MINISTRY OF HEAVY INDUSTRIES

Website Link : https://heavyindustries.gov.in/

SCHEME FOR ENHANCEMENT OF COMPETITIVENESS IN THE CAPITAL GOODS SECTOR – PHASE I

Overview Capital Goods

- Machines that make machines
- Have a multiplier effect on manufacturing
- Contributes about 1.8 % to GDP
- 12% of manufacturing output
- Technology development and investment key drivers

Major Sub-Sectors

- Heavy electrical equipment
- Process plant equipment
- Earth-moving and mining machinery
- Printing machinery
- Food processing machinery
- Dies, moulds and press tools
- Textile machinery
- Machine tools
- Plastic machinery
- Metallurgical machinery

Scope of the CG Scheme

- The scheme encourages investment in technology up gradation, skill development and augmentation of modern manufacturing capacities for holistic growth of the industry.
- The Scheme envisages financial assistance for setting up and strengthening the technology development and common manufacturing/ services infrastructure.
- The scheme proposes to enhance the competitiveness of the capital goods industry enabling it to withstand the import penetration and increase exports.

Scheme for
Enhancing Global Competitiveness of the Capital Goods Sector 2014

Notified in Nov. 2014

Objectives

- To make the sector **globally competitive**
- To create **technology depth**
- To create **common industrial facility** centers
- To foster **Industry Academia** partnerships

Budget

- Outlay: **Rs. 995.96 cr**. with Rs. **631.22 c**r. budgetary support
- Projects worth Rs 583.312 crores have been approved under the Scheme.
- Total approved projects – 33

Advanced Centers of Excellence (CoEs)

- **Aim :**To address the technology gaps , new advanced Centres of Excellence shall bring together academia of repute and private industry for development of new improved indigenous technologies /products. Under this component , augmentation of capabilities of existing CoEs is also included.
- **Financial Outlay: 700 crores**
- **Funding Pattern:** 80% GoI grant in aid, 20% industry contribution

Advanced Centres of Excellence under Phase I

8 CoEs developed with Industry-Academia Partnership

Institution	Technology
CMTI, Bengaluru	High Speed Rapier Loom of 450 & 550 rpm
IIT, Madras	11 Advanced Machine Tools Technologies
PSG College of Technology, Coimbatore	3 Advanced Welding Technologies
Si'tarc, Coimbatore	6 inch Smart Submersible Pump
HEC, Ranchi	5 Cubic meter Hydraulic Excavator
IIT, Delhi	Robot for sliver can transfer
IIT, Kharagpur	6 Advanced Manufacturing technologies and an innovation lab
IISc, Bangalore	Additive Manufacturing of High Performance Metallic Alloys

Common Engineering Facility Centres

- **Aim:** To boost present technology levels of capital goods in the country through awareness programmes for creating demonstration, awareness, training, consultancy and hand holding services to industrial units desirous of upgrading the production by creating Demonstration cum Experiences Centers and promotion of Industry 4.0. Under this component augmentation of capabilities of existing CEFCs is also included.
- **Financial Outlay:** **600 crores**
- **Funding Pattern:** 80% GoI grant in aid, 20% industry contribution

CEFCs developed under Phase I of the MHI CG Scheme

15 CEFCs including Six Technology Innovation Platforms have been established:

S.No.	Institution	Facility established
1.	HMT, Bengaluru	Training in Machining Trades
2.	IISc, Bengaluru	Smart Manufacturing/Industry 4.0
3.	CMTI, Bengaluru	Modernization of Precision Metrology Laboratory
4.	HEC, Ranchi	Steel Making Technology
5.	SETU Foundation	Tool Room for Textile Engineering
6.	Kirloskar CSR foundation, Pune	Smart Manufacturing/Industry 4.0
7.	IIT-Delhi	Smart Manufacturing/Industry 4.0
8.	CMTI, Bengaluru	Smart Manufacturing/Industry 4.0
9.	Korus Engineering	Design and Workshop Training in Steel Plant Equipment

Technology Innovation Platforms (TIPs)

TIPs have been launched on July 2, 2021 under CEFC component of Phase I for bringing the country's technical resources and the concerned Industries on to one network to kick start and facilitate identification of technology problems faced by the Industry. TIPs are proposed to be prime centres point for providing end to end technological solutions/support to the industry.

Partners	Name of Platform	Focus Area
ARAI	Technovuus	Electric Mobility
BHEL	Sanrachna	Renewable Energy, Energy
CMTI	DRISHTI@CMTI	Machine Tools
ICAT	ASPIRE	Automobile
IIT Madras	KITE	Robotics, Machine Tools
HMT-IISc Bangalore	SURGE	Import substitution in Machine Tools

Progress status of Six Technology Innovation Platforms

Organization	Users	Grand Challenges & Projects	No. of hits on the portal	IEC activities
ARAI	9365	9	60348	Social media post: 133 Webinar/Panel discussions: 16 Quiz/Survey :1
BHEL	10653	9	90197	Social media post: 5
CMTI	4149	67	80352	Social media post: 33 Webinar/Panel discussions: 22
ICAT	29863	30	60155	Social media post: 404 Webinar/Panel discussions: 30 Survey:5 , Quiz:26 , Poll:40
IIT Madras	7067	***36***	--	Social media post: 559 Webinar/Panel discussions: 5 Quiz/Survey: 7
HMT-IISc	624	6	4156	Social media post: 4 Webinar/Panel discussions: 9
Total	61721	157	295208	

Technology Acquisition Fund Programme (TAFP)

5 Technologies acquired under TAFP

Industry	**Technology**
HMT, Bengaluru	Four Guide Way CNC Lathe
HMT, Bengaluru	Turn Mill Center
Allied Engineering Pvt. Ltd, Delhi	High Voltage/Heavy Duty Electrical Power Cables
PTC Industries Ltd, Lucknow	Titanium Casting with Ceramic Shelling Technology
IPM Pvt. Ltd, Delhi	Robotic Laser Cladding Technology for Hydro turbines Blades

Integrated Industrial Infrastructure Facility (IIIF)

Industrial Infrastructure Project	Partner	Application
Construction of a world class machine tool park with international specifications.	Govt. of Karnataka	Machine tool park in 530 acres with 158 industrial plots Till date, out of 158 industrial plots, 37 plots have been allotted.

Promotion of Skilling in Capital Goods Sector

- **Aim:** To develop Qualification Packs/ skill training packages for Skill Level 6 and above, with the help of sectoral skill councils for addressing the need for skilling the people in the high technology trades in the capital goods sector.
- **Financial Outlay:** 10 Crores
- **Funding Pattern:** 100% GoI grant in aid for developing Qualification Packs

Testing & Certification Centres

- **Aim:** To attain global competitiveness and address quality related issues thereby upgrading testing infrastructure in the country and providing logistic support for testing new technologies developed through different components of the scheme**.** This will be achieved by augmenting the resources of existing facilities.
- **Financial Outlay:** **250 crores**
- **Funding Pattern:** 80% GoI grant in aid, 20% industry contribution

Industry accelerators

- **Aim:** Development of targeted indigenous technologies, scaled to meet the requirements of identified industrial sector, which is presently dependent upon imports with active participation of the industry.
- **Concept:** Selected Academic Institute/ Industry Body will act as an Accelerator for fostering the development of technologies. The accelerators will identify domains and Select companies into a cohort (based on the present basket of imports – by value /volume / criticality) and collaborate with them to facilitate the development of indigenous technologies/ products from the concept stage, through development, trial and testing of prototypes up to commercialization of the same.
- **Methodology:** Each accelerator will run 2 cohorts for the 5 year period of the scheme. Each Cohort will consist of 8 to 10 companies and will run for a cycle of 2.5 years. It is expected that at least 200 new indigenous products/technologies will be commercialized by the end of the scheme period.
- **Financial Outlay:** 940 crores
- **Funding Pattern:** 80% GoI grant in aid, 20% industry contribution (**within the cohort, the ratio of contribution between the government grant and contribution by private industries may be decided industry wise, based on the criticality of the technology/product, complexity of development cycle, cost intensiveness, import substitution/ export potential and financial strength and past performance of the participating company)

Sr No.	Proposed Intervention		Funding Pattern		
			Total Project Cost(Rs. in Crores)	Scale of Govt. Assistance(max.) (%)	Govt. support (max.) (Rs. in Crores)
1.	Development of Technologies through Technology Innovation Portals		6.25	80%	5.00
2.	Setting up Seven (7) Advanced Centers of Excellence(CoEs) and upgradation of existing Center of Excellence for technology development		700	80%	560
3.	Promotion of skilling in Capital Goods Sector		10	100%	10
4.	Setting up of twelve (12) Common Engineering Facility Centres		600	80%	480
5.	National Testing and Certification Centres		250	80%	200
6.	Industry Accelerator				
		Product development/ Prototyping and Testing	887.50	80%	709.50
		Administrative Expenses for 10 Accelerators	52.50	100%	52.50
		Total	940		760
			2506.25		2015
		Admin. Cost @1.25% of Rs. 2015 cr. =25.1875 cr			25.1875 Cr
		C. Grand Total (Budgetary support proposed)			2040.1875 Cr
		D.Total Outlay (Budgetary support +Industry)	2531.4375Cr		

Implementation Srategy & Project Management

- **Project Recommendation –** Screening Committee
- **Project Approval –** Inter-ministerial Apex Committee
- An **MoU** clearly defining responsibilities of all parties would be signed between beneficiaries and MHI for smooth implementation of the establishment of the components under scheme, including management of IPRs generated under the scheme.
- **Project Monitoring –** Apex Committee, Project Review & Monitoring Committee, Regular Monitoring by the MHI team, Third party evaluation.

Outcomes of the scheme in the form of measurable indicators

i. Development of indigenous mother technologies for local manufacturing of machines and aggregates, which are presently being imported.

ii. Facilitation of skilling for adoption of digital manufacturing technologies.

iii. Augmentation of Test and certification infrastructure facilities shall enable norm adherence to appropriate National & International standards.

iv. Enabling industries to solve their key technology development related problems

v. Enable indigenous development of a basket of industrial products, by bringing together industries and Reputed Institutions/ Organizations in an Accelerator, through a targeted intervention to create an ecosystem which fosters collaborative innovation in manufacturing.

Development of Advanced Technologies for Hi-Tech Shuttleless Loom

Central Manufacturing Technology Institute, Bangalore

Project Details	
Total Project Cost	Rs 20.00 crores
MHI grant approved	Rs 16.00 crores
Progress	❖ Prototype of high speed shuttle- less rapier loom (450rpm) has been successfully developed indigenously and demonstrated at CMTI & Surat. ❖ Weaving has been successfully demonstrated at 450 rpm with cotton yarn (2/40s) and polyester yarn (80D Roto yarn). ❖ One patent titled “An apparatus for high speed weft insertion in shuttleless rapier looms” has been filed on 21/11/2018. ❖ Technology transfer documents to industry partners have been shared between Oct 2017 and Feb 2018. ❖ CMTI is currently working towards the development of the shuttle less loom of 550 RPM.

CoE at IIT Madras/AMTDC for development of 11 advanced technologies for Machine Tools & Production Technology

Project Details	
Total Project Cost	Rs. 56.125 cr.
MHI grant approved	Rs. 44.75392 cr. (Original) Rs. 39.07 cr. (Revised)
Technical Progress	Eleven prototypes have been successfully developed. These are under final testing.

CoE at Coimbatore by Si'TARC on Smart Submersible (6 inch) Pumping Solutions for Industrial and Water Supply Applications

Project Details	
Total Project Cost	Rs 8.41 cr.
MHI grant approved	Rs 6.728 cr.
Technical Progress	Smart submersible (6 inch) pumping solutions for industrial and water supply applications have been successfully developed. The technology has been approved for supplying of pumpsets for PM Kusum Scheme of MNRE. The project has also won the prestigious UNIDO- FLCTD award for energy conservation.

CoE at IIT Kharagpur for Advanced Manufacturing

Project Details	
Total Project Cost	Rs 65.19 Cr.
MHI grant approved	Rs 47.62 Cr. (Original) Rs. 37.692 Cr. (Revised)
Technical Progress	Four technologies have been developed so far under the CoE namely: (i) Multi-sensor system for online prediction of weld quality and real-time control of the quality using cloud computing and machine learning algorithms; (ii) Method and system for multi sensor fusion using transform learning; (iii) A predictive maintenance algorithm to improve the profitability of production jobs; (iv)Low-cost real-time machine vision-based quality inspection system. Other technologies are under development.

CoE at HEC, Ranchi for manufacturing Hydraulic Excavator by HEC with institutional support of ISM Dhanbad

Project Details	
Total Project Cost	6.60 Crore
MHI grant approved	5.28 crore
Technical Progress	5 Cubic Meter Hydraulic Excavator - HEX 400 has been developed. The excavator is undergoing testing.

CoE at PSG College of Technology for development of three Welding Technologies

Project Details	
Total Project Cost	26.70 crore
MHI grant approved	21.10 crore
Technical Progress	The following three technologies have been successfully developed: Tech-1 Automated Welding Systems for specific Industrial Applications Tech-2 Intelligent Welding Power Supply System with waveform shaping Techniques Tech-3 Alloy design for Welding Simulation & Analysis for Development of New Welding Electrodes & Filler Metals

CoE at IIT Delhi for Textile Machinery

Project Details	
Total Project Cost	4.6433 crore
MHI grant approved	3.7146 crore
Technical Progress	Prototype of the Automatic guided vehicle (AGV) is ready and working as per defined requirement. Fabrication of the picking arm is under progress.

CoE at IISc Bangalore by SID for Additive Manufacturing for High Performance Metallic Alloys

Project Details	
Total Project Cost	10.5 crore
MHI grant approved	8.4 crore
Technical Progress	The additive manufacturing machine is completely integrated with all the five subsystems. Building of large size components using AM Machine is underway.

CEFC at HMT MTL, Bangalore for Skill Development

Project Details	
Total Project Cost	Rs.97L
MHI grant approved	Rs. 77.6L
Technical Progress	Project Completed. Training has been imparted to about 849 students in 4 trades viz. CNC operator, Fitter, Mechanical and Electrical Quality Control Inspectors. These job roles were in alliance with National Skill Qualification Framework (NSQF).

CEFC for modernization of Precision Metrology Laboratory by CMTI Bangalore

Project Details	
Total Project Cost	9.18 crores
MHI grant approved	3.672 crores
Technical Progress	Most of the equipment has been procured. The facility is providing Dimensional Metrology Services to around 300 industries per annum. Laboratory is providing training to SMEs in the area of Precision Measurements, Calibration, Quality Management System etc. to the order of 100 personnel per annum.

CEFC on Industry 4.0 by M/s. SLK CSR foundation, groups and others, Pune

Project Details	
Total Project Cost	19.35 Crores
MHI grant approved	14.40 Crores
Technical Progress	First 10 smart solutions are developed and implemented at the factories and used for demonstration of the concept of Industry 4.0. 74 awareness events have been organized by C4i4 Lab till date. The experience lab for showcasing and demonstrating key smart factory solutions, has been successfully developed.

CEFC of M/s. Automation Association of India and IIT Delhi for CEFC on industry 4.0

Project Details	
Total Project Cost	30.85 Crores
MHI grant approved	19.40 Crores (Original) 7.76 Cr. (Revised)
Technical Progress	The first set of faculty development programs and initial set of Samarth training kits have been set up and deployed. The PIO has organized various awareness programs till date for MSME cluster development.

CEFC at IISc Bangalore by SID on Industry 4.0 namely I4.0 India@IISc

Project Details	
Total Project Cost	25.6 Crores
MHI grant approved	20.48 Crores
Technical Progress	Four out of five smart tools have been developed. Industry 4.0 support has been extended to 10 start- ups. The center is continuously providing training and conducting awareness activities w.r.t Industry 4.0.

CEFC at CMTI Bangalore for Industry 4.0

Project Details	
Total Project Cost	29.70 crores
MHI grant approved	23.76 crores
Technical Progress	5 technology smart solutions have been developed i.e. technology for converting legacy CNC machines to smart machine, Smart energy monitoring and management solutions for MSMEs, OEE evaluation using OPC-UA parameter, Remote monitoring of CNC machines through cloud and Smart attendance system. Consultancy services are being provided continuously by the Centre.

CEFC at HEC, Ranchi for imparting training in heavy fabrication and steel making technologies

Project Details	
Total Project Cost	50 crores
MHI grant approved	30 crores
Technical Progress	The construction of 10 ten smart classes, one auditorium have been completed. The PIO has conducted training sessions in 8 out of 9 modules. Out of these, training in first five modules has been imparted by the Russian faculty.

CEFC at Bardoli, Surat by Science Engineering & Technological Upliftment (SETU) Foundation

Project Details	
Total Project Cost	50.27 crores
MHI grant approved	27.81 crores
Technical Progress	Construction of the CEFC building is near completion. All equipment have been finalized. Approximately, eight equipment have been procured. The remaining are being procured in a phased manner.

CEFC for skill development of design engineers by M/s Korus Engineering Solutions Pvt. Ltd.

Project Details	
Total Project Cost	6.00 crores
MHI grant approved	3.60 crores
Technical Progress	More than 80% of the equipment has been procured. 25 mock training sessions have been conducted for Korus Engineering Solutions Pvt. Ltd. Three powder cutting machines for cutting stainless steel and manufactured at the workshop.

TAFP by Industrial Processors & Metallizers Pvt. Ltd on Cutting Edge Robotic Laser Cladding Technology for Hydro Tarbines indigenously using Tungsten Carbide Powder

Project Details	
Total Project Cost	Rs. 4.975 Cr.
MHI grant approved	Rs. 1.240 Cr.
Technical Progress	The project is ongoing. The targeted technology has been imported. The installation of the Robotic Laser Cladding System is under progress.

TAFP by PTC Industries Ltd on Development & Commercialization of Titanium Casting with Ceramic Shelling Technology

Project Details	
Total Project Cost	Rs 51.02 Cr.
MHI grant approved	Rs. 10.00 Cr.
Technical Progress	Project has been completed. The targeted technology has been acquired. The first prototype of casting in Titanium has been manufactured. The first Titanium part manufactured by the company as a sample for India's space research program. Further, under the agreement of the company with its technology partner in the UK, the Titanium Casting technology has also been successfully transferred and absorbed by the company.

CoE : Status

Project Title	Status(in terms of % completion)
CoE at CMTI, Bangalore by TMMA for development of shuttle less rapiers looms of 450 RPM and 550 RPM	53
CoE at IIT, Madras for development of 11 advanced technologies for Machine Tools & Production Technology	97.7
CoE at PSG College of Technology for development of three Welding Technologies	100
CoE at Coimbatore by Si'tarc on Smart Submersible (6 inch) Pumping Solutions for Industrial and Water Supply Applications	100
Centre of Excellence for Automated Guided Vehicle in Textiles by IIT Delhi	67.5
CoE at IIT- Kharagpur along with a common facility namely Innovation Lab at IIT-Kharagpur, West Bengal	65.57
CoE at IISc Bangalore by SID for Additive Manufacturing for High Performance Metallic Alloys	97
CoE at HEC Ranchi Development of 5 Cubic Meter Hydraulic Excavator - HEX 400	80

CEFC : Status

Project Title	Status(in terms of % completion)
CEFC at TAGMA for dies and moulds	Project withdrawn
CEFC at HEC, Ranchi for training of eight batches for heavy fabrication and steel making technologies by Russian experts	70
CEFC at Bardoli, Surat by Science Engineering & Technological Upliftment (SETU) Foundation: Designing and common man ufacturing of Textile engg components	47
CEFC by SUTF at Pune, Maharashtra by Kirloskar Group on Industry 4.0 namely Centre For Learning in Industry 4.0: Aware ness seminars, training programmes, industry consultancy and demonstration facilities.	65
CEFC at IIT-Delhi by IIT-D & AIA on Industry 4.0 namely National Common Engineering Facility Centre on Smart Technology Enabled Manufacturing: Awareness seminars, training programmes, industry consultancy and demonstration facilities.	65
CEFC at IISc Bangalore by SID on Industry 4.0 namely I4.0 India@IISc: Awareness seminars, training programmes, industry consultancy and demonstration facilities.	90
CEFC – Smart Manufacturing Demonstration and Development Cell", a Smart Manufacturing (Machine Tool centric) at CMTI encompassing Industry 4.0, IoT (Internet of Things) Platform at CMTI, Bangalore: Awareness seminars, training programmes , industry consultancy and demonstration facilities and converting legacy machines into smart machines.	41
KORUS – CEFC on Training Facility and training of 540 design engineers and 840 technicians within 5 years	35
CEFC - Modernization of Precision Metrology Laboratory (MOPML) of CMTI: Metrological services to the Industry	86

TAFP: Status

Project Title	Status(in terms of % completion)
TAFP by Allied Engineering Pvt. Ltd on Manufacturing of Heavy Duty High Reliability Electrical Specialised Power Cables	100
TAFP by IPM Pvt. Ltd on Robotic Laser Cladding Technology for Hydro Turbines using Tungsten Carbide Powder	71
TAFP by PTC Industries Ltd on development & commercialization of Titanium Casting with Ceramic Shelling Technology	100
TAFP by HMT MTL on Development of Four Guideway CNC Lathe	100
TAFP by HMT MTL on Develop Turn Mill Centre with Y axis SB CNC 30TMY and integrate high precision C axis on the Main Spindle	100

EFC : Comments Status

S.No.	Comments received from
1.	Department of Expenditure
2.	Department of Economic Affairs
3.	NITI Aayog
4.	Department of Commerce
5.	Ministry of Steel
6.	Ministry of New & Renewable Energy
7.	Department of Pharmaceuticals
8.	Department of Consumer Affairs
9.	Ministry of Skill Development and Entrepreneurship
10.	Ministry of Food Processing Industries
11.	Department of Science and Technology
12.	Department of Higher Education
13.	DPIIT
14.	Department of Chemical and Petrochemicals
15.	Ministry of Housing and Urban Affairs
16.	Ministry of Textiles
17.	Ministry of Road Transports and Highways
18.	Ministry of Electronic and IT
19.	Ministry of Power

Process for the Qualification Approval

Mapping of Skill Gap by SSC and formulating QPs

Industry validation from 30 Industries and hereafter approval from the Line Ministry

Proposal along with all necessary enclosures is submitted to NCVET. Draft QPs are scrutinized by NCVET against checklist

Proposals are uploaded on public domain and shared with stakeholders, hereafter, feedback from stakeholders is shared with submitting body

Final proposals are tabled at NSQC meeting by NCVET. Approved proposal becomes part of National Qualification Register

Existing testing and certifications facilities

Institution	Engineering Facility
HMT, Bengaluru	Training in Machining Trades
IISc, Bengaluru	Smart Manufacturing/Industry 4.0
CMTI, Bengaluru	Modernization of Precision Metrology Laboratory
HEC, Ranchi	Steel Making Technology
SETU Foundation	Tool Room for Textile Engineering
Kirloskar CSR foundation, Pune	Smart Manufacturing/Industry 4.0
IIT-Delhi	Smart Manufacturing/Industry 4.0
TAGMA, Pune	Tool Room for Tool & Die Industry
CMTI, Bengaluru	Smart Manufacturing/Industry 4.0
Korus Engineering	Design and Workshop Training in Steel Plant Equipment
Automotive Research Association of India (ARAI)	ARAI has developed a network of Departments and Laboratories with capabilities that encompass the entire spectrum of automotive engineering areas including Active and Passive Safety, Automotive Electronics, Engineering Design & Simulation, Emissions, Certification & Homologation, Materials & Manufacturing, Noise Vibration & Harshness, Powertrain Engineering, Structural Dynamics, Vehicle Evaluation, Calibration etc.
International Centre for Automotive Technology (iCAT)	International Centre for Automotive Technology (iCAT), Manesar is a leading world class automotive testing, certification and R&D service provider under the aegis of NATRiP (National Automotive Testing and R&D Infrastructure Project), Government of India.

Thank you