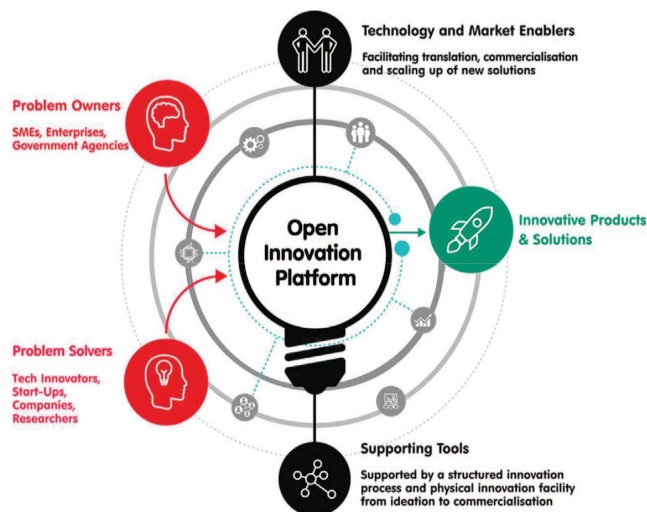
The Ministry of Heavy Industries has developed web based open manufacturing technology innovation platforms under the ongoing Capital Goods Scheme. These platforms will help in bringing all India's technical resources and the concerned Industry on to one platform to kick start and facilitate identification of technology problems faced by Indian Industry and crowd source solutions for the same in a systematic manner so as to facilitate start-ups and angel funding of India innovations. This includes the development of the key 'mother' manufacturing technologies' indigenously through 'Grand Challenges' on the Platforms to help achieve the vision of an Aatmanirbhar Bharat and a globally competitive manufacturing sector in India.

Shri Prakash Javadekar, the then Hon'ble Minister of Heavy Industries and Public Enterprises has inaugurated (through virtual mode) the Technology Innovation Platforms in the presence of Shri Arjun Ram Meghwal, the then MoS HI&PE, and Shri Arun Goel, Secretary, Heavy Industries on 2nd July, 2021.

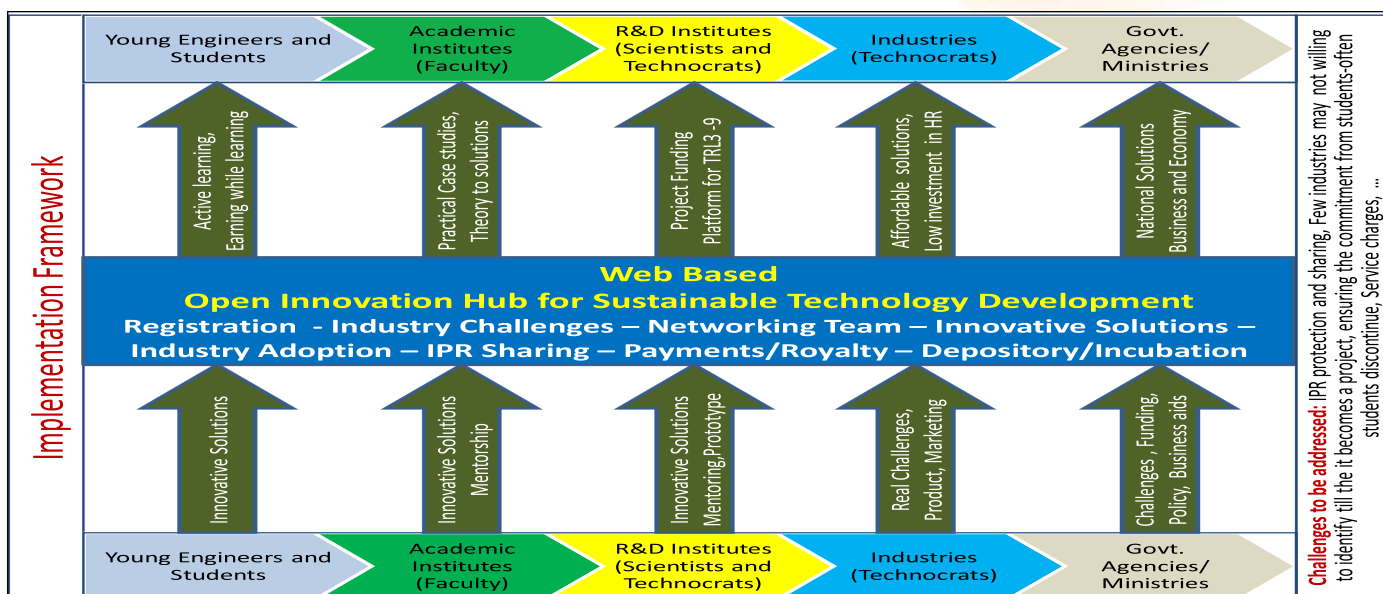
Six Technology Platforms have been developed by IIT Madras, Central Manufacturing Technology Institute (CMTI), International Centre for Automotive

Technology (iCAT), Automotive Research Association of India (ARAI), BHEL and HMT in association with IISc Bangalore. These platforms will focus on development of technologies for the globally competitive manufacturing in India. These platforms will facilitate industry (including OEMs, Tier 1 Tier 2 & Tier 3 companies & Raw Material Manufacturers), start-ups, domain experts/professionals, R&D institutions and academia (colleges & universities), to provide technology solutions, suggestions, expert opinions etc. on issues involving manufacturing technologies. Further, it will facilitate exchange of knowledge with respect to research & development and other technological aspects. Over 60,000 Students, Experts, Institutes, Industries and labs have already registered on these platforms. Following are the links to register on the six Technology Platforms:

- <https://aspire.icat.in>
- <https://sanrachna.bhel.in/>
- <https://technovuus.araiindia.com/>
- <https://techport.hmtmachinetools.com>
- <https://kite.iitm.ac.in/>
- <https://drishti.cmti.res.in/>



Web based open manufacturing Technology Innovation Platforms



### 3.4.7 Capital Goods Scheme Phase II

MHI has notified the Phase II Scheme of the 'Enhancement of Competitiveness in the Indian Capital Goods Sector' on 25.01.2022, which will further lead to indigenisation of products and technology. The Scheme proposal has been approved with total financial outlay of ₹ 1207 crores including Government Budgetary support of ₹ 975 crores.

## 3.5 Heavy Electrical Engineering

### 3.5.1 Background

Heavy Electrical Engineering Industry is a key manufacturing sector, which caters to the needs of the energy sector & other industrial sectors. Major equipment, like boilers, generators, turbines, transformers, and switch gears and related accessories, are manufactured by this sector. The performance of this industry is closely linked to the power capacity addition programme of the country.

There is a strong base for the manufacture of Heavy Electrical equipment in the country. Manufacturers of Heavy Electrical equipment have augmented their installed capacity to meet future power capacity addition targets, by fulfilling domestic and export

demand. Manufacturers of Heavy Electrical equipment have expertise in thermal power technology and are in the process of commercializing super-critical thermal power technology for unit size of 800 MW and above.

### 3.5.2 Steam Generators

Steam generator is a pressurized system in which water or other fluid is heated. The heated or vaporized fluid exits the boiler for use in various processes or heating applications. Steam thus generated may be used directly as a heating medium, or as the working fluid in a prime mover to convert thermal energy to mechanical work, which in turn may be converted to electrical energy. Although other fluids are sometimes used for these purposes, water is by far the most common. Boilers find application in key industries sectors of oil & gas, power, steel, fertilizers, chemicals, cement etc. The Indian industry is capable of manufacturing various types and large capacity of utility boilers and auxiliaries. BHEL is the largest manufacturer of boilers in the country. It has the capacity to manufacture conventional steam generators for utilities ranging from 30 MW to 660 MW capacity and super critical boilers up to 800 MW capacity using coal, lignite, oil, natural gas or a combination of these fuels.

As per Industrial Statistics Unit (ISU), DPIIT, production figures for the last four years for non SSI Sectors are as under:-

Product	Unit	2017-18	2018-19	2019-20	2020-21
Boiler	₹ Crore	11,847.75	111789.32	8986.81	6728.36

#Source-ISU

### 3.5.3 Turbines and Generators

Turbine is a rotary engine that uses a continuous stream of fluid (steam or liquid) to propel the shaft of generator by generating mechanical power. Then, the generator converts this mechanical power to electrical power.

Indigenous industries have the capability to manufacture various kinds of turbines up to unit size of 800 MW for steam, 270 MW for Hydro and 260 MW for gas turbine.

Generators up to 800 MW size for utility and combined cycle application are also manufactured within the country. The Alternating Current (AC) Generator industry in India is adequately catering to the alternative power requirement of large and small industries, commercial establishments and domestic sector. For this sector, manufacturers in India are capable of manufacturing AC Generator from 0.5 KVA to 25000 KVA with specified voltage ratings.

As per Industrial Statistics Unit (ISU), DPIIT, production figures for the last four years for non SSI Sectors are as under:-

Product	Unit	2017-18	2018-19	2019-20	2020-21
Turbines (Steam/hydro)	₹ Crore	3,471.52	2640.75	2423.65	2949.32
Electrical Generators	₹ Crore	7,136.15	6951.90	6366.15	4200.78

#Source-ISU

### 3.5.4 Transformers

A transformer changes voltage levels and facilitates transmission, distribution and utilization of electrical power in the most efficient and economic manner. The health of transformer industry depends largely on the power generation and transmission system programme. The major users of this product are the State Electricity Boards, Power Grid Corporation of India Ltd. and other industries. Some special types of transformers are also manufactured, which are used for the purpose of welding, traction, electrical furnaces etc. The Transformer Industry in India has developed for over 55 years and has a well matured technology base.

As per Industrial Statistics Unit (ISU), DPIIT, production figures for the last four years for non SSI Sectors are as under:-

Product	Unit	2017-18	2018-19	2019-20	2020-21
Trans-formers (PDT and special type)	Mega-Volt-Amperes (MVA)	1,15,543.96	111554.98	91506.72	64948.71
Trans-formers (Small)	Thousand Nos.	9,761.38	11065.52	9729.48	62299.88
Electrical trans-formers, static converters and inductors	Thousand Nos.	25,363.81	26379.35	22273.64	11565.36

#Source-ISU

### 3.5.5 Switch gear & Control gear

Switch gear refers to the combination of electrical disconnects, fuses and/or circuit breakers used to isolate and de-energise electrical equipment to allow work to be done and to clear faults downstream. Switch gear & Control gear are indispensable not only in transmission and distribution of power, but wherever there is a need to access and control electricity.



The Indian Switchgear Industry manufactures the entire range of circuit breakers from bulk oil, minimum oil, air blast, vacuum to sulphur hexafluoride as per standard specification in the entire voltage range from 240 V to 800 KV. This Sector in India has a fully developed mature industry, producing and supplying a wide variety of switch gear; and control gear items needed by the industrial and power sector.

Secondary equipment such as relays/control gear used for various types of fault protection have made significant advances due to major developments in the field of electronics. Owing to technology advancement, compact size & reliability, digital relays have become popular. As per recent trend, in addition to protection and control of power, monitoring and signalling are becoming integral parts of switch gears.

As per Industrial Statistics Unit (ISU), DPIIT, production figures for the last four years for non SSI Sectors are as under:-

Product	Unit	2017-18	2018-19	2019-20	2020-21
Switchgear/ Control gear	Thousand Nos.	286971.60	301476.42	278719.95	286917.21

#Source-ISU

### 3.5.6 Current issues/ Ongoing Policy Initiatives

#### Technical Regulations /Quality Control Orders (QCO)–

With tariffs coming down globally, non-tariff measures in the form of technical regulations have become important for trade. A large segment of Heavy Electrical sector is unregulated and has a wide regulatory gap compared to other countries in critical areas like national security; prevention of deceptive practices; protection of human health and safety; animal and plant life and health, and the environment.

Therefore, to address the regulatory gap in the country in the area of quality adoption and to enforce technical standards, MHI has initiated the process of notifying technical regulation, so as to ensure

safety, quality and regulate the import of unsafe, substandard products. Further to support 'Make in India' programme, strengthen 'Zero Defect – Zero Effect', protect consumers, enhance competitiveness of Indian electrical equipment industry.

Under the updated status of Technical Regulation/ Quality Control Orders issued by Ministry is as under:-

- Electrical Transformers (Quality Control) Order (QCO) for Outdoor Type Oil Immersed Distribution Transformers upto and including 2500 kVA, 33kV vide Gazette of India Notification dated 7th, May 2015.
- Electrical Equipment (Quality Control) Order, 2020 for Low Voltage Switchgears and Control gears has been notified vide Gazette notification no. S.O 4044 (E) dated 11th November 2020. For smooth implementation of the Order, following steps have been taken in consultation with BIS and stakeholders:
  - On receipt of representation of manufacturers and Association, the implementation time of the QCO has been extended by one year.
  - Dedicated groups have been formed to expedite the guidelines formulation and resolving the issues related to testing.

### 3.5.7 Public Procurement Order

Under the "Atamanirbhar Bharat" initiative to provide purchase preference domestic manufacturers, Ministry has issued Public Procurement, (Preference to Make in India) (PPP-MII) Order on Industrial Boilers (Steam generators) vide notification dated 29<sup>th</sup> September 2020 in further reference to the latest PPP-MII Order issued by DPIIT dated 16.09.2020. The PPP-MII Order notifies the goods and component having sufficient local competition and capacity for manufacture of the Industrial Boilers.

## 4.1. Overview of the Automotive Industry:

### 4.1.1 Auto Sector:

The automobile industry is one of the key drivers of the Indian economy. Since the liberalization of the sector in 1991 and allowing 100 percent FDI through automatic route, Indian automobile sector has come a long way. Today, there is a presence of almost every global auto manufacturer in the country. All categories of vehicles like two-wheeler, three wheelers, passenger cars, light commercial vehicles, Trucks, Buses, Tractors, heavy Commercial vehicles etc. are produced in India. India is the largest manufacturer of 2W and 3W and 4<sup>th</sup> largest manufacturers of passenger cars in the world. The manufacturing of automobiles including trucks, buses, cars, three wheeler/two wheelers etc. in India has risen at a very high pace. The industry produced about 22 million vehicles including Passenger Vehicles, Commercial Vehicles, Three Wheelers, Two Wheelers and Quadricycles in financial year 2020-21 and about 16 million vehicles have been produced during the April 2021 to December 2021.

The Indian auto component industry, with a well evolved manufacturing ecosystem, produces a wide variety of products including engine parts, drive transmission and steering parts, body and chassis, suspension and braking parts, equipment and electrical parts, besides others to service the dynamic automobile industry. The sector has also come under tremendous

pressure due to lacklustre performance of the vehicle industry. According to the National Skill Development Corporation (NSDC), the auto component industry provides direct employment for over 50 lakh people. The automotive component industry that contributes 2.3 per cent to India's GDP, 20-25 per cent to its manufacturing GDP.

### 4.1.2 Agricultural Machinery & Tractors Sector:

Agricultural Machinery mainly consists of Agricultural Tractors, Power Tillers, Combine Harvesters and other Agriculture Machineries & Implements. Due to negligible production of Power Tillers, Combine Harvesters and other Agricultural Machineries, this sector is mainly dominated by Agricultural Tractors. Indian Tractor Industry is the largest in the world (excluding sub 20 HP belt driven tractors used in China), accounting for one third of the global production. The other tractor markets in the world are China and United States.

Indian Tractors were exported to US and other countries like Malaysia, Turkey, etc. Indian players have aggressively started exporting to African countries by bidding for government tender requirement. As such, Indian tractors are gaining acceptance in international markets. As the cost of tractors in India is cheapest in the world, there is tremendous scope for improvement of export of tractors in future.

#### 4.2. Role of MHI in development of Automobile Sector:

MHI is not the custodian of any Act/ Rules related to Automobile sector. However, Automobile sector is governed and impacted by various rules and regulations enacted by different departments/ministries viz

- MORTH: CMVR
- MOEFCC: Emission regulations
- MOPNG: Regulations related to Fuel Efficiency and Fuel used for vehicles (BS VI)
- MOP: Energy Efficiency requirement through BEE
- MOF: Taxation structure
- DOC: Foreign Trade Agreements
- DPIIT: Internal Trade and Make in India

MHI is mainly engaged in policy advocacy for promotion of Automobile industries. In addition, MHI work towards achieving target set under Automotive Mission Plan and for promotion of Electric Mobility.

#### 4.3. Important initiatives taken in respect of auto sector by the Ministry of Heavy Industries:

MHI being the nodal Ministry for automobile and auto component industry, takes up an array of issues relating to automobile sector at various platforms for its growth. In this regard, MHI has taken various important initiatives, as outlined below:

##### 4.3.1 Development Council for Automotive and Allied Industries (DCAAI):

The Development Council constituted under the chairmanship of Secretary, Heavy Industries is focused upon the issues relating to the growth of the sector. This forum provides an opportunity to identify key areas

of concern for which appropriate policy modulations and other identified areas of action can be taken up by various Ministries/Departments of the Government of India. According to the Industries (Development and Regulations) Act, 1951, “A *Development Council shall perform such functions of a kind specified in the Second Schedule as may be assigned to it by the Central Government and for whose exercise by the Development Council it appears to the Central Government expedient to provide in order to increase the efficiency or productivity in the scheduled industry or group of industries renders or could render to the community or to enable such industry or group of industries to render such service more economically*”.

The funds allocated under DCAAI to the Ministry are utilised for supporting R&D & study projects received from Industry in Collaboration with IITs/NITs, ARAI and such like Institutions through Expression of Interest (Eoi) issued by Department. The proposals sent are evaluated by a Screening Committee (headed by Joint Secretary) and Main Committee (Apex Committee – headed by Secretary, MHI) considers the projects and accords them final administrative and financial approval.

##### 4.3.2 UNIDO-ACMA-MHI Cluster Development Project:

The project aims to provide practical services to Small and Medium Enterprises (SMEs) for enhancing the performance of domestic SMEs in the automotive component industry to facilitate their inclusion into national, regional and global supply chain requirements (quality, cost and delivery), to upgrade and enhance the competitiveness of an increasing number of target companies along the supply chain in India, including lower tier suppliers. The 1<sup>st</sup> Phase this project was completed in June, 2018 and 2<sup>nd</sup> Phase commenced from 1<sup>st</sup> January, 2019 for a period of three years.

### 4.3.3 Indo-German Joint Working Group (JWG) on Automotive Sector:

Indo-German Joint Working Group (JWG) on automotive sector was established under the aegis of Indo-German Joint Commission on Industrial and Economic Cooperation (JCM). This is the fifth JWG; the other four groups are in the areas of Agriculture, Coal Infrastructure and Tourism. The first meeting of the JWG was held on 6.2.2009 in New Delhi with three sub-working groups i.e. (i) Sub-working Group on Technology (ii) Sub-working Group on Commercialization & Framework Development and (iii) Sub-working Group on Institutional Cooperation, Training & Skill Development. The last meeting (13<sup>th</sup> meeting) of this Joint Working Group was held in January 2022. JS (Auto) co-chaired the aforesaid meeting as a representative of MHI.

### 4.3.4 Automotive Skill Development Council (ASDC):

Ministry of Heavy Industries has taken an initiative for “*Formulation of Skill Development Plan*” with a view to make available adequate, trained manpower for sectors like machine tools, heavy electrical, auto industry etc. so as to ensure proper streamlined and high growth rate during the current fiscal and in future. As far as auto sector is concerned, the task of identifying the skill gaps in the industry was undertaken through the specialized group formed during the framing of AMP 2006-16, whereby the industry was expected to require an additional 25 million workforce by 2016. Based on the deliberations held in the Ministry on various occasions, the Society of Indian Automobile Manufacturers (SIAM) prepared a Detailed Project Report (DPR). Accordingly, an Automotive Skill Development Council (ASDC) has been set up under the oversight of NSDC. ASDC was incorporated as a society under the Societies Registration Act, 1860 in March 2011.

The Indian Automotive Industry plays a major role in

the country’s manufacturing and employment sector to emerge as one of the most important driving forces in the opening up of the economy and its growth. To achieve this, the industry needs skill support for its employees. The skilling part is being taken care of by ASDC through different programs. These programs have an extensive digital outreach and are targeted to re-skill the workforce at various levels. This endeavor of ASDC is rooted in its belief that training people and skilling them with state of the art technologies is not just about giving jobs but it is about keeping the workforce employable for tomorrow. At present ASDC has 474 training partners and 2000 training centres to accommodate the same.

ASDC has done many industry lead programs under SANKALP scheme where they have trained trainers for job roles like Machining, Welding, Automation and Robotics. Currently ASDC has 110 job roles across all domains like Research and Development, Manufacturing, Sales, Service and Road Transportation. ASDC have presence in 26 states and Union Territories (UT).

#### 4.3.4.1 Adarsh Gram Camp Project:-

Hon’ble Prime Minister of India has launched Azadi Ka Amrit Mahotsav on 12<sup>th</sup> March 2021 involving a series of events that will be organised by the Government of India to commemorate the 75th anniversary of India’s independence [www.amritmahotsav.nic.in](http://www.amritmahotsav.nic.in)

Under this initiative, MSDE under SANKALP plans to undertake RPL certification of 1400+ workers in identified selected grams across five states and 25 villages.

The purpose of this project is to create an institutional framework for linking skilling and employment to identified services at the gram panchayat or Adarsh Gram level, creating awareness of the relevance and importance of skill certification.



Recognition of Prior Learning (RPL) will be a suitable training module to certify an existing workforce for mainstreaming their skill acquisition and improving productivity and output produced by such skilled workers.

#### 4.3.4.2 Activities During the Year

- 41 apprenticeship curriculums were approved and made available on the apprenticeship portal in FY 2021-22
- ASDC is interfacing with SIAM, ACMA, FADA members for propagation and awareness about NAPS amongst all OEMs, suppliers, dealerships in manufacturing, sales, service and allied or support services
- 25,000+ contracts generated, in NAPS
- Pilot study at dealership with OEMs
- ASDC organised various expert group meetings on Electric Vehicle, with members from ARAI, Mahindra & Mahindra Ltd., Tata Motors Ltd., Maruti Suzuki India Ltd., Revolta Motors Pvt. Ltd., Okaya Power Group, Autobot India Pvt. Ltd. and Ansys Software. The agendas of these forums are to discuss current industry requirement in form of Qualification Packs, Trainer, assessor and placement scenario under Electric Vehicle domain, such as manufacturing, service, R&D etc.
- ASDC has undertaken the initiative to promote skill development to equip today's youth with the essential skills and experience and developed 7 Qualifications on Electric Vehicle Domain.
- ASDC in collaboration with FCDO and NPTC Group of Colleges, UK has done Training of Trainers (ToT) program for the newly developed Electric Vehicle Service Lead Technician qualification where 12 trainers were certified.

#### 4.3.5 End of Life of Vehicle (ELV) Policy:

MoRTH has announced the Vehicle Scrapping Policy to reduce population of old and defective vehicles, achieve reduction in vehicular air pollutants to fulfil India's climate commitments, improve road and vehicular safety, achieve better fuel efficiency, formalize the currently informal vehicle scrapping industry and boost availability of low-cost raw materials for automotive, steel and electronics industry. The main role of MHI in the matter is to provide/ create a proper roadmap, considering all related aspects before such a policy is laid out. There is a need for creating infrastructure for dismantling of vehicle in a scientific and environment friendly manner.

#### 4.3.6 Voluntary Vehicle Recall Information:

The vehicle recall is as per SIAM's guidelines "Voluntary Code on Vehicle Recall" announced in July 2012. This guideline addresses the potential issues that exist in a motor vehicle that do not meet safety requirements due to a manufacturing defect and subsequent remedial actions. A vehicle is covered under safety recall for seven years and targets the first buyer. The decision on recall takes into account the degree of seriousness or severity of any possible hazard involved. This data is maintained by SIAM with a link on MHI website which is updated on a regular basis.

#### 4.3.7 Automotive Mission Plan 2016-26:

**4.3.7.1 Vision Statement:** Based on the envisaged future scenario, the Vision Statement for the Indian Automotive industry under AMP2026 is as follows:

##### Vision 3/12/65

*"By 2026, the Indian Automotive industry will be among the top three of the world in engineering, manufacture and export of vehicles and components, and will encompass safe, efficient and environment friendly conditions for affordable mobility of people and transportation of goods in India comparable with*

*global standards, growing in value to over 12% of India's GDP, and generating an additional 65 million jobs"*

#### **4.3.7.2 The Objectives of Automotive Mission Plan, 2026:**

'Automotive Mission Plan' for the period of 2006-2016 was a step further from Auto Policy 2002. It set growth targets for the automotive industry and recommended interventions to make India a global automotive hub. The Mission Plan envisaged to make India emerge as the destination of choice in the world for design and manufacture of automobiles and auto components, with output reaching a level of US\$ 145 billion (accounting for more than 10% of the GDP) and providing additional employment to 25 million people by 2016. It envisaged increase in automotive industry from the level of Rs. 169000 crore to reach Rs. 5,61,200 – 7,31,400 crores by 2016.

The success of the Automotive Mission Plan 2006-16 gave a definite boost to the industry and Government of India who have jointly worked on the next collective vision for the Indian automotive industry, AMP 2016-26 aims to deliver on three critical aspects also known as "Vision 3/12/65". The idea is to bring Indian automotive industry among the top three of the world in engineering, manufacturing and export of vehicles and auto components. Second part of the vision is to ensure that the automotive industry contributes to over 12% of the Indian GDP and generates an additional 65 million jobs to fulfil a major part of its responsibility, thus 3/12/65.

AMP 2026 also seeks to define the trajectory of evolution of the automotive ecosystem in India including the specific regulations and policies that govern research, design, technology, testing, manufacturing, import/ export, sale, use, repair, and recycling of automotive vehicles, components and services. In terms of production and basic numbers, under the AMP 2016–26 vehicle sales are expected

to touch 66 million units by 2026 with additional investment of ₹ 4.5 trillion-5.5 trillion. A large share of the production is expected to be exported globally. This growth is expected to directly impact the auto component sector, providing it huge opportunities. Indian automotive industry has evolved very significantly and we are now the 4<sup>th</sup> largest market for passenger vehicles.

The Ministry of Heavy Industries has been working for formulation of National Automotive Policy for Holistic development of Automobile sector in India. After series of one to one stakeholder consultation, Ministry has finalized the draft Automotive policy, which inter alia proposed to:

- Adopt a long-term road map for emission standards beyond BSVI and harmonize the same with global standards by 2028
- Roll out CAFE norms till 2025 and beyond and setup incentives/ penalties and introduce banking, trading
- Adopt a composite criterion based on length and CO<sub>2</sub> emissions to classify vehicles for differential taxation purposes
- Harmonize automotive standards over the next 5 years in line with WP-29
- Improve the skill development and training ecosystem, increase accountability of ASDC and implement a Labor Market Information System
- Retain tax exemption on different levels of R&D expenditure with strong audit control
- Scale-up of indigenous R&D with commercially viable innovations
- Harmonize AIS and BIS standards on safety critical parts over next 3 years
- Fast track adoption of Bharat New Vehicle Safety Assessment Program

**4.3.7.3 The core objectives of AMP2026** can be summarised under five themes as follows:

- AMP 2026 aims to propel the Indian Automotive industry to be the engine of the “Make in India” programme, as it is amongst the foremost drivers of the Manufacturing sector: Over the next decade, the Indian Automotive sector is likely to contribute in excess of 12% of the country’s GDP and comprise more than 40% of its manufacturing sector. Around 13% of the GST collection of the Government can be attributed to the Indian Automotive industry. The Automotive industry can be termed as the mother of the manufacturing sector in an economy, as its fortunes directly impact the fortunes of several related manufacturing industries (e.g. Iron & Steel, Aluminium, Lead, Rubber, Plastics, Glass, Machine tools, Moulds & dies, Chemicals, and Capital Goods) and several in the Services sector (e.g. Logistics, Banking, Insurance, Sales & distribution, Service & repair, and Fuels). The rapid growth of the Indian Automotive industry will provide a strong fillip to the Micro, Small and Medium industries of the country across multiple sectors, the development of which is one of Government’s principal objectives.
- AMP 2026 aims to make the Indian Automotive Industry a significant contributor to the “Skill India” programme and make it one of the largest job creating engines in the Indian economy: The incremental number of jobs to be created by the Indian Automotive industry over the next decade is 65 million. This is over and above the 25 million jobs created in the previous decade. The automotive industry has numerous backward and forward linkages with over two dozen industries across manufacturing and service sectors, across rural and urban India, and across the formal and informal sectors of the economy. Most of the jobs in the Indian Automotive industry involve acquiring specialist skills, and confer to the person sufficient technical and soft skills to progress professionally within and outside the automotive sector. In addition to creating high skilled jobs, the industry also provides employment opportunity to a large number of semi-skilled and low skilled workers.
- AMP 2026 seeks enhancing mobility: The focus of AMP 2026 is to promote safe, efficient and comfortable mobility for every person in the country, with an eye on environmental protection and affordability through both public and personal transport options. The objective is to provide a choice to the consumer to access multiple options for mobility. AMP 2026 aims to enhance mobility in the country while also addressing the need to minimize the negative externalities arising from the use of automobiles, such as, congestion, air pollution, global warming, and road accidents. AMP 2026 seeks to achieve a healthy balance between the human aspiration of personal transport and efficiency of public transport in India.
- AMP 2026 seeks to increase net exports of the Indian Automotive industry several fold: AMP 2026 recognises that the Indian Automotive industry (both vehicles and auto components) has the potential to scale up exports to the extent of 35-40% of its overall output over the next ten years and become one of the major automotive export hubs of the world. In line with this, AMP 2026 makes several prescriptions to improve competitiveness, technological advancement, infrastructure investment, and branding. On the flip side, the import intensity of automobiles is likely to increase in the coming years on account of the increasing use of electronics and the enhancement in the value of design and engineering in making of vehicles and components. At present, India is deficient

in skills and capabilities in both these areas, namely auto-electronics and design/engineering. AMP 2026 seeks to increase the share of local manufacture of vehicles and components, in particular, automotive electronics, light-weighting materials, moulds & dies, and machinery, which will save the country substantial foreign exchange and be a shot in the arm for the “Make in India” programme as well. AMP 2026 also aims to increase the quantum of indigenously carried out research, design, engineering and manufacturing in both automotive vehicles and components. Developing a robust ecosystem for design and development of automobiles in India is an important pillar that will determine the industry’s success. This will also go a long way in building Brand India from current Low Cost Manufacturer tag to something more aspirational.

- Comprehensive and stable policy dispensation required: Given the distinctive contributions of the Indian Automotive Industry to the socio-economic development of the country, it is imperative that the industry is subjected to a comprehensive and predictable policy regime that governs it in a stable and sustainable manner. World over, every economically advanced nation has succeeded in attaining its developed status with Government’s support and nurturing of its automotive industry. Given the widespread and differential impact of the Automotive sector on different stakeholders and the vibrancy of India’s democracy, regulations and policies that govern the Auto sector are subject to pulls and pressures of several lobbies. Therefore, to ensure a fair and predictable governing environment for the Indian Automotive industry, AMP 2026 spells out the Government’s views on the path of evolution of key policies for the Auto sector, so that all regulations impacting the industry are

formulated comprehensively in scope and scale to be implemented harmoniously across the nation and both at the centre and the states.

#### 4.3.8 FAME India Scheme:

The Government approved the scheme titled ‘Faster Adoption and Manufacturing of Electric (&Hybrid) Vehicles in India’ (FAME India) in March, 2015 for a period of 2 years w.e.f 1 April, 2015 with an aim to reduce dependency on fossil fuel and to address issues of vehicular emissions. The Phase-I of FAME India Scheme has been extended from time to time till 31 March, 2019 with enhancement of total outlay to ₹ 895 crore.

The scheme had four focus areas *i.e.* Technology Development, Demand Creation, Pilot Project and Charging Infrastructure.

Market creation through demand incentives is aimed at incentivizing all vehicle segments *i.e.* 2-Wheelers, 3-Wheelers Auto, Passenger 4-Wheeler vehicles, Light Commercial Vehicles and Buses. The scheme lays greater emphasis on providing affordable and environmental friendly public and private transportation/vehicular mobility for the masses. The demand incentive is available to buyers (end users/consumers) in the form of an upfront reduced purchase price to enable wider adoption. The demand incentive amount has been determined for each category (vehicle - technology - battery type), taking into account the principles of Total Cost of Ownership (TCO), Pay-back Period on account of fuel savings, cost of maintenance etc.

Specific projects under Pilot Projects, R&D / Technology Development and Public Charging Infrastructure components are approved by the Project Implementation & Sanctioning Committee (PISC), under the chairmanship of Secretary (Heavy Industries), for extending grant under focus areas of the scheme.



#### 4.3.8.1 Achievement of Phase-1 of FAME India Scheme:

- i. In the First Phase of the FAME Scheme about 2.8 lakh hybrid and electric vehicles are supported by way of demand incentive amounting to Rs 358Crore (Approx.) resulting in saving of about 97 million liters of fuel and reduction of about 242 million Kg of CO<sub>2</sub> as on 25<sup>th</sup> January, 2022.
- ii. Projects worth about ₹ 158 Crores are sanctioned for the technology development projects like establishment of testing Infrastructure, setting up of 'Centre of Excellence' for Advanced Research in electrified transportation, Battery Engineering etc. to various organisations / institutions like Automotive Research Association of India (ARAI), IIT Madras, IIT Kanpur, Non Ferrous Material Technology Development Centre (NFTDC), Aligarh Muslim University (AMU) etc.
- iii. Supported for deployment of 425 Electric buses in about 9 cities by way of incentive amounting to Rs 280 crore (Approx.). Through these buses, an additional 80 million litres of fuel about 180 million kg of CO<sub>2</sub> is expected to be saved during the lifetime of bus.
- iv. Sanctioned Projects for setting up of 520 charging stations for Rs 43 crore (Approx.) in cities like Bangalore, Chandigarh, Jaipur and NCR of Delhi and major highways such as Delhi-Chandigarh, Mumbai-Pune, Delhi- Jaipur, Delhi-Agra etc. Out of these 520 Charging stations, 461 charging stations as on 21<sup>st</sup> Jan, 2022 have been installed.
- v. The Scheme was very successful in creating the major policy discourse on Electric Mobility among all stakeholders including different departments of Govt. of India and State Governments.

#### 4.3.8.2 Phase-II of FAME India Scheme:

Based on the experience gained during Phase I of FAME Scheme and suggestions of various stakeholders, the

Ministry of Heavy Industries notified Phase-II of the Scheme, vide S.O. 1300 dated 8<sup>th</sup> March 2019, with the approval of Cabinet. Phase-II of the scheme is for a period of 5 years, commencing from 1<sup>st</sup> April 2019, with an outlay of ₹ 10,000 crore. The main objective of the scheme is to encourage faster adoption of Electric and hybrid vehicle by way of offering upfront Incentive on purchase of Electric vehicles and also by establishing the necessary charging Infrastructure for electric vehicles. The scheme will help in addressing the issues of environmental pollution and fuel security.

In this phase of the scheme, more emphasis is given on electrification of public transportation, that includes shared transport. Demand Incentives on operational expenditure model for electric buses will be delivered through State/city transport corporation (STUs). In 3W and 4W segments, incentives will be applicable mainly to vehicles used for public transport or registered for commercial purposes. In the e-2Ws segment, focus will be on private vehicles. The Scheme aims to create demand by way of supporting 7090 e-Buses, 5 lakh e-3 Wheelers, 55000 e-4 Wheeler Passenger Cars and 10 lakh e-2 Wheelers. Creation of charging infrastructure will be supported in selected cities and along major highways to address range anxiety among users of electric vehicles under the Scheme.

#### 4.3.8.3 Salient features of FAME India Scheme Phase II:

- i. This phase aims to generate demand by way of supporting 7090 e-Buses, 5 lakh e-3 Wheelers, 55000 e-4 Wheeler Passenger Cars (including Strong Hybrid) and 10 lakh e-2 Wheelers.
- ii. With greater emphasis on providing affordable & environment friendly public transportation options for the masses, the scheme will be applicable mainly to vehicles used for public transport or those registered for commercial purposes for all segment of vehicles.

- iii. For e-2W segment, this scheme is also applicable to privately owned registered e-2W.
- iv. Depending upon off-take of different category of e- Vehicles, provision has been made in the scheme for inter as well as intra segment fungibility.
- v. Scheme is applicable to only those xEVs, which is fitted with advanced chemistry battery. Scheme is applicable to only those vehicles, which is defined as Motor Vehicle as per CMVR and eligible to registered with Road Transport Authority.
- vi. In this phase, the demand incentive is linked to battery capacity i.e., ₹ 10,000/KWh for all eligible Vehicles except e-Buses (for which the incentive is ₹ 20,000/KWh), subject to capping at certain percentage of cost of eligible Vehicles [i.e., 40% for e-Bus and at 20% for all other categories of eligible Vehicle].
- vii. FAME II Scheme has been redesigned based on experience particularly during Covid-19 pandemic and feedback from industry and users. The redesigned scheme aims at faster proliferation of Electric Vehicles by lowering the upfront costs. w.e.f from 11th June, 2021, demand incentive for e-2W is increased from Rs 10,000/kWh to ₹ 15,000/KWh subject to increase in capping to 40% from 20% cost of eligible e-2W.
- viii. Demand incentive is extended to only those vehicles having ex-factory prices less than the threshold value. Further, keeping in view market and technology trends in batteries, a provision has been made for revision of demand incentives from time to time under the scheme.
- ix. The incentive is applicable to vehicles manufactured in India as per phase manufacturing program issued by the department.

#### 4.3.8.4. Achievement under FAME India scheme Phase II:

**OEMs and Vehicle Models:** As on 21<sup>st</sup> January 2022, 50 OEMs [2e-Ws= 15; 3e-Ws= 33 & 4e-Ws= 2] have registered their 103 EV Models [2W= 33; 3e-W=63 & 4e-W=7] under Phase-II of FAME Scheme for availing benefit of demand incentives. As on 21<sup>st</sup> January 2022 sale of Electric vehicles 220117 [2e-Ws=184180; 3e-Ws= 33874 & 4e-Ws=2063] for availing benefit of demand incentives.

**Sanction of Electric Buses:** In order to promote electric mobility in public transport, the Ministry has invited proposals from cities and state transport corporations through an Expression of Interest for deployment of Electric Buses under Operational cost model basis. After examining the proposals, MHI has sanctioned 6315 e-buses to 65 cities/STUs/CTUs/ State Govt. entities for intracity and intercity operations across 26 states/UT under the Scheme. Which includes, 650 e-buses were approved for intercity operation and 100 e-buses to Delhi Metro Rail Corporation Limited for last mile connectivity. Out of 6315 e-buses, supply order for about 3728 electric buses for intra-city and intercity and last mile connectivity have been issued as on 21st January 2022. Out of these 3728 e-buses, 1022 electric buses have been developed; 340 buses are deployed in the city of Mumbai, 150 buses in Navi-Mumbai, 175 in UP, 30 buses in Goa, 25 in (DMRC) Delhi, 18 in Rajkot, 10 each bus in city of Dehradun & Silvassa, 25 in the city of Patna, 49 in the city of Surat, 40 in Chandigarh and 150 in Ahmadabad. After this initiative, total 1447 electric buses have become operational under FAME scheme including 425 electric buses as deployed in the cities of Srinagar, Jammu, Lucknow, Indore, Kolkata, Guwahati and Hyderabad, Mumbai under Phase-I of the Scheme. These buses will run about 4 billion Kilometre distance during their contract period and are expected to save cumulatively about 1.2 billion liters of fuel, which will result in avoidance of 2.6 million tonnes of Carbon-dioxide emission.

**Sanction of Charging Infrastructure:** The Scheme envisages support for setting up of adequate public charging infrastructure to instill confidence amongst EV users, through active participation and involvement of various stakeholders including Government agencies, industries, and Public Sector Enterprises (PSEs). The Ministry has also sanctioned 2877 charging stations in 68 cities across 25 states/UTs. Letter of Award are being issued to selected entities after ensuring the availability of land for charging stations, signing of necessary agreements/MOU with concerned partner organizations like city municipal corporation/ DISCOM's/Oil Companies etc., Letter of award for 1797 charging stations have been issued as on 21<sup>st</sup> January 2022. Further, the Ministry has sanctioned 1576 charging stations in 9 Expressways and 16 Highways and issued LOA to selected entities accordingly.

**Promotional activities of EVs:** Under the Chairmanship of Hon'ble Minister of Heavy Industries a conference to promote E-Mobility was Organized on 4<sup>th</sup> Dec, 2021 at Goa which was attended by Hon'ble Chief Minister/ Goa, Hon'ble MoS/MHI, CEO/NITI Aayog, Secretary Heavy Industries, Transport Ministers of States, senior officials from Central Govt/ States/UTs, CEOs/Industry Leaders/Senior officials from the Automobile sector, Startups and Technical experts. The highlight of the event was the flagging off Electric buses sanctioned under FAME-II for Goa and exchange of views between the different stakeholders for faster uptake of Electric/ Green Vehicles.

#### **4.3.9. Production Linked Incentive scheme 'National Programme on Advanced Chemistry Cell (ACC) Battery Storage':**

The Union Cabinet on 12 May, 2021 approved a Production Linked Incentive (PLI) Scheme for setting up manufacturing facilities for Advance Chemistry Cell (ACC), Battery Storage in India, with a total manufacturing capacity of 50 Giga Watt Hour (GWh) and with an outlay of ₹ 18,100 crore for 5 years. The Scheme aims to enhance India's Manufacturing Capabilities and Exports — for manufacture of Advance Chemistry Cell (ACC) in India and envisages

incentivizing large domestic and international players in establishing a competitive ACC battery set-up in the country.

Under the PLI Scheme for ACC, the production-linked subsidy is based on applicable subsidy per KWh and percentage of value addition achieved on actual sale for manufacturers who set up production units with a capacity of at least 5 GWh up to a maximum of 20 GWh.

Ministry of Heavy Industries, on 22<sup>nd</sup> October 2021 has released Request for Proposal (RFP) inviting bids from domestic and international players for setting up manufacturing facilities for Advance Chemistry Cell (ACC) Battery Storage in India under the ACC Production Linked Incentive (PLI) Scheme. In response to the EoI, total 10 domestic/international manufacturers submitted their proposal for ~130 GWh as per technical bids opened on 15.01.2022.

#### **4.3.10 Production Linked Incentive scheme for Automobile and Auto Components:**

The Union Cabinet on 15<sup>th</sup> September 2021 has approved the Production Linked Incentive (PLI) Scheme for Automobile and Auto Components Industry in India for Enhancing India's Manufacturing Capabilities for Advanced Automotive Products with a budgetary outlay of ₹ 25,938 crores.

The PLI Scheme for Automobile and Auto components proposes financial incentives to boost domestic manufacturing of Advanced Automotive Technology products and attract investments in the automotive manufacturing value chain. Its prime objectives include overcoming cost disabilities, creating economies of scale and building a robust supply chain in areas of Advanced Automotive Technology products. It will also generate employment. This scheme will facilitate the Automobile Industry to move up the value chain into higher value-added products. The Scheme and its guidelines have been notified on 23 September 2021.

Application Window for the PLI Scheme has closed on 9 January 2022 and total 115 applicants have filed their applications.

## Technology Up-gradation and R&D

**5.1.** India has established a strong and diversified manufacturing base for the production of a wide variety of basic and capital goods to meet the requirements of various sectors including heavy electrical, power generation and transmission industries, process equipment, automobiles, ships, aircrafts, mining, chemicals, petroleum, etc. However, the share of the manufacturing sector in India's economy is still quite low. There is a considerable potential for growth which, in a globalised world economy, has to be based on improving productivity and competitiveness. Innovation and adoption of new technologies are the key factors in competitiveness. In the Indian context, opening of the economy and consequently the entry of international players has substantially enhanced the need for production of goods and services matching international standards. Indian Industry has undertaken a number of steps to meet the needs of the customers in a fast changing environment. CPSEs under the Ministry are also pursuing their plans to adopt and adapt new technologies through collaboration and in-house R&D efforts. Some of the initiatives in this regard are described below:

### **5.2 National Automotive Testing and R&D Infrastructure Project (NATRIP)**

**5.2.1** National Automotive Testing and R&D Infrastructure Project (NATRIP) is the largest and one of the most significant initiative of the Government of India in the Automotive sector so far and represents a unique joining of hands between the Government of

India in the Ministry of Heavy Industries, a number of State Governments and Indian Automotive Industry to create a *state-of-the-art* Testing, Validation and R&D infrastructure in the country. The project envisaged upgrading two centres at ARAI, Pune and VRDE, Ahmednagar and setting up of 4 Centres of state-of-the-art testing and homologation at ICAT/Manesar, GARC/Chennai, NATRAX/Indore, and NIAMIT/Silchar.

**5.2.2** NATRIP was initially approved at a cost of ₹ 1718.00 crore. The Cabinet Committee on Economic Affairs (CCEA) in the month of July, 2016 has approved the second revised cost estimate of ₹ 3727.30 crores.

**5.2.3** NATRIP is being funded by the Central Government through a mix of grant-in-aid, interest free loan and user charges to be collected from the centres for the facilities developed under the project.

**5.2.4** Under National Automotive Testing and R&D Infrastructure Project (NATRIP), the following centres have been set up :-

- i. International Centre for Automotive Technology (ICAT), a full-fledged testing and homologation centre within the northern hub of automotive industry at Manesar in the State of Haryana;
- ii. Global Automotive Research Centre (GARC), a full-fledged testing and homologation centre within the southern hub of automotive industry at a location near Chennai in the State of Tamil Nadu;



- iii. Up-gradation of existing testing and homologation facilities at Automotive Research Association of India (ARAI), Pune and at Vehicle Research and Development Establishment (VRDE), DRDO, Ahmednagar;
- iv. National Automotive Test Tracks (NATRAX), world-class proving grounds, testing tracks in Indore, Madhya Pradesh;
- v. National Institute for Automotive Inspection Maintenance and Training (NIAIMT), National Specialized Hill Area Driving Training Centre as also Regional In-Use vehicle management Centre at Dholchora (Silchar) in the State of Assam.

#### 5.2.5 Current Status of various facilities planned under NATRIP at various centres.

- (i) In accordance with the approval of CCEA, NATRIP has completed 21 of the 22 sanctioned facilities. Some of the facilities created under NATRIP of various centres are given below:
  - o **ICAT, Manesar** – The ICAT, Manesar is providing quality services to the industry in all the domains of automotive and non-automotive developments, such as Powertrain, Noise Vibration and Harshness (NVH), Component, Fatigue, Photometry, Electrical and Electronics, Tyre & Wheel, Passive Safety, Vehicle Dynamics, Electromagnetic Compatibility (EMC) and Computer Aided Design and Engineering (CAD/CAE) etc.
  - o **GARC Chennai**- Test Tracks, Fatigue Lab, Safety Component Lab & Photometry Lab, Powertrain Lab (Emission Lab, Automotive Infotronics & CAD/CAE, Advanced Passive Safety Lab (APSL), Electro Magnetic Compatibility (EMC), Recycling Demo Unit.

- o **NATRAX- Indore** – Powertrain Lab and Test Tracks.
- o **VRDE, Ahmednagar** – Electromagnetic Compatibility (EMC) Lab.
- o **NIAMIT, Slichar** – Training Test Tracks, Model I & M, Mechanics Training Institute (MTI).
- o **ARAI, Pune** – Passive Safety Lab, Powertrain Lab & Fatigue Lab.

The remaining 1 facility under construction/ commissioning are:

- Advanced Passive Safety Lab is being constructed & commissioned at GARC/ Chennai.

- (ii) Centers of Excellence have also been created for facilitating R&D in the auto sector at the following locations:

- ICAT, Manesar–Component Lab and NVH Lab,
- GARC-Chennai- Passive Safety Lab, Infotronics Lab and Electromagnetic Compatibility (EMC) Lab.
- NATRAX- Indore – Vehicle Dynamics Lab, and Test Tracks
- ARAI, Pune –Powertrain Lab and Fatigue Lab.

#### 5.2.6 Major Activities at a glance in FY 2020-21:

- i. Driving Training Institute (DTI) is conducting regular driving training courses under self-sponsored category and Cab Driving Training program in beginner course (LMV, HMV) & PMKVY-CSCM-STT Program for Taxi-Driver. Total 79 candidates have been trained in FY 2021-22 (April-September).

- ii. Training of 30 candidates at Mechanics Training Institute (MTI) sponsored by Timken under Automotive Service Technician Level-4 segment for 2-days RPL programme has been successfully conducted. All the candidates were provided hand kits (including various types of tools) from Timken as technical aid to the candidates for utilization in their technical works in automotive workshops / service station.

### 5.3. Automotive Research Association of India (ARAI)

1. Located in the picturesque surroundings in the western part of Pune, Maharashtra, India and built on approximately 15000 sq. metres area, The Automotive Research Association of India (ARAI) houses various test facilities.
2. ARAI is a co-operative research organisation that was established in 1966 by the Indian Vehicle and Automotive ancillary manufacturers and the Government of India. ARAI is affiliated to the Ministry of Heavy Industries and recognised by the Department of Scientific and Industrial Research. It is an ISO 9001-2015, ISO 14001-2015, ISO 45001-2018 and ISO 27001-2013 certified organisation. ARAI is also accredited as per ISO/IEC 17025-2005 by National Accreditation Board for Testing and Calibration Laboratories (NABL) for its major certification facilities.
3. ARAI is registered as a society under the Societies Registration Act XXI of 1860 and major automobile and ancillary manufacturers are its members. The Governing Council consists of members from Indian Automotive Industry and representatives from Government of India.
4. ARAI has been playing a crucial role in assuring safe, less polluting and more efficient vehicles.

It provides technical expertise in R&D, testing, certification, homologation and framing of vehicular regulations.

5. The state-of-the-art Research & Development and Testing facilities at ARAI are increasingly utilised for sponsored and in-house Research & Development projects as well as domestic CMVR Type Approval and export homologation activities.

### Major Achievements During the Year

#### A. Achievements during the period April 2020 to March 2021:

- MoU with Telangana State Information Technology, Electronics & Communications Department for promoting R&D for manufacturing of EVs & Energy Storage Systems
- Patent granted by Patent Office to ARAI for Dual Fuel System for Induction of CNG into a Diesel Engine
- Licensing Agreements signed for “Technology Know-How” transfer of AC and DC Charging Stations
- Design and development of Lightweight Aluminium Extrusion Profiles and its joining technique for bus superstructure building for inter and intra-city bus applications
- Patent on ‘Joint for assembling a vehicle body’, jointly filed by ARAI with Hindalco
- India’s first ‘All Aluminium (Al) Freight Trailer’ launched by leading Aluminium Company which has been engineered with inputs of ARAI
- Web-based Technology Innovation Platform– Tech Novuus developed under a mandate of MHI for facilitating

- development of indigenous solutions through a collaborative approach
- Addition of Engine Test facility catering to certification and development testing of Automotive, Tractor, CEV & Combined Harvester Engines
- Whole Vehicle Electro Magnetic Compatibility test facility operational and services being offered for M3 & N3 category
- Installation of facility for evaluation of Material Compatibility with Dimethyl Ether' (DME)
- Collaboration between ARAI and Atal Innovation Mission (AIM) for promoting & strengthening innovation eco-system in India with focus area as automotive and mobility solutions
- Contribution to the Society in the fight against COVID-19 Pandemic:
  - Lightweight Face Shield development for the benefit of frontline workers
  - Support to the industry for development of indigenous respiratory support devices through pre-compliance functional testing and R&D support
- Post transfer of Technology Know-how by ARAI to 'Navratna PSU', first AC Charger (developed by the PSU) has been Tested and Certified
- Drive by Wire Platform for Start-up and an Innovation Hub
- HIL Validation of EV Controllers for Vehicle Platform of Global OEM (First of its Kind in India)
- Regional Centre in Telangana proposed for catering to pre-certification and training needs
- Successful Organizing of SIAT 2021 on Virtual Platform
- Trials on Methanol (M 15) initiated

#### 5.4 Fluid Control Research Institute (FCRI), Palakkad, Kerala

Fluid Control Research Institute (FCRI) is an autonomous body under Government of India, Ministry of Heavy Industries. FCRI was established at Palakkad, Kerala, in 1987 with Technical and financial assistance from UNDP. FCRI has full-fledged NABL accredited laboratories for the calibration/testing of flow products in water, oil and air media. It is a premier institute in our country rendering industrial services and solutions to industry. The facilities are most comprehensive for flow engineering, provide a one-stop solution for industry in India and abroad and are well utilized for sponsored research and development programmes as well as testing/calibration/evaluation of flow products.

The Flow Laboratories at FCRI are at par with similar international facilities in Europe as routinely confirmed through regular inter-laboratory comparison programmes conducted with foreign laboratories. A major objective of the Institute is to establish research and development assistance to flow product industry and assist in upgrading quality and reliability of flow

#### B. Achievements during the period April 2021 to September 2021:

- Transfer of BMS Technology developed at ARAI
- Non Exclusive transfer to MSME for UPS and Inverter application
- Exclusive transfer to a Tier-I (for Series Production)
- Deployment of Developed Technology and Know-how

measurement and Instrumentation in our country apart from higher level skill development and training of industrial personnel.

#### 5.4.1 Research & Development and Technology Upgradation

##### i) Project on improving the efficiency of the dewatering pump 'Petti and Para'

A project to improve the efficiency of dewatering pump system used in low lying paddy fields of Kole Lands of Kuttanad (Thrissur) and Malappuram was undertaken at FCRI. The problem with the existing system was that the efficiency was low at around 18 to 22% and had high maintenance cost. Two axial flow submersible pumps were studied for performance in FCRI, to be used as alternatives to the *Petti and Para* pumps currently being used. Efficiency of the axial flow pumps were found to be more than 65% and the pumps were installed at site and is working satisfactorily resulting in savings for the agriculturists.



*One of the axial flow submersible pumps in operation*

##### ii) Air Compressor Certification Facility

Compressed air has become an inevitable part of input to many businesses and air compressors account for significant amount of electricity used in Indian Industries. However too often, compressed air systems are highly inefficient, resulting in significant wasted energy. Periodic

performance assessment is essential to minimize the cost of compressed air. With the objective of fulfilling this requirement, FCRI has developed a new facility for testing and certification of positive displacement type air compressors. This NABL accredited facility can be used to conduct free air delivery tests on air compressors as per standards ISO 1217 and IS 10431.



*Compressor Test Facility*

##### iii) Testing of 800 mm special Bellow for IGCAR, Kalpakkam

Development of the bellows for sodium systems in Fast Breeder Reactors requires extensive testing and qualification while simulating the operating conditions expected in the reactor secondary system piping. There is almost no operating experience with the bellows in main sodium piping. A bellows assembly of size 800 NB of Inconel-625 material is designed and manufactured as per standards of Expansion Joint Manufacturers Association (EJMA). Experiments were conducted on a bellows assembly of size 800 NB of Inconel-625 material, designed and manufactured as per standards of EJMA. The experiments were conducted at steady state flow conditions in a specially designed test loop assembled by modifying the existing Large Water Flow Lab (LWFL) test facility at FCRI. The top



and bottom part of bellows was made of 800 mm NB CS pipe keeping the internal diameter same. The test medium for the experimentation is potable water and the tests were carried out at ambient temperature.



*Bellows assembly of size 800 NB under test*

#### 5.4.2 Major achievements during the year

- Exhaustive testing of various flow meters for model approval were conducted for Director, Legal Metrology

- Online Training Programmes were conducted for International and National participants
- NABL Re-certification of Flow and Electronic Test Facilities was successfully completed.
- ISO 9000-2015 Surveillance audit was conducted online by M/s. Bureau Veritas S. A. (formerly BVQI) and had certified FCRI.
- A huge tranche of Large diameter Flowmeters were Calibrated for M/s MCGM

#### 5.4.3 Achievements made and measures taken for pollution control

- Use of Plastic: Use of Single-Use Plastic cups and plastic bottles were barred inside the Institute. The employees were instructed to minimize and use of single-use-plastics in their area of activity.
- Rain water harvesting: Rain water harvesting is being implemented in all buildings of FCRI
- Tree Plantation: Tree-plantation drive inside the campus is an ongoing process and is expected to be a continuing initiative.
- Toilets: Odour free toilets are being implemented.
- Towards Paperless office: The paper usage in FCRI has been reduced by implementing digital documentation for many critical applications.

#### 5.5 Central Manufacturing Technology Institute, Tumkur Road, Bengaluru:

Central Manufacturing Technology Institute, a premier R&D organization in the manufacturing technology, established in the year 1962, is an autonomous body, registered as a Society and under the administrative control of Ministry of Heavy Industries. The institute is assisting Indian Industries to achieve excellence in technology and stimulate economic growth. The Institute is active in metal working technology, evolving solutions to national strategic initiatives and

is a one-stop destination for end-to-end solutions in manufacturing technology deployment. The Institute is guided by a Governing Council consisting of representatives from industries in the manufacturing sector, machine tool manufacturers, Government nominees and other stakeholders.

CMTI continues to support the Indian engineering industry and various sectors through its value added services in manufacturing technology and product development/realization activities. It continues to play a vital role of a catalyst in the application of manufacturing technology. The Institute is equipped with trained manpower, equipment and facilities for design, research, prototype production, manufacturing, testing, inspection, calibration, product development, training and technical information.

Over the years CMTI evolved as Centre of Excellence for Machine Tool and Manufacturing Process Development; developed special purpose machines for various needs and significantly assisted MSMEs by providing high value added services. This has been possible with in-house capabilities covering the entire product development cycle viz., ideation, design, manufacturing, testing of pilot plants, and system integration in related areas. Today, CMTI undertakes research, develops process technologies and machines, trains manpower and deploy the solutions to applications. The focused domains include Ultra-precision machine tools, Special purpose machines, Sensors and machine controls, Textile machineries, Smart manufacturing and Industry-4.0 enabled technologies, Additive and other special manufacturing processes, Precision Metrology, Aircrafts LRUs including test rigs development & qualifications, Skilling and Reskilling (experienced learning). There are about 35 technologies which are ready for licensing to industrial use and to manufacture in multiple. CMTI also hand-holds the technology licensee and the start-ups through incubation/consultancy, until commercialization of acquired technology.

### **CMTI has successfully developed:**

- a. In 2020-21, CMTI has transferred two of its original technologies to industries.
  - o Thermal error compensation system to use in ultra-precision grinding machine that enhance the productivity and also improve/ensure the surface integrity.
  - o Manufacturing technology for high resolutions optical glass scale: These scales are used in all the precision machine tools.
- b. CMTI in its endeavour to develop smart machines has developed smart ultra-precision diamond turning machine built in with several intelligent features. Under the aegis of 'Smarth Bharath Udyog Platform 4.0' scheme of MHI, CMTI is establishing "Smart Manufacturing Development and Demonstration Cell" with the consortia of six industries. While Smart Factory is being established, 11 IIoT solutions relevant to metal cutting industries have been already developed for the benefits of MSMEs.
- c. Two planetary mixing machines (of 4.5tonne) to use in mixing of solid propellant of Rocket motors have been developed for different customers.
- d. Thin Film Temperature Sensor Array for Heater Temperature Monitoring for industrial and defence applications has been developed.
- e. Small AIR Bearing Rotary Stage to use in ultra-precision machine tools has been developed
- f. IIOT enabled Smart foundry capable casting up to one Kg castings is being developed in collaboration with 10 other academic and R&D institutes, which was funded by DST, GOI
- g. Manufacturing & Supply of FWD & AFT Propellers to Defence.

- h. Manufacture, Inspection, Testing & Supply of Super Precision Copper Alloy Cups for Nuclear application.
- i. Development of Hybrid material Pitot tube & single material Pitot tube prototypes through direct metal deposition (DMD) process for multinational company.
- j. Three patents are in the process of filing in this year.



*Shuttle less rapier loom of 450 RPM developed by Centre of Excellence at CMTI, Bengaluru*



*3D Scanner Developed*



*NMTC Building – Clean Room Infrastructure development*

## 5.6 R&D Initiatives by some of the CPSEs.

Some of the technology up-gradation and R&D efforts of the Central Public Sector Enterprises under the Ministry of Heavy Industries are detailed below.

### 5.6.1 Bharat Heavy Electricals Ltd. (BHEL):

BHEL is one of the highest spenders on R&D and innovation in its field, with consistent expenditure of over 2.5% of its revenue over the past many years. BHEL's 14 Centres of Excellence include establishments at Corporate R&D Hyderabad, HPBP Tiruchirappalli and EDN Bengaluru.

BHEL also has 5 Specialized Research Institutes, namely Pollution Control & Research Institute (PCRI), Haridwar, Welding Research Institute (WRI), Trichy, Ceramic Technological Institute (CTI), Bengaluru, Centre for Electric Transportation (CET), Bhopal and Amorphous Silicon Solar Cell Plant (ASSCP), Gurugram.



*Electron microscope at Welding Research Institute (WRI), Trichy*



The details of major ongoing collaboration agreements with Indian Organisations as well as Global OEMs are:

Sl.	Name of Collaborator	Product
<b>A Indian Organisations</b>		
1	Indian Space Research Organisation (ISRO), India	Space Grade Lithium Ion Cells
2	CSIR-IIP, Dehradun	PVSA based Oxygen Plant
<b>B Global OEMS</b>		
1	Mitsubishi Power Ltd, Japan	Flue Gas Desulphurization
2	Kawasaki Heavy Industries Limited, Japan	Stainless steel coaches and bogies for metros
3	General Electric Technology GmbH, Switzerland	700 MWe Steam Turbine for Nuclear Power Plants

#### Major R&D/ Technology upgradation achievements in 2020-21

- Under the aegis of Ministry of Heavy Industries and Principal Scientific Advisor (PSA) to GoI, a consortium of BHEL, NTPC and IGCAR was formed to develop AUSC technology to reduce Carbon Emissions & achieve higher efficiency of ~46%.
- For the first time in India, BHEL has successfully conceptualized, designed, commissioned and synchronized a 1.7 MW Solar PV Plant along the railway trackside for Indian Railways at Bina, Madhya Pradesh to feed power to 25kV traction line.
- BHEL has for the first time designed & manufactured India's highest rating 500 MVA, 400/220/33 kV, 3-Phase Interconnecting Transformer (ICT), which has been successfully dynamic short circuit tested at NHPTL Bina.

#### Major R&D/ Technology upgradation achievements in 2021-22 upto September 2021

- The largest size Kaplan turbine in BHEL, 7 meter in diameter, has been developed for Polavaram HEP Project (12 × 80 MW).
- BHEL has developed a compact 122 kW DC fast charger for charging Electric Vehicles (EVs), which has successfully passed the certification tests at ARAI, Pune.

#### Focus areas for R&D & technology development

- Development of indigenous technology to generate green fuels (Methanol, Hydrogen, etc.) from high ash Indian coal.
- Application of Industry 4.0 with deployment of new technologies including Intelligent machines & robotics and Advanced Manufacturing Technologies.

#### 5.6.2 Rajasthan Electronics & Instruments Limited, (REIL)

In today's competitive business environment, it is important to offer new products & systems with latest technological features. REIL is aligning its R&D framework and business strategy to provide reliable products which are not only cost-competitive but also have an edge in efficiency and performance. In-house Research and Development is extremely important for self-sustenance and growth in today's challenging environment. The Company's R&D activities achieve the corporate mission of meeting existing & emerging needs of Customers and serve them through development/ marketing and delivery of Quality Products and dependable after sales service by designing and developing new products & processes.

#### Major activities undertaken by R&D includes:

##### a) Development of Electronic Milk Analyzer Without Calibration

Electronic Milk analyzer used for the milk quality



analysis requires the calibration at the field level. To eliminate the problem of wrong calibration due to human/environmental behavior, calibration of Electronic milk analyzers are done during manufacturing. In milk analyzer three types of calibration have been incorporated – one for the buffalo milk, one for the cow milk and another one for the mix milk. Calibrations of all the three channels are done during manufacturing only.

#### b) BMC Automation Unit

BMC Data logger is designed for online monitoring critical parameters of milk temperature and volume stored at BMC with the objective to protect the milk from getting sour and spill over. The real time data of milk stored at various BMC help in better management of milk at Dairy.

In addition it also provide near real time data of compressor, agitator, generator and grid supply. Alarms are also devised for emergency conditions. Web and mobile application has been developed to monitor various parameters related to BMC and to provide daily, weekly and Monthly reports.

#### c) Stirrer

Ultrasonic Milk Stirrer is the essential equipment for testing the quality of milk in collection units. For the cost optimization and in-house manufacturing development of the stirrer was started. This is specially designed to completely remove air bubbles from fresh milk prior to its testing for error free reading of parameters in Milk analyzers. The body of the stirrer is ideal for dusty and humid environment with excellent capability to operate under wide temperature range.

#### Product up gradation

1. EMAT without buffer;

2. Milk Analyzer Sensor of SL20;
3. Major Accounting feature added in the ADVDPDPU for the UCDF software;
4. Firmware Over The Air (FOTA) in BMC/ADVDPDPU for the remote firmware update;
5. REIL USB Module for the cost optimization;
6. Development of Next generation DPU on IoT/Android platform; and
7. Development of mobile application for milknet and other various products on IoT platform.

#### Patents & IPR

R&D has filed the response to the review received from Indian Patent Office regarding the innovation of Control & Data Acquisition System for Monitoring & Storing Milk Collection Data and Digital EMT. REIL R&D has received the patent of the Control & Data Acquisition System for Monitoring & Storing Milk Collection Data on 18/07/2020 vide Patent Number 341940.

#### 5.6.3 HMT Limited

HMT has established R & D centers in all manufacturing units to meet the needs of design & development of different products, with a focus to improve product technology and enhance product competitiveness.

R&D has been a focus area for the company in its endeavor to serve the customer better and develop new products. R & D activities are carried out in each subsidiary with particular reference to customer needs in product technology, quality, reliability and price competitiveness. Upgrading the existing products with additional features, design optimisation and improvement in aesthetics are the major thrust areas. The initiative has resulted in many new products and also up-gradation of existing products.

Highlights of R&D activities carried out / planned in the different product areas of HMT's domain are as below:

### HMT Limited (Food Processing Machinery Division)

- Development of Hydraulically operated Homogeniser, Cap. 100 & 200 lph (Testing Stage)

#### 5.6.4 HMT Machine Tools Limited:

All the manufacturing units of the Company have its own R&D facilities to meet its needs. The focus of R&D is to progressively achieve self-reliance in product technology, upgrading the existing products with additional features.

R&D is a continuous process and closely linked with the various operations of the Company and benefits could be derived as a result of the above R & D. Consistent efforts are being made in-house to design, develop and manufacture new products as per technologies available as well as state-of-art and technology centric special purpose machines. Technology development plans are focused to facilitate reduction in cost of production by value engineering, thereby providing viable import substitution as well as Joint Working Arrangement with overseas foreign Institute & IIT's etc.

Major Research & Development during April 2021 to September 2021 are as follows:

- HMT Machine Tools Limited, Hyderabad designed and developed Mini Vertical Turning lathe, which will be manufactured and displayed in IMTEX' 2022. The USP of the machine is low cost, compatible, with C-axis and tool drives, single lift.
- HMT Machine Tools Limited, Pinjore designed and developed Vertical Machining Centre VMC 300, which will be manufactured and displayed in IMTEX'2022. The USP of the machine is low cost, and machine built for Training Institutes.
- HMT Machine Tools Limited, Kalamassery designed and developed SBCNC 40TT (Twin Turret Slant Bed Lathe), which will be manufactured and displayed in IMTEX'2022. The USP of this machine is that the machine can be operated on single turret. The independent operation feature of the turret axis (X axis) can prevent machine downtime in case one of the turrets is under maintenance

- HMT Machine Tools Limited, Bangalore Complex is designing and developing Three Piece manipulator (TPM) for BARC.

#### 5.6.5 HMT (International) Limited:

##### a. Inland Projects:

- Setting up of Workshops and Laboratories in Indian Maritime University, Chennai.
  - HMT(I) has completed supplies of all major machines/equipments to site in June 2021.
  - Despite domestic travel restrictions clamped across the country, HMT(I) is deputing E&C experts and erection and commissioning is likely to complete in November 2021.
- Setting up of Workshops and Laboratories in Indian Maritime University, Visakhapatnam.
  - HMT(I) has dispatched all major machines/ equipments to site in June 2021.
  - Despite domestic travel restrictions clamped across the country, HMT(I) is deputing E&C experts and erection and commissioning is likely to complete in October 2021.

##### b. Update on MEA-Projects under Implementation:

- Setting up of "Common Facility Centre for

Small & Medium Enterprises” at IDEB, Khulna, Bangladesh

- Erection & Commissioning at IDEB, Sirajganj (Dairy Processing Plant) was completed. Certificate of completion of supplies, E&C and Initial Training on the installed machines and equipment received.
- In spite of Corona travel restrictions, HMT(I) had deputed 3 experts to Choubari, Kamarkhanda, Sirajganj, Bangladesh for restarting the plant, trial run using milk & to make preparation for inauguration by Hon’ble Prime Minister.
- Due to the ongoing travel restrictions and pandemic situation, AHCI, Rajshahi proposed to conduct the Project Monitoring with Project Monitoring Committee (PMC) consists of Bangladesh and Myanmar (BM) Division, Internal Finance Division (IFD), MEA, HMT(I) and IDEB, Khulna, Bangladesh through hybrid mode.

- Setting up of “Gandhi-Mandela Centre of Specialisation for Artisan Skills”(GMCOS), Pretoria, South Africa:
  - PMC activities were completed. Training in India & OJT activities shall start once travel restriction due to corona virus is lifted.
  - HM(I) has received Invitation for opening ceremony of “Gandhi-Mandela Centre of Specialisation for Artisan Skills” (GMCOS), Pretoria, South Africa.

- Setting up of Indo-Belize Centre of Engineering, (IBCE), University of Belize, Belize

- Erection & Commissioning activities were successfully completed. OJT activities shall start once travel restriction due to corona virus is lifted.

- Setting up of Indo-Myanmar Industrial Training Centre (IMITC), Monywa, Myanmar.

- Major machines supplied till 8th shipments were commissioned successfully.
- In spite of corona restrictions and difficulties in arranging vessels HMT(I) has successfully dispatched the balance left out supplies to project site in May 2021.
- HMT(I) is planning to depute E&C experts to commence the erection and commissioning activities.

- Setting up of Indo-Myanmar Industrial Training Centre (IMITC), Thaton, Myanmar.

- Major machines / equipment was shipped. In spite of international travel restrictions and difficulties in arranging vessels to Myanmar, HMT(I) has successfully completed 97% of balance supplies till September 2021.
- HMT(I) is planning to depute E&C experts to commence the erection and commissioning activities.

- Upgradation of INDO-ZIM Technology Centres in Zimbabwe

- E&C activities will be started for

the remaining items once the Covid pandemic is under control.

- HMT(I) has handed over 2 nos. Pickup & Drop Twin Cab & 1 no. Sedan vehicles to Government of Zimbabwe in July 2021.
- Inspection of Jam Processing plant completed in September 2021 and will be shipped based on the availability of containers to project site.

➤ Setting up of Upgradation & Modernisation of “Centre D’Entrepreneuriat Et De Developpement Technique (CEDT), Le G15” Dakar, Senegal.

- A draft Agreement copy for implementation of Project “Upgradation & Modernisation of “Centre D’Entrepreneuriat Et De Developpement Technique (CEDT), Le G15” Dakar, Senegal, Phase – II submitted to MEA in September 2021.

#### c. Products:

- HMT(I) has won the ADB Open Tender and signed a contract with Ministry of Labour and Human Resources, Department of Technical Education, Royal Government of Bhutan for supply of Welding equipment of value ₹ 3,60,06,998/- in August 2021.
- HMT(I) has received order for supply of HMT Praga, Cutter and Tool Grinding Machine, Model No: 414P for USD.36,031 from M/s. Leitz Vietnam in September 2021.
- HMT(I) has supplied HMT Tool and Cutter Grinder Machine, Model: GTC28TM to Saudi Arabia, for USD.23,915.

#### 5.6.6 Andrew Yule & Company Limited (AYCL)

The R&D activities carried out by the Company’s different Divisions were as follows: –

##### I. Steps have been taken for:

- a) Tea Division’s Innovation cells for designer / specialty tea of AYCL is in operation.
- b) Tea Division is also the member of Tea Research Association (TRA), an autonomous body is dedicated to Research & Development of Tea Industry which has always helped AYCL to improve upon land productivity and quality of tea produced.
- c) Engineering Division has an in-house R&D facility for product development.

##### II. Benefits derived like product development, cost reduction or import substitution:

- a) AYCL Tea Division has commanded INR 63/-per kg incremental price over that similar period last year (INR 247/- per kg vis-a-vis INR 184/- per kg in 2019-20) by improving the Quality.
- b) Premium Darjeeling White teas (250 kg appx.) from Mim Tea Estate fetched very good price of INR 4,000 per kg on an average.
- c) Import Substitution: Engineering Division had received order for one-to-one replacement of imported Fan components (Russian Design) from SAIL – Bhilai and SAIL – Bokaro. During Design Engineering, those items were substituted by AYCL’s standard design at much lesser cost, using the Division’s retrofit expertise developed over years.
  - Manufactured & supplied 02 Nos of Import Substitute (Russian make)



impellers of Dia 2215 mm to SAIL – Bhilai in Feb'21. 2 nos Impellers and 2 sets Casing Assembly is under manufacturing.

- Manufactured & supplied 1 set Impeller & shaft Assembly to SAIL – Bokaro – 2740 mm dia.

### 5.6.7 Engineering Projects (India) Limited (EPI)

Considering company's nature of job, there is limited scope of Research & Development as EPI is executing the work based on the technical specifications and requirement of clients. However EPI has actively provided state of the art technology like Prefab Technology, Glass Fibre Reinforced Gypsum (GFRG) system and Light Gauge Sheet Framed Structure (LGSF) system.

The company is making continuous effort to upgrade technology and construction technique. The Government of India unveiled with much fanfare the Smart Cities Mission (SCM), one of its marquee initiatives aimed at upgrading 100 cities. Among the projects in SCM are affordable housing, integrated multi-modal transport, creation and preservation of open spaces, waste and traffic management, modernization of railway stations and airports, among others.

The company has developed a state of the art Border Infrastructure and Surveillance System for international projects, adopting a combination of physical and electronically controlled barriers, real-time display monitoring with an intelligence system using sensors, optical fiber cables and HRC camera's keeping the international border safe and secure for prevention of infiltration/trafficking.

EPI used excavated material like limestone/clinkers for stabilization of sand dunes for construction of roads and fence foundation, etc. EPI has started using rapid monolithic disaster proof technology in construction of

mass housing and other construction projects.

EPI has entered into tie agreement with Global Technology Provider to source technology for Flue Gas Desulfurization (FGD) system for reduction of SO<sub>2</sub> (Sulphur Dioxide) and NO (Nitrogen Oxide) from Flue Gas Thermal Power Projects within permissible limit.

EPI is implementing the PLC System for controlling, measuring and carrying out tasks in complex manufacturing and industrial applications as it increases the reliability, system stability and performance, also minimizing the need for human operators and the chances of human error. For Road Projects, EPI is working on Toll Plaza Management System (TPMS) and Automatic Traffic Management System (ATMS).

### 5.6.8 Instrumentation Limited (IL)

Instrumentation Limited, Palakkad (ILP), the operating Unit of Instrumentation Limited, under Ministry of Heavy Industry, set up in 1974 to attain self reliance in Process Control Industry, under technical collaboration of Yamatake Corporation, Japan for manufacturing Control Valves.

Over the years, there were many collaboration for various products and accessories of Control Valves. ILP has absorbed and indigenized all the technology inputs from these collaborations and is fully self reliant in technology and not dependent on any collaborator / agency.

ILP has the capability for upgrading the absorbed technology and develop new product variations to keep up with the latest technology and cater to ever changing requirements of process industry by its own Design and Engineering department.

This is the biggest asset of the company in today's competitive business environment, as it can offer customized solutions to clients requirements and also develop new products meeting with latest

technological features. ILP's Design and Engineering Department is continuously doing in-house Research and Development for self-sustenance and growth in today's challenging environment.

**Major activities undertaken by Design and Engineering Department for 2021-22 includes::**

- The new product (VDS) "Steam Conditioning Valve" has been developed in-house in line with PM's Atma Nirbhar Bharat" mission. It is a combined Pressure reducing and de-superheating control valve. It was installed at M/s Seshasayee Paper and Boards Limited, Erode, Tamil Nadu and the performance has been found satisfactory. Team of senior officials visited the site on 03.12.2021 and customer appreciated

the new development, which replaced existing valve which was giving problems.

- ILP is in process of developing 2 new products under PM's "Atma Nirbhar Bharat" initiative viz., Multi Nozzle Spray and Multi Stack Control Valve.
  - The prototype of Multi Nozzle Spray has been manufactured and its CV (Valve Coefficient) testing was successfully carried out at ILP's flow testing laboratory.
  - The prototype of 4" Multi stack" control valve has been manufactured and its CV (Valve Coefficient) testing is under progress at FCRI, Palakkad. The initial results are satisfactory.

## Welfare of SCs/STs/OBCs/ PWDs and Minorities

# 6

**6.1** Instructions issued by the Government in respect of reservation in appointment/promotion for SCs/STs/OBCs, persons with disabilities and minority communities are followed by CPSEs under the Ministry. It has been the constant endeavour of this Ministry to oversee the obligations of Central Public Sector Enterprises to promote the welfare of minorities in the light of Government's directive on this subject.

**6.2** An SC/ ST Cell is functioning within the Ministry, under the supervision of a Liaison Officer of the rank of Director/Deputy Secretary for proper monitoring of the implementation of the reservation policy of Government of India. All operating CPSEs under this Ministry are under the provisions of the Rights of Persons with Disabilities Act, 2016.

**6.3** The work force in the CPSEs consists of a large number of persons from different minority communities. Their integration into the mainstream workforce is emphasized in all CPSEs and there is no discrimination on account of their caste, creed or religious beliefs. Facilities like residential accommodation etc. are extended to employees on equal terms. Every Year, Qaumi Ekta/Sadbhavna Diwas is organized where people from all sections of the society including women and children participate

to stimulate the spirit of oneness, national integration and harmony.

**6.4** Ministry of Heavy Industries issues GST Concession Certificate to Persons with Disability for availing eligible GST concession on purchase of modified cars. As a step towards simplification of Government procedure, the application process has been made online and the affidavit to be submitted by the applicant in this regard has been replaced with the self-attested certificate. The detailed eligibility conditions are displayed on website of the Ministry. During the year 2020-21, total number of applications received were 1494 and certifications were issued to 1210 persons. During the period from 01.01.2021 to 31.12.2021, total number of applications received were 2087 and certificates were issued to 1995 persons.

**6.5** The annual data about representation of SCs, STs, OBCs and Persons with Disabilities in the Ministry of Heavy Industries as on 1<sup>st</sup> January of each year is furnished on-line to DoPT, through the portal launched by Department of Personnel & Training ([www.rrcps.nic.in](http://www.rrcps.nic.in)) for representation of reserved category in posts and services.

## 7

## Empowerment/ Welfare of Women

**7.1.** In order to safeguard the rights especially of female employees, the Ministry of Heavy Industries in accordance with the directions issued by the Government for the preservation and enforcement of rights to gender equality and justice to working women employees, an Internal Complaint Committee has been constituted in the Ministry for redressal of complaints related to sexual harassment of women in accordance with the Sexual Harassment of Women at Workplace (Prevention, Prohibition and Redressal) Act, 2013.

**7.2.** Ministry of Heavy Industries and the CPSEs under its administrative control constantly endeavour to ensure that there is no discrimination against women on any count. All members of the staff are made conscious of the principles of gender mainstreaming and gender justice enshrined in the Constitution of India.

**7.3.** In order to create awareness regarding human rights, especially of female employees, in accordance with the directions issued by the Government for the preservation and enforcement of rights to gender equity and justice to women employees, a Complaints Committee has been constituted in the Ministry for redressal of complaints related to sexual harassment of women. Ministry actively encourages women employees to freely participate in all activities like meetings, seminars, competitions, training etc. This helps in ensuring their fuller integration into the mainstream workforce.

**7.4.** The instructions issued by the Ministry of Women & Child Development on Gender Budgeting with a view to identify sectors/services where initiatives can be taken by the Ministry for the implementation of schemes/programmes for promoting gender equality, are being followed in Ministry of Heavy Industries and CPSEs under the administrative control of the Ministry.



# Vigilance

## 8

## Chapter

**8.1** The Ministry of Heavy Industries has a Chief Vigilance Officer of the rank of Joint Secretary/ Additional Secretary to look into vigilance matters of employees of the Ministry as well as Board Level Officers of the Central Public Sector Enterprises and Organizations under its administrative control. He/she is assisted by a Director/Joint Director and an Under Secretary along with a Vigilance Section.

**8.2** The main areas of work of the Vigilance Section are:-

- Dealing with complaints against Board level appointees of CPSEs under the administrative control of the Ministry of Heavy Industries as well as the officers of the Ministry;
- Issue of vigilance clearance in respect of Board level appointees in CPSEs and all other appointments based on PESB recommendations requiring ACC approval as well as officers/ officials of MHI;
- Interfacing with CVC, CBI and CVOs of PSEs

under MHI to streamline flow of information in respect of vigilance matters;

- Monitoring submission of Annual Property Return by officers and staff of the Ministry of Heavy Industries as well as Board level appointees of its CPSEs;
- Other works as enumerated in the Vigilance Manual.

**8.3** The Vigilance Section lays considerable emphasis on preventive vigilance and is promoting the use of IT to bring about greater transparency. Punitive measures are also taken in appropriate cases and followed up, wherever required.

**8.4** Vigilance Awareness Week was observed by MHI from 26.10.2021 to 01.11.2021 to generate and spread awareness against corruption and on the process of filing complaints under PIDPI (Public Interest Disclosure and Protection of Informers). The following events were organized during the said period:-

Date	Event performed during Vigilance Awareness Week-2021
26.10.2021	Pledge taking ceremony and display of posters on PIDPI Complaints and banners.
26.10.2021	Slogan Writing Competition. Topic- 'Ill effects & eradication of corruption'
27.10.2021	Essay Writing competition Topic-'Whistleblowers Act: Will it be helpful in controlling corruption'.
28.10.2021	Sensitization Programme for Officers/Staff of this Ministry on vigilance aspects and PIDPI Complaints.

Date	Event performed during Vigilance Awareness Week-2021
29.10.2021	Talk event by guest speaker Ms. Alpana Shukla Rao, CVO, EPIL on dissemination /awareness on handling issues of Vigilance Administration in CPSEs comprising challenges and opportunities.
01.11.2021	A virtual meet of all CVOs of CPSEs/ABs under this Ministry to share best practices adopted in their organizations as well as to engage in meaningful discussions with Ministry Officials on various challenges faced by them.
01.11.2021	Valedictory function Presided by Hon'ble Minister (HI) and prize distribution to the winners of the competitions.

#### The winners of the competition held during Vigilance Awareness Week-2021-

Competition	Prize	Name/Designation
Slogan Writing Competition Topic- 'Ill effects & eradication of corruption'	First	Ms. Anshumalika, Stenographer
	Second	Shri Rao Vineet Kumar, Under Secretary
	Third	Shri Chandra Dutt Sharma, Section Officer
Essay Writing Competition Topic- 'Whistleblowers Act: Will it be helpful in controlling corruption'	First	Shri Rao Vineet Kumar, Under Secretary
	Second	Shri Munna Prasad, Under Secretary
	Third	Ms. Aniyeri Aparna, Junior Hindi Translator

#### Prize Winner Slogan

First	यदि गया धन तो कोई बात नहीं । गया यदि ईमान तो फिर कुछ साथ नहीं ।।
Second	एक रहेंगे, नेक रहेंगे । भ्रष्टाचार को नहीं सहेंगे ।
Third	एक संकल्प एक ही नारा । भ्रष्टाचार मुक्त हो देश हमारा ।।

**8.5** Vigilance cases are usually of a complex nature, demanding varied and detailed information, comments and analysis into the allegations, with due assistance from the CVOs of the CPSEs. The details of vigilance cases/complaints dealt during 2021 would be as under:-

No of cases at the beginning of year	New complaints received	No. of complaints disposed off with the approval of competent authority	No. of complaints pending
29	63	47	45

**8.6** Vigilance clearance was obtained from CVC in case of 12 Board level officers for recruitment/confirmation/extension/retirement/resignation and Vigilance Clearance of 179 Officers of MHI/PSUs was granted by CVO, MHI for various purposes.

## Progressive use of Hindi

**9.1** In keeping with the motto “Shramev Jayate”, Hindi Section of the Ministry of Heavy Industries is making all efforts to make the Official Language Hindi a medium to transact government business in accordance with the goals set by the Department of Official Language. To review the progress made towards the use of Hindi, the Official Language Implementation Committee held its meeting in the Ministry on 23 April, 2021 & 23 December 2021 successfully.

**9.2** During the year 2021-22, the inspecting team of the Ministry carried out inspection of 11 Units/Offices (9 offices in virtual mode and 2 offices in physical mode) of Central Public Sector Enterprises under the administrative control of this Ministry to monitor the progress made in the implementation of Hindi and also directed the officers concerned to achieve the targets prescribed in the Annual Programme issued by the Department of Official Language. Although, as per the Annual Programme issued by the Department of Official Language, Ministry of Home Affairs, Official language inspection was to be carried out of at least 25% offices under the control of this Ministry. Due to the Covid-19 Pandemic, there has been difficulty in achieving the set target. However, the Ministry is making efforts for virtual inspections of a few more offices by March, 2022.

**9.3** All the Cabinet Notes, Notifications, Resolutions and Circulars, Parliament Questions & papers laid on the Table of both Houses of the Parliament, Annual Report, CAG Reports, Delay Statements and General Orders as received were issued both in Hindi and in English.

**9.4** In order to promote the use of Hindi, “Hindi Fortnight” was organized from 14 September, 2021 to 28 September, 2021 in which Officers/Staff of the Ministry participated enthusiastically.

**9.5** Public Sector Undertakings under the administrative control of this Ministry also continued to make vigorous efforts to implement the Official Language Act and its provisions. Various Seminars, Competitions and Workshops were organized in these PSUs to propagate the use of Hindi. “HINDI WEEK/HINDI FORTNIGHT/HINDI MONTH” were celebrated in these PSUs with great zeal.



**9.6** Rule 5 of the Official Language Rules, 1976 (as amended in 1987) was fully complied with and all letters received in Hindi and all representations/appeals signed in Hindi were answered in Hindi only.

**9.7** Check-points have been issued afresh to draw attention of all to increase the use of Hindi. 44 officials of the Ministry up to the level of Director proficient in Hindi have been instructed to put up certain letters, notes & drafts and replies to letters in Hindi only. The reconstitution of the Hindi Salahkar Samiti of this Ministry is in progress.

# 10

## Implementation of Sevottam

**10.1** The Ministry of Heavy Industries is committed to the goal of effective and responsive administration and service on delivery excellence. The SEVOTTAM framework of the Government of India has been implemented in the Ministry. Following steps have been taken in this direction. In addition to above, the Ministry has appointed/designated various Nodal Officers at appropriate levels for the smooth functioning of the Ministry as well as for helping its staff and the public. Some of such areas are described below:

- In an effort to streamline the system of Redressal of Public Grievances, a Joint Secretary in this Ministry is functioning as Joint Secretary (Public Grievances).
- In order to process litigation matters and to further coordinate, a Nodal Officer has been designated to ensure timely action.

### 10.2 Grievance Redress Management

The Ministry receives public grievances and Covid-19 related grievances online through CPGRAMS Portal. In addition, off-line grievances are also received. The grievances received on CPGRAMS and also physical receipts are maintained on regular basis and immediately forwarded to concerned Sections/CPSEs for redressal. Follow up is done with concerned officials on phone/through reminders for time bound redressal of grievances and submission of reply to the complainant.

During the period from 01.04.2021 to 08.1.2021, 954 grievances were received and 126 grievances

were brought forward. Out of 954 received grievances, 1030 grievances were disposed of as on 08.11.2021, which is 107% of total grievances received. The average days of pendency of grievances is 21 days.

During the period, total 76 grievances related to Covid-19 were received online and all of them were disposed off within the stipulated time of 3 days.

### 10.3 IT initiatives in the Ministry of Heavy Industries:

Ministry of Heavy Industries is taking forward the slogan “Minimum Government and Maximum Governance”. A citizen centric approach and accountable administration is the focus of the Ministry. COVID 19 has challenged the existing system and has also opened up a lot of opportunities for enhancing the capacity and use of information technology specifically in Digital Governance. The Ministry of Heavy Industries has taken big strides by enabling ‘work from home’ on e-office for all officials of the Ministry during the pandemic. In addition to this monitoring of all CPSEs and Autonomous Bodies under its domain done through digital platforms.

Several IT achievements have been accomplished which included use of e-office above 98 %. The other achievements include DBT web service integration, implementation of the second phase of the FAME-India portal with online beneficiary verification, PRAYAS API integration, launching of GST Exemption Certificate Scheme portal, revamping of the Ministry’s website, launching of dedicated Dashboard on Key Performance Indicators of sectoral growth operationalization of



various in-house intranet applications/MIS finalization of GIS based land records for CPSEs.

MHI Informatics Division of the National informatics Centre, Ministry of Electronics and Information Technology renders NIC support services, consultations, development cum implementations of e-governance in MHI as well as all its organizations. It also maintains websites of Ministry, facilitating MHI in accessing online e-governance services portals and conducting training/workshops on different topics with reference to the need.

### **10.3.1 MHI Website**

MHI website (<https://heavyindustries.gov.in>) has been revamped and upgraded into the cloud environment along with more capacity, SSL encryption. Real time dashboard of FAME 2 scheme also incorporated in the website along with API. It is the most effective platform for dissemination of Information on Policies, Procedures, Feedback, Performance, Budget, RTI etc. relevant to the Heavy Industry Sectors as well as Indian Citizens.

Flashing of latest initiatives, schemes, policies, notices and events under the 'What's New' are most popular among global visitors. To encourage the participation of the Industry in Policy, feedbacks are invited from them within the due date. The Content related to various Scheme-wise Policy, Procedures, performing reports, Industry 4.0 Events Citizen Charter, Budget, Grant & Aid details, GST implementation etc are also regularly maintained. To keep the latest information and its updation in the website, MHI content moderators are facilitated through content management framework to take care of their respective web contents. In order to monitor the content publishing regularly, an automatic email alert has been activated. An exclusive MIS system has also been developed and implemented in intranet to monitor the content moderation activity and trace out the audit log of the website. Hindi version of the website is also made available and regularly updated by the Hindi Section.

### **10.3.2 E-Office Implementation**

Under National e- Governance Division (NeGD) project, e-office has been implemented and operationalized with all its modules. During COVID Pandemic lock down MHI officers were able to access the e-office through VPN. The E-File module has been upgraded to version 6 with proper hands on training for successful performance. Necessary facilitation for Integration with DSC, e-sign and email diarization have also been taken up. In order to monitor the performance, an intranet based MIS had also been developed and deployed.

### **10.3.3 MHI Dashboard**

A Dashboard portal has been developed by the Ministry for interaction with the public. The portal contains progress of e-Mobility, sectoral information and information regarding the Central Public Sector Enterprises under the administrative control of MHI.

### **10.3.4 Fame India II Portal**

MHI hosts FAME India I and FAME India II portals in NIC-Megraj Cloud. Stakeholders like NAB, OEM, Dealers, Testing Agencies are integrated together to complete the full processing cycle. Digital Aadhaar verification, e-vahan verification, data pushing to DBT portal, data pushing to PMOs prayas portal , Progress status push to MHI website & Dashboard are enabled through APIs. Detail MIS reports and analytical reports are equipped under single sign on system.

### **10.3.5 GST Concession Certificate to PWDs Scheme (DBT)**

Under this scheme certificate are issued to the beneficiary, who can avail GST concession for purchasing cars. A new portal has been launched at <https://gecs.heavyindustries.gov.in/> with single logon system in open source platform again. Beneficiary will register the system and submit their application. Their UID will be verified through API and UDID

will be verified by separate APIs. Once both data are qualified then MHI will approve their application and issue the certificate by online, it will reach the beneficiary by email as well as mobile. Then registered vehicle number is also verified through different API with Transport authority. All requirement procedures, Scheme Policy, User Guidelines, are made available. Email and SMS alerts are also enabled for better management and service among the stakeholder.

### 10.3.6 MHI DARPAN Portal

A MHI DARPAN Portal interface linked to NGO-Darpan Portal of NITI Aayog to verify the details of the NGOs before releasing funds to them has been developed.

### 10.3.7 Technical Portals for innovation platforms

MHI has developed web based open manufacturing technology innovation platforms under the Capital Goods Scheme. These platforms helped in bringing all India's technical resources and the concerned Industries on to one platform to kick start and facilitate identification of technology problems faced by Indian Industry and crowd source solutions for the same in a systematic manner.

### 10.3.8 Online E-governance Services

E-governance portals with common services like SPARROW (Smart Performance Appraisal Report Recording Window) for IAS,CSS,IPS officers, Pro Active Governance and Timely Implementation (PRAGAT) PMO, online Single User Platform Related To Employees Online (SUPREMO), Online Legal Information Management & Briefing System (LIMBS), Online e-tendering-and e-procurement, Biometric Attendance System (BAS), Visitor Management for the Bhavans (MHA), RTI applications/first appeal online (DoPT), Centralized Public Grievance Redressal and Monitoring System (CPGRAMS), online system for monitoring of follow-up action (e-samiksha) (CS), India Code Portal, e-suidha, Foreign Visit Management System, Government E-Marketing

System, PFMS (Public Financial Management System) are operationalised in the Department.

### 10.3.9 DGQI (Data Governance Quality Index)

Niti Aayog launched Data Governance Quality Index 2.0. In DGQI 1.0 report of December 2020, MHI got overall 1.86 points out of 5. In DGQI 2.0 report of November 2021 overall score of MHI increased to 3.75 out of 5.

### 10.3.10 Cyber Security and IT Policies

MHI nominated CISO to look all the matters under the cyber threat and data breach incidents. Officers of MHI attended various workshops organised by MEITY and IB etc on Cyber Security. Two level authentications through Kavach for email and Parichay for e-office are already implemented. Regular patch updations and cloud virtual server health is monitored by MHI-NIC cell regularly. Websites and portals of MHI are equipped with the latest cyber security auditing and SSL compliance.

## 10.4 Social Media

Media and Publicity Cell has been created w.e.f 24.08.2020 in Ministry of Heavy Industries (MHI) for being more active on official social media platforms by publishing information pertaining to important activities/events/achievements/notable CSR initiatives etc. on it and to provide greater visibility to the work being done by various organisations under MHI. Information regarding MHI's official twitter account @MHI\_Gol (active since 2014), is:

Twitter account i.e. @ MHI_Gol	Tweets/ Retweets done(Nos)	Followers (Nos)
Upto Dec 2020	350	2784
During 2021	810	1160
<b>Total upto 31.12.2021</b>	<b>1160</b>	<b>3944</b>

During 2021, the twitter handle of MHI generated approximately 3 lakh tweet impressions.

### 10.5 International Cooperation

In furtherance of the objective of bringing the state of the art technologies in the industries, MHI collaborated with other nations and participated in the following international meeting/ conference :-

Secretary, Heavy Industries attended the 1<sup>st</sup> meeting of Ministers of Industry of the Member States of Shanghai Cooperation Organization (SCO) held on 16th July 2021 by the present chair Tajikistan on virtual mode. The SCO has been formed to establish a mechanism to coordinate and synchronize activities of relevant government agencies, expand and deepen cooperation in industrial cooperation between the SCO Member States.

### 10.6 Swachh Bharat Abhiyan

Awareness regarding Swachhta and implementation of the Swachh Bharat Abhiyan is regularly monitored by the Senior Officers in the Ministry. A Swachhta Pakhwada (fortnight) was observed in this Ministry from 16<sup>th</sup> August, 2021 to 31<sup>st</sup> August, 2021 to engender a sense of responsibility for keeping ones' surroundings clean and to take forward the Swachh Bharat Abhiyan. In addition to this, a special cleanliness campaign was observed from 02.10.2021 to 31.10.2021 to dispose of all obsolete items including weeding out obsolete files/papers. As a part of this campaign, cleanliness drive is also being carried out on regular basis in this Ministry to achieve maximum cleanliness.

# 11

## Right to Information

**11.1** Various provisions of the RTI Act and the instructions issued by the Department of Personnel and Training, Government of India have been implemented in the Ministry of Heavy Industries. The Central Public Sector Enterprise under the administrative control of the Ministry have separate public authorities under the RTI Act.

**11.2** The web portal [www.rtionline.gov.in](http://www.rtionline.gov.in) launched by DoPT has been made operational in the Ministry of Heavy Industries with effect from 18.7.2013. All the officers of the level of Under Secretary or equivalent have been designated as CPIOs and all officers at the level of Director/Deputy Secretary or equivalent have been designated as First Appellate Authority under the RTI Act, 2005. In addition, officer of the rank of Director/Deputy Secretary is designated as Transparency Officer to ensure suo-motu disclosure of information on the

website of the Ministry in terms of Section 4(1) (b) of the RTI Act, 2005 and updating the information on the website of the Ministry.

**11.3** For the effective and quick disposal of RTI applications/appeals, Government had decided to integrate the CPSEs/Autonomous Bodies with the [www.rtionline.gov.in](http://www.rtionline.gov.in) Portal of DoP&T. The Quarterly RTI returns were submitted to CIC online by the Ministry and the CPSEs under MHI.

**11.4** During the year 2020-21, 692 applications and 38 appeals under RTI were received in the Ministry. During the same period, 655 applications and 35 appeals disposed off. For the period 01.01.2021 to 31.12.2021, 774 applications and 41 appeals were received, and during this period 735 applications and 39 appeals were disposed off.



# Azadi Ka Amrit Mahotsav

# 12

## Chapter

### 12.1 Azadi Ka Amrit Mahotsav Celebrations of Ministry of Heavy Industries

Azadi Ka Amrit Mahotsav is an initiative of the Government of India to celebrate and commemorate 75 years of progressive India and the glorious history of its people, culture and achievements. Azadi ka Amrit Mahotsav is an embodiment of all that is progressive about India's socio-cultural, political and economic identity. The official journey of Azadi ka Amrit Mahotsav commenced on 12 March, 2021 which marked a 75-week countdown to the 75<sup>th</sup> Anniversary of our Independence on 15 August 2022, and will continue for a year thereafter till 15 August 2023.

As part of the celebrations of Azadi Ka Amrit Mahotsav, Ministry of Heavy Industries in association with its CPSEs and Autonomous Bodies has organized over 125 events and activities across the country through the year 2021 from March to December. These included flagging off of Electric Buses at Goa, inauguration of High Speed Test Track at NATRAX, Indore, Technology Innovation Platforms developed under Capital Goods Scheme, Solar Electric Vehicle Charging Station and prototype Air Pollution Control Tower (APCT) at Noida indigenously designed and developed by BHEL by Hon'ble Minister Heavy Industries. Other activities included Webinars on technical topics, Seminars, Hackathon, Technical Exhibitions, Master Class lectures, Talk Shows, New Product Launches, Technical Writing Competitions etc.



*Dr. Mahendra Nath Pandey, Hon'ble Union Minister of Heavy Industries inaugurating the prototype Air Pollution Control Tower (APCT) in Noida on 17 November 2021*



## 12.2 Round Table to Promote Electric Vehicles

As part of AKAM celebrations, Ministry of Heavy Industries (MHI) organized a Round Table to Promote Electric Vehicles on December 4, 2021 at Goa. Dr Mahendra Nath Pandey, Hon'ble Minister of Heavy Industries was the Chief Guest. Shri Krishan Pal Singh Gurjar, Hon'ble Minister of State for Power & Heavy Industries and Chief Minister of Goa graced the event.

Ministers of Transport from States, Chief Secretaries/ Senior Officers from Centre, States, Industry Leaders from Automotive Sector, Start Ups and Technical Experts participate in the Round Table and deliberated out strategies to promote adoption of Electric Vehicles in India and attract investment in manufacturing of Electric Vehicles, batteries and high technology automotive components in India. Electric Buses for Goa were also flagged off by Hon'ble Minister of Heavy Industries during the event.



*Hon'ble Minister, Heavy Industries, Hon'ble Minister of State for Power & Heavy Industries, Hon'ble Chief Minister of Goa and Secretary, Heavy Industries addressing the E-Mobility Round Table on 4 December 2021*



*Hon'ble Minister Heavy Industries, flagging off the Electric Buses for Goa during Round Table on E-Mobility on 4 December 2021.*

### 12.3 Azadi Ka Amrit Mahotsav (AKAM) ICONIC Week

Ministry of Heavy industries celebrated the Azadi Ka Amrit Mahotsav (AKAM) ICONIC Week from 10 to 16 January 2022 at over 40 locations across the country including Haridwar, Hyderabad, Bengaluru, Bhopal, Jhansi, Tirucharapalli, Delhi, Noida, Visakhapatnam, Varanasi, Chennai, Kolkata, Bokajan (Assam), Tandur (Telangana), Rajban (Himachal Pradesh), Guwahati, Bhubaneswar, Mumbai, Pinjore (Haryana), Ajmer, Kalamassery, Jaipur, Kharaghoda (Gujarat), Mandi (Himachal Pradesh), Sambhar (Rajasthan), Jagdishpur (Uttar Pradesh) etc. The celebrations focused on AKAM themes of Actions@75, Achievements@75, Ideas@75, Resolve@75 and Freedom Struggle. The events and activities were focused on Innovation, Manufacturing Excellence, Atmanirbhar Bharat, Environment & Sustainability, Swachha Bharat, Swastha Bharat, Freedom Struggle etc. The events

and activities included Inaugurations, New Product launches, Technology Demonstrations, Technical Exhibitions, Seminars, Webinars, Expert Lectures, Yoga and Meditation sessions, Health Camps, Celebrating the Unsung Heroes of Freedom Struggle, Cultural Programs and Competitions amongst children on Freedom Struggle and Movements, Cleanliness Drives etc. During the AKAM ICONIC week Mega Programmes were organized with wide participation and outreach. Hon'ble Minister of Heavy Industries, Dr. Mahendra Nath Pandey, Hon'ble Minister of State, Shri Krishan Pal Gurjar and Secretary, Ministry of Heavy Industries, Shri Arun Goel participated in celebrations at several sites across India including Bengaluru, Hyderabad, Pune and Bhopal.

118 Webinars and 454 other activities and events were organized during the AKAM ICONIC Week. The details of the activities/events is given below:

Name of Event/Activity	Number of Event/Activities
Foundation/Inauguration/Launch/Dedication	12
Expert Talk/Technical Presentation	16
Swacchata/Cleanliness Drive	59
Competitions (Essay/Projects/Drawing/Essay/Quiz/Debate/Slogans/Other)	137
Plantation drive	24
Hackathon	1
Film/Documentary screening	26
Blood donation camp/Health/Medical check up camp/Health Talk	27
Yoga/Meditation Camp	18
Walkathon/Fit India Walk/Run	30
Exhibition	7
Skit/Nukkad Natak/Kavya Goshthi/Cultural program/Function	34
Seminars/Brainstorming/Idea Generation sessions/Training	38
Stories of Freedom Fighters/Talks	22
Awareness campaigns	3
<b>Total</b>	<b>454</b>



## 12.4 AKAM Celebrations at BHEL

As part of AKAM celebrations, Dr. Mahendra Nath Pandey Hon'ble Minister for Heavy Industries dedicated India's first BHEL built Coal to Methanol (CTM) pilot plant, to the Nation on 15 January 2022. Management and staff of BHEL and officers of Ministry of Heavy Industries were present in the virtual ceremony. The 0.25 TPD capacity CTM pilot plant, indigenously designed, developed and installed by BHEL, is currently producing methanol with purity of more than 99% from high ash Indian coals. Significantly, this conversion of high ash Indian coals to methanol through the gasification route, is the first of its kind technology demonstration in India. During his address Hon'ble Minister emphasised that BHEL,

one of the largest engineering and manufacturing enterprise has a crucial role to play in building an Atmanirbhar Bharat and meeting India's climate change mitigation commitments.

Hon'ble Minister for Heavy Industries also inaugurated an exhibition on 'Products Developed under Aatmanirbhar Bharat' organised at BHEL's Hyderabad unit. In addition, an audio-visual presentation was made on the 'Unsung Heroes of the Indian Freedom Struggle' belonging to the Telangana Region. BHEL employees joined the program virtually from multiple locations across the country. While participants logged-in to the online event in large numbers, the event was also webcast live where scores of employees watched the proceedings through the broadcast mode.



*Dr. Mahendra Nath Pandey, Hon'ble Minister of Heavy Industries addressing the gathering during AKAM celebrations at Hyderabad on 15 January 2022*



*Dr. Mahendra Nath Pandey, Hon'ble Minister of Heavy Industries dedicating to the nation indigenous Pilot Coal to Methanol Plant made by BHEL at Hyderabad on 15 January 2022*



Shri Krishan Pal Gurjar, Hon'ble Minister of State for Power & Heavy Industries, inaugurated a webinar via video conferencing on 11 January 2022, on "Power Plant Flexibilization – A Key to Grid Stability" and "Industry 4.0 – Success with Smart Solutions", held at BHEL's Electronics Division, Bengaluru. Power plant flexibilization and implementation of Industry 4.0 are important for enhancing power generation with accent on reducing carbon emissions. The deliberations

focused on Flexible Operation of Thermal Power Plant for Integration of Renewable Energy, Flexibilisation Challenges in coal based Thermal Units and Way Forward, Green Energy, Grid Stability, SMART I 4.0 Solutions for Power & Industry, Future trends in power Electronics Devices and Topologies etc. National and international experts, industry representatives and academia participated in the Webinar and presentations.



*Shri Krishan Pal Gurjar, Hon'ble Minister of State for Heavy Industries & Power  
inaugurating Webinar at BHEL Bengaluru on 11 January 2022*

As a part of AKAM celebrations at Bhopal on 13.01.2022, Shri Arun Goel, Secretary Heavy Industries virtually inaugurated the Exhibition on "Unsung Heroes of Freedom Struggle" from Madhya Pradesh. This was followed by brief commentary on Unsung Heroes namely Tantia Bhil, Avantibai Lodhi, Sadad Khan, Jhalkari Bai, Bhagirath Silawat, Raja Shankar Shah, Bhima Nayak, Kuwar Raghunath

Shah, Smt Sahodra Bai Rai and Raja Bakhtawar Singh. Presentation on "Idea Generation Challenge" on Sanrachna Portal (Innovation Portal) through online mode was also organised during the celebrations on 13 January, 2022. Officials and staff of various units of BHEL across the country and Ministry of Heavy Industries participated in the program virtually from different locations of the Country.



*Shri Arun Goel, Secretary, Heavy Industries addressing the gathering during AKAM Week celebrations at Bhopal on 13 January 2022*

## 12.5 AKAM Celebrations at ARAI

During the AKAM celebrations at Pune on 13 January 2022, Hon'ble Minister of State for Heavy Industries, Shri Krishan Pal Gurjar inaugurated a student Hackathon on Smart Safe and Sustainable mobility hosted on Automotive Research Association of India (ARAI) -TechNovuuson.

During the AKAM ICONIC Week celebrations thrust was on following "Whole of Government Approach" and people's participation i.e 'Janbhagidari' in the events and

activities in the week-long celebrations. During the events and activities proper Covid-19 protocols were ensured. Thrust was given to leverage Information Technology and Virtual modes for organizing the events/activities. To create awareness about the events, a Social Media campaign consisting of tweets, infographics, videos, etc. was undertaken



*Shri Krishan Pal Gurjar, Hon'ble Minister of State for Heavy Industries & Power, inaugurating Hackathon at ARAI Pune on 13 January 2022*

through the Social Media platforms of the Ministry, it's CPSE's and other affiliated organizations including PIB social media handles and other stakeholders in a synchronized manner for a wide reach. PIB's tweets and posts were shared by many individuals and organizations to disseminate the information.



# Allocation of Business to the Ministry of Heavy Industries

The Ministry of Heavy Industries is previously Ministry of Heavy Industries and Public Enterprise. On 7 July 2021 the Ministry has been renamed as Ministry of Heavy Industries. The Department of Public Enterprises has become a part of Ministry of Finance. The Ministry of Heavy Industries is looking after the following items of work:

1. The Heavy Engineering Corporation Limited.
2. The Mining and Allied Machinery Corporation Limited.
3. The Engineering Projects (India) Limited.
4. Bharat Heavy Electricals Limited.
5. H.M.T. Bearing Limited.
6. H.M.T. Limited.
7. H.M.T. International Limited.
8. Scooters India Limited.
9. Andrew Yule and Company Limited.
10. Bharat Ophthalmic Glass Limited.
11. Bharat Leather Corporation.
12. Cement Corporation of India Limited.
13. Cycle Corporation of India Limited.
14. Hindustan Cables Limited.
15. Hindustan Paper Corporation Limited.
16. Hindustan Photo Films Manufacturing Company Limited.
17. Hindustan Salts Limited.
18. Hooghly Printing Company Limited.
19. Instrumentation Limited.
20. The Mandya National Paper Mills Limited.
21. Nagaland Pulp and Paper Company Limited.
22. National Bicycle Corporation of India Limited.
23. The National Industrial Development Corporation Limited.
24. National Instruments Limited.
25. N.E.P.A. Limited.
26. Rajasthan Electronics and Instruments Limited.
27. Hindustan Newsprint Limited.

28. Damodar Cement and Slag Limited.
29. Tannery and Footwear Corporation of India Limited.
30. Tyre Corporation of India.
31. Praga Tools Limited.
32. Rehabilitation Industries Corporation.
33. Sambhar Salts Limited.
34. Fluid Control Research Institute.
35. Bharat Bhari Udyog Nigam Limited: Subsidiaries
  - (a) Bharat Brakes and Valves Limited;
  - (b) Bharat Process and Mechanical Engineers Limited;
  - (c) Bharat Wagon and Engineering Company Limited;
  - (d) Braithwaite and Company Limited;
  - (e) Burn Standard Company Limited;
  - (f) Jessop and Company Limited;
  - (g) The Lagan Jute Machinery Company Limited;
  - (h) Braithwaite, Burn and Jessop Construction Limited;
  - (i) Reyrolle Burn Limited;
  - (j) Weighbird (India) Limited.
36. Bharat Yantra Nigam Limited. Subsidiaries
  - (a) The Triveni Structurals Limited, Allahabad;
  - (b) The Tungabhadra Steel Products (India) Limited, Durgapur;
  - (c) The Bharat Heavy Plates and Vessels Limited;
  - (d) Bharat Pumps and Compressors Limited;
  - (e) Richardson and Cruddas (1972) Limited;
  - (f) Bridge and Roof Company.
37. Maruti Udyog Limited.
38. Manufacture of heavy engineering equipment for all industries.
39. Heavy Electrical Engineering Industries.
40. Machinery Industries including Machine Tools and Steel Manufactures.
41. Auto Industries, including tractors and earth moving equipment.
42. All types of diesel engines.
43. Automotive Research Association, Pune.
44. National Automotive Testing and Research and Development Infrastructure Project (NATRIP) and NATRIP Implementation Society (NATIS).

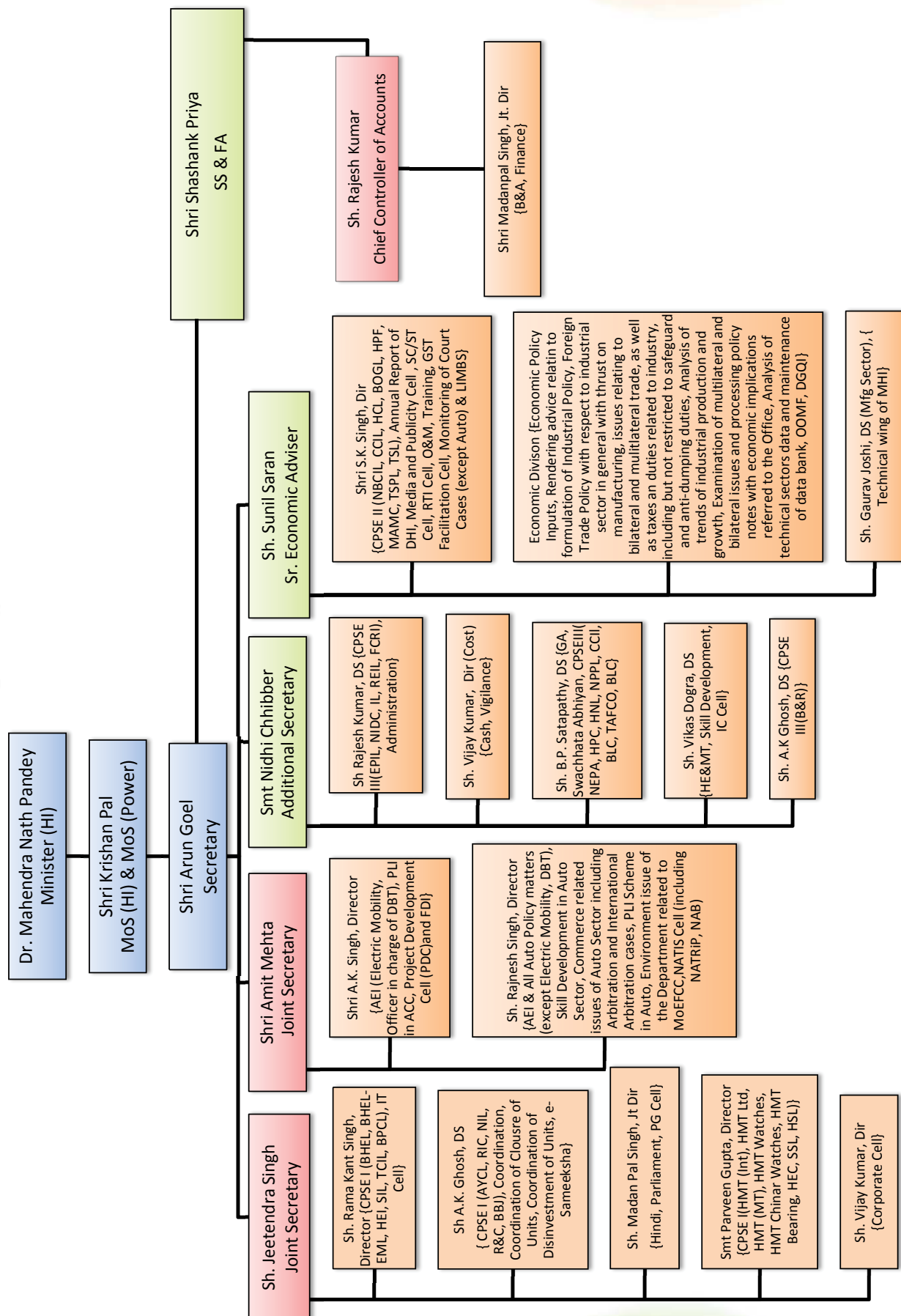


# List of CPSEs under Ministry of Heavy Industries

S. No.	Name of CPSE
<b>Operational CPSEs</b>	
1	Andrew Yule and Company Ltd.
2	Bharat Heavy Electricals Ltd.
3	Braithwaite, Burn & Jessop Construction Ltd.
4	Bridge & Roof Company (India) Ltd.
5	Cement Corporation of India Ltd.
6	Engineering Projects (India) Ltd.
7	Heavy Engineering Corporation Ltd.
8	HMT Ltd.
9	HMT Machine Tools Ltd. (subsidiary of HMT Ltd.)
10	HMT (International) Ltd. (subsidiary of HMT Ltd.)
11	Hindustan Salts Ltd. (HSL)
12	Sambhar Salts Ltd. (subsidiary of HSL)
13	Instrumentation Ltd.*
14	Rajasthan Electronics & Instruments Ltd.
15	Richardson and Cruddas (1972) Ltd.
<b>CPSE under revival</b>	
1	NEPA Ltd.
<b>CPSEs under closure</b>	
1	HMT Watches Ltd. (subsidiary of HMT Ltd.)
2	HMT Chinar Watches Ltd. (subsidiary of HMT Ltd.)
3	HMT Bearings Limited (subsidiary of HMT Ltd.)
4	Hindustan Cables Ltd.
5	Tungabhadra Steel Plants Ltd.

S. No.	Name of CPSE
6	Bharat Pumps & Compressors Ltd
7	Scooters India Ltd
8	National Bicycle Corporation of India Limited
<i>*Kota unit of Instrumentation Limited is also under closure</i>	
<b>CPSEs under Liquidation</b>	
1	Reyrolle Burn Limited
2	Tyre Corporation of India Ltd (TCIL)
3	Bharat Ophthalmic Glass Limited
4	Weighbird (India) Limited
5	Mining and Allied Machinery Corporation Ltd.
6	Bharat Process and Mechanical Engineers Limited
7	Bharat Brakes and Valves Limited
8	Cycle Corporation India Ltd.
9	Rehabilitation Industries Corporation Ltd
10	Bharat Yantra Nigam Ltd (BYNL)
11	Triveni Structurals Ltd. (TSL)
12	Bharat Leather Corporation Limited
13	National Industrial Development Corporation Limited(NIDC)
14	Tannery and Footwear Corporation of India Ltd (TAFCO)
15	Hindustan Photo Films Mfg. Co. Ltd
16	Hindustan Paper Corporation Limited
17	Nagaland Pulp and Paper Company Limited

# Organogram



## General Information about CPSEs under Ministry of Heavy Industries

Sl. No.	Name of CPSE and location of Registered Office	Year of setting up of CPSE	Gross Block as on 31.03.2021 (in ₹ crore)
1	Andrew Yule & Co. Ltd., (AYCL), Kolkata	1919	218.94
2	Bharat Heavy Electricals Ltd., (BHEL), New Delhi	1964	6883.00
3	Braithwaite, Burn & Jessop Construction Co. Ltd., (BBJ), Kolkata	1987	23.18
4	Richardson & Cruddas (1972) Ltd., (R&C) Mumbai	1973	29.27
5	Bridge and Roof Co. (India) Ltd., (B&R) Kolkata.	1920	116.86
6	Heavy Engineering Corpn. Ltd., (HEC), Ranchi.	1958	389.74
7	HMT Ltd., (Holdg Co.), Bangalore.	1953	143.28
8	HMT (Machine Tools) Ltd., Bangalore.	1999	324.98
9	HMT (International), Bangalore	1974	8.36
10	Rajasthan Electronics & Instruments Ltd., (REIL) Jaipur	1981	55.63
11	Cement Corporation of India Ltd. (CCI), New Delhi.	1965	763.29
12	Hindustan Salts Ltd., (HSL), Jaipur.	1958	16.96
13	Sambhar Salts Ltd., (SSL) Jaipur.	1964	49.37
14	Nepa Ltd., (NEPA), Nepa Nagar.	1947	96.52
15	Engineering Projects (India) Ltd., (EPIL), New Delhi.	1970	28.14
16	Instrumentation Limited, (IL), Jaipur	1964	34.90
	<b>Total:</b>		<b>9,182.42</b>



## Employment Position including SC, ST & OBC as on 31.03.2021 in CPSEs under Ministry of Heavy Industries

Sl. No.	Name of CPSE	Total No. of Employees				Number of Employees			
		Executives	Supervisors	Workmen/ Others	Total	SC	ST	OBC	PWD
1	2	3	4	5	6	7	8	9	10
1	AYCL	163	88	14296	14547	1143	4063	7852	23
2	BHEL	9742	5975	16414	32131	6649	2389	11352	862
3	BBJ	45	6	34	85	8	0	5	0
4	R&C	3	0	2	5	0	0	0	0
5	B&R	685	266	183	1134	152	10	95	19
6	HEC	648	51	675	1374	301	309	294	15
7	HMT (Hldg Co.)	36	1	43	80	14	2	15	2
8	HMT (MT)	276	21	592	889	183	41	266	13
9	HMT (International)	22	0	0	22	0	1	5	0
10	REIL	80	60	82	222	47	9	50	3
11	CCI	144	121	221	486	76	38	113	4
12	HSL	21	19	45	85	10	1	36	0
13	SSL	11	11	46	68	19	2	23	1
14	NEPA	72	30	137	239	20	4	33	0
15	EPIL	255	18	16	289	49	11	58	2
16	IL	18	72	110	200	31	4	86	3
	<b>Total</b>	<b>12221</b>	<b>6739</b>	<b>32896</b>	<b>51856</b>	<b>8702</b>	<b>6884</b>	<b>20283</b>	<b>947</b>

## Production Performance of CPSEs under Ministry of Heavy Industries

(in ₹ crores)

Sl. No.	Name of CPSE	2018-19 (Actual)	2019-20 (Actual)	2020-21 (Actual)	2021-22 (Anticipated)	2022-23 (Tentative)
1	2	3	4	5	6	7
1	AYCL	302.78	297.28	325.91	353.50	407.50
2	BHEL	29,423.00	20,491.00	16296.00	20500.00	26000.00
3	BBJ	104.99	129.02	59.67	130.00	149.00
4	R&C	13.00	9.20	5.00	5.00	0.00
5	B&R	3,074.64	3,244.17	2695.40	3302.00	4500.00
6	HEC	356.21	132.68	202.76	201.88	489.36
7	HMT (Holding Co.)	17.01	20.99	15.39	24.50	65.00
8	HMT(MT)	238.83	213.42	161.20	180.00	230.00
9	HMT (International)	57.07	67.15	19.83	40.00	50.00
10	REIL	269.31	110.19	147.44	250.00	270.00
11	CCI	276.66	247.62	411.77	422.23	436.59
12	HSL	7.93	3.38	12.45	13.35	18.50
13	SSL	17.81	22.76	32.47	32.50	50.00
14	NEPA	0.00	0.00	0.00	277.59	413.60
15	EPI	1,791.05	1,336.59	805.62	1400.00	1700.00
16	IL	75.90	57.17	68.39	70.00	75.00
	<b>Total:</b>	<b>36026.19</b>	<b>26382.62</b>	<b>21259.30</b>	<b>27202.55</b>	<b>34854.55</b>

## Profit (+)/ Loss (-) (Before Tax) of CPSEs under the Ministry of Heavy Industries

(in ₹ crores)

Sl. No.	Name of CPSE	2018-19 (Actual)	2019-20 (Actual)	2020-21 (Actual)	2021-22 (Anticipated)	2022-23 (Tentative)
1	2	3	4	5	6	7
<b>Profit Making CPSEs</b>						
1	AYCL	10.51	-21.25	14.70	-18.60	26.10
2	BBJ	1.60	2.28	15.07	6.00	8.50
3	R&C	23.78	24.06	18.41	20.00	22.00
4	B&R	51.42	50.92	12.66	15.00	50.00
5	HMT (Hldg. Co.)	17.25	248.18	27.49	28.00	28.50
6	HMT (International)	1.51	2.71	0.97	1.50	2.47
7	CCI	6.35	-50.94	13.16	26.39	32.88
8	HSL	1.26	-1.85	5.80	6.00	7.00
9	SSL	-10.83	-2.59	5.35	7.00	10.00
10	IL	101.14	35.58	13.84	15.00	17.00
<b>Sub-Total of Profit making CPSEs</b>		<b>203.99</b>	<b>287.10</b>	<b>127.45</b>	<b>106.29</b>	<b>204.45</b>
<b>Loss Making CPSEs</b>						
1	BHEL	2,048.00	-662.00	-3612.00	-501.00	-255.00
2	HEC	-93.67	-405.37	-175.78	-259.61	-155.87
3	HMT (Machine Tools)	-63.83	-98.72	-132.79	-141.65	-129.43
4	REIL	14.36	-27.56	-19.04	5.00	8.00
5	NEPA	-77.78	-71.25	-53.26	46.26	47.99
6	EPIL	-29.62	7.94	-43.69	7.11	9.50
<b>Sub-Total of Loss making CPSEs</b>		<b>1,797.46</b>	<b>-1,256.96</b>	<b>-4,036.56</b>	<b>-843.89</b>	<b>-474.81</b>
<b>Grand Total</b>		<b>2,001.45</b>	<b>-969.86</b>	<b>-3,909.11</b>	<b>-737.60</b>	<b>-270.36</b>

## Salary/Wages Bill & Social Overheads as percentage of Turnover of CPSEs under Ministry of Heavy Industries

Sl. No.	Name of CPSE	Wages and salaries as % of Turnover					Social overheads as % of Turnover				
		2018-19 (Actual)	2019-20 (Actual)	2020-21 (Actual)	2021-22 (Anticipated)	2022-23 (Tentative)	2018-19 (Actual)	2019-20 (Actual)	2020-21 (Actual)	2021-22 (Anticipated)	2022-23 (Tentative)
1	2	3	4	5	6	7	8	9	10	11	12
1	AYCL	53.66	59.00	54.94	56.00	55.00	5.80	5.21	4.67	4.80	4.60
2	BHEL	19.00	26.00	33.00	27.00	22.00	2.60	3.50	3.20	2.90	2.70
3	BBJ	19.27	18.39	30.72	16.92	15.36	0.62	0.38	0.40	0.15	0.07
4	R&C	3.75	7.14	4.57	4.57	4.57	0.00	0.00	0.00	0.00	0.00
5	B&R	6.94	8.23	9.47	8.07	6.38	0.99	1.02	1.42	1.17	0.95
6	HEC	34.75	93.22	54.99	56.85	24.74	2.65	8.73	5.38	5.84	2.51
7	HMT (Hldg)	48.00	50.00	44.00	38.00	15.00	3.00	3.00	3.00	2.00	1.00
8	HMT (MT)	44.00	49.00	43.00	58.00	47.00	7.00	10.00	7.00	6.00	6.00
9	HMT (International)	5.00	4.00	15.00	8.00	7.00	0.00	0.00	0.00	0.00	0.00
10	REIL	11.27	28.06	22.02	13.60	13.10	1.49	3.72	1.92	1.60	1.70
11	CCI	16.00	16.31	10.97	10.81	10.46	8.02	8.23	3.88	3.83	3.70
12	HSL	74.17	170.14	44.24	47.63	50.00	3.14	5.85	1.69	2.87	3.00
13	SSL	32.55	28.15	26.57	27.00	35.00	3.04	2.55	2.86	2.52	3.00
14	NEPA	0.00	0.00	0.00	0.07	0.07	0.00	0.00	0.00	0.10	0.12
15	EPIL	3.83	5.06	8.32	4.93	4.12	0.43	0.43	0.68	0.43	0.41
16	IL	26.69	29.53	24.05	22.00	22.00	1.26	0.25	0.20	0.17	0.15



## Order book position of CPSEs under Ministry of Heavy Industries

(in ₹ crores)

Sl. No.	Name of CPSE	As on 01.10.2018	As on 01.10.2019	As on 01.10.2020	As on 01.10.2021
1	2	3	4	5	6
1	AYCL	161.78	120.93	109.39	166.14
2	BHEL	115,532.00	108,603.00	107,645.00	110023.00
3	BBJ	638.87	692.55	802.50	768.69
4	R&C	19.17	15.42	8.00	10.00
5	B&R	7,216.54	8,160.70	9,884.01	12559.00
6	HEC	863.02	1,138.33	1231.40	1935.46
7	HMT(Hldg)	3.61	17.75	11.24	66.87
8	HMT(MT)	114.65	99.56	90.90	61.61
9	HMT(I)	80.90	85.08	53.40	45.14
10	REIL	129.43	173.86	63.29	121.57
11	CCI	3.83	4.74	5.00	0.80
12	HSL	5.06	0.70	4.16	8.03
13	SSL	8.32	10.53	10.66	10.86
14	NEPA	0.00	0.00	0.00	0.00
15	EPIL	5,805.79	3,285.45	5,496.15	6600.77
16	IL	76.45	79.92	76.30	67.25
	<b>Total</b>	<b>130659.42</b>	<b>122488.52</b>	<b>125491.40</b>	<b>132445.19</b>

## Annexure-X

# Export Performance of CPSEs under Ministry of Heavy Industries

(in ₹ crores)

Sl. No.	Name of CPSEs	2018-19 (Actual)			2019-20 (Actual)			2020-21 (Actual)		
		Physical	Deemed	Total	Physical	Deemed	Total	Physical	Deemed	Total
	1	2	3	4	5	6	7	8	9	10
1	AYCL	2.23	0.00	2.23	3.60	0.00	3.60	4.35	0.00	4.35
2	BHEL	3282.00	2019.00	5301.00	3821.00	959.00	4780.00	1855.00	535.00	2390.00
3	BBJ	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	R&C	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	B&R	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	HEC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7	HMT (Hldg)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	HMT (MT)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	HMT(I)	3.07	0.00	3.07	2.50	0.00	2.50	2.16	0.00	2.16
10	REIL	0.04	0.00	0.04	0.07	0.00	0.07	0.00	0.00	0.00
11	CCI	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
12	HSL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
13	SSL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
14	NEPA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
15	EPIL	1116.15	0.00	1116.15	714.10	0.00	714.10	275.21	0.00	275.21
16	IL	0.00	0.51	0.51	0.00	0.19	0.19	0.00	0.05	0.05
	<b>Total</b>	<b>4403.49</b>	<b>2019.51</b>	<b>6423.00</b>	<b>4541.27</b>	<b>959.19</b>	<b>5500.46</b>	<b>2136.72</b>	<b>535.05</b>	<b>2671.77</b>

## Annexure-XI

# Paid-up Capital, Networth and Accumulated Profit/Loss as on 31.03.2021 of the CPSEs under Ministry of Heavy Industries

(in ₹ crores)

Sl. No.	Name of CPSE	Paid up capital		Networth	Accumulated Profit (+)/Loss (-)
		Government/ Holding CPSE	Others		
1	2	3	4	5	6
1	AYCL	87.28	10.51	190.14	65.59
2	BHEL	439.92	256.49	26484.00	25788.00
3	BBJ	120.86	0.00	207.88	87.02
4	R&C	156.61	0.00	227.97	-363.43
5	B&R	54.63	0.36	376.67	321.68
6	HEC	606.08	0.00	-582.25	-1272.47
7	HMT (Holding Co.)	279.57	76.03	387.14	31.54
8	HMT (Machine Tools)	276.60	0.00	-1,539.83	-1,839.14
9	HMT (International)	0.72	0.00	37.17	36.45
10	REIL	6.25	6.00	81.09	68.84
11	CCI	811.41	0.00	-29.80	-820.34
12	HSL	52.06	0.00	50.97	-9.34
13	SSL	1.00	0.00	-42.63	-52.98
14	NEPA	615.48	0.43	71.84	-544.07
15	EPIL	35.42	0.01	148.54	113.12
16	IL	24.04	0.00	-410.81	-557.88
	<b>TOTAL</b>	<b>3567.93</b>	<b>349.83</b>	<b>25658.09</b>	<b>21052.59</b>

## Details of BHEL write-up

### 1.0 Covid Response

#### During the first phase of COVID-19, BHEL:

- Ensured strict implementation of Standard Operating Procedure (SOP) duly incorporating Government directives on social distancing, compulsory wearing of face cover in public places, hygiene, sanitization, etc.
- Conducted regular fumigation, sanitization, etc., at factories, offices, townships and nearby areas
- Work from Home through policy intervention as well as remote access through IT network for seamlessly carrying out office activities and conducting meetings through VC.
- Quick implementation of eOffice to ensure continuity of work.
- Developed atomized liquid sanitizing equipment called BHEL MISTER. More than 150 Nos. of BHEL MISTERS have been delivered to various parts of the country for mass sanitization.



*In-house developed BHEL Mister for Mass Sanitization*

With the second wave of the Covid-19 pandemic developing into an unprecedented crisis for the nation, BHEL's units located at Bhopal and Haridwar supplied over 5,75,000 m<sup>3</sup> (i.e. over 80,000 cylinders) of medical oxygen to hospitals across adjoining states.

BHEL developed prototype for oxygen generating plant of 500LPM (based on design by CSIR-IIP, Dehradun) in a record time of 40 days from signing of Transfer of Technology and delivered the first order within 35 days from receipt of the order.



BHEL is well on its way to ensure 100% vaccination of its employees, their families and all persons working in the company's premises across all locations.



*Oxygen plants*

## 2.0 Social Responsibilities

BHEL remained focused on its social responsibility through its various CSR initiatives.

### 2.1 CSR activities undertaken in 2020-21 & 2021-22 (up to September 2021)

#### Clean India

- BHEL continued with its program for constructing Bio-digester toilets in Haridwar & Rishikesh. Twenty-Two clusters of these Bio-digester toilets have been completed.

#### Educated India

- Providing scholarship to 44 Widow Ward / Orphan / PH school students in BHEL adopted villages and 15 differently abled ITI students.
- Financial support for construction of Tin shed at Govt. Hr. Primary School, Lunkaransar, Bikaner (Rajasthan).

#### Healthy India

- Financial support to the Artificial Limbs Manufacturing Corporation of India (ALIMCO) for distribution of Aids and Appliances to Divyangjan at Aspirational Districts Haridwar (Uttarakhand), Khammam (Telangana), Damoh (Madhya Pradesh), Khagaria (Bihar).
- An Awareness session on Ovarian cancer & Relationship of risk factors of vitamin D deficiency concluded at Village Sarfarabad, Noida.

### Responsible India

- Financial support for construction of Bridge and Road across the canal from Makali to Harokyathanahalli, Dasanapura Hubli, Bangalore North Taluk.
- Distribution of wheel chairs to rural poor people, Chennai, Tamil Nadu

### Inclusive India

- Financial support to the “Professional Assistance for Development Action” for the project: Motivating Agrarian communities of Aspirational District Kandhamal (Odisha) for their Economic Transformation.
- Vocational & Skill Development Training to Differently Abled & Visually Impaired Children, Vizag, Andhra Pradesh.

### Disaster Relief

- Financial support for Distribution of essential grocery items to the affected families of workers during flash flood in Chamoli district, Uttarakhand.

## 3.0 Recognition of Excellence

### During 2020-21 and 2021-22 (upto September 2021)

- Clarivate South and South East Asia Innovation Award 2020, putting BHEL among top 28 innovators in South East Asia.
- **Governance Now 8<sup>th</sup> PSU Award under Maharatna Category for: -**
  - HR Excellence
  - Digital Transformation
  - Research & Innovation
- **Golden Peacock Environment Management Award 2020** in Power Equipment Sector.
- **SKOCH Gold Award** for Cyber Security resilience during Covid-19 pandemic.
- **Scope Meritorious Award for R&D 2016-17** for Technology Development and Innovation.
- BHEL has been placed among the top 25 best workplaces in the ‘**2021 top companies list**’, to grow your career in India, recently by LinkedIn.
- Shri Subodh Gupta, Director (Finance), BHEL was conferred with the ‘**BEST CFO PSU**’ award for his professional contribution as CFO of the company.



- BHEL has been ranked **No. 1 among top 20 PSUs for procurements** from GeM for Q-1 of FY 2021-22.

In recognition of efforts made by BHEL team in fulfilling customer obligations, Appreciation letters have been received from:

- Defence Machinery Development Establishment (DMDE)** for successful first-time indigenous development, completion of Endurance Trials and dispatch of Main Motor Generator (500KW) for naval application.
- Cochin Shipyard Ltd. (CSL)** for successful maiden sea trials of Integrated Platform Management System (IPMS) of the Indigenous Aircraft Carrier (IAC P-71).



## 4.0 Project Execution

### 4.1 Commissioning highlights during 2020-21

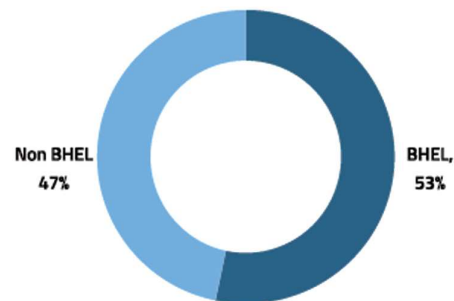
The ongoing pandemic has been a major dampener for project execution, with mass exodus of labourers and hesitancy to resume execution. However, through its concerted efforts, BHEL achieved a capacity addition of ~2,400 MW in the power sector in 2020-21. Notably, even during the initial national lockdown period, work continued at critical sites with the support of local authorities.

With this, BHEL has a majority share of 53% in the country's total installed capacity of Utility\* power projects

#### Major project execution milestones for the year 2020-21 include:

- Kakrapar Atomic Power Project Unit-3, synchronized in January 2021, is India's first-of-its-kind, highest rated, 700 MWe Nuclear Power Plant with Pressurized Heavy Water Reactor (PHWR).
- With the capacity addition of Kameng HEP Units 3 & 4 during 20-21, all the 4 units of the project have been commissioned. The 4×150 MW project has the largest unit rating (150 MW) for any hydro power project in the state of Arunachal Pradesh.

**Installed Capacity - Utility\***  
3,07,109 MW (March 31, 2021)



\*Includes Coal, Gas & CCPP, Diesel, Nuclear & Hydro; Excludes Renewables  
Based on capacity at the time of installation

### 4.2 Commissioning Highlights during 2021-22 upto September 2021

**BHEL has achieved synchronization of following projects amounting to 1025 MW:**

- Rourkela (1 × 250 MW)
- Nabinagar-4 (4 × 250 MW)
- Tuticorin Stage-IV (1 × 525 MW)



#### **Synchronization/commissioning of following R& M projects have been completed:**

- TSGENCO Kothagudem Unit-10
- First ever De-NOx project of SSBG i.e. APCPL Jhajjar Unit-1,2,3 completed successfully ahead of schedule.

### **4.3 Generation, Plant Load Factor (PLF) & Operating Availability (OA)**

#### **4.3.1 During 2020-21**

55.6% of the country's total generation of 981.443 BUs from thermal utility sets (coal & lignite based) was contributed by BHEL supplied sets.

Among BHEL supplied supercritical sets, Kothagudem-12 (800 MW) achieved highest PLF of 87.2% and OA of 93.6%.

Nuclear sets registered OA of 82.4%, with 7 sets registering OA of 90% and above.

Notably, NPCIL's Narora Unit 2 where BHEL has supplied turbines in both units of 220 MWe (Unit 1&2), clocked uninterrupted operation for more than 852 days, the second highest among nuclear sets in India after the world record of uninterrupted operation of Kaiga-1 (962 Days), which has also been supplied by BHEL.

#### **Major achievements of performance of BHEL sets include:**

- Super critical sets (660 / 700 / 800 MW) registered OA of 86.2%.
- 3 Thermal sets clocked uninterrupted operation between 300 and 365 days and 4 Nuclear sets clocked uninterrupted operation between 300 and 365 days.

#### **4.3.2 During 2021-22 (Upto September 2021)**

58.3% of the country's total generation of 529.482 BUs from thermal utility sets (coal based) have been contributed by BHEL supplied sets

- BHEL's first supercritical unit Barh-4 (660 MW) has clocked around 54,429 hours (PLF 74.4% & OA 99.0%).
- Among BHEL supplied supercritical sets, Kothagudem-12 (800 MW) achieved highest PLF of 84.9% and OA of 91.8%.

### **5.0 Acknowledgement & Recognition of Excellence for Power Sector Projects**

#### **During 2020-21**

- NTPC appreciated BHEL for Completion of Steam Blowing of North Karanpura STPP- 1 in record time of 13.5 days.
- TANGEDCO appreciated BHEL for Successful completion of retrofitting of 210 MW LMW surface condensers for the "First Time" in Tuticorin project.



### During 2021-22 (Upto September 2021)

- Customer appreciation received from MSPGCL Chandrapur Unit#7 for successful completion of rectification of generator Stator Earth Fault
- Customer appreciation received from WBPDC Bakreswar Unit#5 for remote trouble shooting of huge hydrogen consumption in Generator.

## 6.0 Defence & Aerospace

### Achievements during 2020-21:

- Completion of manufacturing & supply of Propellant Tank Pressure Vessel parts to Liquid Propulsion Systems Centre (LPSC) for Chandrayaan-3 Project much ahead of schedule.
- Delivery of 100<sup>th</sup> Space Battery to U R Rao Satellite Centre (URSC)-ISRO

### Achievements during 2021-22 upto September 2021:



First 'Made in India' aircraft carrier warship, INS Vikrant, equipped with BHELGE Avio supplied IPMS (Integrated Platform Management Systems), has successfully completed its maiden sea-trials

- First order of upgraded SRGM (2 nos.) along with accessories from Goa Shipyard.
- BHEL signed MoUs with Naval Science & Technological Laboratory (NSTL) (DRDO Lab) to effectively synergise capabilities of both organisations to produce wide variety of high technology equipment and systems so as to give boost to indigenous defence production.
- India's first indigenous Aircraft Carrier - INS Vikrant, equipped with BHEL supplied Integrated Platform Management System (IPMS), completed maiden sea trials in Aug 2021.

## 7.0 Industrial Products (including Oil & Gas and Electrical Machines)

### Achievements during 2020-21:

- Secured milestone order for single largest Fractionator Column (9.5 m Dia, 60 m long and 650 MT weight) from HRRL, Barmer.
- First ever order from Wuhan Engineering Corporation Limited for Compressors for Coal Gasification Plant at TFL, Talcher

### Achievements during 2021-22 upto September 2021:

- Order for Recycle Gas Compressor for Diesel Hydro Treating (DHDT) unit at IOCL Barauni from CB&I India Pvt. Ltd. First ever order of BHEL from M/s CB&I (McDermott).

## 8.0 Electric Mobility, Energy Storage, Railway Electrification, Water Business

### Achievements during 2020-21:

- Delhi-Chandigarh highway is the 1<sup>st</sup> highway in the country which has been made e-vehicle friendly with successful commissioning of 20 Nos. Solar Based EV Chargers by BHEL.



*Delhi-Chandigarh Highway has become the first e-vehicle friendly highway in the country, with a network of Solar-based Electric Vehicle Charging stations (SEVCs) set up by BHEL under the FAME-1 scheme of the Ministry of Heavy Industries*

- Received order for 25KW Solar based EV Charging Station (1 no. DC001 and 1 no. AC001 EV Charger) at Atal Incubation Center-Entrepreneurship Management Process International (AIC-EMPI) from AIC-EMPI.
- BHEL signed MoU with:**
  - IOCL for co-operation in setting up EV charging stations at IOCL outlets.
  - EESL to develop network of Smart Grid based Distribution Transformer Monitoring System (DTMS).



### Achievements during 2021-22 upto September 2021:

- BHEL has started offering Pressure Vacuum Swing adsorption (PVSA) based Oxygen Concentrators (500 LPM & 1000 LPM) to supplement the Nation's efforts of battling the Covid-19 Pandemic.
- Solar Based EV (SEV) charging station at Karna Lake Resort, Karnal inaugurated by Hon'ble Minister of Heavy Industries, Dr. Mahendra Nath Pandey, on 18th August 2021 in the presence of Secretary(MHI), CMD-BHEL.



*BHEL aided restoration, synchronisation to grid and operationalisation of Generating Unit 1 of the 336 MW Chukha Hydropower Plant, Bhutan*

## 9.0 International Operations

The cumulative portfolio of BHEL's overseas projects stands at 17 GW out of which over 11 GW has already been commissioned. Currently, BHEL is executing several major projects, including 2x660 MW Maitree thermal power project in Bangladesh, 6x200 MW Punatsangchhu-I and 6x170 MW Punatsangchhu-II hydro projects in Bhutan, 2 x 200 MW Tishreen Thermal in Syria, and 40 MW Rahughat hydro project in Nepal.

### Major Orders received during 2020-21

- Secured maiden orders for motors from two new markets- Bahrain and Liberia
- First ever order of 2 nos. of 560 kW Flameproof motors from France.
- Major Orders received in 2021-22 upto September 2021
- Notification of Intent to Award received from Zimbabwe Power Company (ZPC), Zimbabwe for Renovation/ Upgradation of 90 MW Bulawayo Thermal Power Plant (on EPC basis).

## Execution of Major Overseas Orders 2020-21

- With the help and guidance of MEA and customs authorities of India, BHEL carried a Covid-19 vaccination drive through Max Healthcare Institute, India at the project site of Maitree Super Thermal Power Project (1320 MW) at Bangladesh.
- Strenuous efforts by BHEL enabled restoration, synchronization to grid and operationalization of Generating Unit 1 (84 MW) of the 336 MW Chhukha Hydropower Plant, which was also appreciated by DGPC.

## Execution of Major Overseas Orders 2021-22 upto September 2021

- Supply and Supervision for Restoration of Generator Unit#3 of Mangdechhu Hydroelectric Project, Bhutan: Generating Unit-3 (180 MW) of Mangdechhu Hydroelectric Project, Bhutan was successfully commissioned and synchronised.

## Export Plans

The company has been aggressively pursuing opportunities in focus markets (viz. Neighbouring countries, Africa and South-East Asia), concentrating on conventional sectors of coal, hydro & gas based power plants, besides renewables.

## 10.0 Information Technology

### Major Highlights for the year 2020-21

BHEL has leveraged COVID imposed constraints for ensuring full implementation of e-Office across the organization.

Major digital initiatives for improving project execution include implementation of Integrated Project Management System (IPMS) for real time monitoring of projects, Site Data Digitisation (SDD) for direct capture of data from sites, Site Contract Management System, RFID system for tracking materials at site, etc.

- **Centralized integration of Government e-Marketplace (GeM) with BHEL systems:** A centralised BHEL GeM portal establishes a two-way link with GeM for fetching the order and invoice details from GeM and updating payment details on GeM.
- **System for issuing experience certificate to vendors - Siddhi.**
- **On-line System for replying to vendor's grievances – Suvidha.**

### Major Highlights for the year 2021-22 upto September 2021

**Digital Week Celebration:** To build and strengthen digital culture in BHEL, the first ever Digital Week – DRIVE 1.0 was celebrated across the organization with great enthusiasm from 16th to 21st August 2021.

Consolidation of servers and setting up of data centre at BHEL EDN Bengaluru.





*Inauguration of Data Centre at EDN, established to commemorate India's celebration of 'Azadi ka Amrit Mahotsav'*

**Business Opportunity and Technology Scanning (BOTS) platform:** An in-house developed platform "BOTS" was launched in August 2021 to facilitate a single window to search for Tenders related information from multiple sources.

## 11.0 Status of Joint Ventures and Subsidiaries

As on 30<sup>th</sup> September 2021, BHEL has four Joint Venture Companies as per details given below:

### Joint Ventures

- With GE Pacific (Mauritius) Ltd., Mauritius (a 100% owned subsidiary of General Electric Co., USA): The Joint Venture Company "**BHEL GE Gas Turbine Services Ltd.**" (**BGGTS**) was incorporated on 5 May 1997.
- With NTPC Ltd, India: NTPC BHEL Power Projects Private Limited (NBPPL) is a Joint Venture Company of BHEL and NTPC Limited promoted to execute EPC contracts for Power Plants and manufacture power plant equipment.
- With Karnataka Power Corporation Limited (KPCL): Raichur Power Corporation Limited (RPCL) is a Joint Venture promoted for setting up of 2x800 MW supercritical thermal power plant at Yeramarus, Raichur, Karnataka and 1x800 MW supercritical thermal power plant at Edlapur, Raichur, Karnataka on build, own and operate basis.
- With Siemens AG, Germany: **Power Plant Performance Improvement Private Limited (PPIL)** is a Joint Venture Company of BHEL and Siemens AG, Germany promoted for plant performance improvement of old fossil fuel power plants. Since sufficient business to ensure viability of the Company was not forthcoming, the promoter partners mutually agreed to gradually wind up the Company. All the pending contracts of the JVC have been closed. The JVC is under liquidation.
- No new Joint Venture was formed during FY 2020-21 and FY 2021-22 upto September 2021.

## Annexure-XIII

# Demand No.44 – Ministry of Heavy Industries Scheme-Wise Allocation for the year 2021-22

(in ₹ crores)

Sl. No	Schemes/Items	BE 2019-20	RE 2019-20	Actual 2019-20	BE 2020-21	RE 2020-21	Actual 2020-21	BE 2021-22	Expenditure as on 30.11. 2021
1.	Secretariat	39.05	39.05	36.95	41.09	34.38	32.50	41.09	18.68
2.	<b>Development of Automobile Industry</b>								
i.	Grants to National Automotive Testing and R&D Infrastructure Project (NATRIP)	259.23	259.23	259.23	300.00	114.30	114.30	67.22	0.00
ii.	Grants to Scheme for Faster Adoption and manufacturing of (Hybrid and) Electric Vehicle in India - FAME India	500.00	500.00	500.00	692.94	318.36	318.36	756.66	319.30
iii.	Grants to Development Council for Automobile & Allied Industries (DCAAI)	25.00	8.80	8.80	15.00	13.51	13.51	15.00	0.00
	<b>Total- Development of Automobile Industry</b>	<b>784.23</b>	<b>768.03</b>	<b>768.03</b>	<b>1007.94</b>	<b>446.17</b>	<b>446.17</b>	<b>838.88</b>	<b>319.30</b>
3.	<b>Development of Capital Goods Sector</b>								
i.	Scheme for Enhancement of Competitiveness in Capital Goods Sector	110.00	102.30	102.17	173.11	55.52	54.22	97.59	13.85
ii	Scheme in R&D Projects Development of Advanced Ultra Super-Critical(Adv.-USC) Technology for Thermal Power Plants - AUSC	134.00	134.00	134.00	0.00	0.00	0.00	0.00	0.00
iii	Industry associations and PSU for undertaking promotional activities	0.50	0.20	0.04	0.20	0.20	0.05	0.50	0.00
	<b>Total- Development of Capital Goods Sector</b>	<b>244.50</b>	<b>236.50</b>	<b>236.21</b>	<b>173.31</b>	<b>55.72</b>	<b>54.27</b>	<b>98.09</b>	<b>13.85</b>
4.	<b>Other Central Sector Expenditure</b>								
	Grants to Central Manufacturing Technology Institute (CMTI)	19.00	19.00	19.00	6.00	18.00	18.00	15.00	11.25

Sl. No	Schemes/Items	BE 2019-20	RE 2019-20	Actual 2019-20	BE 2020-21	RE 2020-21	Actual 2020-21	BE 2021-22	Expenditure as on 30.11. 2021
<b>5.</b>	<b>Support to Central Public Sector Enterprises (CPSEs)</b>								
i.	Grants to Hindustan Salts Limited (HSL)	2.30	2.30	2.30	2.00	2.00	2.00	2.00	1.00
ii	Grants to Tungabhadra Steel Products Ltd. (TSPL)	0.00	0.00	0.00	0.00	53.92	53.92	0.00	0.00
iii	Grants of Bharat Pumps Compressor Ltd. (BPCL)	0.00	0.00	0.00	0.00	92.55	92.55	0.00	0.00
iv	Grants-in-Aid General to Swachhta Action Plan	0.01	0.00	0.00	0.01	0.00	0.00	0.01	0.00
v	Investment in Hindustan Paper Corporation (NPPC)-(NER)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
vi	Investment in HCL	0.01	0.00	0.00	0.01	0.00	0.00	0.01	0.00
vii	Investment in NEPA Ltd.	248.31	181.05	181.05	137.24	92.95	92.95	0.01	30.00
viii	Investment in Hindustan Salts Limited (HSL)	5.00	0.00	0.00	5.00	0.00	0.00	0.01	0.00
ix	Implementation of Revival Scheme of Public Sector Enterprises (Lump sum provision)	0.01	0.00	0.00	0.01	0.00	0.00	0.01	0.00
x	Implementation of VSS/VRS and Payment of Statutory Dues (Lump sum provision)	0.01	0.00	0.00	53.92	0.00	0.00	0.01	0.00
xi	Loans to implementation of closures of sick Public Sector Enterprises	24.41	24.41	24.39	0.01	0.00	0.00	0.01	0.00
xii	Loans to Scooter India Ltd. (SIL)	0.01	0.00	0.00	0.01	41.00	41.00	0.01	0.00
xiii	Loans to NEPA Ltd.	0.01	38.27	38.26	63.31	63.31	63.31	0.01	0.00
xiv	Others	0.14	0.00	0.09	0.12	0.00	0.00	0.12	0.00
	<b>Grand Total</b>	<b>1367.00</b>	<b>1308.61</b>	<b>1306.28</b>	<b>1489.98</b>	<b>900.00</b>	<b>896.67</b>	<b>995.27</b>	<b>562.30</b>
				<b>(95.56%)</b>			<b>(60.18%)</b>		<b>(56.50%)</b>

# Important Audit observation from Comptroller & Auditor General of India Report for 2020-21

Chapter-VI of the Report No. 18 of 2020 is related to Ministry of Heavy Industries

## A. Bharat Heavy Electricals Limited

- 1. Loss due to non-performance under a contract:** BHEL suffered a loss of Euro 3.83 million (Rs. 28.35 crore) due to failure to deliver performance as per the contractual provisions and resultant invocation of bank guarantee by the client.

(Para No.6.1, Report No.18 of 2020)

- 2. Avoidable payment of sewerage cess:** The Heavy Power Equipment Plant, Hyderabad of BHEL failed to avail the rebate in sewerage cess extended by Hyderabad Water Supply and Sewerage Board, which resulted in avoidable extra expenditure of ₹ 21.24 crore during January 2012 to March 2019.

(Para No.6.2, Report No.18 of 2020)

## B. Heavy Engineering Corporation Limited

- 3. Township and Land Management:** Heavy Engineering Corporation Limited (HEC or Company) is one of the leading suppliers of capital equipment in India for steel, mining, railways, power, defence, space research, nuclear and strategic sectors. Government of Bihar (GoB) allotted 7,199 acres of land to HEC during 1958-59 (2,312 acres free of cost to install a Foundry Forge Plant (FFP), Heavy Machine Building Plant (HMBP) and the Heavy Machine Tool Plant (HMTP) and other ancillary and allied purposes and 4,887 acres at a cost of ₹ 2.75 crore for township and other 135 allied purposes). HEC established FFP, HMBP and HMTP and has 11,109 quarters in its township apart from other buildings like hostels, hospital, school buildings, shop etc. A study on land and township management in HEC was conducted to assess whether land and township services were effectively managed, existence of policy and adherence thereof for leasing of land to other parties, leases were renewed on time, estate dues were recovered and adequate and effective system was in place to identify and remove encroachment of land and buildings. Records relating to land and township management of HEC was examined during April and May 2019 for a period of three years from 2016-17 to 2018-19.

(Para No.6.3, Report No.18 of 2020)

## C. Tungabhadra Steel Products Limited

- 4. Avoidable payment of income tax:** Incorrect treatment of waiver of Government of India loan and other liabilities in the books of accounts by Tungabhadra Steel Products Limited resulted in avoidable payment of income tax of ₹ 55.38 crore and further tax liability of ₹ 41.18 crore.

(Para No.6.4, Report No.18 of 2020)



ACMA	Auto Components Manufacturers Association
ARAI	Automotive Research Association of India
AYCL	Andrew Yule & Company
BBJ	Braithwaite, Burn & Jessop Construction Company Limited
BHEL	Bharat Heavy Electricals Limited
BLC	Bharat Leather Corporation Limited
BOGL	Bharat Ophthalmic Glass Limited
BPCL	Bharat Pumps & Compressors Limited
BPME	Bharat Process & Mechanical Engineers Limited
BYNL	Bharat Yantra Nigam Limited
BRPSE	Board for Reconstruction of Public Sector Enterprises
CCI	Cement Corporation of India Limited
CCIL	Cycle Corporation of India Limited
CCEA	Cabinet Committee on Economic Affairs
CIRP	Corporate Insolvency Resolution Process
CPSE	Central Public Sector Enterprise

EPC	Engineering Procurement and Construction
EPI	Engineering Projects (India) Limited
FCRI	Fluid Control Research Institute
HCL	Hindustan Cables Limited
HMT(I)	HMT (International) Limited
HMTP	Heavy Machine Tools Plant
HPC	Hindustan Paper Corporation Limited
HNL	Hindustan Newsprint Limited
HPF	Hindustan Photo Films Manufacturing Company Limited
HSL	Hindustan Salts Limited
IBC	Insolvency and Bankruptcy Code
IL	Instrumentation Limited
ICEMA	Indian Construction Equipment Manufacturers Association
IMTMA	India Machine Tools Manufacturers Association
MAMC	Mining & Allied Machinery Corporation Limited
MoU	Memorandum of Understanding
MHI	Ministry of Heavy Industries
MT	Metric Tonne

NBCIL	National Bicycle Corporation of India Limited	RIC	Rehabilitation Industries Corporation Limited
NCLT	National Company Law Tribunal	RTI	Right to Information Act
NIDC	National Industrial Development Corporation Limited	SIL	Scooters India Limited
NATRIP	National Automotive Testing and Research & Development Infrastructure Project	SSL	Sambhar Salts Limited
NAB	National Automotive Board	TAFCO	Tannery & Footwear Corporation of India Limited
PAT	Profit After Tax	TAGMA	Tools and Gauge Manufacturers Association of India
PBT	Profit Before Tax	TCIL	Tyre Corporation of India Limited
PSE	Public Sector Enterprise	TMMA	Textile Machinery Manufacturers Association
PMMAI	Plastic Moulding Machinery Association of India	TSL	Triveni Structural Limited
PPMAI	Process Plant and Machinery Association of India	TSPL	Tungabhadra Steel Products Limited
R&C	Richardson & Cruddas (1972) Limited	VRDE	Vehicle Research Development Establishment