Department of Heavy Industry
Ministry of Heavy Industries & Public Enterprises

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Capital Goods & Engineering Sector

Report of the Working Group on Capital Goods & Engineering Sector for the 12th Five Year Plan (2012-2017)

Contents

Executive Summary

1. **Planning Commission constituted a Working Group on Capital Goods and Engineering Sector for the 12th Five Year Plan (2012-2017)** under the Chairmanship of Secretary, Department of Heavy Industry. The Terms of Reference and Composition are given in the Appendix. Seven sector-wise, sub-groups, namely, machine tools & plastic processing machinery, earth moving and mining equipment, heavy electrical and power plant equipment, metallurgical machinery, textile machinery, process plant equipment, engineering goods and dies, molds & tool industry were constituted. The methodology consisted of inviting information/suggestions from all the stake holders, such as industry associations, centres of excellence and major PSUs etc. The inputs were deliberated in-depth at various fora, before finalizing the report.

2. **Five key objectives identified for the 12th Five Year Manufacturing Plan.**

   a. Increase manufacturing sector growth to ~ 2-4% more than GDP growth to make it the engine of growth for the economy and increase its share to ~ 25% of overall GDP by 2025.
   b. Increase the rate of job creation in manufacturing sector to create ~100 million additional jobs by 2025.
   c. Increase "depth" in manufacturing, with focus on the level of domestic value addition.
   d. Enhance global competitiveness of Indian manufacturing through appropriate policy support.
   e. Ensure sustainability of growth, particularly with regard to the environment.

3. **In order to synchronize recommendations of this working group with the overall plan objectives, the following strategies are proposed through a set of recommendations contained in the report.**

   a. The industry growth during 11th Plan stood is at 14%. The turnover during 2010-11 was Rs 2,67,944 crore. There is a need for rapid growth of the sector, for which it is proposed to initiate some national programmes. These in turn will create additional demand. It is also proposed to take steps to substitute imports by domestic production. This is expected to take the sector to Rs 6,81,000 crores in 2016-17 at a CAGR of 16.8%.

   b. The current employment of 1.4 million is proposed to be boosted through a series of recommendations to reach 2.8 million by the end of the 12th Five Year Plan.
   c. In order to increase technology content in the domestic production, policy and programme initiatives are proposed for R&D, education and training, technology development, technology purchase, technology development abroad on contract, technology acquisition, IPR purchase and ownership, joint technology development and funding for technology upgradation.
   d. Some sub-sectors of capital goods in Indian manufacturing sector are not upto the global standards. It is proposed to provide exposure, facilitation, technology

development support and support for acquisition of technology firms abroad. Some of the PSUs are proposed to be elevated as national/global champions.

e. Technology and design development support is proposed to be provided to the capital goods sectors for producing energy efficient machines.

4. Capital goods & engineering sector as a strategic sector for Indian economy:

- "Capital Goods" sector comprises of plant and machinery, equipment / accessories required for manufacture / production, either directly or indirectly, of goods or for rendering services, including those required for replacement, modernization, technological upgradation and expansion. It also includes packaging machinery and equipment, refrigeration equipment, power generating sets, equipment and instruments for testing, research and development, quality and pollution control.
- In the context of Working Group of Capital Goods and Engineering Sector, sub-sectors such as machine tools, plastic machinery, dies/ moulds & tools, earthmoving & mining equipment, heavy electrical & power plant equipment, metallurgical machinery, textile machinery, process plant machinery and light engineering goods have been included.
- Capital goods sector is extremely crucial for the development of the country's economy for the following two important reasons:
  - Capital Goods is considered as a strategic sector and development of domestic capabilities is essential from a national self-reliance and security perspective
  - Capital Goods sector has multiplier effect and has bearing on the growth of the user industries as it provides critical input, i.e., machinery and equipment to the remaining sectors covered under the manufacturing activity.
- The capital goods industry contributes 12% to the total manufacturing activity (which is about 15% of the GDP).
- With a view to achieve 9% growth in GDP during the 12th Five Year Plan, the manufacturing industry should grow at least by 11% to 13% per annum. This would mean that the Capital Goods sector, which is considered to be the core of manufacturing, should grow at around 17% to 19%.

Policy environment in respect of capital goods & engineering sector

- No industrial license is required for the sector.
- FDI up to 100% permitted on automatic route (through RBI)
- Quantum of payment for technology transfer, design & drawing, royalty etc. to the foreign collaborator has no limit
- Imports and exports are allowed freely.

Capital goods & engineering sector has market size at ~ Rs 3,11,515 Cr, growing at a CAGR of 14.%

- ◊ Heavy electrical and power equipment sector is the largest sub-sector with size of Rs 1,21,418 Cr (2010-11), followed by Engineering Goods sub-sector at Rs 1,16,449 Cr (2010-11)

Imports are gaining market share across all sub-sectors, with 30% of domestic demand met through imports

- ◊ Metallurgical machinery, machine tools & textile machinery are relatively weak in self reliance as more than 50% of demand is being met through imports
- ◊ Import content across the sub-sectors of capital goods varies from 10% to 78% due to absence of technology of critical assemblies and subsystems

Indian export share globally remains small ranging from 0.1% to 0.6% across sub-sectors

5. Terms of Reference (ToR) -wise summary of recommendations

ToR has been considered through the formation of seven sub-groups for different sub-sectors of capital goods sector independently to address the issues like

(i) Identification of the critical segments where the domestic capital goods industry has remained stagnant in spite of growing domestic demand and analysis of its causes,

(ii) Need to develop/ strengthen institutional support to industry in the context of long term goals and

(iii) Suggestions on strategy to overcome the present limitations in order to develop an enabling environment. Considering the present scenario of liberalisation in the capital goods and engineering sector, the Working Group has delved on the issues concerning these sub-sectors and suggested the appropriate support measures required to enhance the growth of the capital goods & engineering sector.

5.1 Long-term goals sought to be achieved in capital goods and engineering sector.

SN.	12th Five Year Plan Goals	Budget Rs. crore	Impact
i	Production growth rate of 16.8% is proposed.	30,528	• Moving Indian capital goods industry to the global level • Reducing overseas dependence in the strategic sectors of Indian economy. • Increasing 'Depth' in manufacturing
ii.	Converting import content into		• Enhancing Production level to

	domestic production – increasing value addition – increasing technology content –technology development and creating facilitation mechanisms.		Rs. 6,81,000 Crore • Total Employment: 2.8 Million • Export: Rs. 1,50,000 Crore • Contribution to National Exchequer (@15% of the turnover during 12th FYP) = Rs. 4,31,218 crore.

5.2 Status of capital goods (machine tools, earth moving, heavy electrical, metallurgical, textile, process plant, mining, power plant and other industrial machinery) and engineering sector in terms of capacities, production and its technological/engineering standards as well as volume of imports.

5.2.1 Status of Machine Tools Sector

(Rs Cr)	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	CAGR
Market Size	3403	4877	7162	8698	8319	7245	10236	16%
Production	1634	2028	2579	2853	2138	2484	3624	12%
Import	1821	2899	4656	5992	6271	4842	7245	20%
Export	52	50	73	147	90	81	91	13%
Import content in domestic production (%)	30% in standard machine tool (medium technology) 40% in high technology machine tools							
Employment (No. of people)	30,000							
Investment Intentions	na	na	173	20	228	675	957	Total 2053
FDI	na	na	170	226	206	640	53	Total 1295

na – information not available

5.2.2 Status of Plastic Processing Machinery

	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	CAGR
Market Size (Rs Cr)	775	925	1148	1466	2233	2332	3850	30.6%
Production (Rs Cr)	525	620	745	871	1333	1519	2403	28.8%
Import (Rs Cr)	250	305	403	595	900	813	1447	34%
Export (Rs Cr)	242	348	316	372	459	393	415	9.4%

Import content in domestic production (%)	Standard equipment - 12% and Hi-tech equipment - 22%.							
Employment (No. of people)							40000	

5.2.3 Status of Earth Moving and Mining Equipment

	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	CAGR
Market Size (Rs Cr)	5763	6700	9199	13800	10400	13850	14500	16.7%
Production (Rs Cr)	3608	4061	5150	7884	5070	6748	7333	12.5%
Import (Rs Cr)	2313	2807	4237	6176	5600	7430	7395	21.3%
Export (Rs Cr)	158	168	188	260	270	328	228	6.3%
Import content in domestic production (%)	35% in standard equipment 78% in high-tech equipment							
Employment (No. of people)						100000		

5.2.4 Status of Heavy Electrical and Power Plan Equipment

	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	CAGR
Market Size (Rs Cr)	51009	58941	68106	82309	89041	104185	121418	15.5%
Production (Rs Cr)	49749	56784	64813	75416	81815	93187	110000	14.1%
Import (Rs Cr)	9232	11343	13937	18942	25180	25565	31769	22.8%
Export (Rs Cr)	7698	9052	10644	12050	17954	14567	20351	17.6%
Import content in domestic production (%)	37% in supercritical segment for BTG equipment 26% in subcritical segment for BTG equipment							
Employment (No. of people)							500000	

5.2.5 Status of Metallurgical Machinery

	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	CAGR
Market Size (Rs Cr)	1068	1386	2181	2423	4172	3800	4992	29.3%
Production (Rs Cr)	568	720	981	1039	1315	989	1129	12.1%
Import (Rs Cr)	936	1200.6	1843.3	1976.1	3842.3	3252.3	4346	29.2%
Export (Rs Cr)	436	535	643.7	592.5	986.1	441.8	483	1.7%
Import content in domestic production (%)	15% in standard equipment 35% in high-tech equipment							
Employment (No. of people)							12,940	

5.2.6 Status of Textile Machinery

	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	CAGR
Market Size (Rs Cr)	8831	9090	12212	10770	7867	8020	10500	2.93%
Production (Rs Cr)	4117	4402	5753	6155	4063	4245	6150	6.92%
Import (Rs Cr)	3299	5065	6884	5255	4411	4357	5000	7.18%
Export (Rs Cr)	338	377	425	640	607	582	650	11.51%
Import content in domestic production (%)	12% in standard equipment 27% in high-tech equipment							
Employment (No. of people)							95,000	

5.2.7 Status of Process Plant Equipment

	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	CAGR
Market Size (Rs Cr)	8332	9329	10480	13142	13365	14628	16345	11.9%
Production (Rs Cr)	8880	9988	11237	12642	14222	16000	18000	12.5%
Import (Rs. crore)	619	721	162	150	264	246	1548	16.5%
Export (Rs. crore)	1167	1380	1632	1930	2283	2700	3194	18.3%
Import content in domestic production (%)	10% standard equipment and 30% in hi-tech equipment							
Employment (No. of people)						128,000		

5.2.8 Status of Engineering Goods

	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	CAGR
Market Size (Rs Cr)	50647	62013	79752	89744	95029	100990	116449	14.9%
Production (Rs Cr)	50142	60614	73896	87059	94697	94173	106820	13.4%
Import (Rs Cr)	7208	10515	17318	18994	22396	22436	28155	25.5%
Export (Rs Cr)	6704	9116	11462	16309	22064	15639	18526	18.46%
Employment (No. of people)							370,000	

5.2.9 Status of Dies, Moulds and Tools

	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	CAGR
Market Size (Rs Cr)	6200	7,000	8,000	9,190	10,385	11,735	13,225	13.4%
Production (Rs Cr)	6320	7,396	8,473	9,725	11,058	11,080	12,485	11%
Import (Rs Cr)	2450	2,380	2,720	2,940	3,323	3,755	4,150	9.1%
Export (Rs Cr)	2570	2,776	3,193	3,475	3,996	3,100	3,410	4.8%
Employment (No. of people)							120,000	

5.3 Critical factors that inhibit the development of capital goods sector particularly in creation of additional capacities and diversification to meet the emerging requirement of growing needs of the industry.

- Capital Goods Sector is highly fragmented with majority of units in SME Sector.
- Technology profile of domestic products is from basic to intermediate.
- Support facilities, technology development institutions and skilled man-power lags behind global standards.
- Inverted duty structure and other economic parameters favours imports as preferred source of supply.
- Higher cost of production and other impediment.

5.4 Critical segments where the domestic capital goods industry has remained stagnant in spite of growing domestic demand.

Domestic capital goods industry remained stagnant in the following sectors in spite of growing domestic demand.

- High Technology multi spindle five axes machine tools
- Automatic Shuttle-less looms, cone winders, garmenting machinery.
- Slag granulation plant, steel melting converters, continuous casting equipment
- High capacity electric dump trucks, walking draglines, longwall mining system and continuous miners
- Coal gassifires, super critical technology

5.5 The extent of technology transfer and enhancement of production capacities in last five years in this sector through Foreign Direct Investment (FDI) in Joint Ventures and Wholly Owned Subsidiaries (WOS).

Machine tools sector is dotted by individual techno-entrepreneurs. Though, a number of MNCs are also present in India by opening technical centres to facilitate exports to India, FDI in machine tools have been marginal (app. Rs. 1300 crore during last 5 years) and have not been a vehicle for major technology transfers. High Technology equipments in capital goods sector are continued to be imported. Joint-ventures and Wholly Owned Subsidiaries are liberally allowed under automatic route. Still, due to unfavourable economic system and easy import of the machineries, major global manufacturers have not set up the manufacturing plants.

More or less same situation prevails in other capital goods sectors except in earthmoving and mining equipment sector which remains an assembly based sector and process plant equipment which has developed export market based on its intermediate level of technology.

5.6 Assessment of role of Public Sector Enterprises (PSEs) in capital goods sector and future road map thereof.

BHEL, a Navaratna Company, is the major success story in PSEs in heavy electrical equipment sector. About 65% of the domestic production of the sector is met by BHEL alone. This PSE is also technology leader in the country. BEML, HMT and HEC are also the PSEs engaged in the manufacturing of capital goods and have a strategic role in the country. The report proposes BHEL and BEML to be transformed as global champions. It is also proposed to elevate the levels of HMT and HEC to be national champions.

5.7 Ways and means to improve accessibility of technology for domestic capital goods and engineering sector.

- By providing infrastructure like industrial clusters, common facility centres and product development centres,
- Through technology transfer, acquisition of technology etc.,
- Industry – academia – national laboratory linkages,
- Encourage value addition through suitable procurement and offset policy,
- Promoting demand for local production through national level programmes for modernization of textiles industry, public transport, environment friendly automobiles, energy and consumer goods (through compulsory standards).

5.8 In the context of the long terms goals as at (i) above whether there is a need to develop/ strengthen institutional support to industry.

Yes. Institution support is being proposed to strengthen R & D/ innovation, Technology Development, Product Development, Training, Common Facility Centres and Technology Financing, Export credit facility, etc.

5.9 International best practices for development of clusters in machine tools/capital goods segment, other support measures and institutional arrangement and to take lessons from them.

The development of Integrated Machine tool parks in countries like Taiwan, China, Korea have propelled their growth in becoming some of the largest machine tool producing countries despite a limited local market. Similar strategy could be adopted for development of Indian machine tool industry.

5.10 Strategy to overcome the present limitations and to suggest specific plans including fiscal and other policy measures to develop an enabling environment.

In order to achieve global competitiveness holistic approach for development of strategic capital goods sub-sectors have been advocated through multi-dimensional programmes, schemes and policy interventions such as:

- Create mechanism for technology development/transfer/acquisition/including modernization/ expansion of manufacturing units.
- Support to technical institutes to train manpower
- Strengthening testing facilities
- Arrest imports through technology transfers and local value additions

The following specific recommendations for policy initiatives are proposed for the capital goods and engineering sector:-

◊ Support for incentivizing technology development/transfer and value addition in India

-
  - Modify FDI policy to ensure transfer of technology by giving preference to JVs instead of 100% foreign owned companies,
  - Develop indigenous facilities for design, development & testing of equipment,
  - Incentivize/mandate foreign players to increase value addition in India,
  - Preference in PSE/ Government purchases to products having higher local content,
  - Inter-ministerial coordination through a Central Government body to promote coordination of sub-sectors with user sectors.

◊ Substitute Imports: Calibration of duties and taxes to remove disadvantage to domestic players

- Regulate / ban import of second hand machinery,
- Revisit existing FTAs, PTAs; analyze effects on domestic players before entering into any future agreements,
- Address adverse tax structure for local manufacturers in India,
- Modify Government tender terms to remove disadvantages to Indian firms against imports.

◊ Promote exports

- Export line of credit to be extended at appropriate conditions,
- Support for market/brand development

◊ Build Indian Champions to increase scale of operations and act as base for technology up -gradation in the industry

- Build BHEL & BEML as global champions through export growth,
- Build HEC & HMT as national champions through import substitution.

◊ Few Private sector companies could also be considered to be accorded global champion status with respect to Process Plant machinery, such

companies having proven track record of technological prowess and proven ability to export large hi-technology equipment, coupled with large employment generation capability.

5.11 Milestones to be achieved in the 12th Five Year Plan in order to achieve the long term goals as laid down in TOR (I) above.

Year	Milestone
First year	Approval and start of implementation of policy initiatives, schemes, setting up institutions and programmes relating to R&D, skilled development, technology development, capacity building and business development.
Second year	Physical and financial progress of at least 15% in the above.
Third year	Physical and financial progress of at least 50% in the above. Mid-term review and course correction.
Forth year	Physical and financial progress of at least 75% in the above. Monitoring and review
Fifth year	Completion of the above. Impact analysis.

Detailed plans will be developed.

5.12 Programmes/schemes that are to be terminated in the 11th plan or initiated or continued in the 12th plan period, together with the broad budgetary implications, if any.

The Budget profile and revenue justification / neutralisation of the programmes/schemes sector-wise as well as activity-wise are given as hereunder:-

It is estimated that with the Govt support, the sector will grow at CAGR of 16.8 %.

Projected Production Rs crores	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	CAGR
Machine Tool	4530	5663	7078	8848	11060	13824	25%
Plastic Machinery	4650	5600	6850	8400	10300	12700	22%
Earthmoving & Mining Machinery	10000	16826	22356	26633	30528	34924	17.40%
Heavy Electrical	126312	145421	167521	193097	222719	257050	15.20%
Metallurgical Machinery	1300	1600	2100	2800	3800	5800	34.90%
Textile Machinery	7072	8000	9400	11000	13000	14300	15.10%
Process Plant	19861	22244	24913	27902	31250	35000	12%

Equipment							
Engineering Goods	124558	145551	170451	200059	235358	277526	17.30%
Dies, mould & Press tools	14,274	16,686	19,016	22,235	25,493	29,878	15.90%
	312557	**367591**	**429685**	**500974**	**583508**	**681002**	**16.85%**

The above table shows year-wise expected turnover of the CG & Engineering sector in the 12th Five Year Plan assuming a budgetary support of Rs.30,528 crore is provided as envisaged in the proposed schemes along with other incentives detailed in the preceding paragraphs.

Strategic Importance:
Capital Goods and Engineering sector is of strategic importance to the manufacturing industry. Some countries like China, Korea etc. are progressing rapidly in the sector. The Capital Goods sector in other countries enjoys cost advantage as well as higher technology levels vis-a-vis their Indian counterparts. As a result, India's dependence on imports in manufacturing industry is increasing at alarming proportions. The situation needs immediate correction by implementing measures suggested in this report.

Technology Generation:
In capital goods sector, the present technology levels are at second & third generation and technology gap is widening when compared to other countries. Dependence on high-end technology capital goods is increasing in the country which is evidence by increased imports in this sector. Upgradation of technology levels, continuous R & D efforts and self sufficiency of the nation in this sector requires desired levels of investment and support by the Government.

Revenue Neutralisation:
The cumulative turnover projected during 12Th FYP is Rs 28,75,317 crore. The Total tax contribution during the 12th FYP expected @ 15% of the turnover works out to be Rs. 4,31,297 crore. The budget requirement for CG & Engineering Sector during 12th Five Year Plan projected at Rs 30, 528 crore is only 7% of the estimated contribution to National exchequer by way of taxes. **Therefore, Working Group Report proposes to Government Budgetary support of Rs.30,528 crore for the Capital Goods and Engineering sector which is a fraction of the total tax to be contributed by the sector during 12 FYP.** It may also be pertinent to mention that budgetary support for CG and Engineering Sector is sought for the first time in the history of the Five Year Plans.

PWC-FICCI 2009 survey had found that an average of 16% of the turnover as tax had been contributed by the Industry to the National Exchequer. The tax estimated to be contributed by the Capital Goods sector in 2016 -17 works out to be 17.5% - detailed calculation model is given as below. For the report, a rounded off value of 15% has been assumed.

Calculation model for 15% Total Tax Contribution by the Industry out of its turnover (Rs. crore).

	Import content (%)	2016-17	Import of finished machinery	Import of inputs (components & raw materials)	Customs duty (on machinery @ 7.5%)	Customs duty (on inputs @ 5%)	Excise duty paid on production 8.7%	Income Tax (1% of turnover)/ Corporate tax (1% of turnover) paid
Machine Tools	30% Std 40% Hi tec	13824	10201	4838	765	242	1203	138
Plastic Machinery	12 (standard) /22 (hi-tech) Average 17%	7100	1750	1562	131	78	618	142
Earthmoving & Mining Machinery	35 (standard)/ 78 (hi-tech) Av. 56.5%	34924	11308	19733	848	987	3038	698.48
Heavy Electrical	B/T/G 30 – 45% Av. 37.5%	257050	116977	96393	8773	4820	18765	5141
Metallurgical Machinery	15 (standard)/ 35 (hi-tech) Av. 25%	5800	18500	1450	1388	73	505	116
Textile Machinery	12(standard)/ 27 (hi-tech) Av. 19.5%	14300	5400	27885	405	1394	12441	700
Process Plant Equipment	10 -standard & 30 - hi-tech Av. 20%	35000	3868	7000	290	350	3045	597.56
Dies, mould & Press tools	15 (standard & hi-tech)	29878	7946	4481	596	224	2599	4550.42
Engineering Goods		227521	110005		8250		19794	12507.94
Total		**625397**	**285955**	**163342**	21446	8168	62008	24591.4
	Total tax	1190907						
	Percentage	**17.5**						

Details of Sub-Sector-wise Budgetary Support Required (Rs. crore):

S. No.	Sub-Sector/ PSE	Projected Market Size 2016 -17	Projected Production 2016 -17	Contribution to National Exchequer in 2016 -17(15% of production)	Budget Proposed
1	Machine tool	23678	13824	2073.6	6320
2	Plastic Machinery	13096	12700	1905	3978
3	Earthmoving & Mining Machinery	45232	34924	5238.6	4940
4	Heavy Electrical Equipment	301662	257050	38557.5	6915
5	Metallurgical Machinery	23250	5800	870	2450
6	Textile Machinery	18500	14300	2145	1800
7	Process Plant Machinery	30118	35000	5250	900
8	Engineering Sector	280604	277526	41628.9	1000
9	Dies and Moulds	31783	29878	4481.7	
10	HEC as National Champion				1000
11	HMT as National Champion				1225

	Total	**767944**	**681002**	102150.3	**30528**
	Cumulative turnover of CG Sector in the 12th Five Year Plan		**2875317**	**431297.6**	

Facility wise budget (Rs. crore)

sector	R & D	Skill Development	Technology Development	Capacity Building	Business Development	Total
	R&D Centres	Skill development / Centre of Excellence	Technology development fund / CDP/ technology fees / modernisation /acquisition / Soft loan for expansion	CFC / Cluster park /Capacity building / Testing facility /Strengthening CMTI	Business & market development / Export promotion	
Machine tool	500	200	3220	2400		6320
Plastic Machinery		1720		2258		3978
Earthmoving & Mining Machinery		2000	440	2000	500	4940
Heavy Electrical Equipment			2915.45	4000		6915.45
Metallurgical machinery		950	1500			2450
Textile Machinery	150	50	250	1250	100	1800
Process plant machinery	150	100	100	500	50	900
Engineering sector		100	550	250	200	1000
HEC			1000			1000
HMT	375		350	500		1225
	1175	3400	11945.45	13158	850	**30528**
					30528	

Implementation Strategy:

The proposed scheme, which is need based, multi stakeholder driven, holistic and outcome oriented, would require institutional structure to be in place and processes to be formalized, which would make the programme implementable and, result oriented. The following formulations are proposed:-

SPV: It is proposed to set up an SPV to undertake implementation of the proposed programme. The proposed SPV will be registered as a Society under the Indian Societies Registration Act 1860. A CEO at the level of Joint Secretary will be the operational head. A Governing Body chaired by Secretary (Heavy Industry) will be formed for policy matters. Industry Associations, Institutions, Academia and other stake holders will be represented in the Governing Body. The model is proposed on the basis of a similar institution called NATIS, which is already in place for Auto sector. This institution has given a big boost and fillip to the Indian Automobiles sector. The broad scope of work to be undertaken by the SPV for the Capital Goods and Engineering Sector will include the following:-

1) **R&D:**
2) **Skill Development:**
3) **Technology Development:**
4) **Capacity Building:**
5) **Testing Facilities**
6) **Business Promotion and Development**:

Budgetary allocation for the proposed SPV will be supplemented through other means of financing like PPP route amongst others.

5.13 Any other matter considered integral to the above objective.

The exercise has brought out the following issues concerning all sub-sector of manufacturing sector.

- ◊ Shortage of skilled labor
  - Increasing pool of available resources
  - Increasing quality of resources
  - Rationalize labor policy
- ◊ Infrastructure issues
  - Power and water supply
  - Infrastructure for transportation and logistics
  - Port infrastructure
  - Clusters for common infrastructure
- ◊ High cost of capital
  - Corpus fund for expansion/ modernization/ upgradation of plants.

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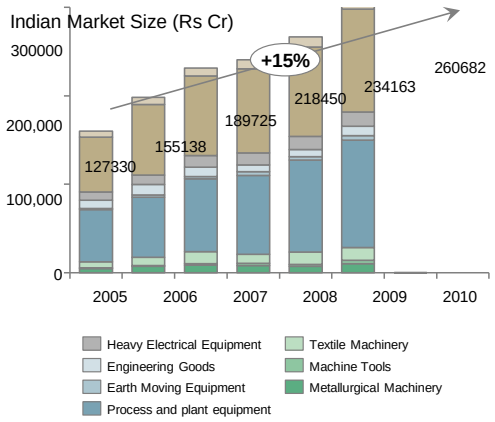
2. Overall Assessment of Capital Goods & Engineering Sector

Industrial, Investment, Foreign Collaboration and Trade Policy in respect of Capital Goods & Engineering Sector

- ◊ As the capital goods & engineering sector falls under delicensed category; no industrial license is required. Industrial Entrepreneur Memoranda (IEM) is required to be filed to undertake the manufacturing activity.
- ◊ FDI up to 100% permitted on automatic route (through RBI).
- ◊ Quantum of payment for technology transfer, design & drawing, royalty etc. to the foreign collaborator has no limit
- ◊ Import and export of capital goods & engineering items including import of second hand capital goods is allowed freely.

Capital goods & engineering sector is large in India with demand at ~ Rs 311,550 Cr, growing at a CAGR of over 14.12%. Heavy electrical and power equipment sector is the largest sector with a size of Rs 121,418 Cr, closely followed by Engineering Goods with size of Rs 116,449 Cr as of year 2010-11.

Capital Goods and Engineering Market from 2005-2006 to 2010-11 (Rs Cr)



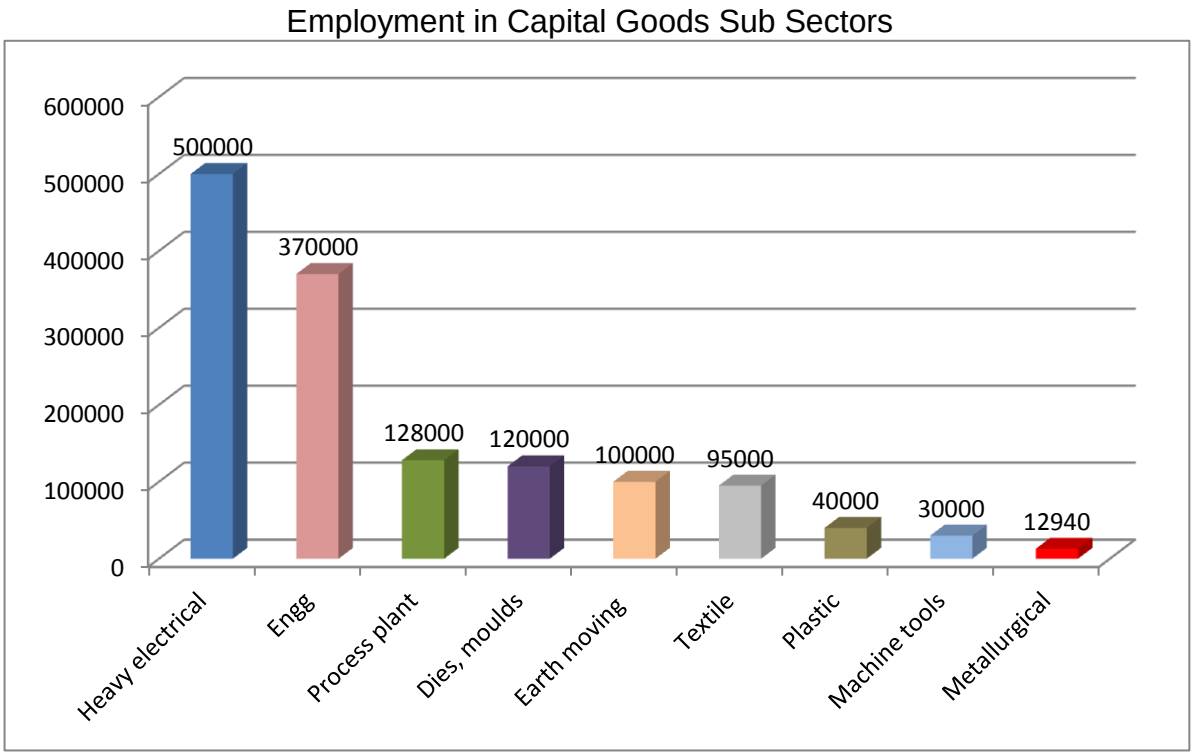
Sub-sector	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	
Machine Tool	4877	7162	8698	8319	7245	10236	16%
Plastic Machinery	925	1148	1466	2233	2332	3850	30.60%
Earthmoving & Mining Machinery	6700	9199	13800	10400	13850	14500	16.70%
Heavy Electrical	58941	68106	82309	89041	104185	121418	15.50%
Metallurgical Machinery	1386	2181	2423	4172	3800	4992	29.30%
Textile Machinery	9090	12212	10770	7867	8020	10500	2.90%
Process Plant Equipment	9329	10480	13142	13365	14628	16345	11.90%
Engineering Goods	62013	79752	89744	95029	100990	116449	14.90%
Dies, mould & Press tools	7,000	8,000	9,190	10,385	11,735	13,225	13.40%
Total	**160261**	**198240**	**231542**	**240811**	**266785**	**311515**	**14.12%**

Robust growth across most sub-sectors

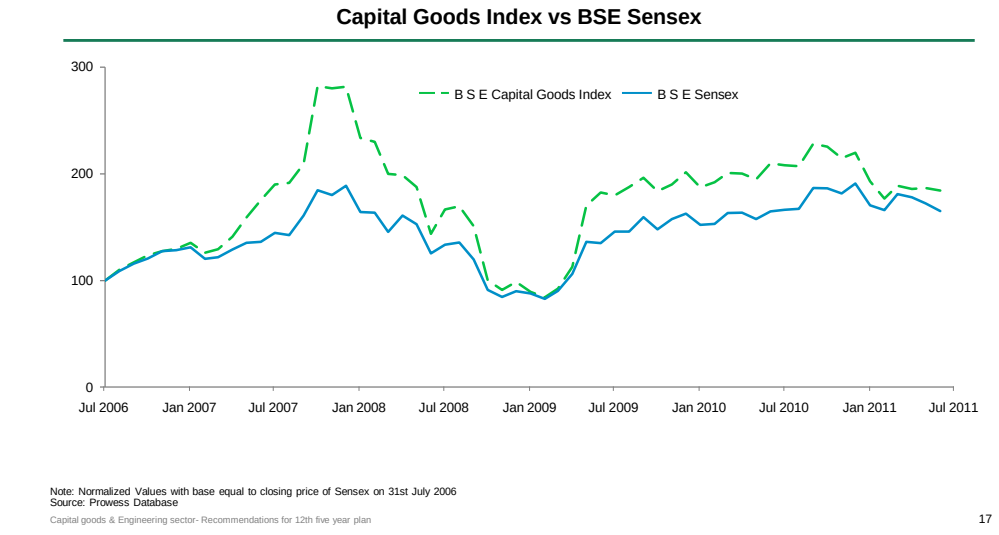
Note: Figures for process plant equipment have been projected backwards using current level and past CAGR
Source: 1: Figures taken from sub-sector; 2: EIS;

Capital goods & Engineering sector- Recommendations for 12th five year plan 12

Capital goods and Engineering sector provides direct employment to 1.40 million people (2010).



Also, the sector has consistently outperformed BSE Sensex over last 5 years as indicated below:-



Note: Normalized Values with base equal to closing price of Sensex on 31st July 2006
Source: Prowess Database

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The 7 sub-sectors were assessed on 3 major parameters namely, self-reliance, export competitiveness and attractiveness to decide upon the strategic future direction.

Sub-sector Characteristic	Criteria for Assessment
1 Sub-sector Attractiveness	• Historical production growth rate • Size of Indian demand • Labor intensity
2 Self Sufficiency	• Import/Domestic Demand • Growth in imports vs. growth in market
3 Export Competitiveness	• Share of India in global exports • Growth of Indian exports vs. growth in global exports

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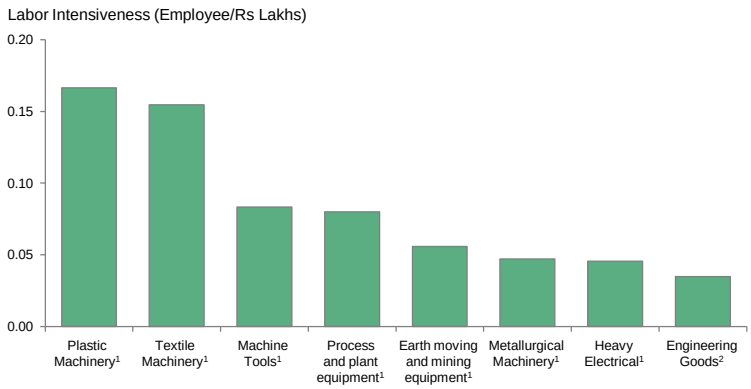
The sub sectors have clear variations in the size and growth rates that could be perfectly explained by the concept of economies of scale. Some sectors are attractive from the employment aspect on account of high labor intensity.

1

1. Industry Attractiveness

Labor Intensiveness for 8 sectors (2010)



Source: 1: Sub-sector data; 2: Annual survey of Industries(2008), BCG Analysis

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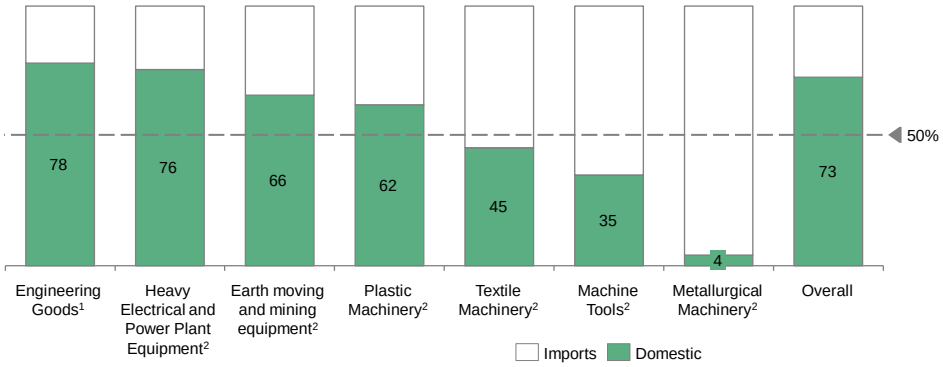
The Plastic Machinery and Textile Machinery are the most labour intensive sub-sectors. These sectors are currently facing a high incidence of imports particularly from low cost countries.

2

2. Self Reliance

% split of demand between imports and domestic production (2009-10)



Note: Import figures for process and plant equipment are being collated
Source: 1:EIS; 2: Sub-sector presentation; 3: 2010-11 figures are used for Plastic machinery, Heavy Electrical & Textile machinery

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Import for Process Plant Equipment:

Import content is approximately 10% of standard machinery and 25-30% of Hi-tech equipment for Process Plant Machinery.

2006-07	2007-08	2008-09	2009-10	Apr-Dec (2010-11)
USD 135 Million	USD 375 Million	USD 220 Million	USD 205 Million	USD 215 Million
Rs 664 crores	Rs 1844 crores	Rs 1082 crores	Rs 1008 crores	Rs 1057 crores.

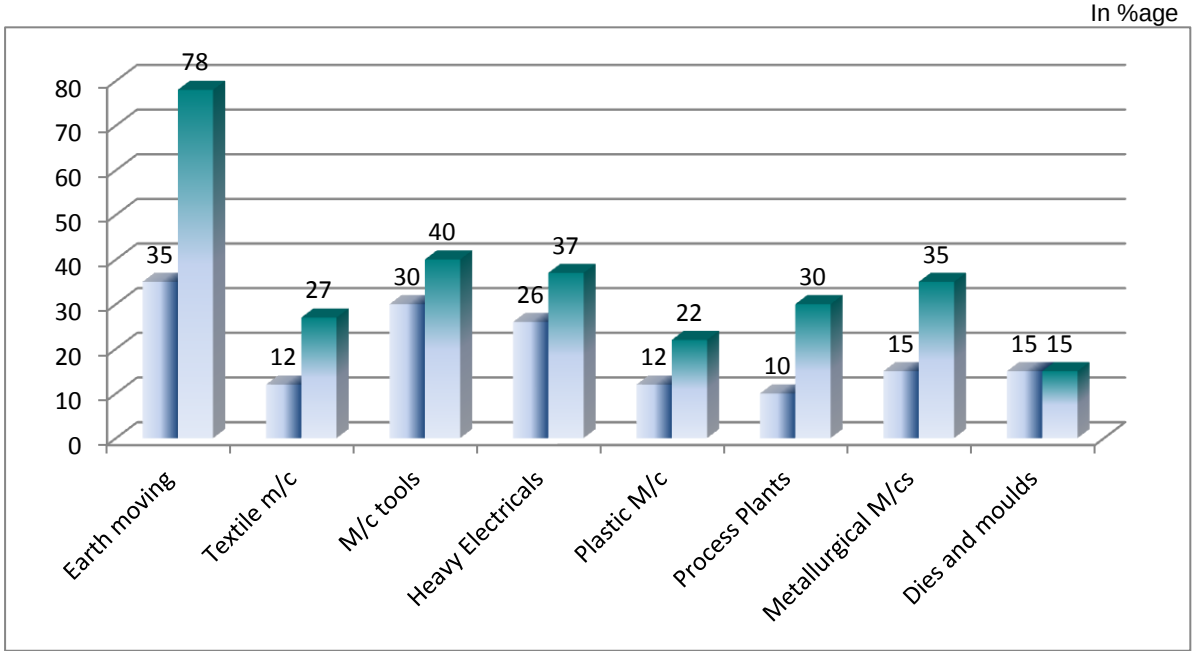
These Imports are for important equipment covering sectors as such as Fertilizers, Refinery, Petrochemicals, Oil and Gas. Overall imports could be arrived by adding 20% more to these value.

Data source: EEPC India.

Four sub-sectors namely Textile Machinery, Earthmoving Equipment, Machine Tools and Metallurgical machinery are weak in self reliance as more than 50% of the demand is met through imports. Moreover, import content in domestic production is also high.

High Import intensity across Capital Goods Sectors (import content in standard and hi-tech machinery)

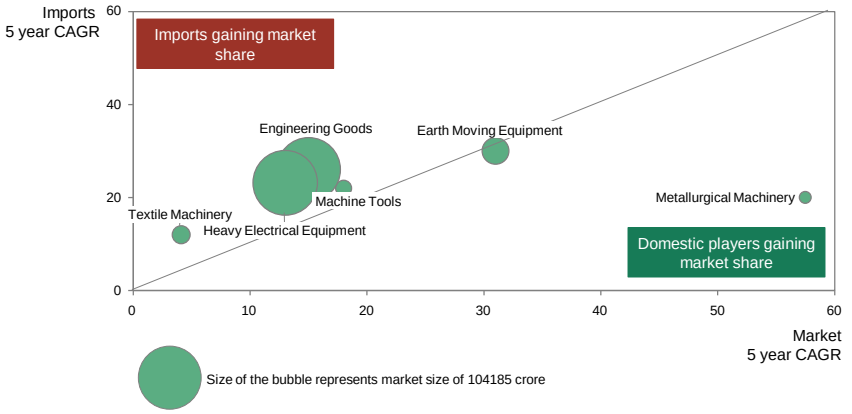
In %age



2

Imports gaining market share over domestic manufacturers across most sub-sectors

5 year CAGR (2005-10) for Imports vs Market



Note: Import growth rate figures for process and plant equipment are being collated
Source: EIS; Sub-sector presentation; TMMA; IMTMA; Vision Document & Perspective Plan for Indian Machine Tool Industry: Report of the DCMT, DHI, August 2010; BCG analysis

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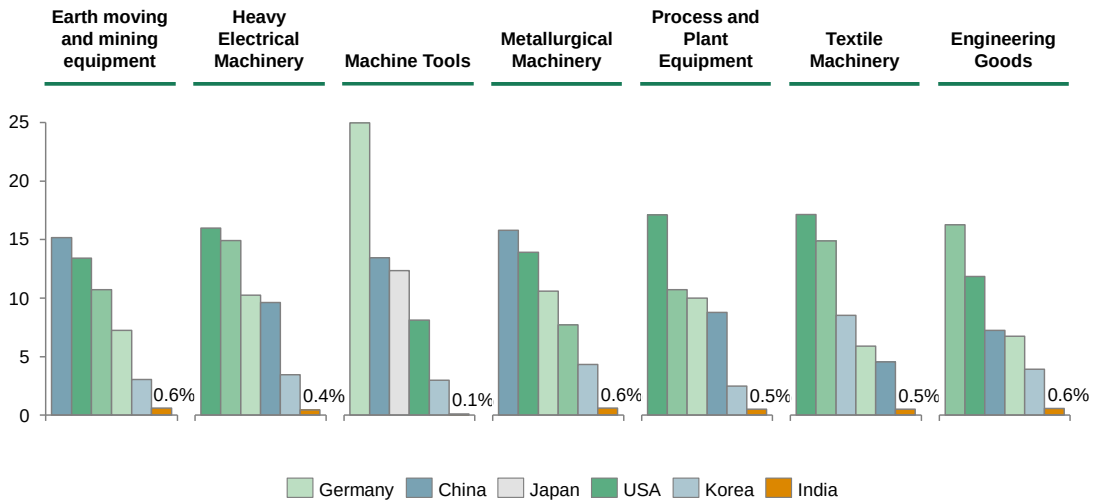
Refer previous page for import data.

3 Export Competitiveness

Export compititiveness:- India's Share in global export is less than 1% across the seven sub-sectors.

Share in Global Exports (2010) for India and 5 other nations

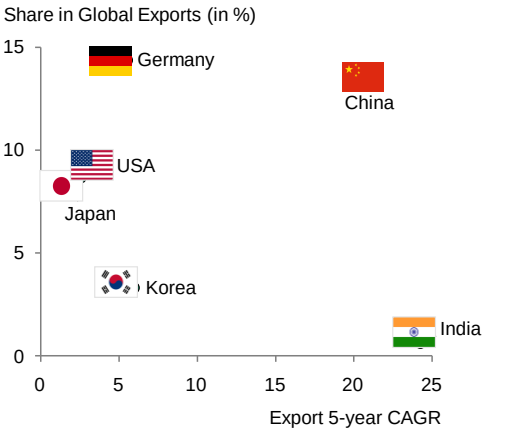


Note: All analysis is done for selected products in the sub-sector
Source: UN Comtrade, Subsector figures are used for Heavy Electrical and Machine Tool sub-sectors

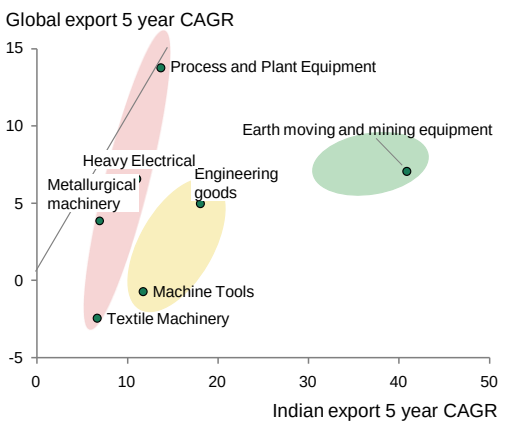
3

Indian exports are small but growing rapidly

Share in global exports (2010) vs. export growth (2005-10)

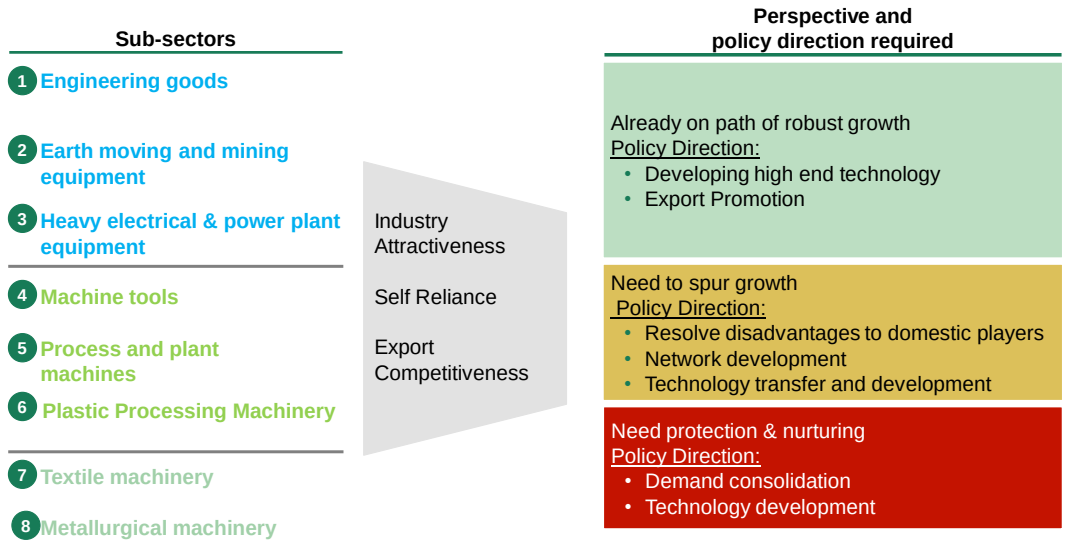


India export growth vs. global export growth (2005-10)



Source: UN Comtrade, Sub sector data for Heavy Electrical and power plant equipment with 3 year CAGR

Capital goods sub-sectors require differentiated approach to drive growth:



- 7 sectors are in 3 different stages of evolution and hence require different strategies and policies for support.
  - Export focus particularly through global champions is required in better performing sectors like earth moving & mining, heavy electrical equipment and engineering goods.
  - Growth enablement required through technology transfer & removal of inhibiting factors for process plant equipment & machine tools.
  - Protection of domestic demand is required for weaker sectors like Textile machinery and Metallurgical machinery.

1. The following Issues are common across manufacturing sector:

1

Issue	Policy areas

1 **Shortage of skilled labor**	• Increasing pool of available resources
	  • Increasing intake in academic institutions
	• Increasing quality of resources
	  • Vocational training
	  • Introducing industry specific courses
	• Rationalizing labor policy

2 **Infrastructure Issues**	• Power and water supply • Infrastructure for transportation and logistics • Port infrastructure • Clustering for common infrastructure
3 **High cost of capital**	• Corpus fund for expansion/ upgradation /modernization of the plants

Capital goods & Engineering sector- Recommendations for 12th five year plan

2. Common issues across capital goods sector were identified.

2

All sub-sectors within Capital Goods and Engineering sector require support in four core areas

1 **Support for incentivizing technology development/transfer and value addition in India**
- Develop indigenous facilities for design, development & testing of equipment
- Address barriers/denial of access to cutting edge technologies to domestic companies
- Incentivize/mandate foreign players to increase value addition in India

2 **Ensuring a level playing field between domestic manufacturers and imports**
- Restrict/ban import of second hand machinery
- Revisit existing FTAs, PTAs; analyze effects on domestic players before any future agreements
- Address adverse tax structure for local manufacturers in India

3 **Incentives for increasing share in global exports across sub-sectors**
- Export line of credit to be extended at appropriate conditions
- Support for market/brand development

4 **Presence of established public sector players who can act as industry leaders**
- Increasing scale of operations in the industry
- PSUs to act as base for technology up gradation in the industry

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3. Sub-sector-specific issues

3.1 Engineering Goods

- Lack of standards in products like engines, fasteners, etc.
- Unavailability/ high price of raw material such as silica sand & pig iron for casting industry, forging quality steel etc.

3.2 **Heavy Electrical**

- Surplus installed capacity leading to projected low capacity utilization as power equipment worth 50,000 MW already ordered to Chinese cos.
- Underdeveloped testing for high voltage testing & inadequate testing capacity for low voltage equipment at CPRI
- Unavailability of raw material like CRGO steel
- Lack of Standardization relating to rating of equipments

3.3 **Process plant equipment**

- Large projects funded on limited recourse basis /ndian Export Credit Agency is not mature to take up large projects.
- Lack of focused/ mass manufacturing mainly due to taxation related paperwork which affects the manufacture of components in the value chain
- Lack of network development

- Lack of Know how on Process technology; Dependant on overseas process licensors

3.4 **Earthmoving& mining machinery**

- Lack of bilateral technology alliances with select countries for longwall mining, walking dragline, high capacity dump trucks and rope shovels

3.5 **Textile machinery**

- Cumbersome procedures for refund of terminal excise duty for purchases of textile machinery under EPCG license from domestic supplier – encouraging the EPCG license holders to import the machinery
- Lack of capacity creation through expansion and new units as gestation period is long with slow rate of return

3.6 **Metallurgical machinery**

- No coordination with the user sector on payment terms, demand outlook and technology up gradation
- Low exports due to trade barriers by other countries as tendency of foreign process licensors / EPC contractors to source equipment from their own countries.
- Lack of design engineering & manufacturing capabilities in steel plant equipment

3.7 **Machine tools & Plastics machinery**

- Government tender terms place Indian manufacturers at a disadvantage against imports such as condition of previous supply, non-acceptance of single tender from domestic manufacturers
- Lack of capacity creation through expansion and new units substantial amount of Working Capital is required by the industry as the cycle time is long, running sometimes into a few years
- Capacity in PSUs such as HMT & HEC not optimally utilized

3.8 **Plastics machinery**

- Increasing imports due to FTAs/PTAs
- Processing industry dominated by SME opt for machines from far east on account of low price. Domestic cost disadvantages to be eliminated.
- Need to develop efficient supply chain cluster

4. Sector Wise Assessment

1. Machine Tools

Machine tool industry is considered as mother industry for capital goods sector as it supplies machinery for the entire manufacturing sector. The multiplier effect could be achieved to the extent of 1:100 times. This sub-sector faces umpteen number of problems mainly due to decade long technology gaps. Out of 800 manufacturers of machine tools and its parts mostly SMEs, about 25 units are mid-size manufacturers which have annual turnover varying between Rs.200 - 300 crore each. Type of machine tools currently manufactured in India are General/Special Purpose Machines, Standard CNC machines, Gear cutting, Grinding, Medium sized machines, EDM, Presses, Press Brakes, Pipe Bending, Rolling, Bending, Measuring, metrology and gauging, etc.

Vision

- ◊ Reduce import dependence in the manufacturing industry
- ◊ Provide sustained manufacturing competitiveness
- ◊ Strengthen national security

Mission

- ◊ Secure market share of 50% in 5 yrs and 67% by 2020
- ◊ Become one amongst top 10 machine tool producing nations of the world
- ◊ Raise exports to a significant level of at least 20%
- ◊ Close technology gaps substantially

4.1.1 Current Status

	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	CAGR
Market Size (Rs Cr)	3403	4877	7162	8698	8319	7245	10236	16%
Production (Rs Cr)	1634	2028	2579	2853	2138	2484	3624	12%
Import (Rs Cr)	1821	2899	4656	5992	6271	4842	7245	20%
Export (Rs Cr)	52	50	73	147	90	81	91	13%
Import content in domestic production (%)	30% in standard machine tool (medium end technology) 40% in high technology (5 axes multifunction high precision) machine tools							
Employment (No. of people)	30,000							
Investment Intentions (Rs Cr)	na	na	173	20	228	675	957	
FDI (Rs Cr)	na	na	170	226	206	640	53	

na: information not available

4.1.1.1 Size & Growth rates

The Indian machine tool industry is Rs.3624 Crore in production output (2010-11) and has recorded a growth rate of around 12% (CAGR) over the last 6 years (2004-05 to 2010-11) against the demand of Rs.10236 cr. (2010-11) which has grown at nearly 16% (CAGR) over the last 6 years.

4.1.1.2 Export levels and import levels

Export is around 2.5% of the production which is not significant. During the last decade, import has gone up to 65% of total machine tool consumption which also includes machine tools required by defence. The market share of domestic production is around 35%.

4.1.1.3 Employment levels

The industry provides direct employment to an estimated 30,000 persons in machine tool and related manufacturing units.

4.1.1.4 Technology level

The industry manufactures most types of machine tools for use by different sectors. The technology available is to manufacture lower-end and medium-end technology such as standard machine tool with upto 3 axes technology. Huge technology gap exists in high productivity, multi-spindle, high precision with 5 and more axes, heavy duty machine tools and metal forming machines of moder design leading to prevalence of import in this sub-sector.

Presently, the industry is dependent on imports for software tools for design, analysis and simulation and the development of new materials for machine tools production. A range of attachments, accessories, sub-systems and parts also need to be developed.

Moreover, the user industries expect the latest technologies to produce high quality end products at competitive prices. This has made it imperative for the machine tool industry to take an inventory of present technologies and those it should develop within a five year time horizon. Particular mention may be made of the need to develop indigenous manufacture of critical mechanical and electronic elements that are the “heart” of CNC machines, for which the industry is entirely dependent on imports. The industry is also subject to technology denials on these elements as well as for the higher technology machine tools. This is a potentially serious weakness which need to be overcome.

4.1.2 12th Plan Target:

The projected target is subject to the encouragement given by the Government as indicated under the action plan.

	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	CAGR
Market Size (Rs Cr)	11771	13537	15568	17903	20588	23678	15%
Production (Rs Cr)	4530	5663	7078	8848	11060	13824	25%
Import (Rs Cr)	7355	8016	8668	9277	9806	10201	6.7%
Export (Rs Cr)	114	142	178	222	278	347	25%
Employment (No. of people)	NA	NA	NA	NA	NA	80000	

4.1.2.1 Target size and growth rate

Demand is projected to grow at an average CAGR of 15% over the 12th Plan period (2012 to 2017). Production is projected to grow at 25% CAGR over the same period.

4.1.2.2 Target export and import levels

Exports are projected to grow at 25% CAGR during the next 5 year plan, whereas imports are estimated to grow at a CAGR of 6.7%.

4.1.2.3 Target employment levels:

The industry targets to directly employ an additional 50,000 persons in machine tools and related industries by 2016-17

4.1.2.4 Target technologies to be developed are:

- High precision machine tools
- Multi-axes, multi-function machines
- Heavy duty machine tools
- Metal forming machines of various types
- Critical mechanical elements,
- Machine tool electronics and other sub-systems
- Software for design/analysis/simulation, machining and manufacture

4.1.3 Issues

In common with other capital goods and engineering sectors, the machine tool industry suffers from a number of constraining factors. These are:

- **Large technology gaps**: Technology capabilities and demands from customers have a serious mismatch. This discourages fresh investments, in the absence of technology flow into the industry.
- **High cost discourages investment in R&D**: Although the industry does invest in product development, there is no significant investment in technology development through R&D due to two reasons: lack of academic/R&D support institutions to undertake R&D and the high cost of R&D especially in modern technology machine tools.
- **Lack of capacity creation through expansion and new units**: While there have been new investments in machine tool units in the last ten years, these are not on a scale required to meet rapidly increasing domestic demand, or make India a significant global player.
- **High interest rate makes industry non-competitive**: The prevailing interest rates of 14% and more makes the industry non-competitive due to the long gestation period and high capital investment required to set up units.
- **Industry dispersed, no cohesive development**: The industry is widely dispersed across the country, with regional variations in the product ranges, quality of products and scales of production. There has been no cohesive development of the industry.

- **Reducing/Zero duty imports under FTAs/PTAs**: During recent years a number of FTAs/PTAs have been signed with foreign countries whereby the import duty on machine tools imported from these countries is gradually reduced to zero. This places domestic producers at a disadvantage due to high input costs, high interest rate and the incidence of 7.5% custom duty on imported parts. This in fact leads to a situation of inverted duty structure detrimental to the competitiveness of domestic manufacturers. Also, despite stipulations of local value addition in the partner countries to qualify under FTA/PTA, there is likelihood of machines manufactured in other countries being diverted via these countries to take advantage of the lower duty. Free import does not encourage transfer of technology and local manufacturing/value addition. This stunts the growth and development of the industry
- **Zero duty import under "Project Imports"** places Indian manufacturers at a disadvantage vis-à-vis imports.
- **High cost of inputs make Indian machines costly to users, especially SMEs**: The price of machine tools is high due to higher input costs and local factors such as ED, VAT, and Entry Tax/Octroi,service tax etc. Some financial measures to reduce price to end users will help spur demand and enable more SMEs to adopt the latest CNC machines.
- **Export efforts are constrained by high cost** of maintaining a presence in foreign markets through Showrooms/Tech Centers and stationing technical personnel for marketing, sales and service.
- **Government tender terms** place Indian manufacturers at a major disadvantage against imports, which need to be rationalized by providing level playing field to the domestic manufacturers.
- **Capacities in PSUs not optimally utilized**: While earlier the machine tool PSUs (esp. HMT) led technology development and production, at present these capacities are not optimally utilized.
- **Skill erosion** in machine tools is a serious constraint: With the development of IT and other employment avenues, it is becoming difficult to recruit persons to the machine tool industry; migration of skilled persons is also a constraint faced by the industry. The education system has no stream for machine tools at any level, except in isolated institutions. This is a constraint in getting persons with the special skills required for the machine tool production shop besides design, research and development functions.

2. Plastic Processing Machinery

4.2.1 Current Status:

There are 11 major manufacturers of machinery in the organized Sector and nearly 200 small & medium manufacturers. Mojor plastic machineries include Injection Moulding Machine, Blow Moulding Machine and Extrusion Moulding Machine. Data relating to production, market size, import & export is indicated below:

	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	CAGR
Market Size (Rs Cr)	775	925	1148	1466	2233	2332	3850	30.6%
Production (Rs Cr)	525	620	745	871	1333	1519	2403	28.8%
Import (Rs Cr)	250	305	403	595	900	813	1447	34%
Export (Rs Cr)	242	348	316	372	459	393	415	9.4%
Import content in domestic production (%)	Standard equipment - 12% and Hi-tech equipment - 22%.							
Employment (No. of people)							40000	

4.2.1.1 Size & Growth rates

Total demand and production of the Plastics Machinery industry is Rs 3850 Crore and Rs.2403 crore in 2010-11 and it has been growing @ 30.6% and 28.8% CAGR respectively.

4.2.1.2 Export levels and import levels

Import is estimated to be Rs 1447 Crore and constitute 37.5% of total domestic demand. Comparatively the exports have grown at slower pace with a CAGR of 9.4%.

4.2.1.3 Employment levels

Present employment in this sector is approx 120,000 (Direct, Indirect, Suppliers & Service providers). The sector employs 40,000 people directly.

4.2.1.4 Technology level

Domestic manufacturers meet 95% of processing industry needs on technology and product range. Product technologies are at par with leading brands of developed world. Moreover, Domestic manufacturers offer technology products to the processors at great cost advantage. World leading technologies have manufacturing presence in the country through wholly owned subsidiaries or technology license arrangements.

4.2.2 12th Plan Target

	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	CAGR
Market Size (Rs Cr)	5590	6510	7700	9153	10906	13096	18.5%
Production (Rs Cr)	4650	5600	6850	8400	10300	12700	22%
Import (Rs Cr)	1563	1688	1823	1969	2126	2296	8%
Export (Rs Cr)	623	778	973	1216	1520	1900	25%
Employment (No. of people)						96, 000	

4.2.2.1 Target size and growth rate

The industry's demand is targeted to grow at a CAGR of 18.5% to Rs 13096 Crore in 2016-17.

4.2.2.2 Target employment levels

The industry is targeting to employ 96,000 people at the end of 12th five year plan. Correspondingly, direct & indirect employment in this sector would be 290, 000.

4.2.2.3 Target technologies to be developed:

Metal Injection Molding (MIM), Polyurethane Reaction Injection Molding Machines, Machinery for milk-packaging containers and retortable bottles would be the immediate target for domestic production based on market volumes.

4.2.3 Issues

- **Lack of skilled manpower**: Skilled manpower is in short supply in associate & supervisory category for processing industry as well as in machinery manufacturing. The education system in current form and curriculum prevalent at institutes and universities does not create industry employable manpower, with exception of diploma and degree in plastics stream conducted by some of the institutions.
- **Lack of efficient supply chain**: Quality and reliability of the product is decided by the quality of components put into its construction. Moreover, cost of the product is dependent on cost of parts from supplier. Industry need to pay attention to develop efficient supply chain for cost-quality–delivery using the Cluster development programs offered under UNIDO program.
- **Financial assistance for further expansion**: Industry has seen sizeable growth in past 5 years in tandem with our growing economy. Domestic manufacturers have 62% share in the machinery market. Share of imports is 38%. Imports are mainly from Far East on account of low price and shorter delivery. To serve the growing demand for machinery all the major machinery manufacturers have undertaken capacity expansion with near Rs. 400 Cr investment in plant &

machinery and up gradation in technology. Further investments are necessary to raise the production volumes and technology to global scale. Volumes will give price competitiveness.

- **High cost of capital**: The cost of capital remaining high, processors in Small scale sectors tend to decide on machinery selection primarily based on price. They end up choosing low to medium technology machines and sometimes opting for used machinery. Soon it proves to be a bad investment as these processors incur high operating cost as well as lose on productivity and also consume higher energy.
- **Cost disadvantage due to duty structure in FTAs**: Duty reductions to 5% for Extrusion and ZERO for Injection Moulding Machine (IMM) in FTAs with South Korea and ASEAN have put domestic machinery at disadvantage on price. IMM imports below 1000T from China were stopped by imposing anti dumping duty since May 2009. Now manufacturers from China are routing the machines through ASEAN. The biggest manufacturer of China has set up plant in Vietnam to find legitimate route to export machinery to India. This is detrimental to Indian manufacturing industry.
- **Used machinery imports**: Advancement in processing machinery for enhancing the energy efficiency and productivity has happened in recent past. Under the compulsions to reduce the carbon footprint, processors in the developed world are replacing the older machines with new technology machines. Thus used machinery from developed world is finding a way to developing world with an attractive price tag. Used machinery population if allowed to increase will render the domestic processing industry inefficient in the long run.
- **High Input Costs**: In order to enable processors to compete with the global manufacturers, the most technology components are imported from Europe, USA and Japan. These imports attract 7.5% customs duty leading to increase in prices of finished goods, which in turns makes the domestic products incompetitive in comparison to global manufacturers.
- **Need of automation equipment**: Certain automation equipments are required in the machinery for improving productivity, reducing wastage and improving quality levels. These automation equipments currently covered under Tariff Heading 9031, are not manufactured in the country and attract an import duty of 7.5%.
- **Unavailability of critical components indigenously necessitates** need to establish clusters for manufacturing critical components of common use across the industry. With increased volumes the resultant economy of scale will reduce the input costs.
- **Lack of skilled labor**: With the development of IT and other employment avenues, it is becoming difficult to recruit persons to the industry; migration of skilled persons is also a constraint faced by the industry. This is a constraint in getting persons with the special skills required for the production shop besides design, research and development functions.

3. Earth moving and mining equipment

4.3.1 Current Status

Currently 20 large & global manufacturers and nearly 200 small & medium manufacturers of Earthmoving & mining machinery are present in India. The product range comprises of 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, etc. Data relating to production, market size, import, export, import content and employment is indicated below:

	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	CAGR
Market Size (Rs Cr)	5763	6700	9199	13800	10400	13850	14500	16.7%
Production (Rs Cr)	3608	4061	5150	7884	5070	6748	7333	12.5%
Import (Rs Cr)	2313	2807	4237	6176	5600	7430	7395	21.3%
Export (Rs Cr)	158	168	188	260	270	328	228	6.3%
Import content in domestic production (%)	35% in standard equipment 78% in high-tech equipment							
Employment (No. of people)						100000		

4.3.1.1 Size & Growth rates

Supported by the accelerated economic growth from the year 2003 onwards, construction and mining machinery sector has grown by leaps and bounds to sustain rapid expansion happening in infrastructure and core sectors projects.

Following a fourfold period of growth from 2003, the market peaked in 2007 at a record total of 50,706 units, but then came the global economic recession that put a brake on further growth. Construction equipment sales then fell to 46,141 units in 2008, with a further drop of 11 per cent to 40,909 units in 2009. However, the market has since shown a sharp recovery, growing by 45 per cent to 59,322 units in 2010.

4.3.1.2 Export levels and import levels

Construction and Mining industries in India have exported a wide range of machinery to countries in Africa, Indonesia, Malaysia and South America and the value of export is about Rs. 228 Crore during 2010-11. The export effort is led by M/s BEML Limited (a CPSE) which contributed about Rs. 200 Crore in Mining and Construction

machinery exports in the financial year 2009-10. Export has grown at CAGR of 6.3% over the last six years.

Direct import of machinery by projects and mine operators and construction contractors taking advantage of the favorable duty structure is to the tune of Rs.7395 Cr. in 2010-11

4.3.1.3 Employment levels

The industry currently employs 1,00,000 people directly. It also provides indirect employment to about 4,00,000 people.

4.3.1.4 Technology levels

The Mining and construction machinery sector in India has evolved over the years and is at present in a intermediate stage of development. The technology available in the country has the pedigree from the international majors due to technical collaborations in the past and is one generation behind in some product segments. Few products manufactured in India by some of the MNC's who have set up assembly plants in India are meeting the global standards. The Industry is trying to bring in International levels of technology as demand and scale of operation is increasing. The users are now not looking at initial cost of equipment but focusing on cost per ton of usage and it is anticipated that 5 years hence, more mechanization and enhancement of scale may lead to change in the level of technology in use. In India open cast mining is much more popular than underground mining. Hence the equipment required for the open cast mining like Dumpers, Dozers Shovels, Draglines and Excavator are manufactured in India. The level of technology is at par with international standards except for the usage of electronic controls, hydraulic systems and engines, adhering to latest emission norms.

4.3.2 12th Plan Target

	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	CAGR
Market Size (Rs Cr)	18500	27376	33558	37155	41276	45232	19.5%
Production (Rs Cr)	10000	16826	22356	26633	30528	34924	28.5%
Import (Rs Cr)	8880	10950	11702	11147	11558	11308	4.9%
Export (Rs Cr)	380	400	500	625	810	1000	21.3%
Employment (No. of people)						300000	

4.3.2.1 Target size and growth rate

The consumption of Mining and Construction equipment is expected to grow to Rs.45, 232 Crore at a CAGR of 19.5%. The domestic manufacturing output would grow to Rs 34,924 Crore at a CAGR of 28.5% and would be able to meet at least 78% of the demand.

4.3.2.2 Target employment levels:

Currently there are an estimated 100,000 direct employees in Mining and Construction companies which also provide indirect employment to 400,000 persons. The Target is to triple this level by 2017, thus creating an additional 1 million job.

4.3.2.3 Target technologies to be developed:

Based on the Industry forecast for the next 20 years, there is a need to develop indigenous capability to design and produce the following complex machineries, to be able to meet the market demand, bulk of which is currently imported.

- High capacity Electric Dump Trucks ~ 190 ton – 240 ton
- High capacity Rope shovels ~ 42 Cum
- Walking Draglines ~ 72 m - 33 Cum; 150m - 50 Cum
- Hybrid Drive Loaders of high capacity ~ 10 cum bucket
- Electronically Controlled Emission Compliant engine ~ 2500 HP
- Fully Automatic Electronically Modulated Transmission ~ 1500HP
- Long Wall Mining systems and Continuous miners for underground mines
- Axial piston pumps and motors
- Cutter Suction Dredgers and Trailer Suction Hopper Dredgers

4.3.3 Issues

- **Technology**: For certain class of equipment such as high capacity dump trucks, underground mining equipment like Longwall & continuous miner, high capacity shovels/excavators indigenous technology is not available and global players with technology are not willing to transfer technology to Indian companies. The risk factor associated with development of such product is inhibiting any of the domestic players or user Industry in taking the necessary steps to develop indigenously.
- **Environment Concerns**: Hazard mitigation and development of mining methods and appropriate equipment for environmental friendly mining practices, especially while mining in populated areas and mining in underground without disturbing life on the surface.
- **Supplier Base**: Inadequate supplier base for high precision high tech aggregates for upgrading the equipment.
- **Demand fluctuation**: Derived demand dependent on user industry & Cyclical in nature and the equipment industry has to adopt special HR model in order to retain the talent as well the capacity to meet demand.
- **R&D and consultancy**: The scale of operations of domestic players do not permit commensurate investment levels in R&D to be able to bring out world class products on par with global majors who are spending billions of dollars on R&D.
- **Skill Gaps** in Manufacturing and Production Technology

- **High tax incidence**: Present tax structure is in favor of imports. Needs to be addressed, urgently to ensure level playing field.
- **Inadequate Infra-structure**: The logistic support to Industry in terms of transportation of raw materials and aggregates, lack of quality power supply, lack of quality water supply etc. are adding to the operating cost and finally eroding competitive advantage of the domestic players.
- **Dumping by Low Cost Countries**: LCC countries are dumping their products in India, without adequate after market support. These products are of very low quality and low life, though the initial cost is very attractive. Domestic industry faces cost disadvantage vis- a-vis overseas suppliers, especially, China/Taiwan/Korean that are dumping their products in India backed by huge export incentives given by their governments. The requirement of mining and construction sector is for spare parts and service support for a period of 7 to 10 years and very often the supplies from LCC fail to meet this requirement.
- **Man Power**: The protective labor law is an inhibiting factor for creating a vibrant industrial atmosphere and comes in the way of pushing up labor productivity levels to global standards. Further over the last decade, talent acquisition and talent retention in Mining & Construction industry has been a major challenge, mainly due to the availability of other attractive options such as IT and ITES industry.
- **Uninhibited import of used equipment:** Import of second hand equipment while lowering the initial acquisition cost for the projects hurts both users and equipment manufacturers in the long run. This needs to be regulated.
- **Lack of soft financing by financial institutions and Banks:** M&C machinery industry is highly capital intensive involving high manufacturing lead time. In order to offset high interest costs, there is a need for support from FI's and banks to offer low interest rates. This would also facilitate setting up of more ancillaries as well as aggregate manufacturing facilities by JV's and MNC's thus adding to the depth of **domestic** manufacturing.

4. Heavy Electrical and power plant equipment

4.4.1 Current Status

There are about 675 manufacturers of electrical machinery in India including Heavy electrical power generation Equipment like Boiler, Turbine & Generator sets. Nearly 90% of them are small & medium manufacturers. PSU named BHEL is the major manufacturer of electrical and power equipment. The Product range includes Transmission Line Towers, HT Switchgear, Transformers, Motors (FHP, LT, HT & DC), AC Generators, Conductors, Capacitors, Cables, Energy Meters, etc. Data relating to production, market size, import, export, import content and employment is indicated below:

	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	CAGR
Market Size (Rs Cr)	51009	58941	68106	82309	89041	104185	121418	15.5%
Production (Rs Cr)	49749	56784	64813	75416	81815	93187	110000	14.1%
Import (Rs Cr)	9232	11343	13937	18942	25180	25565	31769	22.8%
Export (Rs Cr)	7698	9052	10644	12050	17954	14567	20351	17.6%
Import content in domestic production (%)	37% in supercritical segment for BTG equipment 26% in subcritical segment for BTG equipment							
Employment (No. of people)	NA	NA	NA	NA	NA	NA	500000	NA

4.4.1.1 Size & Growth rates

It is estimated that currently the total domestic electrical equipment market size is Rs. 121,418 Crore (2010-11). The market has grown at a CAGR of 15.5% since 2005. Production in the sector is estimated at Rs 110,000 Crore (2010-11) and has grown at a CAGR of 14.1% since 2005.

4.4.1.2 Export levels and import levels

Exports stand at Rs 20,351 Crore in 2010-11 and have grown at a CAGR of 17.6%, whereas Rs 31,769 Crore worth of electrical equipment is imported and imports have grown at a CAGR of 22.8%. These equipments are primarily hi tech equipments.

4.4.1.3 Employment levels

The industry directly employs an estimated 500,000 persons in electrical equipment and related manufacturing units. The industry, both directly and indirectly, provides employment to around 15 lakh persons.

4.4.2 12th Plan Target

	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	CAGR
Market Size (Rs Cr)	140680	163479	190192	221532	258350	301662	16.4%
Production (Rs Cr)	126312	145421	167521	193097	222719	257050	15.2%
Import (Rs Cr)	39478	49057	60961	75753	94135	116977	24.2%
Export (Rs Cr)	25110	30999	38290	47319	58504	72365	23.5%
Employment (No. of people)						750,000	

4.4.2.1 Target size and growth rate

The domestic market is expected to grow at a CAGR of 16.4% to Rs 301,662 Crore in 2016-17. Production is expected to grow at a CAGR 15.2% to Rs 257,050 Crore by 2016-17.

4.4.2.2 Target employment levels

The industry is expected to directly employ 750, 000 people at the end of 12th five year plan.

4.4.2.3 Target technologies to be developed

- Advanced ultra super critical technology
- Maturity in super critical technology intending to provide self sufficiency in domestic capabilities
- Development of higher capacity nuclear power equipment up to 1000 MW
- Development of ultra high voltage transmission equipments & systems.
- Development of Energy efficient technologies like IGCC, UGCC , Concentrated Solar Thermal Project.

4.4.3 Issues

- **Competitiveness of Indian Industry vis-à-vis Chinese Manufacturers**: Price differential between domestic companies and Chinese manufacturers are mainly due to disadvantages faced by domestic Industry, as well as subsidies/ incentives provided to the Chinese manufacturers by its Government.
- **Testing facilities in the country**: There is lack of required testing capabilities in terms of the bandwidth of the test facilities available in the country. Also, there is a lack of adequate capacity of testing facilities.
- **Availability of Raw materials**: Constrained availability of certain critical raw materials such as CRGO/ CRNGO Steel, Amorphous Steel etc. and volatility in raw material prices is hurting domestic industry

- **Skill gap**: Huge gap foreseen in the availability of skilled manpower in the power equipment manufacturing industry needs immediate attention from all stakeholders which includes institutes, industry and the Government.
- **Infrastructural Constraints**: Problems in transporting heavy and Over Dimensional consignments (ODC) >98 MT on NHAI bridges. As per procedure, various zonal railways involved give clearance for the movement of such ODC's. This leads to delay in projects. Congestion at ports further delays delivery.
- Import of used/ second hand capital goods and re-manufactured goods
- **Uncompetitive long term financing for export promotion**: Interest rates and tenure of Exim credits does not compare competitively with those available in the international market and hence puts project exporters like BHEL at a disadvantage.
- Benefits under various export promotion schemes are not easily available for project exports.
- **Pre-Shipment and Post-Shipment Credit:** Interest Rate Subvention of 2/4 Percentage Points (PP) on Pre-shipment and Post-shipment credit, earlier provided for various sectors (including engineering) from 1st April 2007 has been discontinued w.e.f. 30th September 2008. Government had introduced a fresh scheme of Interest Rate Subvention of 2 PP for Pre-shipment and Post-shipment credit with effect from 1st December 2008 till 31st March 2010 for various sectors but engineering sector was excluded from this scheme.
- **Interest on Excise Duty for Differential Price**: The assesses are suffering due to the Hon'ble Supreme Court judgment in the civil appeal of M/s SKF India Ltd. Vs CESTAT, Pune, which has resulted in huge financial burden on the industry.

5. Metallurgical machinery

Metallurgical machinery includes all types of steel plant equipment such as blast furnace, steel melting furnace and equipment, rolling mills, continuous casting machines, etc., coke oven equipment, mineral beneficiation plant, crushers, screens, mixer, magnetic separators and metal converters, metallurgical foundry, etc. Since the nature of technology is specialized and derived from the steel making technology, very few large manufacturers like HEC, L&T and about 200 mid size companies and SMEs making such machines and its accessories. Out of 200 units 85% are SMEs.

4.5.1 Current Status

	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	CAGR
Market Size (Rs Cr)	1068	1386	2181	2423	4172	3800	4992	29.3%
Production (Rs Cr)	568	720	981	1039	1315	989	1129	12.1%
Import (Rs Cr)	936	1201	1843	1976	3842	3252	4346	29.2%
Export (Rs Cr)	436	535	644	593	986	442	483	1.7%
Import content in domestic production (%)	15% in standard equipment 35% in high-tech equipment							
Employment (No. of people)						12940		

4.5.1.1 Size & Growth rates

The demand for metallurgical equipment is growing very rapidly. The domestic consumption has risen from Rs. 1068 crore in 2004-05 to Rs. 4992 Crore in 2010-11 at a CAGR of 29.3%. However, the domestic production has not kept pace and has grown from Rs. 568 crore in 2004-05 to Rs. 1129 crore in 2010-11 at a CAGR of 12.1%.

4.5.1.2 Export levels and import levels

Imports of metallurgical machinery, which were Rs 936 Crore in 2004-05, have jumped to Rs. 4346 Crore in 2010-11, at a CAGR of 29%. It is a matter of concern that, on an average, about 81% of the metallurgical machinery used in the country is being imported.

Exports have grown from Rs. 436 Crore in 2004-05 to Rs. 986 Crore in 2008-09 and the fell to Rs. 483 Crore in 2010-11.

4.5.1.3 Employment levels

The total direct employment generated by this sector is estimated to be 12,940.

4.5.1.4 Technology levels

Some of the steel plant components / spares still imported into the country include:

Area	Typical components
Mineral beneficiation	Pneumatic jigs, wet high intensity magnetic separators
Coke oven complex	Anchorage springs
Pellet / DR plant	Induration / briquetting machines, disc pelletizer components
Sinter plant	Mixing & nodulising drum, circular sinter cooler
Blast furnace	Coal dust injection system, bell-less top
Steel melt shop	Oxygen lance system, gunniting equipment, slag arrestor system
Cont. casting plant	Mould assembly, automatic mould level controller, EMS (electromagnetic stirring) equipment
Rolling mills	Special rolls, roll grinding m/c, AGC (Automatic Gauge Control) cylinder, universal mill stand, large Mill Stands for Hot Strip Mills / Plate Mills
Processing lines	Flash butt welders, jet finishing equipment for hot dip coatings, tension levelers, special spray nozzles, rotating hydraulic cylinders, laser welders, zinc coating pots with inductors
Material handling	Ship loaders / un-loaders
Oxygen plant	Compressors & cryogenic pumps
Gas holders	Fabric seals
Furnaces	Furnace burners, Furnaces for roasting, melting, heating & heat-treatment
Metal Foundries & Metallurgical industry	Moulding machines & Moulds, Die casting machines and other miscellaneous machines used in metal foundries & metallurgical industry.

Even though some components are manufactured in India, they are either through design & drawing received from foreign subsidiary in India or is being developed by some of the new firms locally.

India is also lagging behind the Global Standard in productivity parameters in steel making and pollution control technologies.

4.5.2 12th Plan Target

	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	CAGR
Market Size (Rs Cr)	6500	8400	10850	14000	18000	23250	29%
Production (Rs Cr)	1300	1600	2100	2800	3800	5800	34.9%
Import (Rs Cr)	5370	7390	9410	11940	15050	18500	26.4%

Export (Rs Cr)	530	590	660	740	850	1060	14.7%
Employment (No. of people)						60000	

4.5.2.1 Target size and growth rate

The domestic market is expected to grow at a CAGR of 29% and production is targeted to grow at CAGR of 35%.

4.5.2.2 Target employment levels:

The increase in production of metallurgical machinery will result in increase in employment opportunities – direct as well as indirect. A production of Rs.12, 000 crore/annum of metallurgical machinery by the year 2021 is estimated to provide direct employment to around 60,000 persons against the estimated 12,940 in 2009-10.

4.5.2.3 Target technologies to be developed:

- High Priority
  - Beneficiation/Utilization (Pelletization) of slimes
  - Beneficiation of low grade iron ore (Fe: 30~40%)
  - Development of technology for palletization of hematite/ geothetic ore
  - Recovery of ultra fine iron mineral from slime
  - Coal gasification
  - Developments of smelters e.g. COREX, FINEX etc.
  - Use of energy saving technologies e.g. CDQ (coke dry quenching), TRT(top gas recovery turbine) , HEC (high efficiency combustion) regenerative burners etc.
  - Chemical absorption of CO_2 and storing it underground
  - Development of microbial treatment for effluent treatment
  - Level-3 automation
  - Extensive use of Process/ Supervisory Models
  - Blast Furnace equipment
    - Mud Gun
    - Slag granulation plant
    - Tap hole Drilling Machine
    - Top Charging equipment
    - Tuyeres, Tuyere coolers
    - Copper stave coolers & SG iron stave coolers
  - Coke Oven Machines with pollution control measures
  - Steel Melting
    - Torpedo Ladles
    - Convertors
    - Secondary refining units (LF, RH Degasser, VAD, VOD)
  - Continuous Caster

- Caster Segments & segment cooling equipment
- Electromagnetic devices (EMS/EMBR)
- Moulds & mould cooling equipment
- Mould Oscillator
- Tundish equipment

– Raw Material Handling Plants
- Stackers & Reclaimers
- Wagon Tipplers
- Higher capacity Wagon Pushers

– Bucket Wheel Excavators
– Rolling Mill Equipment
– Large Mill Stands for plate mills & hot strip mills (around 350t single or 500t 3-piece design)
– Heavy duty Hydraulic dividing Shears
– Heavy duty hydraulic plate leveller
– Straightening Machines for long products
– CNC Roll grinding machines
– Large reducers for plate mill & hot strip mill main drives
– Large back-up rolls (up to ~300t) and work rolls (up to ~75t)
– Equipment for sorting, stacking and bundling of long products
– Ultra fast plate cooling equipment (up to ~25/300 C/sec)
– Large size roll bearings

◊ Medium Priority
– Injection of Natural Gas/CBM / coal gas
– Hot charging facility to convey DRI to steel melting shops
– Development of DRI/Metallic nuggets by RHF process
– High strength good toughness steel through HTP/ Bainitic route.
– Wire Injection for close control on alloying elements

4.5.3 Issues

◊ **High cost of capital**: A substantial amount of Working Capital is required by a Machinery Manufacturer as the cycle time is long, running sometimes into a few years. The Indian Capital Goods industry suffers a major disadvantage on interest rates when compared with foreign manufacturers:
– Interest rate in India: 14-16%
– Interest rate abroad: 2-4%

This in itself adds to the cost of Indian Capital, making them non-competitive against imports by at least 10%.

In addition, foreign manufacturers are offered deferred LC payments of 1-2 years placing Indian manufacturers at a major disadvantage. While foreign companies can raise working capital loans at 2-4 % interest on LCs, Indian companies do not get such LCs from buyers, and raising finance even at 14-16% becomes difficult.

- **Condition of "evidence of previous supply**" imposed by customers inhibits indigenous development of new machinery. Domestic manufacturers are not inclined to develop new machinery with additional features as they will not even be eligible to quote for the new product because of this clause by customer.
- **Foreign Competition Factor**
  - Markets like China, Malaysia protecting local industry
  - Korean and Chinese component manufacturers preferentially supporting capital goods manufacturers in Korea and China
  - Tendency of foreign process licensors / EPC contractors to source equipment from their country.
  - Effect of Foreign Trade Agreements
  - European market getting to be protective due to lack of growth in their countries.
- Lack of Research & Development, design and new / expansion of existing manufacturing capabilities..
- Technology gaps and obsolescence.
- Skill gaps and shortage of skilled manpower for manufacturing sector and R&D.
- Hesitance on part of customers to use machinery manufactured on the basis of indigenously developed technology.

6. Textile Machinery

4.6.1 Current Status

There are 1446 units engaged in the manufacturer of textile machinery in the country and 80% of them are small & medium manufacturers. 598 units manufacture complete machinery and 848 units make parts and accessories. Major textile machineries include weaving machine, spinning machine, winding machine, processing machine, synthetic fibre machine, textile testing instruments, etc. Data relating to production, market size, import & export is indicated below:

	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	CAGR
Market Size (Rs Cr)	8831	9090	12212	10770	7867	8020	10500	2.9%
Production (Rs Cr)	4117	4402	5753	6155	4063	4245	6150	6.9%
Import (Rs Cr)	3299	5065	6884	5255	4411	4357	5000	7.18%

Export (Rs Cr)	338	377	425	640	607	582	650	11.5%
Import content in domestic production (%)	12% in standard equipment 27% in high-tech equipment							
Employment (No. of people)							95,000	

4.6.1.1 Size & Growth rates,

Textile Engineering Industry (TEI) production grew at a CAGR of 4.21% during XIth Plan due to global recession which adversely affected the textile industry. Presently the market size of industry is Rs. 10500 Crore, whereas domestic production stand, at Rs. 6150 Crore.

4.6.1.2 Export levels and import levels

The exports stood at Rs.650 crore (2010-11) and growing at a CAGR of 11.51% whereas imports stood at Rs.5000 crore (2010-11) and growing at a CAGR of 7.18%.

4.6.1.3 Employment levels

The industry provides direct/indirect employment to more than 250,000 people

4.6.2 12th Plan Target

	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	CAGR
Market Size (Rs Cr)	12324	12950	14000	15400	17200	18500	8.5%
Production (Rs Cr)	7072	8000	9400	11000	13000	14300	15.1%
Import (Rs Cr)	6000	5750	5500	5400	5300	5400	-
Export (Rs Cr)	748	800	900	1000	1100	1200	9.9%
Employment (No. of people)						142500	
Indirect Employment						285000	

4.6.2.1 Target size and growth rate

Textile machinery production is projected to grow from Rs 6150 Crore in 2010-11 to Rs 14300 Crore in 2016-17 at a CAGR of 15% based on commensurate growth of Indian textile industry and expected policy interventions.

4.6.2.2 Target employment levels:

Existing employment (Direct & Indirect) in Textile machinery is expected to grow from 2.85 lakh to 4.27 lakh during XIIth Plan.

4.6.2.3 Target technologies to be developed:

- Acquire know how related to:
  - High end compact spinning
  - High speed OE
  - High speed winders
  - High speed woolen / worsted frames
  - Air Jet technology
  - Extruders
  - Spinning beams
  - Godets
  - Winders
  - Opening, Cleaning, Blending
  - Spinning
  - Filament yarn testing (on / offline)
  - Shuttleless looms (rapier >400 rpm; air jet > 800 rpm; water jet > 800 rpm)
  - High speed circular knitting machinery (Microprocessors)
  - Warp knitting
  - Environmentally sustainable processing
  - High speed wide width processing
  - Special purpose processing and finishing machinery (e.g. plasma-finishing)
  - Hi-tech industrial stitching/sewing machinery (lockstitch, overlock, coverstitch, bar tacking, pocket set, button holes, etc)

4.6.3 Issues

- **Lack of R & D and Technology Gaps**: Particularly in Technical textiles/nonwoven machinery, Hi-tech machinery in weaving, knitting and processing and jute machinery, Machinery for environmental protection, and conservation of energy and design of machines
- Skill gaps and shortage of skilled manpower.
- High interest rates.
- Lack of sustained demand from the user sector
- **Cumbersome procedure for refund of terminal excise duty** encouraging the EPCG license holders to import the machinery
- **Import of second hand machinery**
- Inconsistence customs duty rates.

7. Process Plant Equipment

4.7.1 Current Status

There are over 200 units engaged in the manufacturer of process plant machinery in the country out of which 65% are small & medium manufacturers. Major process plant machineries which include tanks, pressure vessels, evaporators, stirrers, heat exchangers, towers & columns, crystallizer, furnace, etc. are used in energy sector, gas, oil, refinery, chemical & petrochemical, fertilizer, paper & pulp, sugar, cement, dairy industry, etc. Data relating to production, market size, import & export is indicated below:

	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	CAGR
Market Size (Rs Cr)	8332	9329	10480	13142	13365	14628	16345	11.9%
Production (Rs Cr)	8880	9988	11237	12642	14222	16000	18000	12.5%
Import (Rs. crore)	619	721	162	150	264	246	1548	16.5%
Export (Rs. crore)	1167	1380	1632	1930	2283	2700	3194	18.3%
Import content in domestic production (%)	10% standard equipment and 30% in hi-tech equipment							
Employment (No. of people)						128,000		

4.7.1.1 Size & Growth rates

Estimated size of Process Plant Machinery sector in India is 16000 Cr (2010-11). Process Plant machinery sector has grown with a CAGR of 12 % in last five years.

4.7.1.2 Export levels and import levels

Exports to the tune of Rs.3194 crore during 2010-11 have been realized for major equipments covering Fertilizers, Refinery, Petrochemicals, Oil and gas sectors etc. and growing at a CAGR of 18.3%. Imports stood at Rs.1548 crore during 2010-11 and growing at a CAGR of 16.5%.

4.7.1.3 Employment levels

This sector provides employment to 128,000 persons directly and 240,000 persons indirectly.

4.7.1.4 Technology level

The Process plants have gone up in sizes. Large facilities have been developed along our coastal areas. Technology infusion from sectors like Defence, Aerospace and Nuclear, into the Process Plant equipment industry, has helped our industry leapfrog in technology utilization and quality control. The industry today is equipped with state of the art processes to engineer and fabricate various complex

process equipments across different materials of construction. The plant sizes of these companies have also increased and at times are comparable or even larger than global plant companies.

Information technology has become very useful, to assess design features, simulate "Virtual Reality" conditions on 3D IT interface platforms and correct and modify designs. This enables to see clashes in plant layout, foresee problems in operation, maintenance and accessibility to components in the plant and gives a visualization effect of the plant for making suitable modifications, before issuing drawings for the site. The industry uses IT enabled services for design, manufacturing, Project Planning with Enterprise resource planning tools like BAAN (A Dutch MNC) , Enterprise Resource Planning **(**ERP**)** systems, and also systems for Project Management such as CONCERTO (name of a web based software) , which uses "Theory of Constraints" as underlying principle.

Indian manufacturers are no longer confined to fabrication alone and have a strong presence, across the entire value chain. They are catering to the needs of the customers, from design and engineering at the back-end to erection and commissioning at the front end and are competing with global majors for Engineering, Procurement and Commissioning (EPC) contracts.

However what domestic industry is lacking is the know-how on process technology, owing to which, we are dependent on Overseas process Licensors. However China, on the other hand has attempted to get the knowhow on process technology, by setting up research institutes and labs, and acquiring such expertise from other regions.

4.7.2 12th Plan Target

4.7.2.1 Target size and growth rate

Process Plant equipment Sector is expected to grow to Rs 30118 Crore by 2016-17 with a CAGR of 11%. The domestic production is expected to grow to 35000 crore by 2016-17 at a CAGR of 12%.

	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	CAGR
Market Size (Rs Cr)	17887	19875	22074	24499	27173	30118	11%
Production (Rs Cr)	19861	22244	24913	27902	31250	35000	12%
Import (Rs Cr)	1804	2100	2447	2850	3320	3868	16.5%
Export (Rs Cr)	3778	4469	5286	6253	7397	8750	18.3%
Employment (No. of people)						408,000	

4.7.2.2 Target Export level

The exports are expected to grow at a CAGR of 18.3% and will touch the figure of Rs.8750 crore by 2016-17. The import level is expected to be at Rs.3868 crore by 2016-17 with a CAGR of 16.5%.

4.7.2.3 Target employment levels:

As per the employment level indication for Rs 16,000 Crore market, 3.6 lakh manpower is employed. Considering multi skill development initiatives and cluster development for this sector whereby this sector could become lean and have higher efficiencies towards manufacturing and project execution, it is estimated that this sector would generate additional 2.8 lakh jobs directly and 3 Lakh jobs indirectly by 2017.

4.7.2.4 Target technologies to be developed:

Other than manufacturing technologies, the technologies to improve business performances like productivity increase etc are to be considered. At operational level, Welding, Forming, Machining technologies could be improved to a certain extent. Capabilities on Process Engineering and unit operation system to have independence from overseas licensors and to chart out our own growth strategies are seen as enablers for driving self sufficiency in this sector. Target technologies to be developed are:

- Sub Sea Equipment
- Oil well drilling
- Process gas Boilers for Ethylene and Gas Crackers

4.7.3 Issues

- Taxes and Duties
  - Government has given preferential treatment / exemptions to certain industries and has reduced the custom duty from age old 85% to Zero / 5% / 7.5%
  - Zero duty for project imports like (CD - Nil + CVD – Nil) for Oil & Gas (NELP, Petroleum Operations undertaken by ONGC and OIL under PEL or ML issued or renewed after 1.4.99 and granted by GOI or any State Government on 'nomination basis'), Power (Mega Power, Nuclear and Hydel Power Projects), Specified Goods for Road Projects, etc.
  - Govt. imposed Special Additional Duty / Special Countervailing Duty of 4% in lieu of CST payable by the domestic capital goods manufacturers. This duty was exempted for import of goods for oil & gas, mega power, nuclear power, equipment for construction of roads, World Bank & ADB funded projects, water supply, etc. However, local manufacturers pay CST / VAT. Though the Special additional duty is levied on imports for other sectors which can be offset by the Excise duty payable by the project authority but the CST payable by the domestic capital goods manufacturers cannot be offset. This situation puts the domestic capital goods

manufacturers in a serious disadvantageous position while competing with the foreign manufacturers.

- ◊ WTO and FTA
  - – Indian companies are losing market share to companies in Korea. This is partly because India has signed Free trade agreement with Korea. Huge surge in imports can be seen in the following table:

Product	HS Code	2010 (in US $ Mn)	2009 (in US $ Mn)
Other: Pressure Vessels, reactors, columns or towers or chemical storage tanks etc	841989	35.6	7.7
Parts: parts of instantaneous or storage water heaters	841990	10.7	5
Heat Exchange Units	841950	58	11.6

  - – Korea has a philosophy of exporting value added equipment. Korean raw material and component manufacturers give preferential prices to domestic capital goods manufacturers whereas in India due to sales tax and octroi the component manufacturers are not able to preferentially service Indian capital goods sector.
  - – The domestic manufacturers have inherent cost disadvantages. All domestic manufacturers of equipment are rendered uncompetitive due to additional burden of Sales Tax, Entry Tax, Octroi, VAT, and other local duties and levies etc.
  - – The current duty level is in any case low @7.5 %. Any further reduction in this will not necessarily translate into corresponding reduction in cost to end user as domestic pricing is on cost plus basis, while export pricing is on what market can bear.
  - – Inputs for industrial machinery are not forming part of the negotiations. In certain sectors like Fertilizer/Mega power, where import duty is NIL, the corresponding duty on raw material inputs are also NIL. Hence, any negotiation of duties on Industrial machinery shall happen only if the duties on raw materials are also included.
  - – European markets are getting to be proactive due to lack of growth.
- ◊ **Import of second hand machinery:** As per the present policy, old machinery can be imported without any restriction of age, resulting into huge import of second hand machinery into India. Old machinery is also being imported to various SEZs without payment of tax and duties. This machinery is refurbished later for use. This is adversely affecting the domestic capital goods industry
- ◊ **Export Credit Agency (ECA) funding:** There is a tendency for mega projects to be funded on limited re-course basis, supported by funding from ECAs. Indian ECAs are however not mature enough to support large size projects, and hence are unable to service the funding needs

of the promoter, trying to set up process plant. Once project is funded by ECA, in general, there is a clause which supports sourcing of equipment only from the donor country/countries. This leaves Indian companies to lose their market share. Currently majority of funding is done from EU, USA, China, Japan etc. Moreover, spares and equipment replacement scope also comes under scope of these ECA countries.

- **Financial cost:** Typical lead time for supply of Process plant equipment is 12-18 months. The differential interest change between LIBOR and Indian prime lending rate is around 10% which is itself higher than the import duty. Considering many of Indian manufacturers are SMEs, this by itself can dramatically reduce our competitiveness and hence, the market share. Further, this interest differential inhibits stocking of material and thereby further increases the delivery cycle time.
- Logistics: Infrastructure constraints make it risky to move large size equipment. Need for global competitiveness demands setting up of process plant of large capacity. This necessitates large size equipment. Unfortunately it takes far less time to import goods from Middle East & Europe than to move the equipment over 200 km on Indian roads.
- **Focused manufacturing:** Constraints of paper work related to taxation hinder development of model involving integrator and component manufacturers – a model followed by in Korea. Following are the stages required to convert raw material (plate) into component (shell) assembly stage. Plate marking, cutting, Rolling, Re-rolling, Welding, Heat treatment, and gasket face machining. Each of these activities is specialized activities. If dedicated manpower could be deployed for these activities, this sub sector could achieve competitive advantage. The final integrator could look to source from these people then. The nature of jobs, today is such that job is required to go back and forth several times due to completing paper formalities. For example, Material received at A works centre, is sent to vendor A (crossing Octroi limits) for value addition. While material is returned Octrol is paid at material value + value added component. But, constraints of paper work related to taxation hinder development of model involving integrator and component manufacturers – a model followed in Korea. This offers significant competitiveness by having focused manufacturing. Further in order to avail VAT/Tax credit, unfortunately there exists extensive paper work which is a deterrent towards principle focused manufacturing for completing the equipment on time.
- **Lack of Mass manufacturing:** As per NMCC report – 2008, 14% of the companies are not able to scale up due to unavailability of mass manufacturing. 195 of the firms, as per NMCC report – 2008, site restrictive labor laws as reasons for not scaling up.

8. Engineering Goods

Engineering goods considered for the report are Bearings, Steel pipes and tubes, Seamless pipes and tubes, Nuts, Bolts, Rivets etc., Castings, Forgings, Metal Containers including cylinders, Steel wires and ropes, Engines, Pumps, Compressors, valves & actuators, gears, etc.

4.8.1 Current Status

	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	CAGR
Market Size (Rs Cr)	50647	62013	79752	89744	95029	100990	116449	14.9%
Production (Rs Cr)	50142	60614	73896	87059	94697	94173	106820	13.4%
Import (Rs Cr)	7208	10515	17318	18994	22396	22436	28155	25.5%
Export (Rs Cr)	6704	9116	11462	16309	22064	15639	18526	18.46%
Employment (No. of people)							370000	

4.8.1.1 Size & Growth rates

The market size of the sector stands at Rs. 116449 Crore (2010-11) and growing at a CAGR of 15%. The production of Engineering Goods sector is Rs 106,820 Cr during the year 2010-11 and has shown a healthy growth of 13.4% CAGR in the last 6 years

4.8.1.2 Export levels and import levels

The export for the sector is around Rs 18,526 Crore during the year 2010-11. Overall, 18.5% of the domestic production is exported.

The imports for the sector is estimated to be around Rs 28,155 Crore and they meet 25.5% of domestic demand

4.8.1.3 Employment levels

The sector is estimated to directly employ 370, 000 people.

4.8.1.4 Technology levels

The level of technology is high in this sector and India is global exporter in some product categories.

4.8.2 12th Plan Target

	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	CAGR
Market Size (Rs Cr)	134554	155228	179418	207798	241193	280604	15.8%
Production (Rs Cr)	124558	145551	170451	200059	235358	277526	17.3%

Import (Rs Cr)	31942	36232	41098	46618	52878	60000	13.4%
Export (Rs Cr)	21946	26555	32131	38879	47043	56922	21.0%
Employment (No. of people)						500000	

4.8.2.1 Target size and growth rate

It is estimated that the demand in this sector will reach Rs 280,604 Crore by the end of year 2016-17 at a CAGR of 16% over the next 5 years.

4.8.3 Issues

- **High cost of industrial inputs:** The Engineering industry mainly uses raw materials of domestic origin. The raw materials price index has risen faster than the machinery price index. It is difficult for engineering manufacturers to pass on the rise in prices to the consumers thereby impacting their profitability. Sometimes, the quality of raw materials is also not up to the international standards and which in turn affects the quality of final products. Steel in China is much cheaper for the domestic Chinese industry than steel for the Indian industry. The difference is over 10 to 15%. In such a scenario, MSME's cannot compete with Chinese engineering industry where bulk orders are concerned. The fact that domestic manufacturers are uncompetitive prevents building large scale manufacturing base which creates a chain reaction.
- **High cost of credit** - The credit cost is rather high in India. One of the rationales behind financial liberalization was that interest rates would come down for investment purposes. At present, export credit is available at about 12-14%, which exporters have to factor into the price of their products

9. Dies, Molds & Tools industry

4.9.1 Current Status

Indian toolroom industry is very fragmented and consists of more than 500 commercial tool makers engaged in design, development and manufacturing of tooling in the country. In addition to commercial tool makers, 18 Government toolrooms cum training centers are also operating in the country. The key commercial toolroom locations are Mumbai, Bangalore, Chennai, Pune, Hyderabad and NCR.

	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	CAGR
Market Size (Rs Cr)	6200	7,000	8,000	9,190	10,385	11,735	13,225	13.4%
Production (Rs Cr)	6320	7,396	8,473	9,725	11,058	11,080	12,485	11%

Import (Rs Cr)	2450	2,380	2,720	2,940	3,323	3,755	4,150	9.1%
Export (Rs Cr)	2570	2,776	3,193	3,475	3,996	3,100	3,410	4.8%
Employment (No. of people)							120,000	

4.9.1.1 Size & Growth rates

The estimated market size of Indian Tool Room Industry is Rs. 13,225 crore (2010-11) growing at a CAGR of 13.4%.

4.9.2 12th Plan Target

	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	CAGR
Market Size (Rs Cr)	15,250	17,690	20,390	23,620	27,399	31,783	15.8%
Production (Rs Cr)	14,274	16,686	19,016	22,235	25,493	29,878	15.9%
Import (Rs Cr)	4,728	5,130	5,913	6,377	7,398	7,946	10.9%
Export (Rs Cr)	3,751	4,126	4,539	4,993	5,492	6,041	10%
Employment (No. of people)						450,000	

4.9.2.1 Target size and growth rate

It is estimated that the tooling demand in India will reach Rs 31,783 Crore by the end of year 2016-17 at a CAGR of 16%.

4.9.3 Issues

- **Funds at low rate of interest** is required for modernisation/upgradation of manufacturing facilities,
- **Depreciation**: Toolroom industry machineries used in manufacturing of Die & Mould are facing major threat of obsolence. It is essential to adapt the latest technology to keep pace with the global competition. Special depreciation rates spread over 3 years for better Return On Investment (ROI) is required.
- **Skills**: Industry faces shortage of skills in CAD Design, CAM programmers and CNC operators. An all out Skills Development Certification Program of short duration with focused training is required for upgrading their skills.
- **Testing Facility**: There is a lack of testing facilities for the industry
- **Duty Reduction on imports of tools** due to various WTO/FTA must provide for a level playing field for Indian manufacturers by

simultaneous reduction in import duties on all the inputs used in the tool manufacture like raw material components, etc.

Sub-sector wise 12th Plan Target for capital goods & engineering sector:

- The total projected market size and production at the end of XII Five Year Plan (2016-17) are Rs.7,68,000 crore (16.2% CAGR) and Rs.6,81,000 crore (16.8% CAGR) respectively.
- The targeted direct employment at the end of XII Five Year Plan (2016-17) is about 2.8 million people.

Projected Market Size, Production and Employment in the Capital Goods & Engineering Sector at the end of 12th Five Year Plan

Sub Sector	Projected Market size in 2016-17 (Rs. crore) (16.23% CAGR - base year 2010-11)	Projected Production in 2016-17 (Rs. crore) (16.82% CAGR - base year 2010-11)	Projected Direct Employment (No. of people) (14.8% CAGR - base year 2010-11)
Machine Tool	23,678	13,824	80,000
Plastic Machinery	13,096	12,700	96,000
Earthmoving & Mining Machinery	45,232	34,924	300,000
Heavy Electrical	301,662	257,050	750,000
Metallurgical Machinery	23,250	5,800	60,000
Textile Machinery	18,500	14,300	142,500
Process Plant Equipment	30,118	35,000	408,000
Dies, mould & Press tools	31,783	29,878	450,000
Engineering Goods	280,604	277,526	500,000
Total	**767,923**	**681, 002**	**2,78,6500**

5. Policy

Recommendations for Universal Issues

1. Cluster Development

5.1.1 Proposed action plan:

- One Anchor Unit to play the role of anchor promoter with participation of critical vendors to set up Units in the Cluster
- A group of Anchor Machinery Units forming a SPV and assisting all their common vendors to set up Units in the Cluster
- All vendors coming together to promote a Cluster and act as sourcing hub for Machinery Units within proximity.
- Common Facility Centers (CFCs) and Industrial Cluster Parks (ICPs): Common Facility Centers offering heavy and high precision machining should be established by SPV to provide these services to users on

chargeable basis. CFCs would be equipped with modern facilities of plant & machineries including advanced testing equipments and CAD systems to enhance productivity, achieving the desired quality. ICPs with high growth potential requiring assistance for upgradation of infrastructure to world class standards would be established. Both of these facilities will contribute substantially in enhancement of competitiveness in the Capital Goods Sector. An illustrative list of common plant & machinery for CFCs and infrastructure for ICPs eligible for assistance are given below.

- Common Facility centers
  - Building for common facilities
  - Plant & Machinery
    - Modern Foundry
    - Heat Treatment facility
    - Product Development facility
    - Equipment for Testing Laboratories
    - General and Specific machine shops
    - Precision machining facilities
    - Special purpose fabrication / forging & welding facility
    - Common Production Processes
    - Centre of Excellence for training
    - Technical Information Centre including IP related activities
    - Other need based common facilities
- Sector specific Industrial Cluster Parks (ICPs)
  - Physical Infrastructure
  - Administrative Building
  - Road
  - Water Supply & Storm Water Drainage
  - Common Captive Power Generating Units
  - Transmission and Distribution Infrastructure
  - Common Fuel/Gas Supply System
  - Common Effluent Treatment Plant
  - Solid Waste Management Facilities
- Funding Pattern
  - Common Facility Centres (CFCs)
    - Central assistance will be by way of one time grant-in-aid (not equity) to the Special Purpose Vehicle (SPV) formed by the local industries, Industry Associations, Financial Institutions, Central/State Government, R&D Institution, etc. for development of the Common Facility Centres (CFCs). The Central grant will be restricted to 50% of the project cost for setting up of Common Facility Centres. The remaining 50% will be financed by other stake holders of the respective

SPV, which must be in the form of cash and not in kind like the cost of land/existing building.

- No central grant shall be provided for the purchase of land, land development, preliminary and pre-operative expenses and working capital. Government funding will be confined only to creation of durable assets and activities relating to productivity enhancement and no recurring expenditure will be funded by Government under the scheme.

◊ Sector specific Industrial Cluster Parks (ICPs)

- Central assistance will be by way of one time grant-in-aid (not equity) to the Special Purpose Vehicle (SPV) formed by the local industries, Industry Associations, Financial Institutions, Central/State Government, R&D institution, etc. for development of sector specific Industrial Cluster Parks (ICPs). The Central grant will be restricted to 50% of the project cost for setting up of sector specific Industrial Cluster Parks (ICPs). The remaining 50% will be financed by other stake holders of the respective SPV, which must be in the form of cash and not in kind like the cost of land/existing building.
- The central grant for road, drainage system and water supply system shall be restricted to 25% of the total central grant as these are basically municipal functions.
- No central grant shall be provided for the purchase of land, land development, preliminary and pre-operative expenses and working capital. Government funding will be confined only to creation of durable assets and activities relating to productivity enhancement and no recurring expenditure will be funded by Government under the scheme.

◊ Formulation of Project Proposal

- The project proposal shall be formulated after conducting detailed survey and study of the manufacturing units of identified sub-sectors of capital goods industry existing in the clusters. The critical gaps in the infrastructure impinging upon the competitiveness of the industry should be clearly brought out in the project proposal. The proposal must spell out the indicators that would be positively impacted by the project. It should also suggest the mechanism for operation and maintenance of the Common Facility Centres (CFCs) and sector specific Industrial Cluster Parks (ICPs) by levying user charges to make the project sustainable.
- It should be ensured that the project proposal is of highest quality and a consultancy organisation of national repute should be engaged for its preparation. The survey of existing industrial units should be conducted meticulously so as to generate credible data for laying the foundation of the proposal.

- While sanctioning the projects by the Scheme Monitoring Committee, duly represented by concerned Departments, every care shall be taken that there should be convergence with similar schemes of other Departments so that optimal use of Government resources could be ensured.
- The cost of the preparation of the Detailed Project Report can be met by the respective SPVs.

◊ Common R&D, Product development, Design & Testing facilities to be established in these clusters

◊ Skill development and Enterprise management development through a common training centre to be promoted by SPV

Sub-sector	No. of Clusters with CFCs
Machine Tools	Three
Plastic Processing Machinery	Three Suggested possible locations: Gujarat - Surat Hazira Belt, Maharashtra - Mumbai/Pune/Nashik, Tamilnadu - Chennai/Coimbatore/Salem, West Bengal - Kolkata/Durgapur
Earthmoving & Mining equipment	Two, one each at KGF area and Krishnapattnam
Heavy electrical and Power plant equipment	Two The locations could be Hazira for Foundry & Forgings and Rourkela for Fabrication.
Textile Machinery	Five at Ahmedabad, Surat, Coimbatore, Panipat and Kolkata
Process Plant Machinery	Target to develop total 7 clusters. (2+3+2 in first 3 years) + their expansion in last 2 yrs of 12th five year plan. Suggested locations: Gujarat - Surat Hazira Belt, Maharashtra - Mumbai/Pune/Nashik, Tamilnadu - Chennai/Coimbatore/Salem, West Bengal – Kolkata/Durgapur
Engineering Goods	5 clusters identified on the basis of the concentration of the following sub sector: forging, foundry, casting, steel, nuts/bolts etc.

The proposed schemes, which are need based, multi stakeholder driven holistic and outcome oriented, would require institutional structure and processes that are capable and conducive to achieving the objectives of the programme. The following will be the methodology and process through which the project would be implemented:

R&D: Before creating separate mechanism possibility of utilising existing mechanisms in the Government like in DST/DSIR will be explored. In case the need arises for a

separate mechanism, SPV route will be adopted for creating Section 25 Company or a society to act as a policy body. A fund will be created under the SPV.

Skill Development: National Skill Development Council and Directorate General of Employment and Training (DGET) are the two major funding agencies for skill development. The Department of Heavy Industry is in advance stage of implementing Automobile Skill Development Council with the help of DGET. Similar councils are proposed for the Capital Goods and Engineering Sector.

Technology Development: Technology Development of the Capital Goods and Engineering Sector is proposed to be undertaken as Technology Development Mission. The Department of Heavy Industry has already developed strategy and plans for three sectors namely, Machine Tools, Automobile and Heavy Electrical equipment sectors. Similar approach may be adopted for the entire Capital Goods Sector. For implementation of the Mission programmes SPV route will be adopted for creating Section 25 Company or a society to act as a policy body. A fund will be created under the SPV.

Capacity Building: Capacity Building for these Sectors is proposed by creating common facility centres, testing facilities, product development centres etc. It is proposed to undertake capacity building in Mission mode through SPVs.

Business Development: Business Development of the Capital Goods and Engineering Sector involve domestic as well as export promotion. It is proposed to undertake capacity building in Mission mode through SPVs. For the export promotion, MDI Scheme of Department of Commerce will also be utilised.

5.1.2 Stakeholders in Policy implementation

Clusters will be established in Public-Private partnership mode. Stakeholders in the establishment would be industry associations (TMMA, IMTMA, PPMAI, IEEMA, IECIAL, ITAMMA etc.), Centre/State government, local industry, financial institutions and research institutions.

6. Skill Development Support:-

6.1.1.1 Proposed action steps

- Skilled manpower is required in two different categories.
  - The first relate to provision of skilled people to the immediate requirements of the economy such as ITI trained persons, skilled persons at polytechnic and graduates while certain industries like Chemicals, Pharmaceuticals etc., need highly skilled persons like PhD holders. In terms of enrollment for PhD, the number in India is 5,000 which is very small

compared to 1,20,000 in China and 50,000 Ph.Ds in USA. As against this, only 375 PhDs were awarded in India, of which engineering disciplines contributed to about 100. There is need to improve the turnout of PhDs, for which a long term plan needs to be drawn up.

- The second category of skill development is for the long term growth and strength of the economy. These are Science & Technology skills of a high order which can be developed only in the longer run. They include basic research and directed applied research. There is need to give high priority to this area of skill development not only from the competitiveness and economic growth point of view but also from the point of long-term national security.

◊ There is a need to follow a two-pronged approach.

- Promote skill development through public agencies
- Promote skill development with the help of private sector on a Public- Private Partnership mode. For this, it is necessary that
  - Programmes for skill development being implemented by 18 departments of the Government of India in the public sector be continued however, the curriculum needs to be harmonized on the lines of Modular Employable Skill Scheme of DGET
  - National Skill Development Corporation in PPP mode with seed capital from Government and Funds for the programme from the private sector is set up at the earliest. The programmes should be run substantially for the private sector requirements.

    There is need for coordination amongst various Ministries involved in skill development programmes. Linkages with Ministry of Labour may be provided wherever feasible and adopt exiting modules from Modular Employable Skills (MES) or National Vocational Certificate Training (NVCT) programmes. The modular employable skills have to be expanded for large number of trades in manufacturing. The instructional media has to be freely made available by National Instructional Media Institute (NIMI). Modular Employable Skill Scheme can also achieve this provided the skill list is expanded to include all relevant trades and for all levels of literacy. Enough training providers are also required and for this, delivery mechanism has also to be improved.

◊ Assessment of Skill Gaps:

- The detailed skilled gap studies are required to be studied for setting up of skill development initiatives in the capital goods sub-sectors. The skill gaps should be periodically updated and made a part of institutional mechanism.

Association of local industry in such skill gap studies should be ensured. Action plan for filling the gap can be drawn.

- Special emphasis may be given for development of appropriate curriculum and accreditation system in these sub-sectors.
- Greater thrust should be given to 'Soft Skills' including spoken English computer usage, etc. which increases the employability.
- The thrust of skills is required at traditional and modern industry levels and also at the level of basic Sciences & Research. The skill gap should be identified at the top level and incentive structure should be such which encourages people to take to primary R&D activities.

◊ Development of world-class manufacturing managing capabilities

- There is need for running more Programme for Visionary Corporate Leaders in Manufacturing (VLFM) type programmes on two institute model under partnership between IITs and IIMs. It is necessary that a plan scheme for supporting VLFM initiative may be introduced in the 12th Plan.
- The National Strategy of Manufacturing (NSM) recommended that the Government should encourage some of the premier technical institutions like Indian Institutes of Management and the Indian Institutes of Technology to collaborate and conduct programmes in India for developing leadership in the Indian Manufacturing Industry on PPP basis.
- Accordingly, one such pilot programme called VLFM Programme has been developed by the NMCC in collaboration with Ministry of HRD, IIT Madras & IIT Kanpur, IIM Kolkata and CII as a flagship programme to develop leaders in manufacturing. The VLFM Programme was launched in August 2007 with technical cooperation from Japan International Cooperation Agency (JICA) after the Agreement between Hon'ble Prime Minister of India and Prime Minister of Japan.
- The VLFM program is currently being run with support from JICA and will end in March, 2013. Thereafter, this programme will have to be migrated from Japanese aid to institutionalized Government support and need to be synchronized with the 12th five year Plan.

◊ Industry should take responsibility for shaping the curriculum for providing their resources for the real life tuning up of skills requirement of world-class vocational training

- Since the current training infrastructure of ITIs and ITCs are inadequate, it is recommended that the industrial houses should be allowed to conduct evening courses in the existing facilities of ITIs and ITCs. Industrial houses may also be

encouraged to setup their own institutions under PPP mode. The NSDC should provide necessary financial support for setting up such training institutes.

- To improve the quality of training of the ITIs, the programme of adoption of ITIs by Member Companies of Industry Associations should be continued. We propose adoption of ITIs by following industry associations for the indicated sub-sectors:
  - TMMA: Textile Machinery
  - IMTMA: Machine Tools
  - IECIAL: Earth moving and mining equipment
  - IEEMA: Heavy electrical and power plant equipment
  - TAGMA: Dies, moulds & tools industry
  - PPMAI: Process plant equipment

◊ The industry would be allocated responsibility for the assigned ITIs through following initiatives:

- Provide old/used equipments to the ITIs for labs/training
- Arrange for regular guest lectures by foreman/operators
- Create a program for internship for students during the course of their program
- The graduating students would then act as a pool of skilled labor for the adopting industry
  - Efforts should be made to bring vocational education programmes parallel to the normal conventional school and programme by providing lateral induction from one stream to another at all stages.
  - Voluntary Code of Conduct (VCC) should be extended in a phased manner (over a period of six years or so) to all establishments with a defined threshold level of employment.
  - Industry Associations should adopt more backward districts in a phased manner for development purposes.
  - Department of Corporate Affairs should also prepare a template of disclosures with regard to the compliance of VCC and the efforts of the corporate sector in skill development.
  - Skill development centres operated by public and private sector should be mandated to lay emphasis on training youth from the deprived sections, pay a stipend if the same is not feasible from government assistance for this purpose.
  - 150 % weighted deduction should be provided for investments (made out of a portion of a company's annual profits) made in specified CSR projects.

Skill Development Support proposed by National Skill Development Corporation is indicated at Annexure I.

Sub-sector	Action steps	Stakeholders
Machine Tools	◊ Upgrade 5 select ITIs, polytechnic institutions and 5 engineering colleges with modern machine tools and related equipment. ◊ Establish 3 greenfield training centers ◊ Establishment of Sector Skill Council for Machine Tools (& Machine Building) to bring curriculum and quality standards and certification for the training imparted by various agencies. ◊ Establish COE for executive development	ITI, Polytech institutions, Engineering Colleges, IMTMA DGET Total Budget: Rs 200 Crore
Plastic Processing Machinery	◊ Establish more Central Institute of Plastic Engineering and Technology (CIPET)/ Nettur Technical Training Foundation (NTTF) model educational institutes ◊ Add plastic processing operator training program at ITI's ◊ 6 “Knowledge centers of Excellence” are to be created under guidance from German universities to provide education and research capabilities in Machine design, Polymer technology and Dies & mold engineering	
Earth moving & mining equipment	◊ Introduce Mining and construction equipment design, manufacturing process, operation & maintenance as a separate stream in ITI/Diploma course curriculum as a mandatory subject ◊ Fund 1000 technical institutions to train 100,000 students a year on vocational courses in manufacturing, operation and maintenance of mining & construction equipment.	
Heavy electrical and power plant equipment	◊ Upgrade ITIs	ITIs
Metallurgical Machinery	◊ Technical institutions to float vocational courses	-
Textile	◊ Undertake capacity building programmes	

Machinery	at textile engineering institutes and vocational institutes ◊ Training the trainer ◊ Scholarships for students from rural areas and small towns ◊ Review of existing curriculum for certificate, diploma and graduate courses ◊ Exchange programmes with foreign textile technology institutes such as Aachen University, Germany ◊ Explore partnership with Swiss Indian chamber of commerce under Swiss government vocational training programme already initiated in other sectors ◊ Encourage regular interaction between the industry and academia	
Process plant machinery	◊ The Process plant Equipment sector needs continuous skilled and trained manpower both at shop floor level, as well as managerial level. ◊ Skill Development support could be provided to units, which come together to have their employees trained, through approved training institutes. ◊ For instance, promoting skill development programs with National institutions, NITIE etc could be actively taken up and also close co-operation with machine tools industry and other associate industries to improve productivity of the worker in imparting training could be pursued.	NITIE, Machine Tools industry
Engineering Goods	◊ Develop linkages with local SEZs, EPZs, knowledge parks, polytechnic, industry chambers to develop skill development clusters ◊ 100% finance support for micro enterprise for technology up gradation ◊ Developing centre of excellence for training of trainers	Tool rooms, ITIs, Polytechnics
Dies, moulds and tools	◊ An all out Skills Development Certification Program - Short duration focused training to sponsored employees for upgrading their skills. Double the turnout of toolmakers through existing training institutes. ◊ Setting up more special training institution	

	to impart training in line with need of tool room industry ◊ Improving skills of existing employees and areas of skill shortage	

2. Corpus Fund for expansion/ upgradation/modernization of existing units and funds for technology transfer, acquisition of firms abroad:

It is observed that the SMEs are major players in Capital Goods & Engineering sector. More than 80% of the units are SMEs. Most of these SMEs have old and out dated technology (old generation lathes, drills, cutters etc.). Such SMEs have no capacity to invest in modernisation/upgradation of the existing level of technology of the capital goods installed in their factory. In addition, SMEs face various problems such as lower capital base, lower level of resource, less profitability, lack of trained manpower, no R&D facility, lack of standardization, lack of modernization, lack of cutting edge technology, infrastructure constraints, large import of capital goods, etc. Government should provide revolving funds at lower interest rate to SMEs to modernize and upgrade their existing plant facilities by advanced machineries, expansion, investment for technology development, acquisition of units abroad and working capital requirement.

Sub-sector	Action steps	Stakeholders
Machine Tools	◊ A Revolving Corpus Fund of Rs. 2000 Cr. with low interest rate to act as seed capital may be introduced to attract investment in fresh capacity and substantial expansion of existing units.	DHI, IMTMA, MOF, Financial Institutions/Banks
Plastic Processing Machinery	◊ Corpus fund of Rs 1000 Cr for technology upgradation	
Earth moving & mining equipment	◊ Fund for interest subsidy for soft financing scheme: 6% interest subsidy on an expected Capex of Rs.4000 Cr over 5 years. The estimated budget requirement is Rs. 240 Crore	
Metallurgical Machinery	◊ Soft loan for setting up of new units/expansion of existing units with an estimate budget of Rs 500 Crore	
Textile Machinery	◊ Total investment for Capex is projected to be Rs 2500 Cr. 5% interest subvention would amount to Rs 125 Cr only for a period of 5 years. The upfront margin money subsidy of 10% would amount to Rs 250 Cr. Hence, the total requirement	

	of fund under the modernization/ Technology upgradation of the Textile machinery manufacturing units is Rs.325 Cr.	
Process plant machinery	◊ Technology transfer support – Rs.100 crore	
Engineering Goods	◊ Corpus fund of Rs 150 Crore for credit at low cost for investment and interest subventions	
Dies, Moulds and Tools	◊ Provision of funds at low Rate of Interest for Capacity addition to meet growing demand	

7. Policy Recommendations for Issues Common across Capital Goods Sector

1. Increasing value addition in India

7.1.1 Indigenous technology development

7.1.1.1 Proposed action steps

- ◊ High Level Empowered Body for R & D promotion to be set up comprising of key stake holders from institutes, private & public sector which would be responsible for execution and monitoring of efforts for technology development.
- ◊ Establish product development centers covering all product development lifecycle stages in the following selected institutions:
  - Central Power Research Institute (CPRI)
  - Central Manufacturing Technology Institute (CMTI)
  - Central Institute for Plastic Engineering and Technology (CIPET)
  - Selected IITs and NITs
  - Designated PSUs
- ◊ The PSU/industry association to act as nodal agency for these Product development centers.
- ◊ Strengthen existing institutions e.g. CPRI, CMTI with up-to-date equipments and facilities
- ◊ Additional testing facilities to be established under public private partnership mode
- ◊ Development and manufacture of critical raw materials and components
- ◊ Preferential treatment in Government procurement process to indigenous innovative products

- 5% of the machinery procurement budget of large government buyers to be allocated for awarding risk-sharing Development Contracts to develop technologies/products for user sectors
- Government system for initial purchases and orders to encourage equipment innovation
- Allow duty free imports for R&D projects and R&D infrastructure creation
- Comprehensive methods which weigh technical merit and other technology-related factors alongside the product price to create an overall score to select the most competitive products to be used by provincial authorities. This would lead to 4-8 percent boost in technical and price evaluations of indigenous innovation products
- 100% depreciation should be permitted for promoting investments in equipment & technology for energy efficient and recycling equipment. A list can be made in consultation with the sector industry associations.
- Include capital goods under Technology Up gradation Fund.
- Setting up of Centers of Excellence (CoE) for the sub-sectors as follows:

Sub-sector	Action steps	Budget Outlay
Machine Tools	◊ Technology Development ◊ Centers for Product Development & Critical elements development ◊ Machine tool electronics ◊ Strengthen and set up 3 more units of CMTI to serve as product development centres ◊ Acquisition of firms abroad ◊ CoE at institutions of higher learning	Rs 1000 Cr Rs 250 Cr Rs 250 Cr Rs 1000 Cr Rs 1000 Cr Rs 500 Cr
Plastic processing	◊ 6 nos. Centre of Excellence	Rs 720 Cr
Earth moving & mining equipment	◊ Centre of Excellence for technology & new product development	Rs.1500 Cr over 5 years
Heavy electrical & power plant equipment	◊ Research & development of advanced ultra super critical technology ◊ 182 MW IGCC Technology Demonstration Project ◊ High voltage and Extra High Voltage testing facility for	Rs 7250 Cr (Govt. support of Rs.1250 cr) Rs.1665 Cr. (Government support: Rs 350Cr) Rs 4000 Cr

	Transmission Equipments.	
Metallurgical Machinery	◊ 2 centers of excellence (1 each for metallurgical machinery and steel plant machinery)	Rs.850 Cr
Textile Machinery	◊ Technology Up gradation ◊ R&D centre	Rs 250 Cr Rs 150 Cr
Process Plant Machinery	◊ R & D projects & collaboration between industry and academia for joint development programs ◊ Productivity enhancement through Technology Up gradation fund	Rs 150 Cr Rs 100 Cr
Engineering Goods	◊ Technology up gradation fund scheme Setting up of funds to look into critical areas like absorption of information technology like ERP, adoption of clean energy techniques, adoption of TQM techniques and adoption of ISO/BIS standards	Rs 300 Cr Rs.200 crore
Dies, Moulds & Tools	◊ Testing facilities: Installation of injection moulding machines of 2000 tons/ 1100 tons/ 850 tons for Multiple locations at Pune, Chennai, Bangalore, Coimbatore, Delhi	This may be within the Machine Tools allocation

◊ Detailed action plan for establishment of product development centers is given in the Annexure II.

7.1.2 Mandating local value addition/technology transfer

7.1.2.1 Proposed action steps

◊ Regulatory mechanism to stipulate 30% minimum value addition for large value imports along with transfer of technology to an Indian company via JV/JWA

◊ Tax holidays for wholly-owned subsidiaries, JVs & overseas companies setting up production base in India with a Phased Manufacturing Program leading to 75% local content over 3 years

- ◊ Preferential tax treatment for companies using equipments manufactured in India for example tax rebate for domestic procurement by EPC companies.
- ◊ Higher depreciation after 1st year at 25% on machinery manufactured with 75% local value addition in India.

7.1.2.2 Participants in Policy implementation

Ministry of Finance, Ministry of Defence, Ministry of Railways, Ministry of Power, Ministry of Oil & Gas, Ministry of Steel, Ministry of Fertilizer, Ministry of Mines, Ministry of Chemicals & Petrochemicals, Ministry of Heavy Industries & Public Enterprises, Department of Industrial Policy & Promotion.

7.1.3 Preference to local content in PSE purchases

7.1.3.1 Proposed action steps

- ◊ Giving preferential treatment through 'Development Contracts': Technology being equal, preference may be given to Indian products. This is so even now but price factor is disadvantageous. One contentious issue is that Indian products may not have been developed, tested and found to be functionally equal to imported products in all aspects including reliability. Therefore Government tenders stipulate "earlier supply" of the tendered product as a precondition for Indian suppliers to qualify. This is a chicken-and-egg situation, since Indian companies will never gain this experience unless they are given a reasonable opportunity to supply products to Government agencies. There are many instances where Indian companies have successfully developed and supplied new products to Government agencies; outstanding examples are in atomic energy and space, both of which depend substantially on Indian manufactured components, especially in the light of technology denial. Most of these are "first time" efforts.

  To address this situation, it is proposed that all large Government purchasers may adopt the route of "Development Contracts" by which they award contracts to suitable Indian companies to develop their requirement of new machines/technologies/products through a risk-sharing partnership between the purchaser and supplier. This is a standard practice in foreign countries, where major developments are realized through contracts.
- ◊ Indian Government agencies may be asked to source 30% of their future requirements with Indian companies especially in high technology sectors like space, atomic energy, electronics, oil & gas, defence, telecom, shipbuilding.
- ◊ Following products could qualify for such preferential purchases in Government contracts:
  - Made in India (Manufacturers and IP in India)
  - Made for India (Manufactured in India with atleast 40% local content)

- ◊ Indigenous innovation products may enjoy an additional 4-8 percent boost in their technical and price evaluations if provincial authorities use comprehensive evaluation methods. Comprehensive methods weigh technical merit and other technology-related factors alongside the product price to create an overall score, which is used to select the most competitive products.
- ◊ Establishing a Government system for initial purchases and orders that will encourage the commercialization of products with indigenous innovation accreditation. The Government can purchase the first set of innovative products created by domestic enterprises, universities, and research institutes if the products are thought to have future wide-market potential. This would give such products a stronger foothold in the market.
- ◊ Purchase terms (starting with tender evaluation, payment terms, exchange rate variations, etc.) need to be made same as for imported products otherwise Indian offers will suffer competitive disadvantage in price.
- ◊ Minimum of 30% local content as a Pre-Qualification criterion for PSU/government buyers
- ◊ Preference to JV bids over foreign companies against total import offers on govt. tenders

7.1.3.2 Stakeholders in policy implementation

Ministry of Finance, Ministry of Defense, Ministry of Railways, Ministry of Power, Ministry of Oil & Natural Gas, Ministry of Steel, Ministry of Fertilizer, Ministry of Mines, Ministry of Chemicals & Petrochemicals, Department of Heavy Industry

7.1.4 Collaboration with user sectors through inter-ministerial coordination

- ◊ The objective of this recommendation is to provide an assured demand to domestic players to enable capacity creation & utilization and technology development. The idea is to leverage our huge demand to enable growth of domestic players. The importance of such coordination can be illustrated with following 3 examples:
- ◊ NTPC: NTPC has current capacity of 34, 000 MW and around 15, 000 MW under construction. This capacity is projected to grow to 75, 000 MW upto 2017 and 128, 000 MW up to 2032. This amounts to consolidated demand of Rs 143,000 Cr over the five year period. If this demand could be consolidated and used as an incentive to promote technological development through say BHEL, it could create huge benefits for the level of technology development in the country.
- ◊ Coal India: Coal India's annual value of purchase of mining equipment is over $2 billion every year. It is the largest buyer of mining equipment in India. A concerted effort to develop technology for the equipments that would be required by Coal India over the next 5 years would promote investments in technology
- ◊ Rs 200, 000 Cr worth of plant & machinery would be required in the coming 7-10 years in order to meet the projected steel production

capacity. Players like HEC, HMT could work in coordination with SAIL to draw up a technology roadmap for the Metallurgical machinery sector.

7.1.4.1 Proposed action steps

- Creation of an empowered committee comprising of following departments: Ministry of Finance, Ministry of Defense, Ministry of Railways, Ministry of Power, Ministry of Oil & Natural Gas, Ministry of Steel, Ministry of Fertilizer, Ministry of Mines, Ministry of Chemicals & Petrochemicals, Department of Heavy Industry.

2. Substitute imports

7.2.1 Ban import of second hand goods

7.2.1.1 Proposed action steps

- Ban/regulate import of all second hand machinery.
- Capital subsidy to be provided for import of new machinery for select identified equipments for which no domestic production facility exists.

7.2.1.2 Participants in policy implementation

DGFT, Department of Commerce, DIPP, Ministry of Finance

7.2.2 Regulatory mechanism for FTAs/ PTAs

7.2.2.1 Proposed action steps

- Regulatory apparatus to prevent misuse of FTAs
- Ministry of Commerce to periodically revisit FTA/PTA for equipments manufactured indigenously
- Effect on domestic manufacturers to be analyzed before any future agreements
- In case of import through 3rd country impose mandatory 40% value addition
- Anti dumping duties levied on machinery imports from China to be extended up to 2017.
- Imposition of circumventing duties on Chinese machinery getting routed through other countries

7.2.2.2 Participants in policy implementation

Ministry of Finance, Ministry of Defense, Ministry of Railways, Mistry of Power, Ministry of Oil & Gas, Ministry of Steel, Ministry of Fertilizer, Ministry of Mines, Ministry of Chemicals & Petrochemicals, Ministry of Heavy Industries & Public Enterprises

7.2.3 Tax structure rationalization

7.2.3.1 Proposed action steps

- Withdraw CENVAT credit for imported machines

- ◊ Abolish Octroi charges/entry tax for domestically manufactured machines
- ◊ Abolition of Octroi (now present only in Maharashtra and few other states) to facilitate fast movement of materials and bringing down cost of transportation
- ◊ Reduce excise duty from 10% to 8%
- ◊ Provide tax exemption to deemed overseas revenue.
- ◊ Revoke 'nil' or 5% duty exemption schemes for project imports currently given for the power equipments, construction & mining machinery.
- ◊ Reduce customs duty to nil on critical raw material (CRGO) and components for hi-tech machine tools, shuttleless looms, cone winders, transformer, etc.
- ◊ Allow domestic manufacturers to import raw materials, components and consumables at five percent less duty than that of finished products.
- ◊ Impose additional duty equal to CST / VAT on all projects / goods in lieu of CST/ VAT (2% / 15%) paid by local manufacturers. The additional CVD on all dutiable goods should be made ineligible for Cenvat credit under Rule 3 of Cenvat Credit Rules 2004.
- ◊ Exempt supplies made against global tenders with Custom Duty exemption from payment of Excise duty and VAT .
- ◊ Supply of local machinery under Export Promotion Capital Goods (EPCG) and Export Oriented Units (EOU) status to be treated at par.

7.2.3.2 Participants in policy implementation

Central and State governments.

3. Export Promotion

7.3.1 Export Financing

7.3.1.1 Competitive Long Term Financing

- ◊ RBI/Ministry of Finance to suitably equip EXIM Bank with dedicated fund to support exporters with buyer's credit at rate of interest close to London Interbank Offered Rate (LIBOR) (LIBOR + 2% approx.) with a repayment period of at least 10 years in addition to the moratorium/grace period equal to the project construction period against Project Agreements.
- ◊ In cases where the Independent Power Producer (IPP) is largely owned by Government entity or an Indian entity, Government of India (GoI) should consider providing interest equalization support and/or GoI guarantees.
- ◊ Defrayment of part of borrowing cost of EXIM / Refinance may be made available to EXIM Bank at soft rates from Govt. / Central Bank.

- ◊ Govt. guarantees/ enhanced equity of Export Credit Guarantee Corporation (ECGC) to enable them cover high value project risks without the need of reinsurance, which will make them competitive and also provide cover in emerging markets like Africa, Latin America, Middle East Asia, South East Asia and neighboring countries.
- ◊ Subsidize Buyer's credit premium charges of ECGC to make these competitive.
- ◊ ECA risk coverage is considered as Sovereign risk cover in many countries where as it is not the case for ECGC cover. This enablement will help EXIM & other banks to offer credit at competitive rates.

7.3.1.2 Supplies against Indian Line of Credit/ Grant

- ◊ Govt. of India disburses soft loans under line of credit / grant to countries of strategic importance to India. To enable Indian manufacturers gain access to export opportunities, GoI may like to consider extending project-tied credits as priority to infrastructure projects like power projects where the following criterion are fulfilled:
- ◊ Project runs for say a life of 25 - 30 years during which it becomes a regular foreign exchange earner in terms of spares and services & becomes a symbol of goodwill for plant life.
- ◊ Should serve as a reference project for further anticipated and potential orders / opportunities.
- ◊ Can promote energy security by providing leverage of mining/oil/gas concessions.
- ◊ Hundreds of vendors supplying to such projects overseas, earn references for their goods.

7.3.1.3 Supplies against Indian Equity / Buy-back Leverage

- ◊ India has a burgeoning need of fuel like coal, crude oil, LNG, uranium etc to meet its increasing domestic energy demand. Further, inputs like minerals (iron ore, bauxite etc), fertilizers etc are also required by India in huge quantities to meet the demands of its domestic industry and agriculture sector. Many of our existing / potential trading partner countries are rich in fuels, minerals, raw materials etc and at the same time are in need of setting up and developing infrastructure projects especially Power Projects. These countries can serve as a valuable source for fuel, minerals etc for India and are willing to make available the same at attractive terms and conditions or pledge the same as security / collateral in exchange of India helping them in the power infrastructure sector. For example: Indonesia – Coal; Bangladesh – Gas, Electricity; Bhutan & Nepal – Electricity; Malaysia – Palm Oil; Sudan – Oil; Nigeria – Oil, LNG; Malawi, Niger – Uranium; Kazakhstan – Oil; Iran – LNG; D.R. Congo - Minerals (iron ore, bauxite, chromium, diamond, gold); Sierra Leone - Minerals (iron ore, bauxite, chromium, diamond, gold).

- India's bulk purchase requirement of these commodities can be leveraged to secure projects for Indian companies by providing GoI guarantees for projects against Coal, Oil, LNG etc. This will also help India in improving its Energy Security as well as gaining diplomatic leverage.

7.3.1.4 Export Incentives

- Served From India Scheme (SFIS): As per clause no. 3.12.6 of the present FTP the duty credit scrips can be utilized for paying duties for imports of freely importable goods related to the service sector business. Utilization of the duty credit scrips should be allowed not only for imports of goods for service sector business but for manufacturing activities also as manufacturing is an integral activity of project exports.
- Focus Market Scheme (FMS): Focus market scheme, currently applicable to notified countries and for equipment for Oil sector, which entitles exporters to Duty credit Scrip equivalent to 3% of Free on Board (FOB) value of export should be extended to exports to all countries in Latin America, Africa and Middle East and North Africa (MENA) region. Focus market scheme should be expanded to include more Asian and African countries capable of providing energy security through our exports, like Myanmar, Indonesia, Bangladesh, Nepal, Bhutan, Sri Lanka, Nigeria, Iran etc (at present only one Asian country – Mongolia is included in the list). The procedure for filing application for claiming the applicable benefits under FMS needs to be simplified particularly in respect of documentation requirements.
- Focus Product Scheme (FPS): The benefit under FPS should be enhanced from present 2% to 3%.
- Any scheme of export promotion incentive should be on long term basis allowing contract specific benefit during the currency of contract. The changes in the scheme should not affect an on-going contract where such scheme is already agreed upon.

7.3.1.5 Pre-Shipment and Post-Shipment Credit

- Engineering goods / Capital goods / Project exports should be accorded Priority Sector status considering its employment generation and Foreign Exchange earning potential and Pre-shipment and Post-shipment credit should be made available at rates applicable for Priority Sector (e.g. agriculture sector). The interest rate subvention scheme may be continued and Engineering sector and Project Exports should be covered under the same. Also considering the longer manufacturing cycles and gestation periods for Project Exports/ Capital Goods, Pre-shipment credit should be made available for longer durations, say 3 years. Similarly, post-shipment credits should be made available for duration at least up to one year to take care of longer shipment and realization cycles for Project Exports / Capital Goods.

7.3.1.6 Interest rate support for working capital used for manufacturing export products

- Reimburse an amount equal to the difference between the interest rate cost in India and other countries for capital used for manufacturing of exported products.
- ECA status is to be improved at least on some projects, to begin with. Further interest charges of 12-14% against 3-4% charged by USA, China etc would make ECA funding non-competitive.
- EXIM bank & ECGC must support Indian exporters to the same extent as their European, Chinese and Korean counterparts.
- Preferential tax treatment to EPC companies using equipment sourced from India is to be accorded. For example, Chinese & Korean companies preferentially source equipment from their countries because of this tax advantage.

7.3.2 Soft Promotion of exports

7.3.2.1 Support for Market / "Made in India" Brand Development

- Market Development Assistance (MDA) Scheme should be extended to project exporters/ large enterprises to provide incentives for the development of new markets
- Provide hand holding to manufacturers across all engineering sectors who are interested to export in the field of
  - International marking
  - Brand Development
  - Technology Benchmarking missions abroad
  - Market surveys/studies
  - Warehousing facilities
- EEPC to promote the “Made in India” brand for capital goods exclusively by setting up Showroom and Technology Centers at important locations abroad. Users will pay EEPC for use of the facilities
- Promote participation in international trade fairs and exhibitions.
- Setting up of a corpus fund of Rs 200 Crore to promote all Engineering goods through Brand development activities, exhibitions etc. at key promotion centres in focus markets abroad in Latin America, Africa and Asia

7.3.3 Counter trade in sectors where we have strong presence

7.3.3.1 Proposed action steps

- Counter trade on bulk import of petrochemical / fertilizer / refinery products should be negotiated e.g. deficit of 6 Million tons of urea is likely to be met by import at a cost of USD 400 to 600 / ton. This import of USD 2.5 to 3 Billion should be used to leverage counter trade of at least USD 1 Billion of capital goods from India. Quantum leap in market size can be achieved.

4. Building National and Global Champions

7.4.1 Building BHEL and BEML as Global Champions

7.4.1.1 Building BHEL as a Global Champion

- It is important to ensure that the agency undertaking execution of GOI financed projects is sensitive to the GOI's objectives and a flag-bearer of the Government. Therefore, it is recommended that the first preference for the execution of these projects should lie with those Central Public Sector Enterprises of India (CPSEs) which are the leaders in their respective domains/sectors. These CPSEs, with the requisite experience in their field, not only would help in faster take-off of the projects, but also would be in a position to appreciate the strategic importance and sensitivity of such projects and could be better controlled by the Government to suit specific strategic requirements. Needless to say, the dividend payout by the CPSEs would also contribute directly to the exchequer. Therefore, it is suggested that Bharat Heavy Electricals Limited (BHEL) - a Navratna company, and the largest power plant equipment manufacturer in India with a share of around 72% in the country' power generation be appointed as the nodal agency for execution of power generation projects. BHEL has established its presence in 75 countries across the globe, enhancing India's credibility in the power sector abroad over the last four decades and the company also has the unique distinction of being a major OEM and a successful EPC contractor.
- **Infrastructure Projects:** LOCs' may preferably be granted for projects only. Infrastructure projects, particularly the power projects, become permanent symbol of goodwill and visibility as it has minimum life of 30 years and also help in bringing prosperity to the adjoining areas through Industrialization and employment generation. Such projects also become regular foreign exchange earners through spares and after-sales-services throughout the project life. Such projects also enable hundreds of other Indian exporters to supply equipment/items for use in these projects and get acceptability and earn global presence.
- **Initial expression of interest:** It has generally been seen that although many countries, particularly those who had not earlier availed Lines of Credits by Government of India, are keen to have such concessional Lines of credit from India but, expect initial expression of interest to come from the donor Government rather than from the borrowing country, as in case of countries like China, Spain, etc.
- **Provision for issue in-principle commitment letter from Govt. of India**: Chinese companies are empowered by Govt. of China / EXIM Bank of China to offer soft credit for which in principle approval is available to these companies. This puts pressure on recipient countries to finalise the Project as well as

block the project for new entrants. There is no provision for issue in-principle commitment letter from Govt. of India by which Indian companies can secure the project. PSU may be empowered to offer in-principle letter of Commitment from GOI to secure the projects as Chinese companies are empowered by Govt. of China / EXIM Bank of China to offer soft credit for which in principle approval is available to these companies. In sectors where Indian Public Sector companies are strongly placed, the job may be assigned to them for faster implementation & due care should be taken to eliminate bidding by small trading companies in such projects as it gives bad name to our country.

- **Counter Trade Bulk Buying Opportunities:** There are opportunities available where Indian Companies like MMTC and other PSUs/Government Departments are buying in bulk various commodities which can be used as leverage to barter such bulk-buying by supply of infrastructure/ power projects.
- **Interest Rates:** In many cases, where Government have offered concessional Lines of Credit, such lines remain unutilized because of higher interest rates as is the case with all categories of countries other than HIPC countries. In non-HIPC countries, the rate of interest is around 4-5% on floating basis whereas most of the countries like China, Spain, Russia and even Iran are able to offer credit at rates between 2 to 3% with repayment period of at least 20 years. Rate of interest offered against lines of credit has to match those offered by other countries and World Bank or IMF.

7.4.1.2 Building BEML as a Global Champion

- BEML Limited is a Miniratna Category-1 Public Sector Undertaking under Department of Defence Production, Ministry of Defence. It is a highly diversified Company engaged in three major Business verticals viz. Mining & Construction, Defence, Rail & Metro. In addition to the above, Technology Division of the Company provides end-to-end technology solutions in Auto, Aero, Defence and Rail & Metro related areas. Trading Division deals in non Company products. The exports of all the Company products are done through its Export Division. BEML's products are sold and serviced through its large marketing network and its sales & service centres are located near to customer's mines and places.

- In Mining & Construction business group, BEML is already a leader in many Mining Products in its product range through institutional customers and is edging to increase its market share in the infrastructure and construction segment. The Mining Sector is now graduating into utility of high-end technology products especially in Institutional sector world over including India. High end technology is required for large size dump trucks, excavators, shovels, walking draglines etc for which

technology is not available in India and being state of the art technology in vogue in the Global market, MNCs / Technology providers demand high Transfer of Technology fee for giving such technology. BEML envisioning the same through in-house R&D has developed high end 150T and 200T electrical dump trucks with design validation by a reputed overseas party. It has also developed 180T & 200T Electrical Excavator to catch up the emerging market. India requires such high end technologies through its diplomatic approach. BEML also has a subsidiary steel Foundry - Vignyan Industries Ltd, in Tarikere, Chikmagalur District that supplies quality steel and alloy castings to various manufacturing units of BEML.

The Company has a strong base of in-house design and development setup under UNDP grant. Company's R&D division at Kolar Gold Field (KGF) has designed, developed and successfully manufactured a number of new products. The activities of R&D include technology absorption, import substitution, cost reduction and product development for domestic and export markets. Company also has R&D units for Design and Product Development in Bangalore and Mysore. Thus BEML is one of the prominent players globally in this business and possibly the only Company in the world to have both Open Cast & Under-ground Mining equipment in its Product range. However, it needs support for orders etc to grow as bigger player in the global market. BEML, with its strength and support of Government can grow from the current level of Rs. 1800 Cr to over Rs. 5000 Cr by 2017-18 in this vertical, keeping in view the emerging markets in India & abroad. BEML's products are exported to more than 58 countries including Syria, Tunisia, UAE, Jordan, Suriname, South Africa, UK, Sri Lanka, Bangladesh, Indonesia, Thailand, Zimbabwe etc. and exported goods and services valued around Rs.1400 Cr. It has Dealers operating from Syria, Tunisia, Sri Lanka, & UAE and representatives in Morocco Suriname and Zimbabwe.

- Therefore, it is suggested that BEML be appointed as the nodal agency for the manufacture and promotion of world class mining & construction equipment.
- Government support required to create a Global Champion out of BEML is
  - **Transfer of Technology through diplomatic approach**: India requires high-end technologies for High capacity Excavators, Shovels and Walking Dragline. Therefore country has to, through its diplomatic approach, try and get these technologies so that BEML can upscale its supplies to meet 100% Indian requirement and also cater to the global market. Ministry of Coal has also stressed that there is need to build the indigenous capacity of

advanced technology coal mining machinery for efficient extraction of coal.

- **Mergers & acquisitions of core technology company with market standing**: BEML should be allowed to acquire small and core technology Companies having products of high market standing and market share, which will enable BEML to make a presence globally.
- **Equity infusion**: To promote BEML as global champion, it has to be supported through infusion of funds to the equity, help for expansion of technology base and manufacturing base for scaling volumes. Further Government has to help and support in splitting of shares of BEML and also help in raising resources including GDRs (this issue concerns to D/o Defence Production) and also help in developing the markets and establishing manufacturing bases world over.
- **Aligning specific line of credits to champion companies**: With the support of Ministry of Commerce, exports can be improved particularly working through Line of Credit.
- **Center of excellence with Government spending**: BEML needs support for establishing centre of Excellences on Technology base, R&D and Design capability to become a global player. The Centre of Excellence for Rail & Metro is in an advanced stage and Government has to put up similar centre of excellences for Mining & Construction and Defence. In fact the R&D Centre of BEML at KGF can itself be converted into a Centre of Excellence for Mining & Construction, so that technology can be focused.
- **Export of BEML products**: BEML has opened the following Companies for enhancing its exports:

◊ BEML Brasil Industrial Ltd, Brazil, Pt. BEML, Indonesia, and BEML (Malaysia) SDN BHD, Malaysia, However, to improve the business the following issued need to be addressed:

- Focus on FTA's with BRICS Countries viz; Brasil, Russia, China & South Africa to emerge as important trading partners
- Developing countries which have European and American sanctions should be supported by SBI and other Indian banks for accepting LC and Bank Guarantees, etc.
- Export finance (post shipment credit) @ 7% – 8% interest should be made available for customers, at par with international competition. Current interest rates are unviable for international markets.
- Simplified export incentives need to be announced to offset VAT and multiple taxes inputs during manufacturing. Current

procedures to claim incentives are cumbersome and do not fully compensate exports.

- All levies and taxes towards domestic inputs to the export product should be exempted
- Government to ensure / support with respect to payments through LC which are sometimes dishonored.
- National Export Insurance Account (NEIA) coverage needs to be extended to private organisations overseas without a need for sovereign guarantees from their government. Also in a situation where importing country is politically unstable e.g. Syria, Iran, Myanmar, Tunisia, and African countries in general, ECGC should support with adequate cover to promote trade.
- For export promotion in BRICS countries, travel related agreements need to be facilitated, to enable long term multiple entry VISAs or VISA on arrival for bonafied export/ global companies. Currently all these countries have complex and lengthy VISA procedures and even top managements of Indian companies do not easily get multi-entry long term VISAs.
- Indian Embassies abroad to help in all possible ways towards establishing offices, product promotion, due diligence of third country partners / dealers / companies, liaisoning with local Government
- Storage space to be provided at ports at subsidized rates and fast track clearance for both imports and exports.

7.4.2 Building HEC and HMT as National Champions

7.4.2.1 Promotion of HEC as a National Champion

- The Heavy Engineering Corporation Ltd., a Public Sector Enterprise was established primarily to facilitate manufacturing Steel Plant equipments so that the country is able to enhance its Steel Producing capacity. Although HEC has a huge manufacturing capacity, it is not able to achieve the optimum production due to the condition of its equipment. As the equipment are very old, some need modernization and some need replacement. From time to time some upgradation work has been carried out and some equipments were installed but it has not been sufficient.
- HEC is already manufacturing some equipment and components which are import substitutes in nature. But there are many critical components and equipments which are being imported. HEC, at present, is unable to produce some of these due to quality constraints and some due to capacity constraints. Modernization of existing facilities and installation of new facilities will enable HEC to manufacture some components which are being presently imported is at *Annexure-III*

- Areas in which technology will have to be developed indigenously because of India specific conditions are given in Table 4.
- Action steps required to promote HEC as a National Champion is as follows:
  - It is necessary for HEC to modernize some facilities and install some new machines/equipment so that it is able to economically manufacture quality machinery and equipment of large size for the Steel & Mining sectors and machine tools of higher capacity and components for Thermal and Nuclear Power plants for which country has to presently depend on imports. Some areas for modernization are:
  - Modernisation of some facilities like Producer Gas plant, Heating and Heat-treatment furnaces, 6000T press, 1650T press and Secondary Metallurgy facilities
  - Installation of a new Electric Arc Furnace (EAF), some large & medium size CNC machine tools etc. and some quality control equipment
  - It is also necessary to augment HEC's product design capabilities so that working drawings can be made from basic engineering/design documents.
  - The Government can help HEC get Technology from the international players like SMS, Siemens- VAI, Paulwurth, Danielli etc. for steel plant equipment and Caterpillar, P & H Mining, Komatsu, Hitachi etc. for mining machinery through policy measures like compulsory offset policy and mandating compulsory at least 50% local content at present.
  - Set up 2 Centres of Excellence (one for Metallurgical machinery and one for Mining machinery) for developing state of art technology.
  - Centre of Excellence for Steel plant and other metallurgical machinery/equipment.
    - To be set up by the Government of India as JV between Govt. of India, HEC, Mecon, SAIL-RDCIS, SAIL-CET and NIFFT
    - Coordinate the efforts of all the agencies in and around Ranchi and act as a link between SAIL, Mecon, HEC etc.
    - Provide complete "concept to commissioning" solution by complementing and supplementing the resources available with SAIL-RDCIS, SAIL-CET, Mecon, HEC, NIFFT etc.
    - The Centre of Excellence to be headed by an eminent technocrat whose rank should be equivalent to the CMD/Chairman of Schedule - A company.

- Land for the centre could be provided by HEC.

– Centre of Excellence for Mining and mineral beneficiation

- To be set up by the Government of India as JV between Govt. of India, HEC, CMPDI, CIL and Indian School of Mines.
- Coordinate the efforts of all the agencies in and around Ranchi and act as a link between CMPDI, CIL & HEC.
- Provide complete "concept to commissioning" solution by complementing and supplementing the resources available with HEC, CMPDI, CIL and Indian School of Mines etc.
- The Centre of Excellence to be headed by an eminent technocrat whose rank should be equivalent to the CMD/Chairman of Schedule - A company.
- Land for the centre could be provided by HEC.

1. Estimate of costs

Purpose		Estimated Cost (Rs. Crore)
1. Modernisation of Facilities in HEC (Upgradation of existing facilties / Addition of new facilities)		1000
2. Acquisition of Technology/collaboration agreement fees		500
3. Setting up of Centre of Excellence for **steel plant equipment**		850
3.1 Land, Buildings	100	
3.2 Machineries and infrastructural facilities	350	
3.3 Funding of R & D projects	350	
3.4 Expenditure towards HRD	50	
4. Setting up of Centre of Excellence for **Mining equipment**		850
4.1 Land, Buildings	100	
4.2 Machineries and infrastructural facilities	350	
4.3 Funding of R & D projects	350	
4.4 Expenditure towards HRD	50	
Total		**3200**

6.4.2.2 Promotion of HMT Machine Tools as a National Champion

- ◊ There is need for developing machine tools sector for enhancing manufacturing capability by providing support to the industry in general and PSU like HMT in particular. Since HMT is the only PSU with units at multiple locations, vast infrastructure i.e. land, manufacturing facility and experienced manpower, it is necessary to nurture the company for promoting technological growth in the machine tool industry to meet the growing demand as National leader. If HMT has to compete with the global market it has to look for machines with latest technologies and for this it is proposed to invest in HMT to support technology development initiatives. Its production capacities have to be upgraded to address the above needs.

- ◊ To promote HMT as National Champion, following is suggested:
  - o The requirement of all Machines Tools by Defence Establishments in the country should be sourced through HMT. It may be on the basis of mutual alliances.
  - o PSU's viz., HAL, BHEL, BEML etc to extend lateral cooperation and preferences for machine tool manufacturers in PSU's, as a source for their capital goods requirement and reconditioning of their existing machines.
  - o Purchase preference for PSU products should be brought down to Rs.1.00 Cr from Rs. 5.00 Cr. and the term of preference should be extended to another 8 -10 years.

In the following table technology gaps have been identified based on the domestic market requirement and likely source for acquiring the same through JV/JWA.

Table 5 - Areas in which technology Gaps Identified where Acquisition / Joint Working / Joint Venture required:

S. No.	**Product / Technology**	**Company**	**Place**
1	High speed machining centres with very fast auto tool change /auto pallet change time	DMG	Germany
		Krause mauser	Germany
		Makino	Japan
		Chiron	Germany
2	Multi tasking machines/mill turn centre	DMG	Germany
		Monforts	Germany
		Mori-Seiki	Japan
		Niles-	Germany

		Simmons	
		Nakamura-Tome	Japan
		WFL	Austria
3	Vertical turning / boring / milling machine	WMW	Romania
		Ds Technologies	Germany
		Rafmet	Poland
		Pegard	Belgium
		Mario Carnahi	Italy
		Toshulin	Czech
		Pietrocarnaghi	Italy
4	Centreless grinder with hydrostatic bearings / guideways with wheel speed 90 mps and circularity 0.3 microns	Tacchella	Italy
		Ghiringhelli	Italy
		Mikrosa	Germany
		Lidkoping	Swiss
		Schaudt	Germany
5	Grinding machines with higher wheel speeds above 60 m/sec. And grinding machines for sub micron grinding(with hydrostatic bearings / guideways)	Junker	Czech
		Kellenberger	Germany
		Danobat	Spain
		Tacchella	Italy
		Studer	Swiss
		Schaudt	Germany
6	Moving gantry type machines with 5 axis machining capability large plano millers horizontal boring & milling machine (bed type, floor type)	Innse Berardi	Italy
		Heller Huille	Germany
		Juaristi	Spain
		Pama	Italy
		Pegard	Belgium
		Wmw	Romania
		Zayer	Spain
7	Orbital grinding technology for crankshaft pin grinding	Lidkoping	Swiss
		Naxos Union	Germany
		Schaudt	Germany

		Mikrosa	Germany
		Tacchella	Italy
		Junker	Czech
8	4 guideway lathe	Giana	Italy
		Skoda	Czech
		Safop	Italy
		Rayazan	Russia
		Bost	Spain
9	CNC multi spindle automats	DMG	Germany
		Schuette	Germany
		Tornos	Czech
		Index	Italy
		Tajmal-Zps	Czech
		Buffoli	Italy
10	CNC sliding headstock automats	DMG	Germany
		Manurhin K'mx	France
		Citizen	Japan
		Tajmac-Zps	Czech
		Index	Germany
11	Surface wheel lathe and under floor wheel lathe	Danobat Rail System	Spain
		Rayazan	Russia
		Danobat Rail System	Spain
		Rafamet	Poland
12	CNC roll grinding machine	WMW	Romania
13	Flow forming machines for aerospace/defence application	Leifeld	Germany
14	Table moving type broaching	Oswald Forst	Germany
		American Broach	Usa
		Detroit	Usa
		Fromag	Germany
		Manaca	Italy
		Balzatt	Germany
*	Thermally stabilised structures		
*	Machines with granite bed / alternate material		
*	Hydrostatic bearings/hydrostatic guideways	Zoltan	Germany
		Ina	Germany
		Hyprostatic	Germany

*	Linear motor technology	Siemens	Germany
		INA	Germany

NOTE : * marked items are technologies required to be used on all the above machines.

5. Building HMT as National Champion

Field	Amount proposed
Modernisation of Facilities in all units of HMT MTL (Upgradation of existing facilties / Addition of new facilities)	Rs.500 crore
Acquisition of Technology/collaboration agreement fees	Rs.350 crore
Setting up of Centre of Excellence for R&D activities Land/Building - 50, Machinery – 150, R&D infrastructure – 150 and HRD - 25	Rs.375 crore
TOTAL	**Rs.1225 crore**

6. Building few private sector companies as National Champion

- Few Private sector companies could also be considered to be accorded global champion status with respect to Process Plant machinery , such companies having proven track record of technological prowess and proven ability to export large hi-technology equipment, coupled with large employment generation capability.

8. Sector Specific Policy Recommendations

1. Machine Tools

8.1.1 Capacity Expansion support

- Capacity expansion: Increasing the production volume requires creation of fresh capacities as well as substantial expansion of existing units. In order to help expansion in capacity suitable incentive scheme should be provided for attracting investment and the FDI in machine Tools Industry. The fragmented nature of the industry affects a synergic growth of the machine tool units along with its supply chain, resulting in shortfalls in technology, quality and services.
- Capacity creation requires substantial investment, as the machine tool industry is capital intensive and has a long gestation period. The prevailing interest rates are high and finance is not easily available.

2. Plastics Processing Machinery:

8.2.1 Discourage imports through policy measures:

- Anti dumping duties levied on machinery imports from China to be extended up to 2017.
- Imposition of circumventing duties on China machinery getting routed through other countries

8.2.2 Create common facility centers for manufacturing of:

- Motion elements such as Ball screws and L.M. Guides
- Single screw barrels – Useful for Injection, Blow and Extrusion machinery
- Foundry to produce machine molded as well as hand molded castings
- Gear Boxes for Extrusion and Blow molding machinery
- Tie Bars & Guide Rods for Injection molding & blow molding machines
- Sheet metal for improving machine aesthetics

8.2.3 Cluster development:

- Plastics machinery sector will need supplier clusters at 3 locations – Ahmedabad, Daman/Mumbai and Chennai based on the spread of manufacturing locations of major machinery manufacturers.

8.2.4 Technology Upgradation funds (TUFS):

- Machinery manufacturers, parts suppliers and processors of plastics are to be supported by creating Technology Upgradation Fund Scheme (TUFS), similar to the one created for the textile industry. Under the scheme funds should be made available at concessional interest rates.

3. Earthmoving and mining equipment

8.3.1 Environmental policy

- Emission norms: Mining & Construction equipments are mostly used in thinly populated areas. The clean air act of USA based on which the emission norms are arrived at for on road application are not directly applicable to these Mining & Construction machines. Hence a separate empowered committee consisting of all stake holders viz: mine operators, construction companies, Mining & Construction equipment manufacturers, Diesel engine manufacturers, representatives of petroleum industry and ARAI to be set up to arrive at a separate emission regulatory road map for Mining & Construction equipment. This empowered committee will align the techno-economic factors and International regulatory obligations & commitments and also match the fuel availability while finalizing the road map.

8.3.2 Development of indigenous dredgers for expansion and maintenance of ports:

- Considering the strategic importance of expansion of ports and port handling capacity required to meet increasing trade, and with a view to achieve self reliance in this field, the indigenous production of dredgers needs to be taken up in right earnest. Funding to the extent of Rs.200 Cr is required for this project.

4. Heavy electrical and power plant equipment

8.4.1 Ensuring utilization of domestic capacity

- The policy framework of the government to allow creation of adequate demand potential for heavy electrical & power plant equipment
- Create appropriate conditions that would enable full capacity utilization of domestic manufacturing entities involved in the Heavy Electrical & Power plant equipment.
- Create a special vehicle for State Electricity Boards (SEB) that would enable replacement of old and ageing power plants of lower ratings with higher rating (500 MW & above) utilizing the existing land and infrastructure, rather than adopting Renovation and Modernization (R&M) route.

8.4.2 Raw Material

- **Facilitating Availability of Critical Raw Materials**: Electrical industry is largely dependent on imported CRGO/ CRNGO electrical grade steel because the same is not manufactured in the country in right quantity and of right quality. Further, CRGO and Boiler quality plates are presently imported by domestic manufactures from very few suppliers worldwide (5 for CRGO, 3 for CRNGO, and 2-6 foreign suppliers for plates). Recent Ministry of Steel Quality control order dated 24.06.11 puts restrictions on imports of CRGO/CRNGO and Thick Boiler Quality steel plates which can be imported only through BIS certifications giving only 6 months lead time for certification which is the least time notified by BIS for foreign suppliers. Any delay in the registration of foreign suppliers with BIS will lead to supply constraints to domestic industry which will impact power capacity addition program in the country and also adds to the transaction cost. It is suggested that mandatory BIS certification to be relaxed on imports.
- Further efforts should be made to develop indigenous capabilities for producing electrical grade steel. In this regard, domestic companies could join hands and build the domestic capability. Government must leverage access to domestic raw material sources to global majors willing to share CRGO technology to the Indian companies interested in setting up the manufacturing capacity.
- **Duty Exemption on CRGO/ CRNGO Steel**: While there is an urgent need for setting up indigenous CRGO/CRNGO capacity to meet the huge demand from electrical equipment manufacturers, import of CRGO/CRNGO be allowed at nil duty till such time the country sets up

indigenous manufacturing and achieves self sufficiency in production of CRGO/CRNGO.

- **Mitigation against Fluctuations in Raw Material Prices**: The electrical equipment manufacturing industry is of the opinion that incorporation of PV clauses should be a uniformly acceptable norm in contracts for procurement of electrical equipments by utilities/ developers/ other agencies. It is advantageous to have well defined PV clause. IEEMA developed clause could be considered as an example. Going forward, it is essential to have a continued dialogue between project developers and contractors/ suppliers for evolution of acceptable PV clauses.

8.4.3 Standardization

- The main gains from standardization are reduction in costs due to mass production and saving of time and cost largely due to time saved in tendering, engineering and approval of designs and drawings, besides better availability/ optimum inventory of Spares; operator's familiarity and ease of trouble shooting.
- Various different ratings are being specified by different developer/ Utilities. This makes standardization of the Plant design, Equipment design, Inventory management including stocking of long lead components and raw material difficult. Critical time is taken for engineering, which affects the timely completion of the Projects. Many manufacturers face the difficulty in meeting the qualification requirements due to new ratings being specified. It is therefore recommended that Central Electricity Authority (CEA)/ Ministry of Power (MoP) may decide on Specific power plant ratings as standard ratings to be adopted for the Indian grid. Utilities must resort to standardization of technical specifications i.e. design basis, equipment parameters, material specification, Quality plans etc., to the extent feasible by adopting standard rating of the set, as this will enable batch production of equipments and these can be tied up with various equipment vendors

8.4.4 **Testing facilities:-** R&D Infrastructure at National Level needs strengthening in terms of facilities especially for type testing of prototypes with a view to minimize development/commercialization cycle. Following recommendations are made:

- Provide necessary budgetary support to augment CPRI's test facilities and also upgrade testing laboratories in India to address capacity & availability issues obviating the need for sending the equipments abroad for type testing.
- Attracting private investments in the testing and certification activity by creation of additional testing/ certification agencies under the PPP route either independently or for specific laboratories under the CPRI.
- Prototype and material development in case of special castings and forgings used in power generating equipment requires infrastructure supplementation at national level to improve their development pace.

- Promote Joint endeavors of Indian companies with IGCAR, MIDHANI etc. to develop and commercialize production of prototypes.

5. Metallurgical Machinery

8.5.1 Technology Development

- A mechanism may be devised for funding of R&D Projects in Metallurgical Industry. At least Rs. 750 crore may be provided in the 12th Five year Plan for the purpose. Funds could be provided from the following sources:
  - Direct aid from Government
  - Aid from Steel Development Fund
  - Cess on Metallurgical Industries for R & D fund
- Allow duty free imports for fostering R & D
- Government to initiate and spearhead bilateral technology alliances with select countries for steel plant equipment needed for enhancing the annual steel output to 120 million tonnes by 2020.
- Set up centre of excellence/design institute in co-ordination with Industry, both user as well as machinery manufacturer.
  - Centre of excellence to have the mandate and resources to develop complete technology upgrade program for addressing the technology gaps in the products currently manufactured in the country.
  - Academic institutes can be leveraged for the Centre of Excellence (COE) where in IIT's /IISc can be partnering for developing one of the specialized technologies related to specific subsystems. For example, a Centre of Excellence for R & D in Metallurgical processes and machinery could be set up at Ranchi in co-ordination with RDCIS, CET, Mecon, HEC and Academia like IIT, Kharagpur, NIFFT etc.
- Promote Transfer of Technology, JV, component manufacture agreements to enhance indigenous production base by offering tax holidays, power at fixed rate for a period of 5 years etc.
- Exemption to domestic manufacturers for selected metallurgical machinery from condition of "evidence of previous supply" imposed by customers.
- Modifications in payment terms in tenders by Government/PSUs in order to remove disparity with Foreign competitors.

6. Textile Machinery

8.6.1 Technology Development

Machinery Segment	Technology	Strategy to follow
Weaving	**To acquire know how**	Attract FDI (Picanol, ITEMA)

	related to: ◊ Shuttleless looms (rapier >400 rpm; air jet > 800 rpm; water jet > 800 rpm)	regarding air jet, rapier (and ev. Projectile) technology to be produced competitively in India Indian OEM's should initiate JV / M&A discussions with Panter, SMIT & ITEMA
Knitting	**To Acquire know how related to:** ◊ High speed circular knitting machinery (Microprocessors) and warp knitting	Indian players should evaluate M&A and/or JV's with EU OEM's (mainly Italian & German OEMs) Explore opportunities with Ningbo Yuren about manufacturing in India
Processing	**To Acquire know how related to:** ◊ Environmentally sustainable processing ◊ High speed wide width processing ◊ Special purpose processing and finishing machinery (e.g. plasma-finishing)	Technology tie up with or acquire units of EU producers
Industrial Stitching	**Acquire know how related to:** ◊ Hi-tech industrial stitching/sewing machinery (lockstitch, overlock, coverstitch, bar tacking, pocketset, button holes, etc)	Attract FDI from reputed companies like Dürrkop, Pfaff, Necchi etc.
Ginning	Indian OEMs are well positioned, since they have know how regarding all 3 ginning technologies	Evaluate a takeover of the Continental brand Explore opportunities with Lummus
Spinning	**Acquire know how related to:** ◊ High end compact spinning ◊ High speed Open End Spinning ◊ High speed winders ◊ High speed woolen / worsted frames ◊ Air Jet technology	Invest in internal R&D Evaluate to work with western Universities (Aachen, Dresden, etc) Winders: Attract investments of Savio, Muratec and Schlafhorst into India as an alternative to China
Synthetics	**Acquire know how related to:**	Attract major EU OEM's (Oerlikon (Barmag, Neumag) to produce /

	◊ Extruders ◊ Spinning beams ◊ Godets ◊ Winders	assemble in India (as alternative to China) Contact medium sized EU OEM's (Swisstex, SML, Sahm, Giudici) in order to explore J&V's or attract them to assemble / produce in India
Jute	**Acquire know how related to:** ◊ Opening, Cleaning, Blending ◊ Spinning	Indian OEM's should proactively contact the major EU OEMs (Schlumberger, Gaudino, Bonino, Finlane, etc) in order to explore JV / M&A opportunities Attract EU OEM's (Schlumberger, Trützschler, Gaudino, Bonino, Finlane) to produce / assemble in India
Testing	**Acquire know how related to:** ◊ Filament yarn testing (on / offline)	Explore M&A or JV activities (e.g. with Sensoptics) on the filament sector

8.6.2 Simplification of procedure for refund of terminal excise duty for EPCG license holders

7. Process Plant Equipment

8.7.1 ECA funding

ECA status is to be improved at least on some projects, to begin with. Further interest charges of 12-14% against 2-3% charged by USA, China etc would make ECA funding non competitive. Hence, this issue is to be addressed innovatively.

8.7.2 Inter-Ministry Consultations

Fortunes of Process Plant sector are closely linked with fortunes of Process Plant sectors like, refinery, petrochemical, fertilizer, etc. Hence, a strong coordination between Ministry of Heavy Industry and Ministry of Petrochemical / Chemical, etc. while framing policies can be beneficial.

8.7.3 Ministry-Industry Consultations

Frequent Ministry-Industry consultation can also help in exploiting wind fall opportunity. E.g. Iran is a big market for process plant equipment. European & Americans cannot service this market. Domestic Manufacturers can service this market without violating UN sanctions, if they can develop a Rial-Rupee trade mechanism. Both China & Korea are working on this mechanism. Such opportunities will keep emerging and a mechanism is needed to exploit such opportunities.

8.7.4 Focused Manufacturing

Simplify/Remove taxation related paperwork which affects manufacturer of components in the value chain.

8.7.5 Counter trade on bulk import of petrochemical / fertilizer / refinery products should be negotiated e.g. deficit of 6 Million tons of urea is likely to be met by import at a cost of USD 400 to 600 / ton of urea. This import of USD 2.5 to 3 Billion per year should be used to leverage counter trade of at least USD 1 Billion of capital goods from India for fertilizer sector. Quantum leap in market size can be achieved

8. Engineering Goods

- **Ensuring availability of raw materials & components at competitive prices**: There should be nil duty on raw materials such as pig iron used in foundries while duties on export should be enhanced on raw materials such as iron ore to encourage domestic value addition. The import tariff on components should be carefully negotiated in consultation with the concerned sector.
- Indian foundries base for high quality valve castings also need to expand to meet the enhanced demand. Certification of foundries and other vendors could help valve makers to focus more on their own products. Any surge in demand of valves brings bottleneck in available capacity as it is noticed even today.
- Schemes such as DEPB should not be abolished without implementing GST
- The existing schemes such as CLCSS of MSME needs revision in consultation with the industry sector association as these are quite old

9. Dies, moulds & tools

- Allow special depreciation rates spread over 3 years for better ROI as the machineries used in manufacturing of Die & Mould is faced with major threat of obsolescence
- Access to low cost Tool Room specific Enterprise Resource Planning (ERP) software

9. Budget Implications sub-sector wise

a) Machine Tools

Field	Amount proposed
Technology / Product Development and CDPs	Rs.1500 crore
Soft Loans for Capacity expansion/ modernization @ 4% of Rs. 2000 crore	Rs.720 crore
Strengthening of CMTI	Rs.250 crore
3 more units of testing agency like CMTI	Rs.750 crore
Academic centers for R&D	Rs.500 crore
Acquisition of firms abroad	Rs.1000 crore
Integrated Machine Tools Park	Rs.750 crore
Common Facility centres	Rs.650 crore
Training and Manpower Development	Rs.100 crore
Greenfield Training Centres	Rs.60 crore
Executive Development Centres	Rs.40 crore
Total	**Rs.6,320 crore**

b) Plastic Machinery

Field	Amount proposed
Establishment of Centres like CIPET (10 No.)	Rs.1200 crore
Knowledge Centre of Excellence (6 no.)	Rs.720 crore
Cluster Development	Rs.508 crore
Technology Upgradation Fund	Rs.1000 crore
Common Facility Centres	Rs.550 crore
Total	**Rs.3,978 crore**

c) Earthmoving & Mining Machinery

Policy Area	Amount proposed
Development of Clusters Parks (2 no.)	Rs.2000 crore
Centre of Excellence (Product Development Centres)	Rs.1500 crore
Export incentives	Rs.500 crore

Development of dredgers	Rs.200 crore
Skill Development scheme (Creation of 1000 training institutes)	Rs.500 crore
Funds for interest subsidy for soft financing @6% of Rs.4000 crore	Rs.240 crore
Total	**Rs.4,940 crore**

d) Heavy Electrical and Power Plant Equipment

Policy Area	Amount proposed
Advanced Ultra Supercritical Technology (BHEL+IGCAR +NTPC)	Rs. 1250 crore
ICGC technology	
◊ **APGENCO**: Rs. 812.45 crore ◊ **BHEL**: Rs. 503 Crore ◊ **Budgetary Requirement from GOI**: Rs.350 Crore.	Rs. 1665.45 crore
High Voltage Testing facility	Rs.4000 crore
Total	**Rs.6,915.45 Cr.**

e) Metallurgical Machinery

Policy Area	Amount proposed
Centre of Excellence	Rs.850 crore
Transfer of Technology fees	Rs.1000 crore
Soft loan for setting up of new unit/expansion of existing unit	Rs.500 crore
Skill Development	Rs.100 crore
Total	**Rs.2,450 crore**

f) Textile Machinery

Policy Area	Amount proposed
Technology upgradation	Rs.250crore
Setting up R&D centre(IIT-B) / NITs	Rs.150 crore
Existing cluster development	Rs.750 crore

Creation of Five CFCs	Rs. 500 crore
Business & market developement	Rs.50 crore
Skill development	Rs.50 crore
Capacity building / Export promotion	Rs.50 crore
Total	**Rs.1,800 crore**

g) Process Plant Machinery

Policy Area	Amount proposed
Cluster Development	Rs.500 crore
Skill Development	Rs.100 crore
Productivity Enhancement through transfer of technology	Rs.100 crore
Support for R&D Projects	Rs.150 crore
Capacity building through Business Development Consultancy	Rs.50 crore
Total	**Rs.900 crore**

h) Engineering Sector

Field	Amount proposed
Infrastructural Development	Rs.250 Crores
Technology up-gradation Fund	Rs.300 Crores
Skill development	Rs.100 Crores
Credit at low cost for investment and interest subventions	Rs.150 Crore
Export Promotion	Rs.200 crore
TOTAL	**Rs.1,000 crore**

i) Dies, Moulds & Tools

Policy Area	Amount proposed
Provision of funds at low Rate of Interest for modernization / upgradation of facilities	Nil To be adjusted against the other sub-sector such as machine tool with similar demand

Technology development fund to substitute the imports	-do-
Skill development	-do-
Set up design centre in CFC	-do-

j) Building HEC as National Champion

Field	Amount proposed
Fund for HEC for modernization (Upgradation of existing facilties / Addition of new facilities)	Rs.1000 crore
TOTAL	**Rs.1,000 crore**

h) Building HMT as National Champion

Field	Amount proposed
Modernisation of Facilities in all units of HMT MTL (Upgradation of existing facilties / Addition of new facilities)	Rs.500 crore
Acquisition of Technology/collaboration agreement fees	Rs.350 crore
Setting up of Centre of Excellence for R&D activities Land/Building - 50, Machinery – 150, R&D infrastructure – 150 and HRD - 25	Rs.375 crore
TOTAL	**Rs.1225 crore**

The total requirements of the sub-sectors are indicated below:

S No.	Sub-sector	Total budgetary requirements from the Government
1	Machine Tool	Rs.6,320 crore
2	Plastic Machinery	Rs.3,978 crore
3	Earthmoving & Mining Machinery	Rs.4,940 crore

4	Heavy Electrical & Power Plant Equipment	Rs.6,915.45 crore
5	Metallurgical Machinery	Rs.2,450 crore
6	Textile Machinery	Rs.1,800 crore
7	Process Plant Equipment	Rs.900 crore
8	Engineering Sector	Rs.1,000 crore
9	HEC as National Champion	Rs.1,000 crore
10	HMT as National Champion	Rs. 1,225 crore
	Total	Rs. 30,528.00 crore

The Budget profile and revenue justification / neutralisation of the programmes/schemes sector-wise as well as activity-wise are given as hereunder:-

It is estimated that with the Govt support, the sector will grow at CAGR of 16.8 %.

Projected Production Rs crores	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	CAGR
Machine Tool	4530	5663	7078	8848	11060	13824	25%
Plastic Machinery	4650	5600	6850	8400	10300	12700	22%
Earthmoving & Mining Machinery	10000	16826	22356	26633	30528	34924	17.40%
Heavy Electrical	126312	145421	167521	193097	222719	257050	15.20%
Metallurgical Machinery	1300	1600	2100	2800	3800	5800	34.90%
Textile Machinery	7072	8000	9400	11000	13000	14300	15.10%
Process Plant Equipment	19861	22244	24913	27902	31250	35000	12%
Engineering Goods	124558	145551	170451	200059	235358	277526	17.30%
Dies, mould & Press tools	14,274	16,686	19,016	22,235	25,493	29,878	15.90%
	312557	**367591**	**429685**	**500974**	**583508**	**681002**	**16.85%**

The above table shows year-wise expected turnover of the CG & Engineering sector in the 12th Five Year Plan assuming a budgetary support of Rs.30,528 crore is provided as envisaged in the proposed schemes along with other incentives detailed in the preceding paragraphs.

Strategic Importance:

Capital Goods and Engineering sector is of strategic importance to the manufacturing industry. Some countries like China, Korea etc. are progressing rapidly in the sector. The Capital Goods sector in other countries enjoys cost advantage as well as higher technology levels vis-a-vis their Indian counterparts. As a result, India's dependence on imports in manufacturing industry is increasing at alarming proportions. The situation needs immediate correction by implementing measures suggested in this report.

Technology Generation:
In capital goods sector, the present technology levels are at second & third generation and technology gap is widening when compared to other countries. Dependence on high-end technology capital goods is increasing in the country which is evidence by increased imports in this sector. Upgradation of technology levels, continuous R & D efforts and self sufficiency of the nation in this sector requires desired levels of investment and support by the Government.

Revenue Neutralisation:
The cumulative turnover projected during 12Th FYP is Rs 28,75,317 crore. The Total tax contribution during the 12th FYP expected @ 15% of the turnover works out to be Rs. 4,31,297 crore. The budget requirement for CG & Engineering Sector during 12th Five Year Plan projected at Rs 30, 528 crore is only 7% of the estimated contribution to National exchequer by way of taxes. **Therefore, Working Group Report proposes to Government Budgetary support of Rs.30,528 crore for the Capital Goods and Engineering sector which is a fraction of the total tax to be contributed by the sector during 12 FYP.** It may also be pertinent to mention that budgetary support for CG and Engineering Sector is sought for the first time in the history of the Five Year Plans.

PWC-FICCI 2009 survey had found that an average of 16% of the turnover as tax had been contributed by the Industry to the National Exchequer. The tax estimated to be contributed by the Capital Goods sector in 2016 -17 works out to be 17.5% - detailed calculation model is given as below. For the report, a rounded off value of 15% has been assumed.

Calculation model for 15% Total Tax Contribution by the Industry out of its turnover (Rs. crore).

	Import content (%)	2016-17	Import of finished machinery	Import of inputs (components & raw materials)	Customs duty (on machinery @ 7.5%)	Customs duty (on inputs @ 5%)	Excise duty paid on production 8.7%	Income Tax (1% of turnover)/ Corporate tax (1% of turnover) paid
Machine Tools	30% Std 40% Hi tec	13824	10201	4838	765	242	1203	138
Plastic Machinery	12 (standard) /22 (hi-tech) Average 17%	7100	1750	1562	131	78	618	142
Earthmoving & Mining Machinery	35 (standard)/ 78 (hi-tech) Av. 56.5%	34924	11308	19733	848	987	3038	698.48
Heavy Electrical	B/T/G 30 – 45% Av. 37.5%	257050	116977	96393	8773	4820	18765	5141
Metallurgical Machinery	15 (standard)/ 35 (hi-tech) Av. 25%	5800	18500	1450	1388	73	505	116
Textile Machinery	12(standard)/ 27 (hi-tech) Av. 19.5%	14300	5400	27885	405	1394	12441	700
Process Plant Equipment	10 -standard & 30 - hi-tech Av. 20%	35000	3868	7000	290	350	3045	597.56

Dies, mould & Press tools	15 (standard & hi-tech)	29878	7946	4481	596	224	2599	4550.42
Engineering Goods		227521	110005		8250		19794	12507.94
Total		**625397**	**285955**	**163342**	21446	8168	62008	24591.4
	Total tax	1190907						
	Percentage	**17.5**						

Details of Sub-Sector-wise Budgetary Support Required (Rs. crore):

S. No.	Sub-Sector/ PSE	Projected Market Size 2016 -17	Projected Production 2016 -17	Contribution to National Exchequer in 2016 -17(15% of production)	Budget Proposed
1	Machine tool	23678	13824	2073.6	6320
2	Plastic Machinery	13096	12700	1905	3978
3	Earthmoving & Mining Machinery	45232	34924	5238.6	4940
4	Heavy Electrical Equipment	301662	257050	38557.5	6915
5	Metallurgical Machinery	23250	5800	870	2450
6	Textile Machinery	18500	14300	2145	1800
7	Process Plant Machinery	30118	35000	5250	900
8	Engineering Sector	280604	277526	41628.9	1000
9	Dies and Moulds	31783	29878	4481.7	
10	HEC as National Champion				1000
11	HMT as National Champion				1225
	Total	**767944**	**681002**	102150.3	**30528**
	Cumulative turnover of CG Sector in the 12th Five Year Plan		**2875317**	**431297.6**	

Facility wise budget (Rs. crore)

sector	R & D	Skill Development	Technology Development	Capacity Building	Business Development	Total
	R&D Centres	Skill development / Centre of Excellence	Technology development fund / CDP/ technology fees / modernisation /acquisition / Soft loan for expansion	CFC / Cluster park /Capacity building / Testing facility /Strengthening CMTI	Business & market development / Export promotion	
Machine tool	500	200	3220	2400		6320
Plastic Machinery		1720		2258		3978
Earthmoving & Mining Machinery		2000	440	2000	500	4940
Heavy Electrical Equipment			2915.45	4000		6915.45
Metallurgical machinery		950	1500			2450
Textile Machinery	150	50	250	1250	100	1800
Process plant machinery	150	100	100	500	50	900

Engineering sector		100	550	250	200	1000
HEC			1000			1000
HMT	375		350	500		1225
	1175	3400	11945.45	13158	850	**30528**
					30528	

Implementation Strategy:

The proposed scheme, which is need based, multi stakeholder driven, holistic and outcome oriented, would require institutional structure to be in place and processes to be formalized, which would make the programme implementable and, result oriented. The following formulations are proposed:-

SPV: It is proposed to set up an SPV to undertake implementation of the proposed programme. The proposed SPV will be registered as a Society under the Indian Societies Registration Act 1860. A CEO at the level of Joint Secretary will be the operational head. A Governing Body chaired by Secretary (Heavy Industry) will be formed for policy matters. Industry Associations, Institutions, Academia and other stake holders will be represented in the Governing Body. The model is proposed on the basis of a similar institution called NATIS, which is already in place for Auto sector. This institution has given a big boost and fillip to the Indian Automobiles sector. The broad scope of work to be undertaken by the SPV for the Capital Goods and Engineering Sector will include the following:-

1) **R&D,**
2) **Skill Development,**
3) **Technology Development,**
4) **Capacity Building,**
5) **Testing Facilities,**
6) **Business Promotion and Development**.

Budgetary allocation for the proposed SPV will be supplemented through other means of financing like PPP route amongst others.

Appendix

Process Followed

- Planning Commission (Industry Division) has constituted a Working Group on Capital Goods and Engineering Sector for the 12th Five Year Plan (2012-2017) vide their OM No. I&M-3(28)/2011 dated 18th May, 2011 under the Chairmanship of Secretary, Deptt. of Heavy Industry to be submitted to the Chairman of the Steering Committee on Industry, Planning Commission by 30th August, 2011.
- Objectives set for manufacturing sector in 12th Five year plan by Planning Commission are as under:
  - Increase manufacturing sector growth to ~2-4% more than GDP growth to make it the engine of growth for the economy and increase share to ~25% of overall GDP by 2025
  - Increase the rate of job creation in manufacturing to create ~100M additional jobs by 2025
  - Increase "depth" in manufacturing, with focus on the level of domestic value addition
  - Enhance global competitiveness of Indian manufacturing through appropriate policy support
  - Ensure sustainability of growth, particularly with regard to the environment
- 1st Meeting of the Working Group held on 29th June, 2011 under the Chairmanship of Shri S. Sundareshan, Secretary, Deptt. of Heavy Industry, the minutes of the above meeting is placed at Annexure-IV.
- The Working Group has created seven sub-groups for the different sub-sectors of the capital goods & Engineering Sectors with the following composition:

S. No.	Composition	
1	Shri S. Sundareshan Secretary Department of Heavy Industry, Udyog Bhawan, New Delhi - 110 011 Fax:011 23062633	Chairman
2	Shri V. Govindarajan Member Secretary or Nominee, National Manufacturing Competitiveness Council, Vigyan Bhawan Annexe, New Delhi – 110011 Tel: 23022540 Fax: 23022529	Member
3	Shri R. P. Singh Secretary or Nominee Department of Industrial Policy & Promotion, Udyog Bhawan, New Delhi - 110 011 Fax: 011 23061598	Member

S. No.	Composition	
4	Shri P. Uma Shankar Secretary or nominee Ministry of Power Shram Shakti Bhawan, New Delhi -110 001 Fax: 011 23721487	Member
5	Shri Sanjiv Handa Member (Mechanical) or nominee Railway Board , Rail Bhawan, New Delhi - 110 001 Fax: 011 23385113	Member
6	Dr. Vijay Kumar Saraswat SA to RM, DG DRDO and Secretary, Defence R&D Defence Research & Development Organisation (DRDO) DRDO Bhawan & HQs, Rajaji Marg, New Delhi - 110 011 Tel: 011-23011519 Fax: 011-23018216	Member
7	Shri D. M. Gupta Chairman & Director General Ordnance Factory Ordnance Factory Board, Ayudh Bhawan, 10 A, S K Bose Road Kolkata- 700 001 Fax: 033 22486647 E-mail: sec.ofb@nic.in	Member
8	Dr. Renu S. Parmar Adviser (I & VSE) Planning Commission, Yojana Bhawan, New Delhi Telefax: 2309 6605 E-mail: rsparmar@nic.in	Member
9	Shri B. P. Rao Chairman & Managing Director M/s Bharat Heavy Electricals Limited BHEL House, Siri Fort, New Delhi-110049 Tel:011-66337000 Fax-011-26493021 E-mail: bprao@bhel.in	Member
10	Shri G. K. Pillai Managing Director M/s HMT Machine Tools Limited Bangalore Complex, Jalahalli, HMT P.O., Bangalore – 560 013 Tel: 080-66626850/52 Fax: 080-28382797 E-Mail: cmd@hmtmachinetools.com	Member
11	Shri G. K. Pillai Chairman & Managing Director Heavy Engineering Corporation Limited Plant Plaza Road P.O: Dhurwa, Ranchi : 834 004 Tel: 0651-2401249 Fax: 0651-2401571 E-mail: cmd@hecltd.com	Member
12	Shri V.R.S. Natarajan	Member

S. No.	Composition	
	Chairman & Managing Director Bharat Earth Movers Ltd BEML Soudha, 23/1, 4th Main S.R. Nagar, Bangalore-560027 Tel: 080-22963111 Tax: 080-22104099 E-mail: bemlcmd@vsnl.net	
13	Dr. S. K. Jain Chairman & Managing Director M/s Nuclear Power Corporation of India Limited (NPCIL) 16th Floor, Centre - I, World Trade Centre, Cuffe Parade, Colaba, Mumbai - 400 005 Tel: 022-22182171 / 22182177 Fax: 022-22180109 E-mail: info@npcil.co.in	Member
14	Shri A. K. Purwaha Chairman & Managing Director M/s Engineers India Ltd Engineers India Bhawan, 1, Bhikaiji Cama Place, R K Puram,New Delhi - 110066 Tel: 011-26762121 Fax: 011- 26178210, 26194715 E-mail:eil.mktg@eil.co.in	Member
15	Shri A.K. Ghosh Chairman & Managing Director MECON Limited, Ranchi - India Phone: +91-651-2481021 E-mail: gmcspna@ranchi.mecon.co.in	Member
16	Shri A. M. Naik Chairman & Managing Director M/s Larsen & Toubro Limited L&T House, N. M. Marg, Ballard Estate, Mumbai 400 001 Tel: 022-67525856 Fax: 022-67525858 E-mail: amn@lth.ltindia.com	Member
17	Shri B. N. Kalyani Chairman & Managing Director, M/s Bharat Forge Limited Pune Cantonment, Mundhwa, Pune - 411 036 Tel: 020-26702777 Fax: 020-26822387 E-mail: info@bharatforge.com	Member
18	Shri Sanjay Jayavarthanavelu Managing Director M/s Lakshmi Machine Works Lmited Regd.Office : Perianaickenpalayam, Coimbatore - 641 020 Tel: 0 422 3022255 Fax: 0 422 2692541 E-mail: sj@lmw.co.in, raju.v@lmw.co.in	Member
19	Shri M. S. Unnikrishnan	Member

S. No.	Composition	
	Managing Director M/s Thermax India Limited Thermax House, 14 Mumbai-Pune Road Wakdewadi, Pune - 411 003 Fax: 020-25542242	
20	Shri S. M. Trehan Vice Chairman M/s Crompton Greaves Limited CG House, 6th Floor, Dr. Annie Besant Road Worli, Mumbai - 400 030 Tel: 0-22-2423 7777 Fax: 0-22-2423 7788 E-mail: sudhir.trehan@cgglobal.com	Member
21	Shri Aditya Puri Managing Director M/s ISGEC Saraswati Corporate Centre, A-4 Sector 24, Noida - 201 301 Tel: 0120 – 2411289/2411290 Fax: 0120 – 2412250 E-mail:apuri@isgec.com	Member
22	Shri Sunand Sharma Chairman M/s ALSTOM Projects India Limited IHDP Building, Plot -7, Sector 127, Noida - 201 301 Tel: 0120-473 1100 Fax: 0120-473 1200 E-mail: sunanda.sharma@crn.alstom.com	Member
23	Shri B. Muthuraman President Confederation of Indian Industry (CII) The Mantosh Sondhi Centre, 23, Institutional Area, Lodi Road New Delhi - 110003 Tel: 011-24629994-7 Fax: 011-24626149 E-mail: cb@cii.in	Member
24	Shri Harsh Mariwala President Federation of Indian Chambers of Commerce and Industry (FICCI) Federation House, Tansen Marg, New Delhi 110001 Tel: 011-23738760-70 Fax: 011-23320714, 23721504 E-Mail: rkumar@ficci.com	Member
25	Shri M. Lokeswara Rao President Indian Machine Tool Manufacturers Association (IMTMA) 10th Mile, Tumkur Road, Madavara Post, Bangalore - 562 123 Tel: 080-662466 Fax: 080-662466 E-Mail:mlrao@lokeshmachines.com; info@lokeshmachines.com	Member
26	Shri Anuj Bhagwati Chairman Textile Machinery Manufacturers' Association (India) (TMMA)	Member

S. No.	Composition	
	53, Mittal Chambers, 5th Floor, Nariman Point, Mumbai - 400 021 Tel: 022-22023766/22024238/22834622 Fax: 022-22028017 E-mail: a_a_bhagwati@ateindia.com	
27	Dr. N. Ramesh Babu Professor Manufacturing Engineering Section, Department of Mechanical Engineering, Indian Institute of Technology Madras, Chennai – 600 036 Fax: 0 44-22570509 E-mail: nrbabu@iitm.ac.in	Member
28	Shri Vimal Mahendru President Indian Electrical & Electronics Manufacturers' Association (IEEMA) 501, Kakad Chambers, 132, Dr. Annie Besant. Road. Worli, Mumbai - 400018 Tel: 022-24930532/ 022-24930532 / 6528 / 6529 Fax: 022-24932705 E-mail: vimalm@indoasian.com	Member
29	Mr. C. M. Venkateshwaran Chairman Process Plant and Machinery Association of India (PPMAI) 002, Loha Bhavan, 91/93, P D'Mello Road, Masjid (E), Mumbai – 400 009 Tel: 022-23480405 / 23480965 Fax: 022-23480426 E-mail: ppmai@vsnl.net	Member
30	Shri Glenvilla da Silva President Indian Earthmoving and Construction Equipment Industry Association Limited (IECIAL) Mantosh Sondhi Centre, 23, Institutional Area, Lodi Road New Delhi –110003 Tel: 011-24629994/458 Fax: 011-24615693 E-mail: glenville.da.silva@volvo.com	Member

S. No.	Composition	
31	Shri R. Maitra Executive Director , EEPC INDIA 'Vandhna', 4th Floor 11, Tolstoy Marg New Delhi 110001 Phone: (+91 11) 23353353, 23711124/25 Fax: (+91 11) 23310920 E-mail: ed@eepcindia.net	Member
32	Dr. P. Radhakrishnan Director PSG Institute of Advanced Studies, Post Box No.1609, Avinashi Road, Coimbatore 641004, Phone: +91 422 - 4344000 /4344104 Fax: +91 422 2573833 E-mail: prk@psgtech.edu	Member
33	Dr. A. K. Chattopadhyay Professor Department of Mechanical Engineering, Indian Institute of Technology Kharagpur, Kharagpur - 721302 Tel: 032-22255221 Fax : 032-22255303 E-mail: akc@mech.iitkgp.ernet.in	Member
34	Dr. P. Venkateswara Rao Professor Department of Mechanical Engineering, Indian Institute of Technology Delhi Hauz Khas, New Delhi – 110 016 Tel:011-2659 1701 Fax:011-26582659 E-mail: pvrao@mech.iitd.ac.in	Member
35	Shri B. R. Satyan Director Central Manufacturing Technology Institute (CMTI), Tumkur Road, Bangalore - 560022 Tel: 080-23372048 Fax:080-23370428 E-mail: brsatyan@cmti-india.net	Member
36	Shri Harbhajan Singh Joint Secretary Department of Heavy Industry, Udyog Bhawan, New Delhi -110 011 Fax:011 23061858 E-mail: hb.singh@nic.in	Member Secretary

- The Terms of Reference as indicated in the Planning Commission O.M. dated 18.5.2011 for 'Working Group of Capital Goods & Engineering Sector' is indicated below:
  - To outline the long-term goals that are sought to be achieved in capital goods and engineering sector.

- To review the status of capital goods (machine tools, earth moving, heavy electrical, metallurgical, textile, process plant, mining, power plant and other industrial machinery) and engineering sector in terms of capacities, production and its technological/engineering standards as well as volume of imports.
- To identify the critical factors that inhibit the development of capital goods sector particularly in creation of additional capacities and diversification to meet the emerging requirement of growing needs of the industry.
- To identify the critical segments where the domestic capital goods industry has remained stagnant in spite of growing domestic demand and to analyse the causes.
- The extent of technology transfer and enhancement of production capacities in last five years in this sector through Foreign Direct Investment (FDI) in Joint Ventures and Wholly Owned Subsidiaries (WOS).
- Assessment of role of Public Sector Enterprises (PSEs) in capital goods sector and future road map thereof.
- Ways and means to improve accessibility of technology for domestic capital goods and engineering sector.
- In the context of the long terms goals as at (i) above whether there is a need to develop/ strengthen institutional support to industry.
- To analyse the international best practices for development clusters in machine tools/capital goods segment, other support measures and institutional arrangement and to take lessons from them.
- To suggest strategy to overcome the present limitations and to suggest specific plans including fiscal and other policy measures to develop an enabling environment.
- To specify the milestones to be achieved in the 12th Five Year Plan in order to achieve the long term goals as laid down TOR (I) above.
- To suggest/recommend programmes/schemes that are to be terminated in the 11th plan or initiated or continued in the 12th plan period, together with the broad budgetary implications, if any.
- Any other matter considered integral to the above objective.

◊ Formation of Sub –Groups

The Capital Goods Sector has been divided into the following sub-sectors of capital goods to give appropriate focus to meet the objectives set by Planning Commission. This has been decided in the first meeting of the Working Group held on 29.6.2011.

Sub-Group –I Machine Tools including Plastic Machinery
Convener: M. Lokeshwara Rao, President, IMTMA
Members: Representative of

- CMTI

- HMT
- Railway Board
- OFB
- ISGEC
- PSG-IAS
- DRDO
- IIT-KGP
- CII
- Plastic Machinery Manufacturers Association
- ACMA
- EEPC

Sub-Group-II Earth Moving and Mining Equipment
Convener: Shri V.R.S. Natarajan, CMD, BEML
Members: Representative of

- IECIAL
- IIT-Chennai
- CII
- Diesel Engine Manufacturing Association
- HEC
- EEPC
- Andrew Yule

Sub-Group-III Heavy Electricals & Power Plant Equipment
Convener: Shri B. P. Rao, CMD, BHEL
Members: Representative of

- Ministry of Power
- NPCIL
- IEEMA
- CII
- NTPC
- TATA Power
- L&T
- Crompton Greaves
- Thermax India
- BFL
- Alstom
- Andrew Yule
- DRDO
- CPRI
- FICCI
- PGCIL
- EEPC

Sub-Group-IV Metallurgical Machinery
Convener: Shri G.K. Pillai, CMD, HEC
Members: Representative of

- MECON
- BHEL
- IIT-KGP
- BFL
- FICCI
- SAIL R&D
- BARC
- CII
- Private Steel Corporations
- EEPC

Sub-Group-V Textile Machinery
Convener: Shri Sanjay Jayavarthanavelu, CMD, LMW
Members: Representative of

- Ministry of Textile
- TMMA
- IIT-Delhi
- FICCI
- CII
- CITI
- SASMIRA
- NTC
- Premier
- CITRA
- EEPC

Sub-Group-VI Process Plant Machinery
Convener: Shri S. N. Roy, Sr VP, L&T
Members: Representative of

- PPMAI
- EIL
- IIT-Delhi
- FICCI
- BHEL
- ISGEC
- Thermax
- EEPC

Sub-Group-VII Engineering Sector

Convener: Shri R. Maitra ED, EEPC
Members: Representative of

- DIPP
- NMCC
- FICCI
- CII
- IIT- Madras
- Institute of Indian Foundry men
- Ball & Bearing Association
- Advance Valves Pvt. Ltd.
- Bharat Forge
- Tata Steel
- Jindal SAW pipes

Annexure-I

Skill Development Support proposed by National Skill Development Corporation

The National Skill Development Corporation (NSDC) aims to promote skill development by catalysing creation of large, quality, for-profit vocational institutions. It provides viability gap funding to build scalable, for-profit vocational training initiatives. Its mandate is also to enable support systems such as quality assurance, information systems and train the trainer academies either directly or through partnerships. Its objective is to contribute significantly (about 30%) to the overall target of skilling/up skilling 500 million people in India by 2022, mainly by fostering private sector initiatives in skill development programmes and providing viability gap funding. NSDC is a not-for-profit company set up by the Ministry of Finance, under Section-25 of the Companies Act. It has an equity base of Rs 10 Cr, of which the Government of India accounts for 49%, while the private sector has the balance 51%.

The National Skill Development Policy is aimed at empowering all individuals through improved skills, knowledge and internationally recognized qualifications to enable them to access decent employment, to promote inclusive national growth and to ensure India's competitiveness in the global market.

The coverage of the National Skill Development Policy is as follows:

1. Institution-based skill development including ITIs/ITCs/vocational schools/technical schools/ polytechnics/ professional colleges, etc.
2. Learning initiatives of sectoral skill development organised by different ministries/departments.
3. Formal and informal apprenticeships and other types of training by enterprises
4. Training for self-employment/entrepreneurial development
5. Adult learning, retraining of retired or retiring employees and lifelong learning
6. Non-formal training including training by civil society organisations
7. E-learning, web-based learning and distance learning.

The Modular Employable Skills (MES) scheme is being offered under the Skill Development Initiative Scheme (SDIS). The Ministry of Labour and Employment undertook the development of a new strategic framework, namely the MES, for skill development for early school leavers and existing workers, especially in the unorganised sector in close consultation with industry, micro enterprises in the unorganised sector, State Governments, experts and academia. The main objective of the scheme is to provide employable skills to school leavers, existing workers, ITI/ITC graduates, etc. Skill levels of persons already employed can also be tested and certified under this scheme, i.e., certification of prior/experiential learning. Public Private Partnership (PPP) envisaged in the form of active participation of the industry/private sector in every stage of design and implementation of the scheme. The MES concept has the potential to go a long way in furthering skill development as it has provided a pathway for multiple entry

and exits as well as transforming skill development from long term skill acquisition periods (1 to 2 years) to short term (about 3 months).

There are 1,122 courses which are a part of the approved list of MES courses. The courses do not cover skill development relating to capital goods sector.

The government is making thrust in upgrading existing institutions through a combination of own funding, multilateral assistance and PPP.

- Upgradation of 500 Government ITIs
  - 100 domestically funded and 400 World Bank assisted initiatives to upgrade 500 ITI in all
  - Closer involvement of industry by forming an Institute Management Committee (IMC) headed by an industry representative.
  - IMC given financial and academic powers to help run the institutes.
- Upgradation of 1,396 Government ITIs through Public Partnership (PPP)
  - 300 ITIs to be taken up every year from 2007-08 till 2010-11 and remaining in 2011-12.
  - For each ITI to be taken up under the Scheme, an Industry Partner is associated to lead the process of upgradation. An Institute Management Committee (IMC), headed by the Industry Partner, is constituted and registered as a Society. A Memorandum of Agreement is signed among the Central Government, the State Government, the State Government and the Industry Partner defining the roles and responsibilities of all the parties. An interest free loan up to Rs. 2.5 crore is given by the Central Government directly to the IMC on the basis of Institute Development Plan (IDP) prepared by it. The loan is repayable by the IMC in 30 years, with a moratorium of 10 years and thereafter in equal annual instalments over a period of 20 years. Under this scheme the IMC has been given financial and academic autonomy to manage the affairs of the ITI. The IMC is allowed to determine up to 20% of the admission in the ITI. The Industry Partner may provide financial assistance as well as machinery and equipments to the ITI. It shall arrange to provide training to instructors and on the job training to trainees. State Governments remain the owner of the ITIs and continue to regulate admissions.

- Other key Skill Development Initiatives of the Government are as follows:
  - Establishment of 1,500 new ITIs through the DGET
  - Establishment of 50,000 Skill Development Centres through the DGET
  - Setting up of PM National Council on Skill Development (already operational)
  - Setting up of National Skill Development Coordination Board (already operational).

Annexure II

Action Plan for Centers of Product Development (CPD)

Establish viable and holistic 'Product Development Competence' at the national level, seed and enable the growth of a robust 'innovation eco system' for the capital goods sector as a whole.

Large Technology Gaps needs to be closed with a national plan, since the perpetual dependence on overseas technology retards the progress of the sectors, which is a strategic threat to the fulfillment of the nation's aspirations of achieving the intended growth rate and the continued sustainability of growth at desired levels.

Common issues on Technology Generation across the Capital Goods Sector need to be addressed with requisite capacity and capability build-up. This would be an 'apex level initiative' of DHI.

DHI needs to have a "Technology Generation Corpus Fund" for Capital Goods Sector and a mechanism established for managing the fund.

Generation of Technologies which are 'feeder technologies' for all the above sectors needs to be the focus for this initiative. This theme transcends the categorization of the sectors based on Equipment and sector classification.

At this opportune juncture where-in (i) technology strength consolidation is a national imperative, (ii) technologies assiduously developed elsewhere and ready for commercial exploitation would not be available for the Indian industry, (iii) international players are setting up their base in the Indian soil with disruptive interventions to capture Indian market share with customized products for Indian customer and (iv) absence of significant avenues for evolving joint ventures which could build up competence for generation of new technologies and products for the Indian market in the long run, etc., "in-country Technology generation and adaptation across sectors" have to be taken as a national common programme for agglomeration of expertise, strengths, networking of existing and 'to be set up' resources/infrastructure and enable cross-fertilization of ideas, technologies and practices across the subsectors. IP generation and development of new and significantly differentiable products for the fast globalizing Indian and global markets requires such repositories to be developed in the Indian context.

This strategy would offer the advantage of scale and penetration spread of technology and longer term sustainability of development momentum for new differentiable products in the sectors.

A national and thematically uniform framework for assessing the Technology Maturity Levels for commercialization and industrial deployment needs to be introduced across the sectors.

Any New Product is a 'result' of innovative adaptation/s of various generic technologies (inputs) which are independent strengths to be developed.

1. The Technology streams include amongst others:-

Process Technology development by Industry/Academia collaboration (IITs, NCL etc): R&D initiatives to boost development efforts with GOI support

Target Technologies to be developed:
Other than manufacturing technologies, the technologies to improve business performances like productivity increase etc are to be considered. At operational level, Welding, Forming, Machining technologies could be improved to a certain extent. Capabilities on Process Engineering and unit operation system to have independence from overseas licensors and to chart out our own growth strategies are seen as enablers for driving self sufficiency in this industry for us. Some areas for target technologies to be developed are as follows:

- Sub Sea Equipment
- Oil well drilling
- Process gas Boilers for Ethylene and Gas Crackers

Industry and Academia collaboration for R&D and training
R&D efforts such as mentioned below, can be encouraged by GOI, to promote Innovation led growth in this sector.

- Application of reduced pressure Electron Beam welding (EBW) for high thickness joints in pressure vessel fabrication (In collaboration with foreign partner/institute like TWI etc)
- Application of Induction heating technology for nozzle pull out & local Post Weld Heat Treatment
- Exploration of Friction Stir Welding (FSW) for high thickness steel joints (In collaboration with foreign partner/institute like TWI etc.)
- Material development for domestic supply of critical welding consumables
- Manufacturing of Carbon Fibers for variety of applications – more for replacing metal with high strength lightweight materials.

- New material adaption technologies
- Metal working technologies -- Metal machining, deposition, joining and forming process technologies including surface engineering/coating technologies
- Metal Casting,
- Tools and Tooling, Dies and Moulds, etc.
- Robotics and Automation
- Measurement Technologies – Sensors, inspection aides/systems, scales, interferometry, etc.
- Electrical Drives and Controls, Kinematics,..
- Embedded Electronics and Computer Numerical Control
- Tribology, Lubricants, Bearings and guideway related technologies
- ICT and Simulation Technologies – Man-machine interface technologies

These technologies need to be developed with an organized effort and they would be facilitating Capital Goods Machinery development across the sectors, since they are generic inputs with differing magnitudes and variants to configure any particular machinery like Machine Tools, textile machinery, Testing systems, etc. They form the back bone of the 'Directed and Application oriented R D & D' in the

national assests of the innovation ecosystem for advancement of technology and generation of products for the advancement of the capital goods sector.

Each of the above could be developed as 'foundation technology resources' through 'Centers for Product Development' (CDPs).

The Following Centres of Product Development (CDPs) would be established in the 12th Plan and serviced by the "Technology Generation Fund for Capital Goods Sector" of DHI:-

S.No.	Name of Centre for Product Development (CDP)	Activity Domain	Sectors serviced /Deliverables
1	**CDP - New material adaptation technologies and products**	◊ High Strength Castings and Alloys, new Formulations ◊ Alternative High Performance Materials – epoxy granites, porous structures, light weighting, Fibre reinforcement in materials, ◊ Energy Efficient Materials and technologies ◊ Surface Engineering, Coating technologies ◊ Tooling Materials, grinding Media, abrasive flow media, metal matrix composites, etc. ◊ Direct Metal Deposition processes	◊ Processes for realizing Special castings, alloys, epoxy granites, etc. ◊ Development of PVD, CPVD systems, Plasma sources, customized to specific applications ◊ Special Coatings for Watch, Vacuum Coating, Tools, and components for high wear resistance, Ceramics, etc. ◊ Media for abrasive flow media, metal matric composites etc. **Sectors Serviced:-** ◊ Machine tools, ◊ Textile machinery, ◊ Tools, moulds and Dies, ◊ Plastics, ◊ Bearings, ◊ Aerospace ◊ Energy (Solar included) etc.
2	**CDP -- Metal working/shaping**	◊ Metal finishing, ◊ deposition,	Processes in finishing (Abrasive Flow,

	technologies, Tools, Tooling and Dies and Moulds	◊ welding and joining ◊ forming process technologies ◊ Die casting and related machinery development ◊ Special Casting Processes ◊ Development of dies and moulds	polishing, grinding, etc.) Machines, Process adaptations, etc. Joining Welding processes and machines and accessories Forming processes and machine subsystems Castings **Sectors/industries Serviced:-** **Machine Tools, Construction industry, Automotive, Presses, Dies and moulds, Aerospace, Plastics, Die Casting, etc.**
3	**CDP – Electronics and Controls Technologies and products**	**Explicit and Embedded Electronics and adaptive controls, Computer interface protocols, integration of sensors and actuators, on-line, realtime compensations for position and path accuracies**	
4	**CDP - Drives and Controls Technologies and products**	**Multi-axis Motion Control, Physical drives and hardware, linear motors, high performance motors, hydraulic drives, electro-hydraulic controls, etc.**	
5	**CDP – High Fidelity Measurement Technologies and products,**	◊ Measurement devices and aggregates including laser applications, encoders, glass scales, etc. ◊ Metrology aides ◊ Interface engineering Specific to machine tools and machineries,	**All Sectors**

		computerized controls, in-process measurements ◊ Sensors, inspection aides/systems, scales, interferometers, etc. ◊ Interferometry related applications	
6	**CDP – Robotics, Material Handling and Automation technologies and products**	◊ Mechatronics applications ◊ Ultra-precision kinematics and assemblies ◊ Advanced kinematics, automation and robotics application products	**Sectors serviced:- Product Adaptations for** • Machine Tools • Process industries • Textile machinery • Automotive manufacturing • Metallurgical industries, • Medical engineering, • Aerospace, • Manufacturing systems… • Measurement systems
7	**CDP:- Tribology, Lubricants, Bearings and guide-way related technologies**	**Bearing applications:-** ◊ Ultra-precision bearings ◊ spindle systems, assemblies, ◊ Guideways, guiding elements etc. ◊ Antifriction, Hydrodynamic, Hydrostatic/aerostatic, hybrid, and other types of bearings, ◊ Magneto-hydrodynamics ◊ Engineered High performance lubricants, slide-way materials, etc. ◊ Functionally targeted surface coatings with	**All machinery including process machinery**

		trans-metals, etc.	
8	**CDP -- ICT and Simulation Technologies – Man-machine interface technologies**	Technologies and products related to computer integrated manufacturing Knowledge Data Base for machining process control Man -Machine Interface controls (MMI), simulations, etc. Products and services related to Simulation of ◊ tool paths, ◊ motion trajectories, ◊ processes, ◊ kinematics, ◊ factory floor activities ◊ Production layouts, etc.	

Note:-

- Detailed Project Reports have to be evolved for the CDPs
- CDPs will be operationally linked to Leading R & D establishments/universities/Institutions/centers of learning like IISc, IITs, CSIR and DRDO labs, for harvesting know-how and 'Proof of Concepts' from such institutions to develop deployable products in CDPs.
- CDPs will incubate technologies with industry startups with equity participation and or partner industry partners who will be suppliers of OEs to Capital Goods machinery manufacturers.
- CDPs will develop specialized machinery/accessories/equipments for strategic sectors and national mission projects involving ISRO, DRDOL, etc.
- Additional CDPs will be developed to promote new product developments in other sectors as and when the need arises.

(Note:- CDPs would be similar to Fraunhofer institutions of Germany. Each CDP has a 'specific technology competence' which could help industries across manufacturing sectors. Such Commercial Laboratory repositories advance sustained development of products and technologies useful to the society. It is perceived the absence of this layer in the innovation continuum of Indian manufacturing domains is the cause of Indian General Engineering Domain not coming up with any world class products even to service Indian growing requirements. They would service technology and product development requirements of industries which deploy technologies and strengths

which are core competences of the particular CDP. CDPs and Academia and Industries form an operational cluster. The industries are not sector specific in such technology value chain clusters. CDPs would have design, manufacture, assembly and testing infrastructure along with requisite laboratory infrastructure manned by system development engineers and scientists. They develop technologies, subsystems, total systems, etc. and even may demonstrate limited series production themes to bring the products to a level of commercialization-worthiness.)

Annexure-III

Table 1 - Some high value items presently being imported which can be manufactured in HEC after its modernisation:

S.No	Area	Components/Equipment	Remarks
1	Mineral beneficiation	Pneumatic jigs, wet high intensity magnetic separators	Humboldt Wedag (Germany) now known as McNally Humboldt Wedag Minerals (India) Pvt. Ltd., Almineral Asia Pvt. Ltd. (Germany), Metso Minerals (Finland)
2	Large size Blast Furnace	Tuyeres, Tuyere coolers	
		Copper stave coolers & SG iron stave coolers	
3	Rolling Mill Equipment	Large Mill Stands for plate mills & hot strip mills (around 350t single or 500t 3-piece design)	HEC has capacity to manufacture Mill stands upto 70 T piece weight
		Large back-up rolls (up to ~300t) and work rolls (up to ~75t)	HEC has capacity to manufacture back up rolls upto 40T piece weight
4	Power plants	Rotor Forgings, HP/IP Inner Casing/Outer Casing etc.	
5	Nuclear Power	Castings & forgings for Pressurisers and Steam Generators	

Table 2 - Areas of Steel Plant equipment/machinery in which Process/Design Know how is required to be acquired through technology transfer/ license agreement/ technological collaboration

S.No	Area	Process/Equipment	World leaders of technology
1	Large size Blast Furnace	Slag granulation plant –INBA system	Paulwurth
		Slag granulation plant –RASA system	Siemens-VAI
		Slag granulation plant –RASMAN system	POSCO
		Slag granulation plant –Dewatering Wheel system	Danieli- Corus
		Hydraulic Mud Gun	TMT(Luxemburg), Siemens VAI, Shougang(China), Woodings Industrial Corporation (USA)
		Hydraulic Tap hole Drilling Machine	

S.No	Area	Process/Equipment	World leaders of technology
		Top Charging equipment	Paulwurth, Totem (Russia), Woodings(USA)
		Torpedo Ladles	Hyundai Heavy Industries(Korea) – MOU with Simplex Castings (India), L&T-GHH, DHI-DCW group (Dalian, China) – MOU with Simplex Engg. & Foundry (India), Quinye (China)
		Pig casting machines compatible with Torpedo Ladle pouring	Paulwurth, Shougang (China)
2	Coke Oven Machines having pollution control features and energy saving technology	Coke dry quenching machine	Schalke, Thyssen Krupp, Koksokhim-mash(KBK) (Ukraine), Giprokoks (Ukraine), KOCHS (Germany), John M Henderson (UK), Uhde (Germany)
		Door Extractor	
		Coal Charging car	
		Coke transfer cars	
		Single spot Coke Pusher	
3	Steel Melting	Convertors	SMS- Siemag, Azovmash (Ukraine), Siemens-VAI
		Secondary refining units (LF, RH Degasser, VAD, VOD)	SMS- Siemag, Danieli, Sarralle (Spain)
4	Continuous Caster	Caster Segments & segment cooling equipment	SMS-Siemag, Siemens-VAI, Danieli
		Moulds & mould cooling equipment	
		Mould Oscillator	
		Tundish equipment	
5	Raw Material Handling Plants	Stackers & Reclaimers	FAM(Germany), Thyssen Krupp, Takraf, Metso
		Bucket Wheel Excavators	
		Wagon Tipplers with hydraulic drive and hydraulic side arm charger	
6	Rolling Mill Equipment	Heavy duty Hydraulic dividing Shears, Heavy duty hydraulic plate leveler, Large reducers for plate mill & hot strip mill main drives	SMS-Siemag, Siemens-VAI, NKMZ(Ukraine), Posco, Danieli, Mitsubishi – Hitachi (Japan)
		Straightening Machines for long products, Equipment for sorting, stacking and bundling of long products	SMS – Meer (Germany), Siemens-VAI (Italy), NCO (Italy), EZTM (Russia)
		Ultra fast plate cooling equipment (up to ~25/30^0 C/sec)	SMS-Siemag, Siemens-VAI, Mitsubishi – Hitachi (Japan)
		CNC Roll grinding machines	Herkules (Germany) - Waldrich Siegen (Germany) has taken over , Waldrich Siegen (Germany), WMW(Romania), Tenova Pomini, Capco Machinery System Incorporation (USA)

S.No	Area	Process/Equipment	World leaders of technology
7	Miscellaneous	Developments of smelters e.g. COREX, FINEX etc.	Siemens-VAI, Posco
		Use of energy saving technologies e.g. CDQ(coke dry quenching), TRT(top gas recovery turbine) , HEC (high efficiency combustion) regenerative burners etc.	

Table 3 - Areas of Mining Equipment equipment/machinery in which Process/Design Know how is required to be acquired through technology transfer/ license agreement/ technological collaboration

SNo	Area	Process/Equipment	World leaders of technology
1	Surface Mining	Rope Shovels 20 CuM capacity and above	P & H Mining, Caterpillar
		Hydraulic Shovels 15 CuM capacity and above	Caterpillar, Komatsu, Hitachi
		Dumpers of capacity 100T and above	Terex, Mitsubishi
2	Underground mining	Underground mining equipment	Caterpillar, Joy Mining,
3	Tunnel excavation	Shield Tunneling machine	Mitsubishi, Herrenknecht (Germany), Hitachi Zosen(Japan), Robbins(USA)
		Tunnel Boring machine	

Table 4 - Areas in which technology will have to be developed indigenously because of India specific conditions

SNo	Area	Process/Equipment	Remarks
1	Mineral Beneficiation	Beneficiation/Utilization (Pelletization) of slimes	SAIL-RDCIS will have to take up R&D in these areas
2		Beneficiation of low grade iron ore (Fe: 30~40%)	
3		Recovery of ultra fine iron mineral from slime	
4		Development of technology for palletization of hematite/ geothetic ore	

Annexure-IV

Minutes of the Meeting of the Working Group on Capital Goods and Engineering Sector held on 23rd August, 2011 in the Department of Heavy Industry under the Chairmanship of the Secretary (Heavy Industry)

The list of participants is enclosed at Annexure.

2. First of all Shri Harbhajan Singh Joint Secretary and Member Secretary, Department of Heavy Industry welcomed the participants. He explained about the formation of the sub-groups and stated that the members of the sub-groups took active interest in the preparation of the report. He further added that the budgetary figures are approximate. After this power point presentation on status, constraints and recommendations and budgetary requirements of the subgroups were made. It was emerged that capital goods sector would grow about @ 20% during the 12th Five Year Plan.

3. Shri S. Sundareshan, Secretary, Deptt. of Heavy Industry and Chairman of the Working Group invited comments from the convenors of the sub-groups.

4. Shri B.P. Rao, CMD, BHEL and convenor of the sub-group of Heavy Electrical Equipment Industry stated that the issues relating to R&D and the requirement of raw materials (CRGO steel, etc.) value addition and infrastructural constraints have not been mentioned in the report particularly for Heavy Electrical Industry. Apart from this, there is shortage of employable and skilled man power in manufacturing and construction. He felt that NSDC may coordinate with HRD Ministry for development of curriculum suitable for the industry. He stressed the need for the development of strong supply chain in India similar to China. He mentioned about the financial support required by the industry which EXIM bank is unable to support on long term basis.

5. Shri R Maitra, CMD, EEPC and convenor of the sub-group of Engineering Industry stressed the need to make available the raw materials to the industry at international prices.

6. Shri S. Suryanarayanan from Larsen & Toubro, on behalf of Process Plant Equipment Industry stated that economy of scale is not available in India unlike South Korea where a large number of Process Plant Equipments are manufactured. He further felt the need to leverage the import of large quantity of urea from Iran with export of Process Plant Equipment as Iran needs large number of hydrocarbon processing equipment which the Indian industry can supply. For increasing exports the industry needs support from Export Credit Agency (ECA).

7. Shri V.R.S Natarajan, CMD, BEML, convenor of the sub-group on Earth Moving and Mining Machinery industry made a mention that the tax structure should be uniform across the country. At present, it helps the users to import the equipment rather than procuring the same from the local sources. As the foreign manufacturers generally do not share the technology with the local manufacturers, centres of excellence for technology development to be opened with funding from the Government. Considering the demand of two billion tonne of coal during coming years, he felt that the requirement of mining equipment would double in the next five years. Therefore, it would be made

mandatory on foreign suppliers to set up the manufacturing units with transfer of technology condition. He also suggested that there should be single window clearance and approvals to be given within 90 days. He further stressed about the requirement of skill development in this sector and suggested a suitable curriculum package to be developed for IITs, NITs and other technical institutions in the country. As regard dumping of the earthmoving equipment, there is need for anti-dumping law to counter it. China manufactures about one lakh excavators every year as against 9000 units of India, a huge infrastructure is required in India for manufacturing similar quantity. He further suggested that Cluster Scheme and SEZ may be started for mining equipment industry to generate large employment. SMEs should be given soft loans as financing is the major problem for them. Apart from this, soft loans with interest rate of 4 -5% may also be provided to the small contractors using construction equipment. Dredgers are not manufactured in India and valued worth Rs. 6000 crores are being imported. PSUs importing dredgers should insist foreign suppliers for the local value addition. He suggested that FDI to be limited to 50 – 60% over 100% to facilitate transfer of technology and value addition. EXIM bank to provide soft loans for exporting the equipment which have local value addition. He informed that there is no custom duty on the equipment imported by the defence whereas local manufactured machineries become uncompetitive due to taxes.

8. Shri Sanjay Jayavarthanavelu, CMD, LMW and convenor of sub-group on Textile Machinery industry stated that innovation and R&D have to be increased and to focus on generation of IPR asset. The user base of the textile Machinery is quite large as 70 – 80% of the machinery is bought out items. Scheme like TUF is required to be introduced for this sector. Skill development and eco system in manufacturing is also required to be developed for this sub-sector.

9. Shri G.K. Pillai, CMD, HEC and convenor of sub-group on Metallurgical Machinery stated that this segment has no industry association as other segments have and there is hardly any indigenous capability to manufacture metallurgical machineries. 80% of the total requirement of the equipment is still imported. Indigenous content in the steel plant equipment is controlled by the supplier of the steel making technology. He suggested that for foreign supplies, 75% of local content to be achieved over a period of three years should be made mandatory and Steel Development Fund under the Ministry of Steel may be used for development of steel plant equipment.

10. Shri Lokeshwara Rao, President, IMTMA and convenor of sub-group on Machine Tools and Plastic Machinery informed that there is erosion of skill in machine tools. Non-tariff barriers should be removed by the foreign countries enforced on supplies of critical components of machine tools. The 5-Axes CNC system is not allowed to be exported to India due to possible dual use for defence application. He opined for the provision of soft loans @ 4-6% as compared to 2% available in foreign countries. He sought subsidy for purchase of large value machines required for the manufacture of machine tools as the individual units are not able to purchase it. Machine tool industry to be treated as priority sector for providing loans and Corpus fund to be set up to help the industry to invest and expand as there is lot of growth opportunity for the industry due to future expansion and demand requirements from power including nuclear power equipment, mining machinery industry etc. Public sector units are required to be strengthened for development of high technology & sophisticated machines tools to its own class.

11. Shri Harbhajan Singh, Joint Secretary and Member Secretary then presented the detailed budgetary requirements as indicated by the various sub-groups of each sub-sector with break-up totalling to Rs. 45,430 crore.

12. Shri R.K. Jain from NMCC opined that considering the market growth of 17%, the growth of export share to 5% in the 12th Plan does not appear to be achievable as the present share of export is less than 1%. He further stressed the need of equipment bank where from the industry can loan the equipment which will help the users who are unable to purchase equipment at any specific time.

13. Shri A.K. Gupta from Ministry of Power felt that recommendations of the sub-groups should have been stronger and sought total ban on the import of second hand machines. On standardisation He informed about the study carried out at CEA in the year 2003 for super critical equipment and standardisation of its ratings of 800 to 1000 MW.

14. Shri M.K. Choudhury from Nuclear Power Corporation stated that the instrumentations required for nuclear power application, though requiring high cost for R&D requires attention.

15. Shri M.Z. Khan from DIPP said that focus should be on labour Intensive Industry and make a list of machineries which should be kept out of PTA/FTA/CEPA.

16. Shri Ramesh Babu from IIT, Madras suggested that absorption of the technology including automation become important across the sector. He underlined the need of exchanging the programme between industry and academia so that curriculum will be framed according to the need of the industry.

17. Shri Chetan Bijesure from FICCI opined that there should be mandatory requirement of 30% local content on foreign supplies. Modernisation fund also be created for the capital goods sector.

18. Shri Balgi from Plastic Machinery Industry suggested that moulds and dies manufacturing industry segment which is quite substantial may also be combined with plastic machinery. He felt that corpus fund for this sector may be created for modernisation of the industry.

19. Shri Sonde from Thermax opined for the development of equipment for Solar Energy which is an upcoming industry and sought cluster approach for its development.

20. Ms. Nita Karmakar from CII observed that the domestic value addition in the industry has fallen with the gradual reduction in the customs duty over the years.

21. Shri B.R. Satyan, Director, CMTI stressed the need of the development of automation, instrumentation, surface engineering across the capital goods sector. For manufacturing high quality components/subsystems proven in real life, there is requirement of setting up of Centres of Product Development in the specific fields such as drive & controls, bearing technology, material technology, toolings etc. Due to lack of development of certain important fields, Machine Tools Industry is lagging behind.

22. Shri S. Sundareshan, Secretary, Department of Heavy Industry and the Chairman of the Working Group directed that the issues which are common to all sub-sectors should be kept at one place in the report. He also directed Member Secretary to make action plan for preparation of the report. Shri Harbhajan Singh, Joint Secretary and Member Secretary of the Working Group informed the members that the draft report will be prepared in consultation with the sub-groups on final recommendations including budgetary provision in due course of time. After incorporating the inputs received, report will be sent to Steering Committee set up by the Planning Commission for its consideration.

23. The meeting ended with the vote of thank to the Chair.

Annexure

List of participants of the Meeting of Working Group on "Capital Goods and Engineering Sector" for the 12th Five Year Plan (2012-2017) held on 23rd August, 2011 at 1100 hrs in Conference Room No.47, Udyog Bhawan, New Delhi

S. No.	Name/Designation	Organization
1	Shri S. Sundareshan Secretary	Department of Heavy Industry, **In the Chair** Udyog Bhawan, New Delhi.
2	Shri Harbhajan Singh Joint Secretary	Department of Heavy Industry, **Member Secretary** Udyog Bhawan, New Delhi.
3	Shri Ambuj Sharma Joint Secretary	Department of Heavy Industry Udyog Bhawan, New Delhi.
4	Shri A.K. Agarwal Chief Mech Engineer	COFMOW, Indian Railways
5	Shri R.K. Jain Joint Secretary	NMCC
6	Shri A.K.Gupta	CEA, Ministry of Power
7	Shri N.K. Sinha Deputy D.G.	Ordnance Factory Board
8	Shri Zakaria Khan Yusufzai Sr.DO	DIPP
9	Shri M.K. Chowdhury Executive Director/ Procurement	Nuclear Power Corporation of India Limited, Mumbai
10	Shri Manoj Bali	HQ, DRDO
11	Shri N. Ramesh Babu Professor	IIT Madras
12	Shri B.R. Satyan Director	CMTI
13	Shri S.K. Singh Deputy Secretary	DHI
14	Shri V.R.S. Natarajan CMD	BEML
15	Shri V.M. Mathur	BEML
16	Shri K.N. Bhat	BEML

17	Shri B.P. Rao CMD	BHEL
18	Shri W.V.K. Krishna Shankar Executive Director/P&D	BHEL
19	Shri Kaushik Acharya AGM	BHEL
20	Shri G.K. Pillai CMD	HEC
21	Shri R. Maitra Executive Director	EEPC India
22	Shri G. Majumdar	EEPC India
23	Shri M. Lokeshwara Rao	IMTMA Bangalore
24	Shri V. Anbu	IMTMA
25	Shri P.J. Mohan Ram Senior Adviser	IMTMA,
26	Shri S. Jayavarthanavelu	TMMA
27	Shri Anuj Bhagwati	TMMA
28	Shri S. Chakrabarty	TMMA
29	Shri S. Suryanarayanan Ex. Vice President	L&T/PPMAI
30	Shri V.P. Ramachandran	Process Plant & Machinery Association of India
31	Shri Kuldip Goel	L&T/PPMAI
32	Ms. Shefali Chaturvedi Senior Director	CII
33	Ms Nita Karmakar	CII
34	Shri Chetan Bijesure	FICCI
35	Shri R.R. Mallick Reg. Director-S&W	ALSTOM
36	Dr. R.R. Sonde	Thermax Ltd., Pune
37	Shri Salil Dutt	Thermax Ltd., Delhi
38	Shri A.K. Sinha	MECON Ltd., Delhi
39	Shri Glenville da Silva	IECIAL
40	Shri Vikram Sharma	IECIAL
41	Shri S.G. Roy	IECIAL
42	Shri Rohit Pandit Director	IEEMA
43	Shri Sudeep Sarkar Assistant Director	IEEMA
44	Shri N.K. Balgi Director	Ferromatic Melacron India (P) Ltd, Ahmedabad
45	Shri P. Kailas, Chief Executive	L&T Plastics Machinery Limited, Chennai
46	Shri Sunil Jain	Rajoo Engineering
47	Shri Sharad Verma	BCG
48	Ms. Surbhi Goyal	BCG
49	Shri Sushil Lakra, IA	Department of Heavy Industry
50	Shri N. L. Goswami Sr.DO	Department of Heavy Industry
51	Shri U.K. Mukherjee US	Department of Heavy Industry