

Draft Detailed Project Report

ESDM Focused Technology Centre at Greater Noida - Technology Centre Systems Program

Submitted To

The Office of Development Commissioner -MSME
Ministry of MSME, Govt. of India
Maulana Azad Road, New Delhi -110108

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18 July 2016

Director (Tool Room)

Office of Development Commissioner (MSME), Ministry of MSME

Nirman Bhawan, Maulana Azad Road,

New Delhi -110108

Dear Sir,

As part of our engagement to provide Consulting services for establishing of Program Management Unit (PMU) for designing the project, undertaking pre-project activities & providing implementation support during the course of Technology Centre Systems Program (TCSP), we hereby submit the Draft Detailed Project Report for setting up of Technology Centre at Greater Noida for your perusal. The deliverable has been prepared in accordance with our engagement agreement dated 07 November 2013, and our procedures were limited to those described in that agreement.

This Detailed Project Report is based on inquiries of and discussions with:

- ▶ O/o DC MSME
- ▶ PSC
- ▶ Industry experts
- ▶ World Bank Mission
- ▶ ESDM units
- ▶ Government Institutes and Industry association
- ▶ Secondary Research

We have not sought to confirm the accuracy of the data or the information and explanations provided by the O/o DC MSME. Our work has been limited in scope and time and we stress that more detailed procedures may reveal other issues not captured here. The procedures summarized in our Draft Detailed Project Report do not constitute an audit, a review or other form of assurance in accordance with any generally accepted auditing, review or other assurance standards, and accordingly we do not express any form of assurance. This Draft Detailed Project Report is intended solely for the information and use of the Office of DC-MSME and is not intended to be and should not be used by anyone other than this specified party.

We appreciate the cooperation and assistance provided to us during the preparation of this report. If you have any questions, please contact the undersigned.

Very truly yours,



Amar Shankar
Partner Advisory Services

Disclaimer

This Draft Detailed Project Report for development of technology centre at Greater Noida as part of consulting services to establish a Programme Management Unit (PMU) for designing the project, undertaking the pre-project activities and providing implementation support during the course of the Technology Centre Systems Program (TCSP) has been prepared by Ernst & Young LLP (hereinafter referred to as 'EY' or 'Ernst & Young' or 'Us') and delivered to the 'Office of Development Commissioner - Ministry of Micro, Small & Medium Enterprise (O/o of DC-MSME)' (hereinafter referred to as 'the Client').

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We would like to convey our sincere thanks to officials of **MSME-DI** for their support during the on site visit for the proposed Technology Centre at Greater Noida.

Also, we must extend our sincere thanks to all the stakeholders including Department of Industries, **industry associations such as CLIK, ELCINA and IESA, Government Institutes and ancillary units** who gave us their valuable time and insights with respect to various dimensions of the ESDM industry and its support requirements. Without their help, capturing of the industry insights would not have been possible.

Abbreviations

AICTE	All India Council For Technical Education
CAD	Computer Aided Design
CAE	Computer Aided Engineering
CAGR	Compound Annual Growth Rate
CAM	Computer Aided Manufacturing
CDGI	Centre for Development of Glass Industries
CFTI	Central Footwear Training Institute
CIHT	Central Institute of Hand Tools
CII	Confederation of Indian Industry
CITD	Central Institute of Tool Design
CMC	Construction Management Consultant
CNM	Cluster Network Manager
CST	Central Sales Tax
CTR	Central Tool Room
CTTC	Central Tool Room & Training Centre
DGM	Deputy General Manager
DMIC	Delhi Mumbai Industrial Corridor
EHS	Environment, Health, and Safety
ELCINA	Electronic Industries Association of India
EMC	Electronic Manufacturing Cluster
EMS	Electronic Manufacturing Services
ESDM	Electronic System Design and Manufacturing
FAB	Fabrication Facilities
FFDC	Fragrance and Flavour Development Centre
FSSP	Full Social Screening Process
GC	Governing Council
GDDP	Gross District Domestic Product
GDP	Gross Domestic Product
GESIP	Gender, Equity and Social Inclusion Plan
GM	General Manager
GNIDA	Greater Noida Industrial Development Authority
GT&TC	Government Tool Room and Training Centre
HDI	Human Development Index
HFC	Haryana Financial Corporation
HR	Human Resource

ICA	Indian Cellular Association
IDEMI	Institute for Design of Electrical Measuring Instruments
IDTR	Indo Danish Tool Room
IESA	India Electronics and Semiconductor Association
IIA	Indian Industries Association
IPSSP	Indigenous People's Social Screening Process
IRR	Internal Rate of Return
IT	Information Technology
ITC	Industrial Training Centre
ITES	Information Technology Enabled Services
ITI	Industrial Training Institute
LA	Location Attractiveness
MAIT	Manufacturers' Association for Information Technology
MoU	Memorandum of Understanding
MSME	Micro, Small and Medium Enterprises
NCR	National Capital Region
NEA	Noida Entrepreneurs Association
NPSP	National Portal Service Provider
NSIC	National Small Industries Corporation
NSSP	No Social Screening Process
O/o DC (MSME)	Office of Development Commissioner - Micro, Small, and Medium Enterprises
OEM	Original Equipment Manufacturer
PCB	Printed Circuit Board
PMU	Program Management Unit
PPDC	Process and Product Development Centre
R&D	Research and Development
RFP	Resettlement Policy Framework
SEZ	Special Economic Zone
SIDBI	Small Industries Development Bank of India
SMT	Surface Mount Technology
STPI	Software Technology Parks of India
TC	Technology Centre
TCSP	Technology Centre Systems Program
TEEMA	Taiwan Electrical and Electronic Manufacturers' Association
TP	Technology Partner
TR	Tool Room
TRTC	Tool Room & Training Centre

UPDESCO	Uttar Pradesh Development Systems Corporation
UPLC	Uttar Pradesh Electronics Corporation Limited
UPS	Uninterrupted Power Supply
UPSSDM	Uttar Pradesh State Skill Development Mission
VAT	Value Added Tax
VLSI	Very Large Scale Integration

Revision History

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1.0	15 th January 2016	Internal Review	Dhruv Mangal, Aliya Bhandari	Dr. Milind Mujumdar, Utsav Mishra
2.3	11 th July, 2016	Revised area and construction cost estimates based on internal discussion and inputs from CMC	Dhruv Mangal, Aliya Bhandari	Dr. Milind Mujumdar, Prakash Singh
2.4	18 th July, 2016	Updation of Section 7.2.1 - Social Screening and 7.2.2 - Environmental Screening based on World Bank screening on 14 th July 2016	Aliya Bhandari	Dhruv Mangal

Table of contents

Executive summary	1
1. Introduction.....	4
1.1 Background and project rationale	4
1.1.1 Demographic overview and challenges	5
1.1.2 Country’s manufacturing objectives	6
1.1.3 Recommendations of XII plan Working group & Parliamentary Standing Committee .	7
1.1.4 Technology Centres System Program	8
1.1.5 Key TCSP stakeholders	10
1.1.6 RFD of TCSP	13
1.2 Overview of existing MSME TCs	15
1.3 Evaluation study of TCs and recommendations of the experts	18
2. DPR objective and approach.....	22
2.1 Objective.....	22
2.2 Approach	22
3. Framework for selection of industry/ clusters/ systems/ location for new TCs	25
3.1 Location selection framework	25
3.2 Selection of Greater Noida location for setting up of new TC	29
4. Location brief	32
4.1 Regional overview	32
4.2 Demographic profile of the district.....	36
4.3 Regional stakeholders	37
5. Opportunity and need assessment	47
5.1 India scenario	47
5.1.1 Focus on ESDM sector under Make in India.....	49
5.2 Market opportunity	52
5.2.1 Market in core sectors in the catchment	54
5.2.2 Market in other potential sectors in catchment.....	60
5.2.3 Market outside catchment area.....	61
5.3 Opportunities associated with other mega projects planned in Greater Noida and it’s catchment area	62
5.4 Potential Market for ESDM	64
6. Focus area for Proposed TC	67
6.1 Innovation and Design Centre.....	69
6.1.1 Concept Creation Support	69
6.1.2 Product Design Centre	70

6.1.3	Patent Registration and Harnessing	71
6.1.4	Entrepreneur Club	71
6.1.5	Consultancy services	72
6.2	Prototyping, Testing and Calibration Centre	75
6.2.1	Electronic prototyping facility	75
6.2.2	Electronic Assembly Facility	76
6.2.3	Electronic Testing Facility.....	77
6.2.4	Electronic Calibration Facility	80
6.3	Manufacturing Incubation Centre.....	81
6.4	Training Centre.....	82
6.5	Industry collaborations and associations	90
6.6	Technology collaboration.....	92
7.	Social and environmental safeguards	96
7.1	Socio-economic profile	96
7.2	Social and environmental screening.....	98
7.2.1	Social screening	98
7.2.2	Environmental screening.....	99
7.3	Gender equity and social inclusion strategy	101
7.4	Sample monitoring and reporting template.....	103
8.	Clearances required and respective authorities.....	105
9.	Manpower and human resource development	108
9.1	Proposed organisation structure	108
9.2	Phase wise induction of human resources	112
9.3	Roles and responsibilities.....	118
9.4	Governance structure.....	132
9.4.1	Selection of the Governance Model for the new TCs.....	132
9.4.2	Composition of the Governing Council	135
10.	Marketing plan of Greater Noida TC.....	140
11.	Quality system	148
12.	Infrastructure and facilities	152
13.	Expenditure pattern.....	162
13.1	Capital expenditure	162
13.1.1	Plant and machinery	162
13.1.2	Land & building cost.....	162
13.2	Operating expenditure.....	163
13.2.1	Variable operating expenditure.....	163
13.2.2	Fixed Operating expenditure.....	163

14.	Financial analysis.....	171
14.1	Key assumptions.....	171
14.1.1	Income assumptions	171
14.1.2	Project cost and financing	178
14.1.3	Other Financial Assumptions	178
14.2	Working capital and cash flow statement.....	179
14.3	Income & expenditure statement	182
14.4	Balance sheet	186
14.5	Profitability	188
14.6	Sensitivity analysis.....	189
15.	Environment, health and safety	192
15.1	Planning and design	192
15.2	Construction phase	192
15.3	Operation and maintenance	196
15.3.1	Operation of the TC	196
15.3.2	Maintenance of the TC	199
15.4	Basic requirements for EHS management.....	199
15.4.1	Storm Water Management.....	199
15.4.2	Fire risk management	200
15.4.3	Rain water harvesting	201
15.4.4	Sewage treatment plant	201
15.4.5	Ventilation system.....	202
15.4.6	Monitoring	202
16.	Key risks and mitigation	205
17.	Conclusion	213
18.	Annexure.....	216
18.1	Key questions asked primary survey	216
18.2	AICTE norms for engineering and technology institutes	221
18.3	Social Screening Certificate	229
18.4	Environment Screening	231

List of Figures

Figure 1: TCSP eco-system	
Figure 2: Location of existing and proposed TRs & TCs	16
Figure 3: Location map	32
Figure 4: Stakeholders of Greater Noida TC	37
Figure 5: Indian ESDM Revenues (US \$ Billion)	47
Figure 6: ESDM Sector Overview	48
Figure 7: Indian ESDM industry revenues 2012 (by categories)	48
Figure 8: Top 10 Products by Total Market Revenues (2012) in %	49
Figure 9: Target market structure of Greater Noida TC	54
Figure 10: Service Areas across the ESDM Value Chain	67
Figure 11: Proposed Services to be provided by Greater Noida TC	68
Figure 12: Potential areas for collaboration or association with key stakeholders	90
Figure 13: Proposed organisation structure	111
Figure 14: Suggestive framework for marketing of TC	140
Figure 15: Positioning of marketing mix for proposed TC	141
Figure 16: Net working capital requirement	179
Figure 17: Cash flow closing balance	179
Figure 18: Net free Cash flows and Cumulative Cash flows	188

List of Tables

Table 1: Result indicators of the RFD	14
Table 2: Existing TCs & TRs with focus sectors	15
Table 3: Gautam Budh Nagar District snapshot	33
Table 4: Status of power, water, wind and rainfall in the region	34
Table 5: MSME Units in Focus Sector in the Key Districts	56
Table 6: Product Design Centre: Software and Equipment.....	70
Table 7: Proposed Consultancy Services	72
Table 8: Suggestive Consulting Revenue	74
Table 9: Electronic Prototyping Facility: Machinery	76
Table 10: Electronic Assembly Facility: Machinery	76
Table 11: Electronic Testing Facility: Machinery	77
Table 12: Electronic Calibration Facility: Machinery	80
Table 13: Training Lab Infrastructure.....	89
Table 14: Potential Areas for Industry Collaborations and Associations.....	91
Table 16: Sample monitoring and reporting template	103
Table 17: Clearances required and respective authorities - Illustrative.....	105
Table 18: Sanctioned strength of key resources	110
Table 19: Summary of phase wise induction of resources	114
Table 20: Department wise induction of fulltime resources - Illustrative.....	115
Table 21: Roles and responsibilities of proposed positions	118
Table 22: Comparison of Society Registration Act and Companies Act	132
Table 23: Governing Council of Greater Noida TC	135
Table 24: Suggestive marketing activities, ownership and timeline	144
Table 25: Indicative certifications of quality systems	148
Table 26: Details of proposed infrastructure.....	153
Table 27: Details of proposed infrastructure for hostel	156
Table 28: Cost for development of campus infrastructures	157
Table 29: Details of other infrastructure	157
Table 30: Capital expenditure.....	162
Table 31: Plant & Machinery.....	162
Table 32: Land & building cost.....	162
Table 33: variable cost assumptions	163
Table 34: Fixed Operating Cost assumptions.....	164
Table 35: Manpower and salary assumptions	166
Table 36: Key assumptions	171
Table 37: Production Assumptions	171
Table 38: Project cost and financing	178
Table 39: Working Capital Schedule	180
Table 40: Cash flow statement	181
Table 41: Balance sheet.....	186
Table 42: Profitability with investment plant & machinery.....	188
Table 43: Activities and anticipated EHS issues during construction phase	192
Table 44: Potential hazards during assembly of PCBs	196
Table 45: Potential hazards during O & M phase.....	199
Table 46: Risk & mitigation	205
Table 46: Environmental screening.....	231

Executive Summary



Executive summary

Objective of DPR: Evaluate the feasibility of the proposed Greater Noida TC.

Key Components

Opportunity and need assessment

Social and Environmental assessment

Technology & Skillset requirement

Investment & Return

Opportunity and need assessment

Greater Noida: Competitive Advantage

- Part of NCR, well connected by road and railway
- Presence of industrial infrastructure including Ecotech
- Large scale investment proposed in the ESDM sector

Potential Market opportunity in Greater Noida

- Automotive Electronics** - Components for large players
- Industrial and Power Electronics** - Focus on inverters, UPS, batteries, power backup, LED, solar systems
- Consumer Electronics** - Training & after sale repair services

Stakeholder discussions



Key Stakeholders

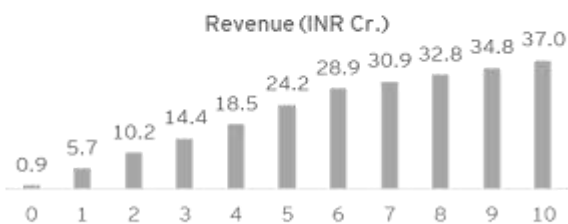
- O/o DC-MSME
- Government of Uttar Pradesh
- MSME-DI
- OEMs
- Industrial Associations
- MSMEs

Key Training Requirement

- Electronic Design and Manufacturing - Embedded Systems, PCB Design and Manufacturing, Electronic Assembly
- Electronic Repair and Maintenance
- Computer Hardware and Software

Financials

Total Capital Expenditure: INR 145.4 Cr
Production Machines: INR 56.97 Cr
Training Machines: INR 8.91 Cr
Construction incl contingency: INR 73.54 Cr
Other infra & Pre-Operative Exp: INR 5.99 Cr



* Year 0 refers to the construction period

Location overview



- In the vicinity of 2 National Highways (NH-24, NH-58), Yamuna Expressway, proposed Eastern Peripheral Expressway
- DMIC corridor



- Dadri Rail Junction where Eastern and Western Freight Corridors meet
- Metro Rail Network between Noida and Greater Noida is under development



- Closest airport is Indira Gandhi International Airport (Delhi)

ESDM Sector in Greater Noida & catchment



Presence of several large ESDM and automotive players



Approx 3,000 MSMEs cater to ESDM Sector



State has an attractive Electronics Manufacturing Policy



International players are investing in the area

Focus area of the Technology Centre

1 Innovation and Design Centre

- Concept creation support
- Product design support (product architecture and specifications, electronic design, mechanical design)
- Patent registration and harnessing
- Entrepreneur club
- Other consultancy services

2 Prototyping, Assembly, Testing and Calibration

Over 55% of total revenue

- Rapid PCB Prototyping facility
- Basic electronic assembly facility for low vol. production
- Testing facility for environmental, safety, EMI / EMC, ingress and performance testing
- Secondary level calibration facility
- 3D additive machines for mechanical components

3 Training

- Electronic Design and Manufacturing - Embedded Systems, VLSI, PCB Design and Manufacturing, Electronic Assembly
- Electronic Repair and Maintenance
- Computer Hardware and software

4 Manufacturing Incubation Centre

- Shell infrastructure
- Business facilities
- IT support
- Electricity and power connection
- Registrations and Clearances

IRR: 8.4%
Positive profit after tax is projected to be registered in 7th year

Introduction



1. Introduction

1.1 Background and project rationale

India is one of the largest and dynamic emerging markets with vast economic potential. India's GDP in 2012 was USD 1.8 trillion ranking 10th amongst all countries¹. The objective of the Government of India's, 12th Five-Year Plan (FY2013-17) is to return to GDP growth rates in excess of 8 percent, with strong emphasis on the manufacturing sector. Manufacturing has long been recognized as an essential driver of economic development for most countries, as it has an important economic and employment multiplier effect. The manufacturing sector will have to play an important role to take Indian economy to a high growth rate trajectory and achieve the planned objectives. Micro Small and Medium Enterprises play an essential role in the overall industrial economy of the country and account for over 45% of India's manufacturing output².

Despite strong potential, India's manufacturing performance has not been encouraging. The share of manufacturing in India's GDP has stagnated at around 16 percent³, compared to more than 30 percent (and growing) in some of the other Asian countries. India's manufacturing sector has been facing challenges, such as low value addition, low productivity, and less-than-desirable up scaling. However, world-class production units that compete in the international market are also present in India.

The major constraints in the growth and competitiveness of India's manufacturing sector are:

- ▶ access to finance (especially for MSMEs)
- ▶ access to technology and skilled manpower
- ▶ access to markets (domestic & export)
- ▶ infrastructure deficiencies

These constraints impact the competitiveness of MSMEs operating in both upstream and downstream manufacturing industries.

Upstream industries, such as the tooling industry, which consists of developing and manufacturing of dies, moulds, casts, as well as testing and prototyping, serves as an interface between product design and product manufacturing. The right tools help increase throughputs, reduce material waste, improve product quality, time to market and thus improve competitiveness. The importance of the tooling industry increases with accelerating technological developments, product sophistication/ innovation/ customization and reducing time to market. Tooling is a specialized but local industry

¹ <http://unstats.un.org/unsd/snaama/dnltransfer.asp?fID=2>

² <http://www.dnb.co.in/Nashik2013/PDF/MSMEsInIndia.pdf>

³ The Manufacturing plan - Strategies for accelerating growth of manufacturing in India in the 12th Five Year Plan and beyond, Planning Commission

(more than 60 percent of tools in the world are locally produced and consumed - including in India) dominated by MSMEs (more than 80% of firms in India, Europe, US and Japan). Like other countries, the private tooling industry in India has grown hand in hand with the manufacturing industry. The turnover of the Indian tooling industry is approximately INR 13,000 crores, with more than a thousand firms employing over 120,000 workers (TAGMA 2011). The constraints to the growth and competitiveness of the Indian tooling industry mirror the ones affecting manufacturing as a whole, as articulated above. The scarcity of skilled workers and problems related to their retention, as well as the lack of access to a high-quality design and prototyping facility has hurt growth.

In downstream industries such as automotive, electronics, fragrance and flavours, glass, leather, toys etc., there is shortage of skilled labour and limited access to advanced technologies. These industries include large numbers of MSMEs, often working as part of supplier networks of larger enterprises and subject to increased international competition.

1.1.1 Demographic overview and challenges

While India stands to benefit from an immense demographic dividend, with the largest youth population in the world (around 66 percent of the total population is under the age of 35), it has an overall employment rate of 4.7 percent (under usual principal status approach) and an overall labour force participation rate of 50.9 percent⁴. For the country to gain from this demographic dividend, skilling and up-skilling its youth are key priorities for the Government of India (GoI).

India has a labour force of about 470 million, of which less than 10 percent have received skills training, either through formal or informal means⁵. About 13 million young people enter the labour force annually. Despite the huge expansion of skills training provision during the 11th Five-year plan, the country's skills development system requires massive up scaling. In its 11th and 12th Five-year plans, India recognized that skill development is critical to achieve faster, sustainable and inclusive growth on one hand, and to providing decent employment opportunities to the growing young population, on the other. According to the National Skill Development Policy published in March 2009, India has set a target of skilling 500 million people by 2022⁶. This program will play a bigger role in the country's plan by setting a target of skilling 150 lakh people within the next 6 years.

Global experience shows that a workforce with higher schooling and skill levels leads to higher productivity and personal income. A 2011 study showed that students who attended three-year vocational training courses at ITIs earned 25 percent more than two-year course students, who earned 14 percent more than did one-year course students⁷. These results were also observed in a

⁴ Report on the Third-Annual employment & unemployment survey (2012 - 2013) of the Ministry of Labor, Government of India.

⁵ 11th and 12th Five Year Plan

⁶ <http://labour.nic.in/upload/uploadfiles/files/Policies/NationalSkillDevelopmentPolicyMar09.pdf>

⁷ Vocational Training in the Private Sector (Goyal 2011)

2007 study showing that the returns on vocational training in India have been found to be 8 percent, almost equivalent to the 8.4 percent related to an additional year of education. The same study showed that, increased educational attainment by one year is associated with 5.8 percent higher firm-level productivity in India⁸.

1.1.2 Country's manufacturing objectives

Development of Indian manufacturing sector calls for deepening and recalibrating of economic reforms that would strengthen the sector and make it grow faster and become an engine of inclusive growth. To realize the potential of the manufacturing sector, Government of India has announced National Manufacturing Policy in 2011 with the objective of enhancing the share of manufacturing in GDP to 25% within a decade and creating 100 million jobs. It also seeks to empower rural youth by imparting necessary skill sets to make them employable. Sustainable development is integral to the spirit of the policy and technological value addition in manufacturing has received special focus.

The National Manufacturing Policy has six objectives:

- ▶ Increase manufacturing sector growth to 12-14% over the medium term to make it the engine of growth for the economy. The 2 to 4 % differential over the medium term growth rate of the overall economy will enable manufacturing to contribute at least 25% of the National GDP by 2022.
- ▶ Increase the rate of job creation in manufacturing to create 100 million additional jobs by 2022.
- ▶ Creation of appropriate skill sets among the rural migrant and urban poor to make growth inclusive.
- ▶ Increase domestic value addition and technological depth in manufacturing.
- ▶ Enhance global competitiveness of Indian manufacturing through appropriate policy support.
- ▶ Ensure sustainability of growth, particularly with regard to the environment including energy efficiency, optimal utilization of natural resources and restoration of damaged/ degraded eco-systems.

In the year 2014, Government of India also launched the Make in India initiative. The Make in India initiative is designed to facilitate investment, foster innovation, enhance skill development, protect intellectual property and build best in class manufacturing infrastructure in the country. The primary objective of this initiative is to attract investments from across the globe and strengthen India's manufacturing sector. The focus of Make in India is on 25 sectors, including automobile and auto components, IT & Business process management (BPM), defence manufacturing, electronic systems and electrical machinery, leather, pharmaceuticals, etc.

⁸ The Knowledge Economy and Education and Training in South Asia (World Bank 2007)

1.1.3 Recommendations of XII plan Working group & Parliamentary Standing Committee

At present, the Office of Development Commissioner [O/o DC (MSME)], Ministry of Micro, Small and Medium Enterprises, operates 10 TRs and 8 TDCs (both hereinafter called as TCs) spread across the country. The TCs have been providing technical and vocational training programmes to more than 1,00,000 trainees annually including AICTE and NCVT approved certification. They also provide design and manufacturing support to entrepreneurs alongside technical consultancies. The TCs primary focus is to improve access to advanced technologies & provide technical advisory support to entrepreneurs and workers, as well as opportunities for technical skill development to the youth at varying levels.

Considering the performance of existing TCs, the Department related Parliamentary Standing Committee on Industry, in its 235th report submitted to Rajya Sabha on 4 May 2012 have recommended as follows:

- i) “The committee is impressed with the performance of the TRs established by the MSME Ministry. These enable the youth to improve their skills and get employment opportunities. The success of such TRs inspires confidence that establishment of more such institutions will equip the young people with necessary ability useful in the expanding market and manufacturing sector”.
- ii) “The Committee strongly recommends that more money must be allocated for establishment of TRs across the country. It is understood that MSME Ministry is also approaching the concerned organizations within Government to get loan from International Financial Institutions. If Planning Commission and Finance Ministry cannot allocate more funds for this purpose, the necessary permission to MSME Ministry to get access to borrowings from international banks may be given without delay. However, it is strongly recommended that we must use our own resources for this cause, which is good for the youth of our country and MSME sector”.

The evaluation of existing ten TCs was undertaken under GIZ-MSME Umbrella Programme during 2011. The experts have appreciated the performance of the existing TCs and have recommended expansion of skill development activities and introduction of newer technologies in the TCs.

During the budget speech of 2013-14, following announcement was made;

Para 75: “TRs and TDCs set up by the Ministry of MSME have done well in extending technology and design support to small businesses. I propose to provide with World Bank assistance, a sum of Rs 2,200 crore during the 12th Five Year Plan period to set up 15 additional Centres”.

In pursuance of (i) the announcement made in the Budget (2013-14), (ii) the recommendations of the Department Related Parliamentary Standing Committee on Industry in its 235th Report submitted to Parliament (Rajya Sabha) on 4 May 2012, and (iii) the recommendations of the experts after evaluating the performance of existing TCs, it was proposed to implement “Technology Centre Systems Programme (TCSP)” at an estimated project cost of INR2,200 crore including World Bank assistance of USD 200 million by setting up 15 new TCs and to modernize / upgrade existing TCs by introducing latest machinery / technologies.

1.1.4 Technology Centres System Program

The Technology Centres Systems Program, a national program, seeks to enhance the technological and skill base of MSMEs in selected manufacturing industries, via upgraded and new TCs (currently called TRs and TDCs). The TCs will have as their mission to improve the competitiveness of MSMEs across India - with a strong emphasis on low income states.

This will be achieved by providing an integrated suite of services to MSMEs on a fee basis, ranging from providing them access to technology, access to skills and access to business advisory services. TCSP will reinforce the technical capability of the TCs as well as their performance, by further increasing the participation of the private sector in key decisions at both the national and local levels.

The TCs will support industry clusters across manufacturing value chains, both upstream (tooling industry) and downstream (key industries exposed to global competition close to the technology frontier, such as the automotive and electronics sectors, as well as industries evolving through indigenous innovations, such as fragrance and flavour, glass, leather, toys etc.).

TCSP’s Program Development Objective has been defined to enhance the competitiveness of MSMEs by improving their access to technology and business advisory services as well as skilled workers through systems of financially sustainable TCs. The program seeks to establish 15 new TCs and upgrade capabilities of select existing TCs and develop linkages between MSMEs, Indian and international research institutes and leading manufacturers. This would include upgradation in technology, land and building infrastructure and other associated infrastructure of the TC. The program will connect leading practices contributing to advance technology, knowledge, skilling and innovation which can be transferred to MSMEs served by each TC.

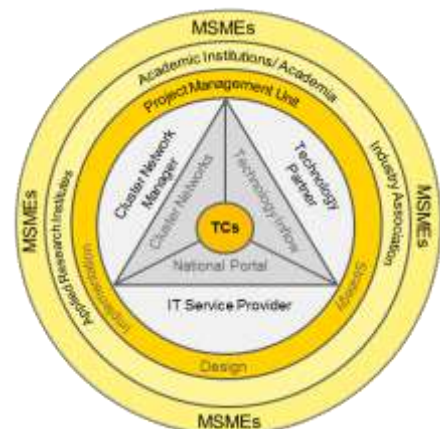
The competitiveness of MSMEs is impacted by various factors such as entrepreneurial drive of the leader, market and customer dynamics, their access to technology, finance & business advisory and availability of skill manpower. The TCs will shape the outcomes of the program by providing MSMEs

access to technology, business advisory and skilled manpower. So it would be possible to measure the success of this program by measuring the offtake of these paid services of the TCs by MSMEs. Therefore, the key indicators that will be measured are;

- ▶ Number of enterprises paid for services rendered including placement services
- ▶ Number of long term trainees employed by industry, including MSMEs, within six months after being trained at TCs
- ▶ TCs' gross profit before depreciation (not including land)
- ▶ Access to Technology
 - Revenue of TCs from access to technology activities (production support and consultancy)
 - Capacity utilization of TCs machines
 - Number of technology strategies/roadmaps developed by TPs and endorsed by Industry Associations and IC
- ▶ Access to Skilled Workers
 - Number of trainees trained (direct program beneficiary)
 - external trainers trained
 - with newly developed contents
 - female
 - from low income states
 - from disadvantaged section of society (SC/ST)
 - Number of skills development contents (e.g. curricula, standards, certification schemes) developed and adopted by industry associations, and/or certifying agencies
- ▶ Access to Business Advisory
 - Number of needs assessment and related business plans developed by CNMs and endorsed by Industry Associations
 - Value of TCs' businesses generated with support of Cluster Network Managers

In addition, intermediate result indicators are designed to monitor critical progress towards achievement of the PDO with primary emphasis on market-tested outputs of the TCs supported by Technology Partner and Cluster Network Manager. Examples of such indicators include capacity utilization of machines, number of trainees trained, access to services by MSMEs, number of technology strategies / roadmaps developed by TPs and endorsed by industry associations and value of TCs' businesses generated with support of CNMs.

Figure 1: TCSP eco-system



This program will create an ecosystem to help MSMEs become more competitive by acquiring improved technology and employing better skilled workers. This will be done directly through the services provided to them by the TCs, as well as indirectly through the linkages with larger firms (e.g. as part of the supplier network of an OEM), which will provide access to the services of the TCs under the condition that it benefits their suppliers. The TCs will contribute by providing inputs to MSMEs on manufacturing technology & business advisory and by improving the skills of workers/ skill seekers for better employment opportunities. The program will therefore benefit the Indian MSMEs, students and workers and help establish systems of TCs in the country wherein each centre will gain from the specialisation and experience of the others and improve the competitiveness of MSMEs.

1.1.5 Key TCSP stakeholders

TCSP has multiple stakeholders who will need to work together to achieve the objective of enhancing the competitiveness of MSMEs by improving their access to technology and business advisory services as well as skilled workers through systems of financially sustainable TCs. The key players who will participate in the program include:

▶ MSME Units - Beneficiaries

MSME units will be the prime beneficiaries of the program and the overall objective of the program centres around providing them with access to modern technology, access to business advisory services and access to skilled workforce.

▶ Skill seekers

Workers, job and skill seekers will also gain from this program with access to short term and long term training/skill development courses that will help job seekers to improve their career prospects and finding livelihood.

▶ Office of Development Commissioner, Ministry of MSME (DC-MoMSME)

The program would be designed and implemented under the aegis of the O/o Development Commissioner MSME, Government of India. O/O DCMSME has the mandate to support MSMEs and TCSP will serve this towards this purpose.

▶ Technology Centres

The TCs will serve MSMEs with integrated suite of services on a fee basis, ranging from providing them access to technology, access to skills and access to business advisory services. The program will focus to upgrade selected existing TCs and development of 15 new TCs that support or will support industry clusters across manufacturing value chains, both upstream (tooling industry) and downstream (key industries exposed to global competition close to technology frontier, such as automotive electronics, as well as industries evolving through indigenous innovations, such as fragrances and flavours, footwear, glassware, toys etc.).

► **Collaborations with Industry associations, academia, applied research institutes and others**

Strategic collaborations between TCs and various other organizations will be critical to foster research and development, business incubation and strengthen the TCs with regard to manufacturing services, business advisory and training capabilities. These include:

- Regional / sectorial industry associations representing MSMEs
- Regional / national level engineering/ academic / vocational training institutions
- National research institutes such as CSIR, DRDO Laboratories
- Local regional engineering colleges
- Autonomous institutes such as IISc, IITs, BITS

Leading practices from around the world for similar program suggest and underscore the importance of establishing such linkages. In the Indian context, there are many research oriented projects and concepts that can provide competitive advantage to Indian industry once the early state research emanating from applied research institutes and academia can be validated and implemented at the TC through such collaborations. The TCs will provide a unique environment of bringing the country's leading academics, engineering and industry professionals together to develop and demonstrate new technologies on an industrial scale. This will allow the clients of TCs to develop new manufacturing processes in a safe, neutral setting, reducing the associated financial risks.

► **Program Management Unit (PMU)**

Role of PMU is to assist the O/o DC MSME in designing and implementing this program. This includes developing framework for identifying sites/sectors for the new TCs, developing detailed project report, support in procurement of services and EPC contracts; developing and implementing environment and social safeguards, monitoring and evaluation, manage the roll out of the national portal, deployment of subject matter expertise and overall program management for TCSP over 6 years. EY LLP has been selected as the PMU for the TCSP by the O/o DC MSME via competitive bidding as per World Bank guidelines.

► **Technology Partner (TP)**

Role of TP is to help enhance the supply side of the TC by augmenting the technologies at the TCs, assist in their capacity building with respect to the identified technologies and clusters and provide greater support to the services being offered to the MSMEs by the TCs. These services include being exposed to the potential impact of new and relevant technologies, learning how to use new technologies/equipment, providing access to cutting-edge equipment, developing and testing new products, consultancy, training and deploying efficient techniques and practices that improve the competitiveness of the MSMEs being served.

▶ **Cluster Network Manager (CNM)**

CNMs for each System (or sub System) of TCs will specialize on specific geographic cluster(s)/ industry(s). The CNM will build capacity of the TC to enhance economic development cooperation amongst key stakeholders to improve the competitiveness of the cluster. This will include strengthening market linkages of the TCs with the MSMEs in the cluster it serves, trade and industry associations, academia, educational institutions, applied research institutions, service providers, other government support institutions, workers and skill seekers.

The CNM would seek to increase competitiveness of supply chains of large firms by enhancing quality, reliability and productivity of MSME suppliers by offering services of the TC, thus also helping in meeting revenue targets of the TC. The CNM will enhance the competitiveness of the cluster business environment by establishing a network of service providers which will address the needs of the MSMEs not served by the TC e.g. access to a network of financial services. The CNM will also facilitate closer cooperation between the TC and MSMEs with key innovation stakeholders such as applied research institutes, autonomous institutions such as IISc, CSIR, academia, skill seekers, and students etc. to enhance product and process innovation. TC's capacity will be further enhanced through closer cooperation amongst skills development and labour market stakeholders to increase the number of workers/ trainees from TCs finding long term employment to improve their livelihood.

▶ **National Portal Service Provider (NPSP)**

Role of NPSP is to design, develop, set-up, operate and maintain the IT platform for MSMEs. The IT platform will act as a common platform for services that will be required by an MSME from the start of their business, to successful operations and closure e.g. access to regulatory services for entrepreneurs, assistance for financing, access to list of suppliers etc. The platform intends to extend the reach of the program to its remote beneficiaries well beyond the TCs' physical location through access to e-learning solutions, B2B service and product market place, e-recruitment, assistance for financial services and e-governance services (forum to address grievances, automation of customer facing operations of the O/o DC MSME) on paid basis.

▶ **Construction Management Consultant**

The Construction Management Consultant (CMC) shall be responsible for design, supervision of work and final closure of construction works for the TC. CMC will prepare concept plans and subproject appraisal reports, carry out contract planning and detailed engineering designs, prepare schedules of quantities and specifications. It will support the PMU in preparation of procurement packages, bid documents, invitation, receipt and evaluation of bids etc. CMC will supervise the construction, manage the contract, monitor construction activities and will certify contractor's progress claims, carry out quality control, testing, and prepare progress and monitoring reports, and certify bills. Tata Consulting Engineers Limited has been selected as the CMC for the TCSP by the O/o DC MSME via competitive bidding as per World Bank guidelines.

1.1.6 RFD of TCSP














TCSP's objective is to enhance the competitiveness of MSMEs by improving their access to technology, business advisory services as well as skilled workers through systems of financially sustainable TCs. For monitoring the program outcomes, RFD has been defined; which contains the results indicators at the PDO level and intermediate outcome level together with the baselines and targets over the life of the program. Intermediate results indicators are designed to monitor critical progress toward achievement of the PDO with primary emphasis on market-tested outputs of the TCs and other stakeholders of the TCSP (viz. TPs, CNMs and ITP service provider).

Active participation of General Manager of TCs will be essential for steering the operationalization of TCSP in line with the envisioned mandate. The key success parameters of the General Manager include:

- ▶ Revenue earned by respective TC from,
 - Production
 - Training
 - Consultancy and others
 - Business given to private tool rooms
 - Production/training/consultancy with the help of CNM (territory/sectors to be identified Jointly by CNM and TCs in advance)
- ▶ Recovery ratio--Revenue/ recurring expenditure (cash) in percentage
- ▶ Profit before depreciation
- ▶ Profit after depreciation
- ▶ No. of trainees trained in Long term & Short term training programme
- ▶ No. of courses identified which are suitable for women employment & courses designed and started (CNM to assist the identification of courses and TP to design)
- ▶ No. of units assisted , out of which how many are MSMEs
- ▶ Present technical papers showing successes delivered and how it has aided industry
- ▶ Technical incubation centre to start and the long term trainees to be encouraged to register for starting enterprises

The table below depicts the snapshot of result indicators which form a part of the RFD.

Table 1: Result indicators of the RFD

Program development objective indicators		Number of enterprises paid for services rendered including placement services	
		Number of long term trainees employed by industry, including MSMEs, six months after graduating from the TCs	
		TCs' gross profit before depreciation (not including land)	
Intermediary Results			
Component 1- Technical assistance to the existing and new TCs	Access to Technology		TCs revenue from access to technology activities (production support and consultancy)
			Capacity utilization of machines in TCs
			No. of technology strategies/roadmaps developed by TPs and endorsed by industry associations and IC
	Access to Skilled workforce		Number of trainees trained (direct program beneficiary)
			Number of skills development contents (e.g. curricula, standards, certifications) developed and adopted by industry associations, and/or certifying agencies
	Access to Business Advisory		Number of needs assessment and business plans developed by CNMs and endorsed by Industry Assocs.
			Value of TCs' businesses generated with support of Cluster Network Managers
			Number of users of IT Platform
	Component 2-Investments to upgrade existing and develop new TCs		Number of new TCs built
Component 3-Technical assistance to MoMSME		Establishment of PMU for program implementation and capacity building of MoMSME	

The program aims to have direct and indirect industrial and economic outcomes to the country, such as enhanced manufacturing competitiveness, improvement in the overall employment rate and increased GDP growth.

1.2 Overview of existing MSME TCs

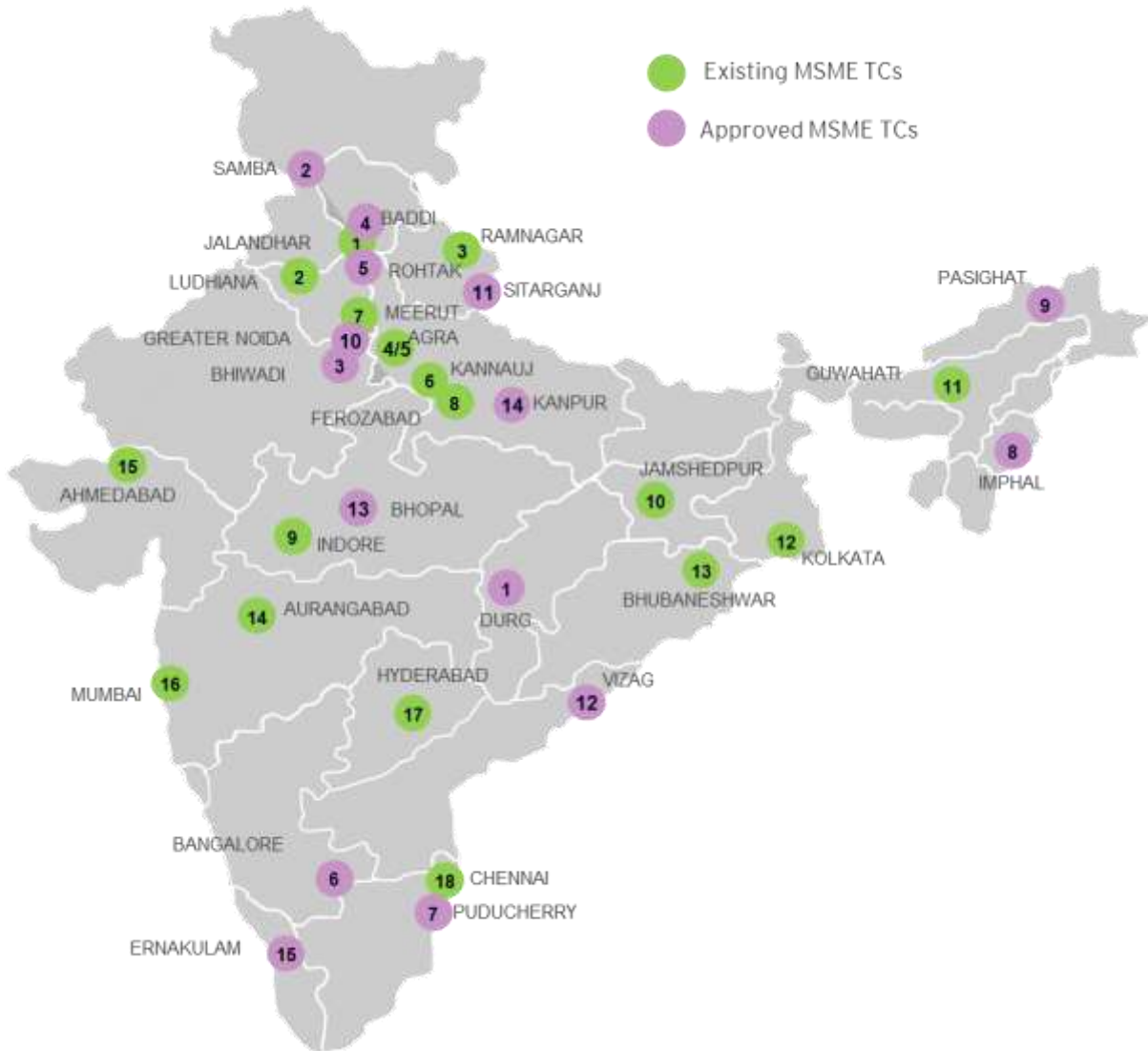
Out of the currently operational 18 Technology Centres (TCs) & Tool Rooms (TRs), 10 are for the tooling industry and 8 are for other industries such as ESDM (electronics system design and manufacturing), glass, footwear, and fragrance and flavour and sports. Half of these eighteen TCs are located in low income states (Uttar Pradesh, Madhya Pradesh, Odisha, Jharkhand and Assam). The TCs are self-sufficient institutions that provide design support, training, manufacturing, testing & calibration and consulting services to MSMEs and other enterprises. They have created a niche in the market in various fields such as hand tools, plastics, automotive, testing & calibration etc. The list of the existing TCs & TRs along with their specializations is given below:

Table 2: Existing TCs & TRs with focus sectors

SN	Name	Focus Sector
1	Central Tool Room & Training Centre (CTTC), Bhubaneswar (Odisha)	General engineering (Precision components)
2	Indo Danish Tool Room (IDTR), Jamshedpur (Jharkhand)	General engineering (Auto components)
3	Central Tool Room & Training Centre (CTTC), Kolkata (West Bengal)	General engineering
4	Tool Room & Training Centre (TRTC), Guwahati (Assam)	General engineering (Training in tool making)
5	Indo German Tool Room (IGTR), Aurangabad (Maharashtra)	General engineering (Auto components)
6	Indo German Tool Room (IGTR), Indore (Madhya Pradesh)	General engineering (Auto & Pharma)
7	Indo German Tool Room (IGTR), Ahmedabad (Gujarat)	General engineering (Auto & Plastic tools)
8	Central Tool Room (CTR), Ludhiana (Punjab)	General engineering
9	Central Institute of Hand Tools (CIHT), Jalandhar (Punjab)	General engineering (Hand tools)
10	Central Institute of Tool Design (CITD), Hyderabad, (Andhra Pradesh)	General engineering & ESDM
11	Institute for Design of Electrical Measuring Instruments (IDEMI), Mumbai, (Maharashtra)	ESDM and tool making
12	Electronics Service & Training Centre (ESTC), Ramnagar (Uttarakhand)	ESDM
13	Process and Product Development Centre (PPDC), Agra (Uttar Pradesh)	Foundry and forging

SN	Name	Focus Sector
14	Process cum Product Development Centre (PPDC), Meerut (Uttar Pradesh)	Sports goods
15	Central Footwear Training Institute (CFTI), Agra (Uttar Pradesh)	Leather & footwear
16	Central Footwear Training Institute (CFTI), Chennai (Tamil Nadu)	Leather & footwear
17	Fragrance and Flavour Development Centre (FFDC), Kannauj (Uttar Pradesh)	Fragrance & flavours
18	Centre for Development of Glass Industries (CDGI), Ferozabad (Uttar Pradesh)	Glassware

Figure 2: Location of existing and proposed TRs & TCs



Several of these were set up through support from German and Danish Government under bilateral agreements as well as with the UNIDO. These TCs are largely self-sustaining entities that provide technical and vocational training programs to more than 1,00,000 trainees annually. Some of these include training programs certified by the AICTE and NCVT. They also provide design and manufacturing support to entrepreneurs alongside technical consultancies.

The existing TC's, were set up between 1967 and 1999, with primary focus on improving access to technologies and providing technical advisory support for entrepreneurs in the given industry cluster they serve. These TCs also serve workers and youth by offering opportunities for hands-on technical training and skill development in varied specialisations with a view to improve employability and livelihood opportunities.

The key services offered by the TCs include:

▶ **Design & manufacturing**

- Product Development
- Design & Manufacturing of tools, dies, moulds, precision tools
- Process Development & Improvement

▶ **Skill development**

- Conduct long & short term training programs in the areas of CAD, CAM, CNC, automation, RPT, mechatronics, glass design, shoe design, aromatherapy etc.
- Offers customised programs for industries

The education level of the participating students ranges from school drop outs to 10th/12th/ITI/diploma/degree holders

▶ **Consultancy**

- Process and Product Improvement
- Automation solutions
- Quality Systems support
- Turnkey assignments
- Course curriculum developments

Over the last few years, financial performance of the TCs has markedly improved. Most of them have experienced strong revenue growth (mostly due to training activities) and have achieved financial sustainability (before depreciation and land costs and few TCs even after depreciation). Based on the recent reports and financial analysis, following are some of the key observations:

- ▶ **High profitability in recent years:** There has been an improvement in recovery ratio of these TCs, thus allowing them to progress towards their self-sustainability mandate. Majority of them have become profitable in the last three years.
- ▶ **Skew towards training:** Training and skill developed services have been a key revenue sources for the TCs. The scope of manufacturing needs to be up-scaled to achieve a balance in operations and revenues from each TC. Ideally, revenues should be balanced between the two main sources of income for the TCs. Only IGTR Aurangabad is found to be closely balanced. CITD Hyderabad and CTTC Kolkata, although profitable, need to perhaps enhance their production activities.
- ▶ **Focus of production activities is more towards job work or component production:** It was found that the utilisation of machines in the production area was focused on component production and facilities for designing, die casting or tooling were not being fully utilized. CTTC Bhubaneswar and IDTR Jamshedpur focus on component production while CTR Ludhiana on job work and IGTR Indore and CTTC Kolkata on jigs and fixtures. Only IGTR Aurangabad and CITD Hyderabad were found to focus on specialization in production, including designing, such as die casting and sheet metal or press tooling.
- ▶ **Training capacity is well utilized:** As reflected in the sources of revenue generation, the scale of training activities has been growing. All TCs initially reviewed, demonstrated an increase in training numbers from 2011-12 to 2012-13. The highest increase was observed at IGTR Ahmedabad. Although this is a positive trend, the staffs at these TCs needs to focus on production and maintain a balance between these two activities, while also up scaling other activities like consultancy and product testing. The centres should also seek avenues for taking advantage of government sponsored schemes and subsequently train more technicians in welding, machining and in automation.

There is a need to replicate the TCs at more places along with technological up gradation, improved training facilities and innovation in the business models etc. This will increase their capacities to train and strengthen the workforce supply. By improving the competitiveness of these facilities, the MSME TCs can be better utilized and expected to produce a bigger footprint in the Indian manufacturing sector.

1.3 Evaluation study of TCs and recommendations of the experts

A study of selected MoMSME TRs in India on '*Strategic Assessment and Recommendations*' was submitted under the '*Micro, Small and Medium Enterprises Umbrella Programme*'. The purpose of the study was to make comparison of the TRs with international TRs programmes. It is to be noted that

these TRs have now been renamed as TCs. An integrated set of ten recommendations have been made to increase the impact of the TR programme - reducing constraints to manufacturing MSME growth which are as follows:

- ▶ **Scale up training to meet market demand** - TCs should train more people. The gap in the supply of advanced manufacturing skills will systematically reduce.
- ▶ **Support private tooling sector to mature to excellence** - Besides 10 government TRs, hundreds of private TRs contribute to increased manufacturing MSME competitiveness by providing more complex tools at lower prices.
- ▶ **Engage in strategic partnerships** - Partnerships with large manufacturers can help realise large scale opportunities for manufacturing MSME. TCs can benefit from large scale and long lasting demand for services and increased revenue.
- ▶ **Re-organise "business model" of government TRs**- the TCs should function as autonomous business units with increased powers and accountability, increase job enrichment and control over own wellbeing. These teams are likely to become more motivated, innovative, leaner and more responsive to customers.
- ▶ **Map out the TRs role in the local innovation system** - TCs can benefit from integration with the local innovation system. Increased opportunity will result from increased stakeholder awareness and support.
- ▶ **Move away from hierarchy to network governance** - TCs will benefit from more autonomy which enables them to respond better to opportunities.
- ▶ **Establish a strategic framework** - TCs should utilise a coherent strategic framework which clearly articulates programme goals, sound economic development principles and good practices. Revised KPIs should promote sound strategy that result in greater, sustained development impact.
- ▶ **Establish a strategic facilitation capacity** - TCs should learn faster to achieve greater development impact. TCs should be at an international level of competitiveness.

Apart from above, several studies have been undertaken by O/o DC MSME in recent years to analyse the technology capabilities and governance framework established at the existing TCs. The key findings from these studies are summarized as follows:

- ▶ **Technology**
 - There is a possibility of improving the overall machine performance by suitable investments in large size milling machines and grinding machines to remove the bottleneck
 - Rationalization and standardization of all manufacturing processes
 - Reduction of in-machine set-up times using zero-point clamping systems and pallets
- ▶ **Organization**
 - Definition of requirements for improving planning and control of the order fulfilment process by developing an electronic planning and control system.
- ▶ **Training**

- Development of a link between manufacturing competencies and course offerings through the introduction of course offerings that address organizational capabilities and component manufacturing,
- Establishment of modular course structure for advanced training of industry professionals.

All of the above recommendations are valuable not only for the improvement of the existing TCs but also it serves as an important input for conceptualizing and planning for the new TCs.

2. DPR objective and approach

2.1 Objective

An ESDM focused Technology Centre in Greater Noida has been proposed with the underlying fact and review of the catchment area (Gautam Budh Nagar, Delhi, Gurgaon, Faridabad, Ghaziabad and Alwar) which has some of the leading ESDM units. Further a number of transformational industrial projects are proposed and the TC can facilitate and support the MSME units coming up across this region. The TC at Greater Noida will play an important role in enhancing the competitiveness of the MSME Units in the area. TC will provide support service to entrepreneurs and MSMEs from the initial stages of product concept to prototyping, low volume production and incubation for a period of 2 years. The TC will focus on improving access to technology, providing skill up-gradation and offering advocacy support to the MSMEs with high growth potential. The long term vision is to ensure competitiveness of the MSMEs in the eco-system by strengthening their linkages to the mainstream ESDM manufacturing sector in the region.

The objective of this DPR is to evaluate feasibility of proposed MoMSME TC at Greater Noida. This includes assessment of the market need in the region, technology and skillset requirement, amount of investment required, construction needed, its layout and subsequent requirements for implementation of the green field TC at Greater Noida. This DPR has been prepared in consultation with relevant stakeholders including O/o DC-MSME, Government of Uttar Pradesh, MSME-DI, Department of Industries, key players, industry associations in Greater Noida, Government Institutes and ancillary units in the region. This DPR would facilitate the implementation plan of proposed TC at Greater Noida.

2.2 Approach

To start with, a comprehensive secondary research was carried out to understand the technological requirements of the sector and in particular of the Greater Noida catchment area. To validate the facts, the team performed a detailed primary research was carried out which included meetings with various key stakeholders including O/o DC-MSME, ESDM units in the catchment and others as explained below.

Discussions with various stakeholders were carried out to develop better understanding of the requirements and expectations from the proposed TC. Leading players were met in this region to discuss and understand the various insights with respect to the tooling & other technological requirements during the preparation of the DPR. Discussions with some of the key ESDM manufacturers in the Greater Noida region were carried out. The objective of this primary research was to understand their business requirements, issues, challenges, and future requirements to develop a deeper understanding of the requirements that can be served by the TCSP in future.

Based on the outcomes and the results of the discussions, market opportunity assessment was undertaken to understand the technology demand in ESDM sector across segments across the various stages of manufacturing.

Way forward:

Tata Consulting Engineers Ltd. has been appointed as the Construction Management Consultant in December 2015. They are currently in the process of undertaking the following activities for the new TC locations:

- a) Undertaking Site survey
- b) Development of building plans and master plans for the new TCs
- c) Preparation of the BoQ for the construction of the new facility
- d) Assisting in the procurement of the construction agency for construction of the facility

Once these plans have been finalized, the same need to be updated in the DPR.

In addition, the on-boarding of 2 other main partners is critical to achieve the envisaged outcome in the defined time frame.

- ▶ Manufacturing Technology Partner for ESDM sector - Procurement of machines and adoption of new technologies
- ▶ Cluster Network Manager - Marketing the centre and development of cluster with the right mix of products and services

Location Selection for New TCs



3. Framework for selection of industry/ clusters/ systems/ location for new TCs

3.1 Location selection framework

With the objective of establishing 15 new TC's to support industry clusters, there was a need to prioritize and identify high potential growth industries based upon certain selected parameters. Hence, one of the most challenging and critical aspect of the TCSP was selection of the Industry/Clusters/Systems/Locations. This required careful consideration of parameters and consultation with the stakeholders. Preliminary meetings with the O/o DC-MSME were held to discuss the concept and approach. Subsequently three distinct approaches were finalised to identify the locations:

a) **Manufacturing Competitiveness approach:** Key idea for this approach was to identify location for TC at a place where it can create the most impact on improving the manufacturing competitiveness. The steps involved were:

- ▶ Listing major manufacturing industries creating value across country
- ▶ Identifying the clusters which can be catalyst to the manufacturing competitiveness for respective industry

One key limitation of this approach is that it will select the clusters which are already established and are among the most competitive across the country, will get shortlisted. A TC at such location will further improve the competitiveness of this location.

b) **Inclusive Growth approach:** Approach is based on the assumption that that state which has higher Net State Domestic Product has better growth and hence the states with lower per capita state domestic product should be supported. A TC in such states would become catalyst to improve the manufacturing growth in the state. Following steps were followed:

- ▶ Identification of bottom 15 Low Income states on the basis of per capita Net State Domestic Product⁹
- ▶ Identification of major manufacturing Industries in the State
- ▶ Identification of the major clusters for the identified major industries in the state

One of the key drawbacks of this approach is that clusters identified will not be the most competitive for the industry in the country. It is possible that by investing in a TC at such a location might improve the competitiveness of that cluster but may not make this TC a world class centre.

⁹ 2011-12 Current prices

c) **Alignment of Major Economic Projects:** As a TC will create value for many years¹⁰ and there are some mega projects in progress which will get completed in 10-15 years. This approach aims to incorporate the possible future growth areas on the basis of these mega projects. Considering that such economic growth is based on future development these areas may not get covered in above two approaches. The steps included are:

- ▶ Identification of major Economic projects & timelines (which have been ratified by the Government)
- ▶ Listing the States & Industries getting impacted
- ▶ Identifying the emerging clusters for the top industries

Above three approaches resulted in the first list of many locations. It was important to create a common framework to choose the most appropriate location. In this context “systems approach” was applied. Systems approach takes in to account the presence of entire ecosystem for a TC in the catchment area¹¹ and **Location Attractiveness Index** was created.

A Technology Centre will perform better in achieving its objectives if it is established at a location with better LA Index.

Construct of LA Index:

$$\text{LA Index Score} = \text{Catchment Score} * \text{Presence of TC Score}$$

Catchment Score = f x (MSME Unit Score * ITI/PT Score * Presence of Major Firms Score* Presence of Leading Technical Institute Score)

Presence of TC Score= Presence of state/private technology center in the catchment area

Following data prints were captured and analysed:

- ▶ Number of MSMEs, Number of ITIs /Polytechnics, Number of Major Firms, Leading Technology Institutes for R&D
- ▶ Existence of TCs in the Catchment area (inclusive of DC-MSME, State Government , and Private Tool Rooms)

MSME Units: This reflects the concentration of MSME and it is envisaged that larger the number of units more opportunity for TC to impact the competitiveness.

Number of ITIs/Polytechnics: This reflects the availability of population seeking skill development courses. It has also been observed that students from ITI and polytechnic form a large group of students seeking vocational training at TCs due to lack of such facilities at their respective institutes.

¹⁰ Existing Technology Centers are more than 25 year old.

¹¹Catchment Area = District of the location and all neighbouring districts (transcending state boundaries) it is assumed that maximum value creation will be in the immediate surroundings of the Technology Center.

Number of Major Firms: It has been observed that often larger firms take the initiatives to go for technology upgrades and performance improvements. This leads to cascading effect and firm’s suppliers, competitors follow up these initiatives in order to stay competitive. If a TC has larger number of such major firms in the vicinity it will have more opportunity to do technology collaborations and thus impact the entire ecosystem.

Leading Technology Institutes: Each TC can play a vital role to establish an Industry- Academia partnership. It has been found that while there are researched ideas available at the academia but they have difficulty in commercializing same. On the other hand the industries are looking for the fresh ideas to improve upon their competitiveness in the market. Unfortunately this linkage does not happen as industry has need of ideas where the proof of concept is ready and unfortunately academia does not goes beyond research. TC can play a role of bridging this gap and create the platform to link industry and academia.

State/Private TC: TC can play a vital role in mentoring and improving the performance of the state government or private sector TCs (tool rooms). If there are such opportunities in the vicinity of the MoMSME TC it can further increase the reach of TC to improve the competitiveness of MSMEs.

The weightages assigned to each parameter were as below:

100				30				20		10		20	
Catchment Area Parameters				Major Firms		Tech Inst.		Presence of state/pvt TR					
State	Industry	Location	Net Score	Units	Unit Score	ITI/IPT	ITI/IPT Score	Number	Score	Number	Score	TC of State Govt/ Pvt Tool Room	TC-State Govt/ Pvt Score

In order to further refine the list of locations arrived using the above approach, following additional criteria for shortlisting the industries were incorporated:

- ▶ **Prior experience:** These are the sectors where O/o DC-MSME has experience of operating TCs, such as General Engineering, Automotive, Electronics/ESDM, Leather & Footwear, Glassware, Sports Goods, and Fragrance & Flavours
- ▶ **Concentration of MSME's:** These are sectors where O/o DC-MSME has limited prior experience of operating TCs, however there exist a large number of MSMEs in these

industries. Such as Food processing, Textiles (including Handlooms & Handicrafts), Pharmaceuticals, Wood/Paper/Pulp, and Rubber & Plastics.

- ▶ **Emerging Sectors:** These are upcoming sectors that may be at the forming stage, but will become major sectors in the near future, such as Bio-technology, Nano -technology, etc.

The sector in which DC-MSME has prior experience have been taken on priority. These sectors are: auto components, ESDM, general engineering, fragrance & flavour, leather & footwear, glass. Later the scope can be expanded to include other sectors pertaining to ministries other than MoMSME, if needed. Such sectors include food processing, pharmaceutical, packaging etc. where presence of MSMEs is considerable.

The list of locations arrived through the above was further refined and finalised with respect to the following additional considerations;

During these discussions additional considerations emerged:

- ▶ **State Classification:** The states were classified into two categories as unserved states and served states. All states of the country were distributed between Un-served states where O/o DC-MSME did not have an operating TC and served states where an operating MoMSME TC existed.
- ▶ At first unserved states were considered for the new TC in order to spread the coverage of MoMSME TC which would help in supporting more MSMEs across the country. With the approval of locations for the unserved states, served states would also be considered for the technologies for which existing TC cannot support.
- ▶ On the basis of MSMEs concentration in prior experience sectors, leading clusters were identified in each unserved state. This resulted in identifying the industry wise potential locations in each of these states.
- ▶ Some of the unserved states took proactive approach and have allocated or identified land for the purpose of TC. These locations were mapped to the locations identified in the step above. Accordingly technology focus was selected for these locations.

3.2 Selection of Greater Noida location for setting up of new TC

As per the location selection framework and subsequent approval in the 8th PSC meeting held on 6th August '15, Greater Noida was selected as the location for setting up of new ESDM TC. Greater Noida region has been found suitable from multiple perspectives:

- ▶ Catchment area Gautam Budh Nagar - Delhi - Gurgaon - Faridabad - Ghaziabad - Alwar has some of the leading ESDM players. Greater Noida and its catchment area has several major ESDM OEMs and over 2984 MSMEs in the ESDM sector. A TC at Greater Noida will help improve the manufacturing competitiveness
 - Major OEMs include - Motherson Sumi, Denso, Delphi, Havells, Honda Power Products, NTL Electronics, Samsung, Videocon, LG
- ▶ Mega industrial projects in vicinity
 - The Government of Uttar Pradesh is taking several measures to boost the ESDM industry in the State. Incentives are being provided to the ESDM industry, which is expected to increase the number of units in this sector.
 - Semiconductor fabrication facility is proposed in Greater Noida, which will be set up by Jaiprakash Associates (in partnership with IBM and Tower Semiconductor Ltd.). The outlay of the proposed facility is about Rs 26,300 crore for establishing the capacity of 40,000 wafer starts per month of 300 mm size, using advanced CMOS technology
 - The Taiwan Electrical and Electronic Manufacturers' Association (TEEMA) is expected to invest \$200 million in electronic manufacturing sector in Greater Noida.
 - LAVA International Limited and Foxconn plan to establish facilities in the district
 - MoUs have been signed with ICA, ELCINA, and IESA worth Rs. 3000 crore for proposed investments in electronic manufacturing clusters (EMCs) at Yamuna Expressway and Greater Noida regions. These EMCs are expected to generate direct and indirect employment opportunities for over 50,000 persons.
 - Initiatives are being taken to encourage solar energy, with 300 MW solar power plants proposed. The National Solar Mission has put into place rules which promote domestic manufacturing in this sector. This will provide a boost to solar PV manufacturing.
- ▶ Good connectivity and access from other locations

Greater Noida is well connected, with two National Highways, NH-24 (Delhi-Lucknow), NH-58 (Delhi-Haridwar-Mana Pass). The Yamuna Expressway runs from Greater Noida to Agra, and an eight-lane, 25km long expressway connects Greater Noida directly to Delhi. It will also be served by proposed Eastern Peripheral Expressway (Kundli-Ghaziabad-Noida-Palwal) of NCR. It is located close to Dadri Railway Junction where the Eastern and Western Freight Corridors

meet. A Metro Rail network is to be developed between Noida and Greater Noida. A high speed Metro Rail line is also proposed from Greater Noida to Indira Gandhi International airport. Greater Noida falls in the Delhi Mumbai Industrial Corridor (DMIC), and the Integrated Industrial Township at Greater Noida is proposed under this project. The DMIC will connect Greater Noida with several other states in the country.

4. Location brief

4.1 Regional overview

Greater Noida is located in the Gautam Budh Nagar district of Uttar Pradesh, located 28° 29' to 28° 49' North latitude, and 77° 30' to 77° 51' East longitude. It comes under the purview of the National Capital Region (NCR) of India. Gautam Budh Nagar is bound by Ghaziabad in the north, Delhi in the west, Aligarh in the south, and Bulandshahar district in the east. The district comprises of 4 tehsils which are Noida, Dadri, Dhankaur, and Surajpur. The District is newly created in the year 1997 from portions of Bulandshahar and Ghaziabad districts.

Greater Noida is growing rapidly. It has become a hub of industrial development, with several industries establishing units in the area. Industrial investment taking place in Greater Noida is now over Rs. 10,000 crores¹². The city has a privatized power distribution system, which ensures efficient power supply. With a large number of automobile and automobile component manufacturers located here, Greater Noida is increasingly being referred to as the 'Detroit of India'. Industrial majors such as Delphi Automotive Systems, Yamaha Motors, Honda Seil, and Moser Baer have selected Noida as an industrial base. IIT Roorkee is developing an extension centre in the area.

The area is well connected, with two National Highways, NH-24 (Delhi-Lucknow), NH-58 (Delhi-Haridwar-Mana Pass). The Yamuna Expressway runs from Greater Noida to Agra, and an eight-lane, 25km long expressway connects Greater Noida directly to Delhi. It will also be served by proposed Eastern Peripheral Expressway (Kundli-Ghaziabad-Noida-Palwal) of NCR. It is located close to Dadri Railway Junction where the Eastern and Western Freight Corridors meet. A Metro Rail network is to be developed between Noida and Greater Noida. A high speed Metro Rail line is also proposed from Greater Noida to Indira Gandhi International airport. Greater Noida falls in the Delhi Mumbai Industrial Corridor (DMIC), and the Integrated Industrial Township at Greater Noida is proposed under this project. The DMIC will connect Greater Noida with several other states in the country.

The proposed Technology Centre is to be set up at Ecotech in Greater Noida. Ecotech is Greater Noida's exclusive Industrial area. Several special incentives are provided to industries here, including speedy clearances and approvals, and incentives to promote early commissioning of projects. An effective single-table functioning guarantees project clearance within a month and an empowered committee continuously monitors the progress of these projects. Ecotech is located adjacent to a residential township with housing sectors, hospitals, schools, commercial complexes, recreational parks, etc. Ecotech will also be connected by the proposed Metro Rail Line in Greater Noida.

Figure 3: Location map

¹² <http://www.greaternoidaauthority.in/industrial>



Table 3: Gautam Budh Nagar District snapshot

Section	Quantity/Value
Area	
Total geographical area	1442 Sq. km
Administration	
Tehsil	4
Revenue Villages	3
Land use pattern	
Total area	71,000 Hectare
Non Agriculture Land	5301 Hectare
Population (census 2011)	
Total population	16,74,714
Men	8,90,214
Women	7,57,901
Literacy	
Total literate	80.12%
Men	88.06%
Women	70.82%
Industries	
Registered MSME units	14,048
Employed persons in MSMEs	2,34,560

Table 4: Status of power, water, wind and rainfall in the region

Aspect	Status	Significance for TC
Water availability	<ul style="list-style-type: none"> ▶ Greater Noida Authority is responsible for water supply in the area ▶ Proposed Ganga Water Project bringing water from the Ganga to Greater Noida¹³ ▶ Ground water level at 13.2m in Gautam Budh Nagar; groundwater level in Noida is falling by 1 meter every year¹⁴ 	<ul style="list-style-type: none"> ▶ To ensure availability of water on a daily basis TC will also have to dig a borewell. This would require permission from Central Ground Water Board
Electricity availability	<ul style="list-style-type: none"> ▶ Greater Noida's power is distributed by Noida Power Company Limited (NPCL) ▶ Several solar power plants are coming up in the area ▶ 12 new substations are being built in the city ▶ 1,320 MW plant to be set up, which will provide 24x7 power supply in Greater Noida 	<ul style="list-style-type: none"> ▶ Power back up (generators) to be designed keeping emergency and essential services / equipment in mind
Wind flow	<ul style="list-style-type: none"> ▶ Wind speed varies from 0m/s to 7 m/s, rarely exceeding 11m/s. ▶ Relative humidity ranges from 17% to 95% ▶ Greater Noida is located 200 meters above sea level 	<ul style="list-style-type: none"> ▶ Should maximize natural ventilation
Rainfall	<ul style="list-style-type: none"> ▶ Average annual rainfall: approx. 700 mm ▶ Monsoon season: June - September 	<ul style="list-style-type: none"> ▶ Should estimate capacity of rainwater harvesting

¹³ <http://www.greaternoidaauthority.in/ganga>

¹⁴ Ministry of Water Resources

Aspect	Status	Significance for TC
Temperature	<ul style="list-style-type: none">▶ Greater Noida has a sub-humid climate▶ Temperature in summer ranges from maximum 48°C to minimum of 28°C▶ Temperature in winter can fall down to 3-4°C	<ul style="list-style-type: none">▶ For estimation of capacity of AC to be installed for adequate cooling, and designing of building, as well as estimate potential for solar systems

4.2 Demographic profile of the district

Population growth: The total population of the Gautam Budh Nagar district is 16,74,714 (census 2011). Out of the total population in 2011, around 54% (8,90,214 people) are men and 46% (7,57,901 people) are women. The growth of population in the district was nearly 40% during between the years 2001-11. The district saw an urban decadal growth rate of 125.52% between 2001 and 2011¹⁵. The population density of the district is 1,187 persons / sq. km¹⁶.

The rapid population growth in Gautam Budh Nagar is attributed to the vast development that has taken place in Noida and Greater Noida. These cities have become industrial hubs, with the development of electronics, textile, engineering, IT, automobile and other industries. World class infrastructure in these cities, coupled with excellent connectivity to Delhi is attracting several people to the district.

Rural-urban population composition: Gautam Budh Nagar district has an urban population of around 59% (9,88,081) and a rural population of around 41% (6,86,633 people) as per census 2011. In the urban area, males constitute around 54% (5,33,564 people) of the population and women constitute for around 46% (4,45,517 people) of the population. In the rural area, males constitute around 53% (3,63,915 people) of the population and women constitute 47% (3,22,718 people) of the population.

Sex Ratio: The sex ratio at the district level is 851 females per 1000 males (year 2011).

Literacy Rate: The literacy rate of Gautam Budh Nagar district is around 80%. Among male and female this rate is 88% and 70% respectively. At the district level, the number of literates has increased by about 12% from year 2001 to 2011. The male and female literates increased by 7% and 17% respectively during this period¹⁷.

¹⁵ http://censusindia.gov.in/2011-prov-results/paper2/data_files/UP/6-exe-summery-9-11.pdf

¹⁶ http://ncrpb.nic.in/pdf_files/Draft%20Revised%20Regional%20Plan%202021/06%20Chapter%204%20Demographic%20Profile%20and%20Settlement%20Pattern-26%20july%202013.pdf

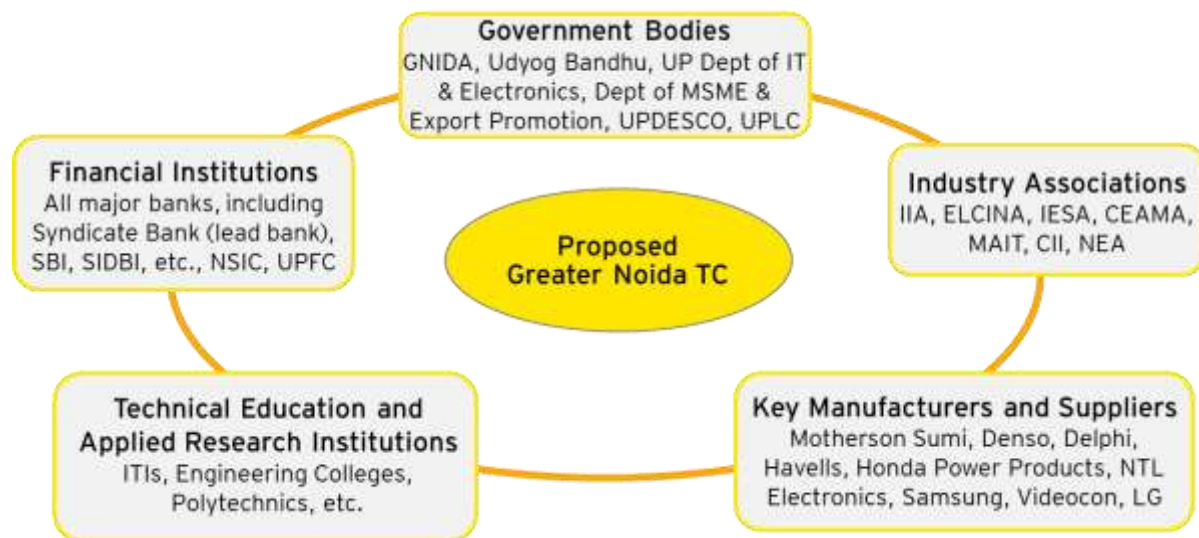
¹⁷ Census 2011

4.3 Regional stakeholders

Regional Industry associations, leading manufacturers, training institutes, applied research institutes, academia, thought leaders and above all MSMEs would play an important role in providing guidance on key aspects including (but not limited to) designing capabilities, technological requirements, skillset requirement and cluster development.

Key stakeholders for the Greater Noida TC would include: Government bodies, industry body associations, manufacturers and suppliers (e.g; OEMs, tier 1 and MSMEs etc.), financial institutions, technical and vocational training institutes, applied research institutes etc. in the catchment area. Greater Noida and its catchment area include the key districts of Gautam Budh Nagar, Delhi, Gurgaon, Faridabad, Ghaziabad, and Alwar. The following figure depicts the stakeholders of the Greater Noida TC:

Figure 4: Stakeholders of Greater Noida TC



4.3.1 Government Bodies

► Greater Noida Industrial Development Authority (GNIDA)

GNIDA is the nodal agency responsible for overall development of the Greater Noida City. GNIDA was established in 1991, and provides for planning, development, regulatory functions, maintenance, and operations in Greater Noida. The activities of GNIDA can be classified as under:

- Provision of Quality Infrastructure
- Attracting industries
- Employment Generation

- Growth and Development of the city, through initiatives for development such as Ganga Water, Gautam Budh University, Noida Metro Rail, Development of infrastructure such as office complex, etc.

▶ **Udyog Bandhu - Department of Infrastructure and Industrial Development**

Udyog Bandhu is an organization of the State Government of Uttar Pradesh in India; dedicated to facilitate Investment in Industrial and Service Sectors, besides solving various problems of existing and up-coming industries related to different Government departments. The organization acts as a coordination agency between entrepreneurs and government. It also functions as a catalyst for investment promotion and has also been carrying out greater responsibilities encompassing its role for industrial promotion, assisting the government in policy formulation, getting studies conducted regarding investment promotion etc. It has emerged as the major interaction centre for entrepreneurs and has been organizing high level conferences on industry related issues.

▶ **Department of MSME and Export Promotion, UP**

The Department is responsible for the enhancement of an industrial base in the State, through promotion and support to MSMEs, and assistance in exports. The Department has the following objectives:

- To provide competitive cost effective and fast services to the industry in UP
- To have an industry base in Uttar Pradesh that is recognized worldwide for quality, environment friendly and cost effective products
- Providing facilitation forums for resolving industrial problems to enhance the growth of industrial environment
- To plug in the information gaps and thereby increase the industry awareness department
- To generate gainful/meaningful employment

These objectives are achieved through the following functions:

- To provide training to entrepreneurs
- To develop industrial data base in all major fields
- To provide support for trade's & fairs
- To provide quality support testing, patents, copyrights information & support system
- To assist craftsman by adequate industrial and social database
- To provide marketing support by virtual sites etc .
- To promote and Assist Export from the State

▶ **Uttar Pradesh Department of Information Technology (IT) and Electronics**

The Department's objective is to use Information Technology as a vehicle for economic development, and to create a high tech society with a high quality of life in Uttar Pradesh. The Uttar Pradesh Electronics Manufacturing Policy was developed in 2014 in order to promote and develop the electronics manufacturing industry in the State. The objectives are to make position Uttar Pradesh as the preferred state for Electronics Manufacturing in India; to provide conducive, industrial friendly, sustainable and proactive environment for ESDM companies within the State; to build a sustainable ecosystem of R&D engineering and production in electronics in the State; and to develop electronic sector specific talent in the State which can help in enhanced employment opportunities. Several incentives and concessions are being provided to the ESDM industry.

▶ **Uttar Pradesh Development Systems Corporation (UPDESCO)**

UPDESCO was formed in 1977. It is a multi-disciplinary consultancy organisation providing systems back-up to Governments, Enterprises, International organisations and other non-governmental agencies in diagnosing and estimating the magnitude of problems, identifying technological and other alternatives and suggesting methods of improvement.

The Taiwan Electrical and Electronic Manufacturers' Association (TEEMA) has recently signed an MoU with UPDESCO, under which it will invest \$200 million to develop a 210-acre greenfield electronic manufacturing cluster in Greater Noida.

▶ **Uttar Pradesh Electronics Corporation Limited (UPLC)**

UPLC is a Government of UP undertaking, with the objective of promoting IT and Electronics industries in the State of UP. The main objectives of UPLC are the following:

- To Promote and develop IT and Electronics industries in the state of Uttar Pradesh
- To implement and operate the Projects relating to development of IT and Electronics Industries in Uttar Pradesh as per instructions of the State Government and to establish electronic industrial enterprises etc. To undertake setting up of new electronic industrial units and/ or expansion of existing units in part or in full
- To Promote research and development in electronics
- To provide support to the entrepreneurs setting up IT and electronics industries, and to act as an Industrial Management and Financial Consultants for them.
- To prepare Market Survey Report, Project Profiles, Project Study related to electronic products etc. to support electronic industries in different fields
- To provide facilities of Testing, Calibration and Standardization
- Development and Training to entrepreneurs and Technical Man power

A greenfield Electronics Cluster under UPLC has been approved on the Yamuna Expressway in Greater Noida.

4.3.2 Industry Body Associations

▶ **Indian Industries Association (IIA)**

IIA is an apex representative body of MSMEs, with a membership base of about 5000 MSMEs. The association was founded in 1985, and has a network of over 40 chapters spread across most of the industrialized districts of UP and the surrounding regions. IIA works towards creating an environment conducive to industrial growth especially for MSMEs, disseminating valuable information on legal & technical aspects, latest development in industry and market, about latest Government policies, procedure and laws etc. apart from solving other problems of the Industry.

▶ **Noida Entrepreneurs Association (NEA)**

NEA is an association of Noida based industries representing more than 6000 Small and Medium Industries. The Association has linkages with various Associations like the Federation of Indian Chambers of Commerce and Industry (FICCI), Confederation of Indian Industry (CII), and Associated Chambers of Commerce of India (ASSOCHAM) etc. The association facilitates the following:

- Brings together entrepreneurs of Noida
- Helps to promote development of industries and allied facilities
- Provides facilities for exchange of useful information
- Holds meetings, conferences, conventions, exhibitions, etc.
- Organizes common facilities for members
- Cooperates with other institutions / associations and organizations for the benefit of members
- Makes representations to Government or other bodies

▶ **Consumer Electronics and Manufacturers Association (CEAMA)**

Consumer Electronics and Appliances Manufacturers Association is an all India organization in the Consumer Electronics and Durables sector. The following services are provided by the industry:

- Interacts with the Government in formulating policies for the development of the sector.
- Facilitates industry growth by serving as an interface with the Government for meaningful interaction and dialogue.
- Takes up the problems of members with govt. for resolution.
- Provides consultancy on commercial matters.
- Conducts Training Programs / Workshops.

- Organizes Seminars, Conferences and Exhibitions.
- Interacts with Media to highlight issues affecting growth of the sector and put across industry's view point.
- Maintains Data Bank for use by members.
- Interacts with other industry Chambers / Associations

▶ **Electronic Industries Association of India (ELCINA)**

ELCINA was established in 1967, and provides a forum for electronics and IT manufacturers. ELCINA actively interacts with the government and advises on policy and business environment issues. It focuses on promoting the manufacture of electronic components, industrial / professional electronics, defence / strategic electronics, electronic manufacturing services, and other expanding areas in electronics such as Medical, Automobile, etc.

▶ **India Electronics and Semiconductor Association (IESA)**

IESA is a trade body representing the Indian ESDM industry. IESA is committed towards building global awareness for the Indian ESDM industry and supporting its growth through focused initiatives in developing the ecosystem. This is through publishing credible data, networking events and alliances with other international associations. IESA works closely with the Government as a knowledge partner on the sector, both at the centre and at the state level. The primary objective of IESA is to act as a catalyst for the growth of the ESDM industry in India.

Objectives include:

- Create global awareness for the Indian semiconductor and electronic systems industry outside of the generic 'IT' umbrella
- Create a win-win interaction among semiconductor and electronics product and services companies, government, academia, venture capitalists and industry bodies
- Create an enabling ecosystem that catalyzes industry growth and leadership
- Enhance operational efficiency
- Foster active collaboration between industry and universities to further expand the available world class semiconductor talent pool
- Identify investment opportunities
- Drive technology vision for the semiconductor and electronic systems industry
- Promote trade and industry

▶ **Confederation of Indian Industry (CII)**

CII works to create and sustain an environment conducive to the development of India, partnering industry, Government, and civil society, through advisory and consultative processes.

CII's primary goal is to develop Indian industry and to ensure that government and society as a whole, understanding both the needs of industry and its contribution to the nation's well-being. Their role includes:

- To identify and strengthen industry's role in the economic development of the country
- To act as a catalyst in bringing about the growth and development of Indian Industry
- To reinforce industry's commitment to society
- To provide up-to-date information and data to industry and government
- To create awareness and support industry's efforts on quality, environment, energy management, and consumer protection
- To identify and address the special needs of the small sector to make it more competitive
- To promote cooperation with counterpart organisations
- To work towards the globalisation of Indian industry and integration into the world economy

► **Manufacturers' Association for Information Technology (MAIT)**

MAIT represents Hardware, Training, R&D & Hardware Design and other associated service segments of the Indian IT Industry. MAIT's charter is to develop a globally competitive Indian IT Industry, promote the usage of IT in India, strengthen the role of IT in national economic development, promote business through international alliances, promote quality consciousness in the IT Industry and transform the Indian IT Industry into a World Scale Industry leading to a World Class Usage and thus a World Size Market.

MAIT contributed in formation of the ICT policies of both the States and the Central Government, including the 12th Five Year Plan for IT. MAIT was also a part of the Task Force set up by the Ministry of Communications & IT, Government of India in the past to suggest measures to stimulate the growth of IT, ITeS and Electronics Hardware Manufacturing Industry in the country. MAIT has played a role in formulating the e-Waste Rules 2011 as well the e-Waste Implementation Guidelines.

Key thrust areas:

- Enabling a policy framework of IT manufacturing ecosystem
- Attracting investments in IT/electronics manufacturing
- Simplification of procedures for domestic and external transactions
- Increasing IT penetration/usage in India.
- Rationalization of local levies and taxes on IT products to make them affordable.

- Promoting Green IT management
- Promoting sustainability & environmentally sound management of e-Waste
- Promoting IP among all the stakeholders
- Promoting international relations
- Demand Creation
- Promoting SME sector
- Promoting design, innovation and new product development.
- Promoting development of local language IT applications/products/solutions.
- Promoting usage of genuine IT products, components and consumables.

4.3.3 Leading Manufacturers

▶ OEMs and Tier 1 players

The Greater Noida region houses some of the largest industries in the electronics sector. Following are some of the key OEMs and Tier 1 players in focus sectors:

Automobile and Auto Electronics: Motherson Sumi, Denso, Delphi, Yamaha Motors, Honda, etc.

Industrial Electronics: Havells, Honda Siel Power Products, NTL Electronics, Electrostar Electronics, Autometers Alliance Ltd., etc.

Consumer Electronics: Samsung, LG, Videocon, Samtel, etc.

▶ MSME Units

Greater Noida and its catchment area include the key districts of Gautam Budh Nagar, Delhi, Gurgaon, Faridabad, Ghaziabad, and Alwar. Together, these key districts of the catchment area comprise approximately 58,258 MSME units. Of these, about 3,833 are in the EDSM sector¹⁸.

4.3.5 Financial Institutions

Major financial institutions across the region are as follows;

District name	Financial institutions
Gautam Budh Nagar	Nationalised Banks, Syndicate Bank (lead bank) State Financial Corporation (UP Financial Corporation)
Delhi	Nationalised Banks
Gurgaon	Nationalised Banks, NSIC, HFC
Faridabad	Commercial banks in Faridabad and State Financial Corporation

¹⁸DC MSME

Ghaziabad	Nationalised Banks, State Financial Corporation
Alwar	Rajasthan Financial Corporation and Lead bank - PNB

4.3.6 Technical Education and Vocational Training Institutes

► Technical Education

Uttar Pradesh has a total of 330 polytechnics, and 1500 ITIs (industrial training institute) / ITCs (industrial training centres)¹⁹. The table below illustrates the number of ITIs, Polytechnics and Engineering Colleges (government and private) in the catchment area, as well as their intake capacity.

Number of Technical Institutes and their Intake Capacity in the Catchment Area

District	Type of institutes	No. of institutions	Intake Capacity
Gautam Budh Nagar ²⁰	ITI & ITC	23	4,320
	Polytechnics	4	1,380
	Engineering	NA	NA
Delhi ²¹	ITI & ITC	37	NA
	Polytechnics	18	NA
	Engineering	24	11,500
Gurgaon	ITI & ITC	5	1,400
	Polytechnics	7	840
	Engineering	14	6,000
Faridabad	ITI & ITC	8	1,672
	Polytechnics	9	1,020
	Engineering	14	5,730
Ghaziabad	ITI & ITC	35	9,104
	Polytechnics	12	2,665
	Engineering	NA	NA
Alwar	ITI & ITC	91	10,118
	Polytechnic	11	3,060
	Engineering	8	3,900
Total		320	62,709

► Vocational Training:

Uttar Pradesh Vocational Training Council was formed in 2009 with the intent of skilling educated and uneducated youth and making them employable. The mission of this council is to integrate efforts of various departments of the State and Central Government organizations engaged in providing skill

¹⁹ <http://www.up.gov.in/upinfo/upsdm/Uttar-Pradesh-Skill-Development-Policy.pdf>

²⁰ <http://www.up.gov.in/upinfo/upsdm/Uttar-Pradesh-Skill-Development-Policy.pdf>

²¹ No of ITIs & Polytechnics are approximate figures compiled from different sources

development training and make available employment oriented and placement linked training in vocational skills to 45 lakh youth in the age group of 14 to 35 years by 2016-17, and even at a greater pace thereafter, by partnering with government and private training providers, while ensuring equitable access to the most disadvantaged, including women; and strive for placement of preferably at least 70% of the trained youth in gainful wage and self-employment to enable them to contribute to the economic development of the State. Key strategies for enhancing vocational training in the State include the following:

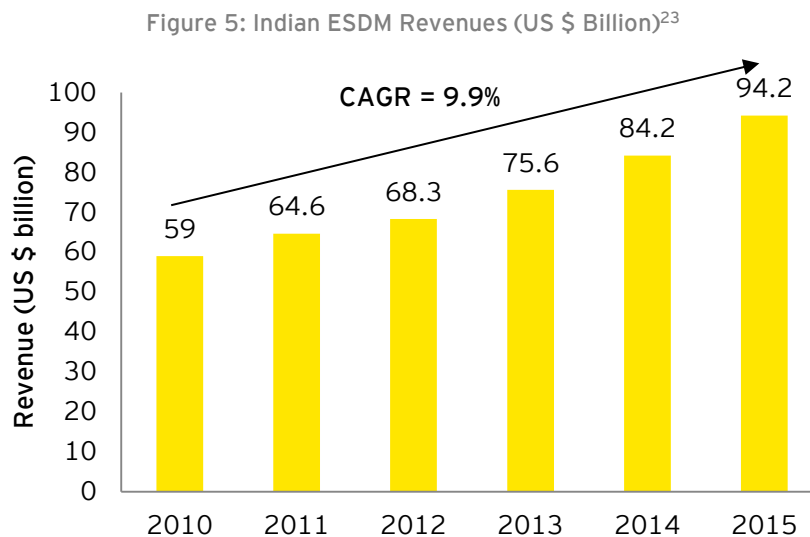
- Creating a system integrator known as Uttar Pradesh State Skill Development Mission (UPSSDM). UPSSDM will prepare a State Skill development plan
- Up-gradation and up-scaling of Government ITIs / ICTs / Polytechnics, improving training infrastructure, and introducing courses in fast growing sectors which have a high demand for skilled labour while removing redundant courses
- Engaging with private sector to establish partnerships with reputed private training providers
- Persuade NSDC to engage their contribution to state skilling efforts
- Special Programmes for addressing the needs of vulnerable groups (women, SCs, STs, minorities)
- Special schemes for Focus Sectors, including IT / ITeS, which have good employment potential in the State
- Financing skill development trainings
- Creating a large pool of trainers - the state has already set up a Vocational Education and Research Centre
- Course standardization, certification, and accreditation
- Strengthening apprenticeship programmes by collaborating with industries and large companies in the State

5. Opportunity and need assessment

5.1 India scenario

ESDM is one of the fastest growing manufacturing industries in the India. Despite accounting for only about 3.5% of the global electronics market, India is witnessing uninterrupted growth, with the ESDM industry in India being globally renowned for its consumption potential. A CAGR of 9.9% is estimated for ESDM in India, from USD 59 billion in 2010 to an estimated USD 94.2 billion in 2015. However, most of the demand is at present being fulfilled by imports. By the end of 2015 only 6.7% of this is expected to be made by local domestic companies.²²

The below charts depict Indian's ESDM sector growth in the recent past:



The Indian ESDM industry is categorised into five key segments:

1. Electronic Products - These constitute the total market for electronic products (produced locally or imported) for domestic consumption as well as export of electronic products manufactured in a country
2. Electronic Components - This includes all local manufacturing of electronic components
3. Semiconductor Design Services - These include revenue from semiconductor design-related activities of local players and captives of semiconductor MNCs operating in a country. It includes revenues from embedded software, very large scale integration (VLSI) and hardware/board design
4. Electronics Manufacturing Services (EMS) - Includes revenue from all EMS services rendered in the country

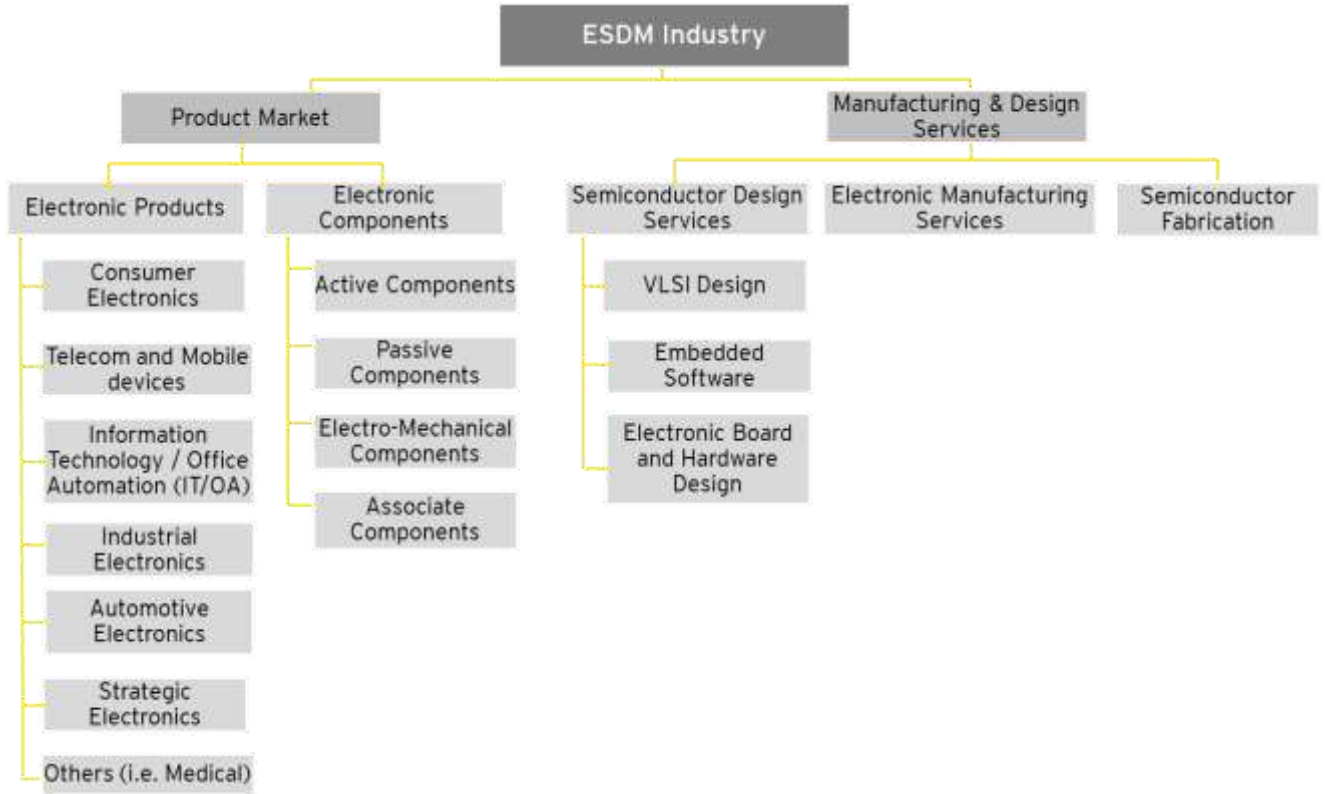
²² Indian ESDM Market 2011 - 2015, ISA - Frost Sullivan Report

²³ IESA-F&S study

5. Semiconductor fabrication - This will include revenue generated by foundries through fabrication of semiconductors.

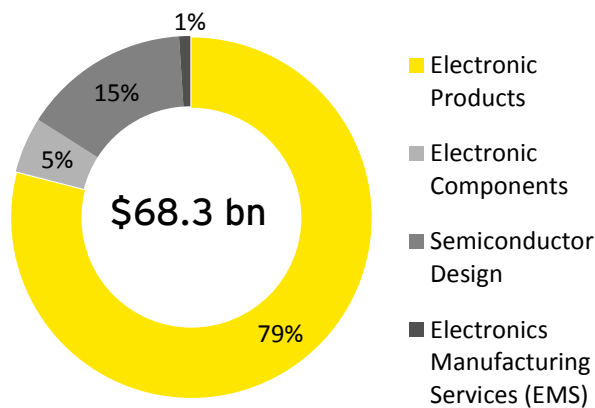
The diagram below depicts the breakdown of these key ESDM Segments:

Figure 6: ESDM Sector Overview



Additionally, the following chart shows the breakup of the revenue from the Indian ESDM industry in the year 2012.

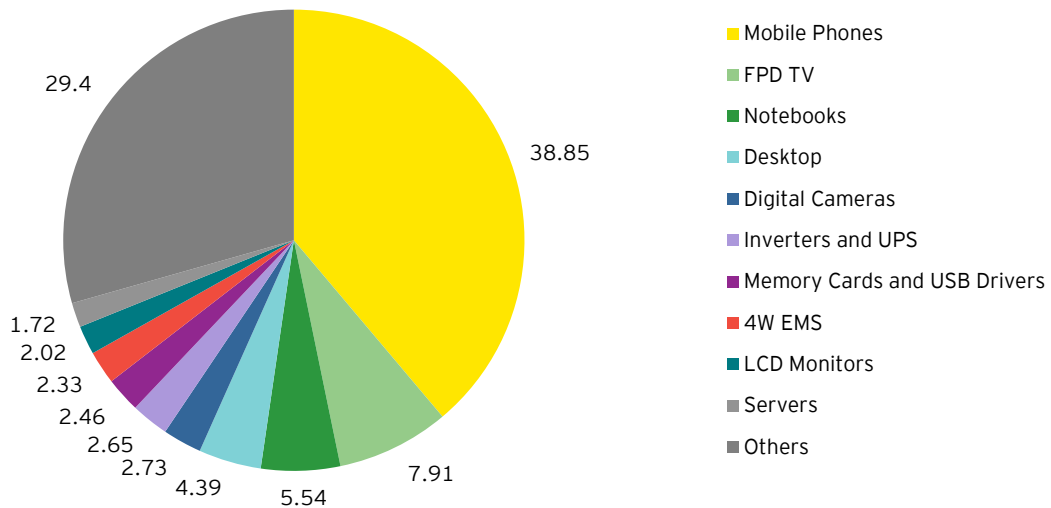
Figure 7: Indian ESDM industry revenues 2012 (by categories)



Note that semiconductor fabrication is a relatively new area in India and no revenue from the same was reported in 2012.

Analysing the application segment, it was observed that the top 20 product markets accounts for 80 percent of the overall electronics total market revenue in 2012. The following chart depicts the top 10 products by Total Market Revenue share in the Indian Electronics Manufacturing Sector:

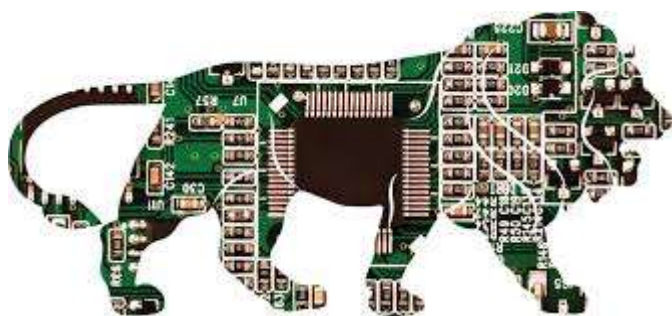
Figure 8: Top 10 Products by Total Market Revenues (2012) in %²⁴



Changing global landscapes in electronics design and manufacturing capabilities as well as cost structures are forcing global companies to look for other options. Companies from around the world are looking to build local capabilities in India as well as other low cost destinations, not just to serve the domestic market but also to cater to overseas markets. The different value chain segments within the ESDM industry are at varying stages of development. Similarly, various electronics applications markets such as telecom electronics, automotive electronics, consumer electronics and industrial electronics, are at different stages of ecosystem development.

5.1.1 Focus on ESDM sector under Make in India

The Government of India has taken a number of measures to boost investments in the electronics hardware manufacturing sector, as well as to promote MSMEs in the ESDM sector. In 2014, the Government of India also launched the Make in India



²⁴ IESA-FS Indian ESDM Market 2014: <http://www.iesaonline.org/downloads/IESA-F&S-Indian-ESDM-Market-2014-Executive-Summary.pdf>

program which identified ESDM as one of the core focus sectors. The program aims to attract investment in the ESDM sector. The following key areas have been identified for investments in the near future:

- ▶ Setting up of Electronics Manufacturing Clusters.
- ▶ Semiconductor Wafer Fabrication (FAB).
- ▶ Electronic Components.
- ▶ Semiconductor Design.
- ▶ Electronics Manufacturing Services (EMS).
- ▶ Telecom products.
- ▶ Industrial/ Consumer electronics.

Various government schemes have also been announced to facilitate this:

- ▶ Introduced in 2012, the National Policy on Electronics is expected to create an indigenous manufacturing eco-system for electronics in the country. To achieve the NPE objectives, the following strategies are proposed:
 - Creating eco-system for globally competitive ESDM sector through the provision of fiscal incentives for investment, setting up of electronic manufacturing clusters, preferential market access to domestically manufactured electronic products, setting up of semiconductor wafer fabrication facilities, industry friendly and stable tax regime
 - Promotion of Exports through aggressive marketing and export incentives
 - Human Resource Development through involvement of private sector, universities and institutions of learning for scaling up of requisite capacities at all levels for the projected manpower demand
 - Developing and mandating standards to curb inflow of sub-standard and unsafe electronic products by mandating technical and safety standards which conform to international standards
 - Creating a complete secure cyber eco-system in the country, through suitable design and development of indigenous appropriate products through frontier technology/product oriented research, testing and validation of security of products
 - Creating long-term partnerships between domestic ESDM industry and strategic sectors for sourcing products domestically and providing Defense Offset obligations for electronic procurements through ESDM products
 - Creating ecosystem for vibrant innovation and R&D in the ESDM sector through creation of an Electronic Development Fund
 - Electronics in other sectors such as automotive, avionics, Light Emitting Diodes (LEDs), Industrial, medical, solar photovoltaics, Information and Broadcasting, Telecommunications, Railways, Intelligent Transport Systems, and Games and Toys

- Handling e-waste through various initiatives to facilitate environment friendly e-waste handling policies

- ▶ Electronic Manufacturing Clusters (EMCs): The government is offering financial support for the development of EMCs. For Greenfield EMCs, assistance will be given up to 50 percent of the project cost subject to a ceiling of INR 50 crore for every 100 acres of land. For brownfield EMCs, assistance will be given up to 75 percent of the project cost subject to a ceiling of INR 50 crore

- ▶ Electronics Development Fund (EDF): The EDF aims to create an ecosystem of R&D in electronics in India which will promote IP generation and large scale manufacturing, while simultaneously fostering the growth of the ESDM ecosystem. The focus of EDF largely revolves around small and medium enterprises (SME) in line with the goal of promoting innovation and job creation. The value of the fund is Rs. 10,000 crore.

- ▶ Modified Special Incentive Package Scheme (MSIPS): The MSIPS aims to offset cost disabilities, attract investments, and promote large-scale manufacturing in the India ESDM sector through an INR 10,000 crore corpus. The main features of M-SIPS are as follows:
 - The scheme provides subsidy for investments in capital expenditure - 20% for investments in SEZs and 25% in non-SEZs. It also provides for reimbursement of CVD/excise for capital equipment for the non-SEZ units. For high technology and high capital investment units, like fabs, reimbursement of central taxes and duties is also provided.
 - The incentives are available for investments made in a project within a period of 10 years from the date of approval
 - The incentives are available for 29 categories of ESDM products including telecom, IT hardware, consumer electronics, medical electronics, automotive electronics, solar photovoltaic, LEDs, LCDs, strategic electronics, avionics, industrial electronics, nano-electronics, semiconductor chips and chip components, other electronic components and EMS. Units across the value chain starting from raw materials including assembly, testing, packaging and accessories of these categories of products are included. The scheme also provides incentives for relocation of units from abroad.

- ▶ Foreign Investment Policy: A foreign company can start operations in India by registration of its company. Foreign equity in such Indian companies can be up to 100 percent. Foreign technology induction is encouraged both through FDI and through foreign technology collaboration agreement.

- ▶ India is attempting to join the select countries which have capabilities to manufacture state-of-the-art semiconductor chips in the world. Recently, Government of India has approved two semiconductor wafer fabrication facilities (FABs) to be set up. Two consortia of investors and technology providers have responded to the Government of India's expression of interest to set up FABs in India. These two consortia are:
 - M/s Jaypee Associates along with M/s IBM, USA and M/s Towerjazz, Israel. The proposed location is Greater Noida about 50 Kms from New Delhi.
 - M/s HSMC along with M/s ST Microelectronics, Geneva and M/s Silterra, Malaysia. The proposed location is Prantij, near Gandhinagar, Gujarat.

5.2 Market opportunity

Uttar Pradesh is taking active measures to promote the ESDM industry in the State, and to transform the State into a hub for ESDM, with a conducive policy environment, support to the industry, and a concerted strategy. Uttar Pradesh introduced an Electronics Manufacturing Policy in 2014, with the objective of manufacturing making the State a globally competitive and industry friendly electronics manufacturing destination. The policy also provides a special thrust to MSMEs in the sector. The State has also signed a Memorandum of Understanding (MoU) with IESA, under which IESA will assist the UP Government in fostering the start-up ecosystem, indigenous product development, and setting up ESDM incubation centres in the state. These measures are expected to provide impetus to ESDM industries in the State. According to Indian Cellular Association's (ICA) Vision 2020 document, Uttar Pradesh has the potential to attract investment of about Rs 72,000 crore by 2020 in the field of ESDM.

Gautam Budh Nagar has been at the centre of the development of the ESDM industry in Uttar Pradesh, with the cities of Noida and Greater Noida rapidly attracting industrial units. Several reputed companies are located in the area. Greater Noida is one of the largest industrial townships in Asia²⁵. GNIDA has taken several initiatives for industrial development and promotion of the district. Greater Noida's competitive advantage lies in the following:

(a) Location

- ▶ Greater Noida is a part of the NCR, and is well connected to Delhi. The Yamuna Expressway runs from Greater Noida to Agra, and an eight-lane, 25km long expressway connects Greater Noida directly to Delhi.
- ▶ It has two National Highways, NH-24 (Delhi-Lucknow), NH-58 (Delhi-Haridwar-Mana Pass).
- ▶ It will also be served by proposed Eastern Peripheral Expressway (Kundli-Ghaziabad-Noida-Palwal) of NCR.

²⁵ http://www.msmedinewdelhi.gov.in/PDF2014-15/DIPS_Gautam%20Budh%20Nagar%2012.6.14.pdf

- ▶ It is located close to Dadri Railway Junction where the Eastern and Western Freight Corridors meet.
- ▶ A Metro Rail network is to be developed between Noida and Greater Noida. A high speed Metro Rail line is also proposed from Greater Noida to Indira Gandhi International airport.
- ▶ Greater Noida falls in the Delhi Mumbai Industrial Corridor (DMIC), and the Integrated Industrial Township at Greater Noida is proposed under this project. The DMIC will connect Greater Noida with several other states in the country.

(b) Industrial Infrastructure

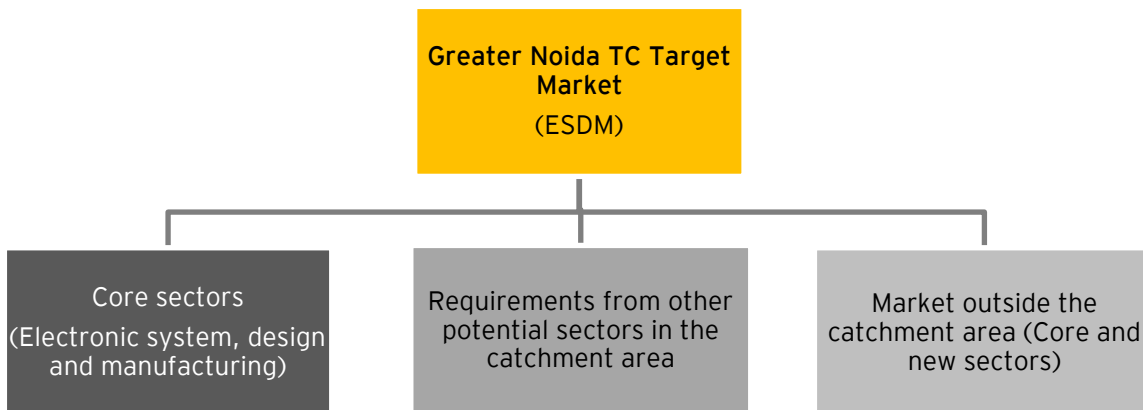
- ▶ Ecotech: Ecotech is Greater Noida's exclusive Industrial area. The Authority ensures speedy clearances and approvals, as well as incentives to promote early commissioning of projects in the area. An effective single-table functioning guarantees project clearance within a month and an empowered committee continuously monitors the progress of these projects. Industrial investment taking place in Greater Noida is now over Rs. 10,000 crores. It has now become one of the favoured locations for industries due to its world class infrastructure, proximity to Delhi, and effective single window system of speedy decision making and clearances. Units in Ecotech include Honda, LG Electronics, Denso, and Delphi.
- ▶ An Export Promotion Industrial Park in Greater Noida has been established on 200 acres of land to provide infrastructure facilities units to boost export of commodities. The park assures high quality power with back-up services through a private sector provider.
- ▶ Infotech Park is being established on 100 acres of land with state-of-the-art infrastructure, housing about 152-200 IT and ITES Units
- ▶ Brownfield Electronics Manufacturing cluster has been notified under M-SIPS in Greater Noida

(c) Investment

- ▶ A MoU has been signed between the government of Uttar Pradesh and Taiwan Electrical and Electronics Manufacturers Association (TEEMA) for setting up an EMC on a 210 acre plot. TEEMA will invest US\$ 200 million in the electronics manufacturing sector in Greater Noida.
- ▶ MoUs worth Rs. 3000 crore signed with Indian Cellular Association (ICA), ELCINA, and IESA for proposed investments in EMCs at Yamuna Expressway and Greater Noida. These EMCs are expected to generate direct and indirect employment opportunities for over 50,000 persons
- ▶ MoU worth Rs. 600 crore signed with LAVA International Limited for setting up an EMC on 100 acres of land along the expressway.
- ▶ Karbonn Mobile India Pvt. Ltd has set up a plant in Noida in partnership with Water World Technology Co., to produce 15 million phones a month

- ▶ Foxconn, the world’s largest contract phone maker, plans to establish a smartphone manufacturing plant in Noida.
- ▶ Chinese smartphone maker Vivo Mobile is coming up with an assembly facility in Greater Noida that will have a capacity to produce 1 million devices a month.
- ▶ Several electronic and automobile companies such as Denso, Delphi, Motherson Sumi, Havells, Honda, Samsung, LG and Videocon have established units in Greater Noida.

Figure 9: Target market structure of Greater Noida TC



5.2.1 Market in core sectors in the catchment

Greater Noida and its catchment area include Gautam Budh Nagar, Delhi, Gurgaon, Faridabad, Ghaziabad, and Alwar. Together, the key districts of the catchment area comprise approximately 66,949²⁶ MSME units. Of these, about 2,984 are in the EDSM sector.

Greater Noida and its Catchment Area

²⁶ DC msme



There is a well-established ecosystem for ESDM in Greater Noida. Several MNCs in the sector have established units here. The State has a conducive Electronics Manufacturing Policy, providing incentives to units, and several EMCs are being set up in the region.

It is proposed that the TC in greater Noida will focus on the ESDM industry, with a special focus on auto electronics and industrial electronics (specifically power electronics). Greater Noida and the catchment area includes the automobile hubs of Alwar, Manesar (Gurgaon), and Faridabad. This provides a market for auto electronics, and opportunities for MSMEs in the auto electronics sector to flourish. In addition, several MNCs focusing on industrial electronics and power electronics are located in Greater Noida and the catchment area. While there are also a large number of consumer electronics companies in the catchment, the scope of MSMEs in the value chain of consumer electronics is limited. Details of the focus industries in Greater Noida and the catchment are provided below:

- a. **Automotive electronics:** Several automobile manufacturers are located in and around Greater Noida. Players in this sector include Honda, Ashok Leyland, Hero Motocorp, Eicher, Escorts, Yamaha, HMTI, Harley Davidson, Maruti Suzuki, and Yamaha. Consumers increasingly demand for comfort, connectivity, efficiency and safety, electronics is likely to gain control over new and existing functions in vehicles. The cost of electronic content in cars is currently 20-25%. It is expected that the cost of electronic content in cars will go up to 35 % by 2017, and further up to 50 % in 2030. The presence of these players and the increasing usage of electronic components in automobiles provide a large market for auto electronics in the area.

- b. **Industrial and Power Electronics:** Greater Noida and its catchment is a hub of industrial electronics manufacturing, with players such as Su-Kam (Guragon), Havells (Noida, Faridabad, Alwar), Microtek, Honda Siel Power Products, NTL Electronics, Electrostar Electronics, Autometers Alliance Ltd., etc. Most companies in the region are focused on power electronics such as inverters, UPS, batteries, high capacity power backup and solar systems. In addition a number of firms also provide solutions for solar power systems. The industrial sector.
- c. **Power Electronics for Lighting Product Segment:** Several companies are present in Noida for the manufacturing of energy and lighting products. These include NTL Lemnis India Ltd., Havells, HPL Electric & Power Pvt. Ltd, and Tech Strong Systems. LED lighting is gaining prominence due to increasing energy efficiency awareness and a growing Green energy drive. The presence of these industries and the growing demand for lighting products provides an opportunity for the TC to expand to this area.
- d. **Consumer Electronics:** With the rising incomes and growing affordability, spending on consumer electronics is growing at a robust rate. Consumer electronics firms such as Samsung, LG, Videocon, Samtel, etc. have established units in Greater Noida. Uttar Pradesh's manufacturing incentives are also promoting investment. For example, Samsung has invested Rs. 517 crores for the expansion of the Noida plant under the Uttar Pradesh's policy providing incentives for mega projects, reaffirming Samsung's commitment and contribution towards India's manufacturing sector. While this is a growing segment in the ESDM sector, the segment is largely dominated by larger players and the role of MSMEs in the value chain for consumer electronics is very limited. Companies like Samsung import all their components from China and other South Asian countries and have set up large assembly units in India. Therefore, almost no work is outsourced to MSMEs in the region. Therefore the TC can cater to this market by concentrating on training for after sales and repair services for consumer electronics.

Table 5: MSME Units in Focus Sector in the Key Districts²⁷

State	District	ESDM	Automotive	Grand total
Uttar Pradesh	Gautam Budh Nagar	892	362	1254
	Ghaziabad	123	NA	123
Haryana	Gurgaon	28	1478	1506
	Faridabad	430	NA	430
Rajasthan	Alwar	1360	200	1560

²⁷ DCMSME District Industrial profiles

Total	2833	2040	4873
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Districts expected to be served by the proposed Greater Noida TC would be Gautam Budh Nagar and its catchment area including Delhi, Gurgaon, Faridabad, Ghaziabad, and Alwar. Key highlights of the catchment area have been presented in the table below;

Key highlights of the key catchment area districts have been presented in the table below:

District & No. of MSMEs ²⁸	District Profile	Units in ESDM	Key highlights
Gautam Budh Nagar (14,048)	<ul style="list-style-type: none"> ▶ Noida & Greater Noida are the two key areas earmarked for industrial development in the district. ▶ Key manufacturing activities include electronics, textile products, engineering, computer software etc. mainly from Noida export processing zone (NEPZ). 	<ul style="list-style-type: none"> ▶ The district has over 800 MSMEs in the ESDM sector ▶ Key ESDM sector players in the region include LG, Videocon, Samsung, Honda Power Products, Havells, etc. ▶ Key auto sector players include Delphi, Denso, Motherson Sumi, Honda, etc. 	<ul style="list-style-type: none"> ▶ The district of Gautam Budh Nagar and its major industrial areas are of strategic importance and have immense growth potential due to its inclusion in the DMIC. ▶ ESDM requirement arises majorly from the electronics and component manufacturers and automotive systems manufacturers in the district.
Delhi (960)	<ul style="list-style-type: none"> ▶ 19 industrial estates²⁹ ▶ Key Industries include banking, financial services, agri and food processing, IT and ITES 	<ul style="list-style-type: none"> ▶ The district has over 150 units in the ESDM sector ▶ Presence of players such as Vintron, Microtek 	<ul style="list-style-type: none"> ▶ Delhi has an abundance of skilled labour due to the high number of technical institutes.

²⁹ http://delhi.gov.in/DoIT/DOIT_DM/state%20profile.pdf

			<ul style="list-style-type: none"> ▶ Delhi has a large consumer market and is a key distribution centre
Gurgaon (14,250)	<ul style="list-style-type: none"> ▶ Brownfield EMC under MSIPS has been notified in Gurgaon ▶ IT/ITES SEZ being developed in Gurgaon ▶ Key automobile hub. The manufacturing cluster around Gurgaon originated with Maruti establishing its base here and it has been instrumental in establishing a supplier base for its cars. ▶ Key products include; Cars, scooters, motorcycles, auto parts, readymade garments and plastic parts etc. 	<ul style="list-style-type: none"> ▶ Gurgaon district has over 1,500 MSMEs in ESDM and auto sectors. ▶ Electronics manufacturing units such as Su-Kam ▶ Automobile manufacturing is strength of the region with presence of Maruti-Suzuki, Hero-Honda, Honda Motors, Escorts 	<ul style="list-style-type: none"> ▶ Gurgaon-Manesar-Bawal region has been identified as an Auto hub by the Government of India. ▶ A number of auto & auto component units have already set up base in this hub. This provides scope for auto electronics MSMEs
Faridabad (11,896)	<ul style="list-style-type: none"> ▶ Brownfield EMC notified in Faridabad district under M-SIPS ▶ Existing MSMEs in the manufacturing sector across the district Faridabad spurred due the setting up of big industries. Automobile parts is one of the top 	<ul style="list-style-type: none"> ▶ Faridabad district has over 400 units in the ESDM sector ▶ ESDM players including Havells, Lumax, Flash Electronics, ▶ Presence of auto majors like Escorts and Eicher 	<ul style="list-style-type: none"> ▶ Auto electronics requirement arises from the presence of automobile majors in the district

	industry segments in the area		
Ghaziabad (881)	<ul style="list-style-type: none"> ▶ Proposed EMC under M-SIPS 	<ul style="list-style-type: none"> ▶ Over 120 ESDM MSMEs ▶ Presence of players including Bharat Electronics Limited, Samtel, Elin, Central Electronics Ltd, etc 	<ul style="list-style-type: none"> ▶ ESDM requirement arises due from presence of large PSUs such as Bharat Electronics Ltd., Central Electronics Ltd., etc.
Alwar (22,201)	<ul style="list-style-type: none"> ▶ Alwar has emerged as an automobile hub ▶ Steps are being taken to attract ESDM industries in the area, as well as other industries. Bhiwadi is being developed as an ESDM ecosystem with infrastructure advantages for EMCs 	<ul style="list-style-type: none"> ▶ Alwar district has over 1,500 MSMEs in ESDM and auto sectors ▶ Key automobile layers such as Honda, Ashok Leyland, Eicher, TAFE, etc. have a presence in Alwar ▶ Micromax to set up manufacturing plant in Alwar 	<ul style="list-style-type: none"> ▶ Alwar District is part of the NCR. ▶ As per the NCR plan, Alwar has been identified as a regional centre and is to be developed for establishment of industries and other economic activities on priority basis. ▶ Investment region proposed as part of DMIC: Bhiwadi – Neemrana-Khuskhera lies in Alwar ▶ Large presence of auto players and focus on attracting ESDM players provides opportunity for MSMEs in the sector

5.2.2 Market in other potential sectors in catchment

The region has potential to tap the demand from other growth sectors in and across the neighbouring districts states within upcoming sectors

- ▶ **IT / ITES:** Several policy measures are being taken to boost the IT / ITES industry in the NCR, specifically in Noida and Greater Noida. Several IT / ITES SEZs and parks exist in the area. NCR has a large number of ITES companies located in the region. 20% of the total number of ITES companies in the country are located in this region³⁰. Since the NCR has emerged as a hub for IT / ITES industry, Greater Noida could emerge as an IT / ITES destination of the future, leveraging its proximity to Delhi and availability of quality industrial and urban infrastructure. Infotech Park is being established on 100 acres of land with state-of-the-art infrastructure, housing about 152-200 IT and ITES Units

- ▶ **Mobile Devices:** Uttar Pradesh proposes to make the state a mobile-manufacturing hub. Several mobile companies are setting up units in Greater Noida. This includes LAVA international (the country's fourth largest smartphone vendor), Spice Group, and Karbonn Mobile. Samsung has also invested Rs. 517 crore towards the expansion of its mobile phone plant in Noida. Besides the three mobile companies, the Indian Cellular Association (ICA), ELCINA and IESA, have also committed investment of Rs 1,000 crore each in the Electronic Manufacturing Clusters along Yamuna Expressway and in Greater Noida.

- ▶ **Solar:** Several solar power plants are being set up in the area. Large solar photovoltaic (PV) cell manufacturers such as Indosolar and Moser Baer Solar are located in the region. There is a growing focus on solar energy, with a thrust being provided to domestic manufacturing. Rules have been put into place under the National Solar Mission regarding the domestic content for solar projects. This has been done with the intent to promote the local manufacturing of the components of solar generation equipment, including cells and modules. The Rajasthan government has promoted solar energy across the state which has resulted in a well-established renewable energy (primarily solar energy) market with uninterrupted power availability throughout the state. This is increasing the demand for manufacturing of solar PV cells and other solar energy related components. The proximity of Greater Noida to Rajasthan, provides an opportunity for the TC in this sector.

- ▶ **Wind:** The State of Uttar Pradesh announced and adopted its “Wind Energy Policy 2015”, in order to capitalise on the states wind power. This policy proposes to promote the generation and use of clean and green power in the State by harnessing win energy. The State of

³⁰ <http://www.greaternoidaauthority.in/itstop>

Rajasthan is also taking similar measures to produce wind energy in the State. The generation of wind energy provides scope for power electronics for harnessing wind energy.

5.2.3 Market outside catchment area

Himachal Pradesh: Several many electronic complexes have been established at Solan, Mandi, Hamirpur, Shogi, Raga-Ka-Bagh, Chamba, Ambi, Taliwala and Keylong. Himachal Pradesh is suitable for the electronics industry due to its dust free climate. 7 brownfield EMCs have been notified in the state. Electronics companies in the State include Himachal Futuristic Communication Limited (Solan), Havells (Baddi), Microtek International Parwanoo (Solan), Luminous Tele Infra Limited (Una), WeP Peripherals Limited (Baddi), Spice Mobile (Baddi), Kaynes Technology (Parwanoo), Elin (Baddi), etc. Himachal Pradesh's IT policy and the incentives offered to the IT industry make the state an attractive destination for the industry. The state has proposed to set up software technology parks in Shimla with an investment of around INR 200 Cr. The state has launched a venture capital fund dedicated to the IT industry with a corpus of around INR 31 Cr. It is funded by the Small Industries Development Bank of India (SIDBI) and other state government agencies. These IT parks are expected to encourage and support manufacturing of hardware and software.

Uttarakhand: A large number of electronics companies are flocking to Uttarakhand, where there is full exemption from sales tax and no excise duty for ten years besides income tax benefits. Three brownfield EMCs have been notified in the state. ESDM companies in the State include Kaynes Technology (Dehradun), Intex Technologies (Baddi), MircElectronics (Roorkee), Videocon (Kashipur), HCL Infosystems (Rudrapur), Hewlett-Packard (Patnagar), Micromax (Rudraprayag)

Madhya Pradesh: Madhya Pradesh government has approved an analog semiconductor fab policy to invite electronic companies to make-in-India. Two digital fabs have already been approved by the central government with a combined investment of over \$10 billion. The State provides special incentives for the ESDM industry. 3 brownfield EMCs have been notified in the State.

Rajasthan: Land of 100 acres has been allotted ELCINA for setting up of EMC at Industrial Area, Salarpur Khushkheda Ext area by RIICO. 125 acres of land at Kaladwas Extension, Udaipur has been reserved for developing dedicated zone for IT/ITES & Electronics industries. A multi-product SEZ has been established by Mahindra World City Ltd. at Jaipur spread over 3000 acre. This is expected to have a large focus on ESDM, with a special IT/ITES

zone spread over 750 acres. In addition, the Jaipur- Bhiwadi-Neemrana-Udaipur-Ajmer-Kota area has been notified as brownfield EMC under M-SIPS for ESDM activities. Rajasthan is also an automobile hub, and thus the TC can cater to the auto electronic requirements of firms located here.

Punjab: The State is taking measures to focus on investment in Manufacturing, Infrastructure, Automobile, IT and Consumer electronics sectors. Punjab is offering a plug and play industrial park adjoining the international airport at Mohali exclusively to prospective South Korean investors for setting up their ventures in the state. Samsung Electronics has expressed their interest to invest in biometric technology and is exploring the possibility of an electronic production unit in the state. A brownfield EMC has been notified in Mohali under M-SIPS. Chinese investors propose to set up telecommunication, food processing, Agriculture, Bio chemical plants, and Electronics units in Punjab.

5.3 Opportunities associated with other mega projects planned in Greater Noida and it's catchment area

- ▶ Semiconductor fabrication facility is proposed in Greater Noida, which will be set up by Jaiprakash Associates (in partnership with IBM and Tower Semiconductor Ltd.). The outlay of the proposed facility is about Rs 26,300 crore for establishing the capacity of 40,000 wafer starts per month of 300 mm size, using advanced CMOS technology.
- ▶ The Taiwan Electrical and Electronic Manufacturers' Association (TEEMA) is expected to invest \$200 million in electronic manufacturing sector in Greater Noida
- ▶ LAVA International Limited, to set up an electronics manufacturing cluster (EMC) on 100 acres of land along the Yamuna Expressway.
- ▶ Foxconn, the world's largest contract phone maker, plans to establish a smartphone manufacturing plant in Noida.
- ▶ MoUs have been signed with ICA, ELCINA, and IESA worth Rs. 3000 crore for proposed investments in electronic manufacturing clusters (EMCs) at Yamuna Expressway and Greater Noida regions. These EMCs are expected to generate direct and indirect employment opportunities for over 50,000 persons.
- ▶ Vivo, a part of Guangdong-based BBK Electronics Corporation, is coming up with an assembly facility in Greater Noida that will have a capacity to produce 1 million devices a month. It also plans to spend Rs 200 crore this year on marketing and promotion.
- ▶ Initiatives are being taken to encourage solar energy, with 300 MW solar power plants proposed. The National Solar Mission has put into place rules which promote domestic manufacturing in this sector. This will provide a boost to solar PV manufacturing.

- ▶ Greater Noida falls in the Delhi Mumbai Industrial Corridor (DMIC), and the Integrated Industrial Township at Greater Noida is proposed under this project. This is expected to provide impetus to industries.
- ▶ An Electropreneur Park has been set up by Software Technology Parks of India (STPI) in association with IESA. The project is being setup with grant in aid of INR 21.17 crores from DeitY. The Park has been set up at the University of Delhi, and aims to contribute to the growth of ESDM in India through:
 - Creation of a holistic eco-system for encouraging R&D, innovation, Entrepreneurship in the ESDM sector in India.
 - Enabling creation of Intellectual Property within the country for maximizing the domestic value add and diminishing the external dependence in the sector especially in the CAREL identified 6 mass consumption electronics products.
 - Providing assistance during prototyping, development and commercialization for the products produced through the scheme for India and other growth markets.
 - Creation of employment at various levels.
 - Creation of long term partnership with strategic sectors.

The project aims to support 50 start-ups over the next 5 years.

The park provides infrastructure over 10,000 sq ft of constructed space with facilities designated for ESDM incubation. Facilities provided include:

- Fully furnished office space with high speed connectivity, conference rooms, etc.
- ESDM Lab with equipment for prototyping in the areas of power electronics, LED, communication, RF, software, embedded hardware and software and testing and measuring
- Creation of a partner eco-system that will bring in a bouquet of shared services and facilities to the incubatees. These include tax, legal, finance, accounting, patent search, training, business counselling, etc.

These mega projects will provide significant opportunities in key sectors for the proposed TC in the long run.

5.4 Potential Market for ESDM

Greater Noida has a vast potential for the MSMEs in the ESDM sector. The state of Uttar Pradesh is taking measures to promote ESDM in the state and attract investment. The State has an attractive Electronics Manufacturing Policy (2014), providing several incentives for industries to establish themselves in the area. It also provides incentives for MSMEs in the sector. Greater Noida has been developed as an industrial hub, which is triggering the entry of ESDM companies in the city. In addition to this, electronics manufacturing clusters are being set up in the catchment area. There is also a vast pool of local talent from several technical institutes in the region, including IIT Kanpur and IIT Allahabad. As a result of incentives taken by the State, several large companies are investing the area, providing a market for MSMEs.

It is proposed that the Greater Noida TC will focus on Automotive Electronics and Industrial Electronics (specifically power electronics). These are rapidly growing sectors of the ESDM industry, with a large domestic market. The production value of both industries grew at a rate of approximately 30 per cent between 2012-2013 and 2013-2014. In addition to this, several large players are already present in these industries in Greater Noida and its catchment area.

Market Potential	Automotive Electronics	Industrial Electronics
Domestic Production Value (2013-14)	Rs. 7,278 crore	Rs. 33,600 crore
Growth of Production Value (2013-14)	29%	30%
Growth Factors: India	Growth in automobile industry and increasing digitization of automobile controls	Increased demand for automation and process control, and increased demand for power products
Growth Factors: Noida	Presence of large players in catchment including Honda, Ashok Leyland, Hero Motocorp, Yamaha, Escorts, Maruti Suzuki, etc.	Presence of large players in catchment including Su-Kam, Havells, Microtek, Honda Power etc.

The auto electronics industry in India is growing rapidly due to the growth of the automobile industry, and increase in electronic content in cars. The cost of electronic content in cars is currently 20-25%.

It is expected that the cost of electronic content in cars will go up to 35 % by 2017, and further up to 50 % in 2030. The establishment of auto hubs, including the Bhiwadi auto hub provides a market for MSMEs in this sector due to the presence of large players.

The industrial electronics sector is closely linked to the investment taking place in infrastructure and industry, including the power sector. There has been an increased demand for automation and process control in process-based industries. Currently, most of the domestic demand is catered to by local manufacturing, whereas about 10% of the sophisticated products are imported. Thus, there is a large domestic base of industrial electronic manufacturers, which provides a market for MSMEs in this sector.

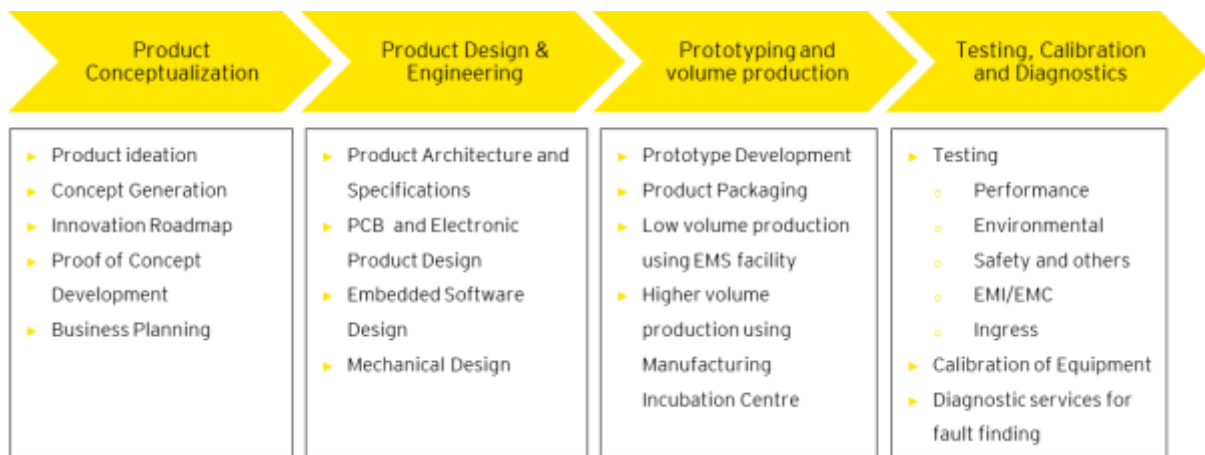
Focus Area for Proposed TC



6. Focus area for Proposed TC

As discussed in the previous section, Greater Noida and its catchment districts comprising of Delhi, Gurgaon, Faridabad, Ghaziabad, and Alwar are major electronics hubs in India and contributes to a large portion of the ESDM market size in India. Within the ESDM sector, the Joint Working Group (ESDM) had identified 14 key sub-sectors that can be supported by the TCs focused on the ESDM sector. The key services such as electronic design, electronic assembly, testing, calibration etc. required to manufacture electronic product remain the same across the various sub-sectors. Therefore the greenfield TC in Greater Noida is proposed to cater to the general requirement for sub-sectors, with a key area for specialization in Automotive and Power electronics.

Figure 10: Service Areas across the ESDM Value Chain



The scope for development of auto-electronic focus for an ESDM focused Technology centre in Greater Noida is large due to the presence of the large auto belt in the region. The Key products for focus within auto electronics include electronic control units (ECUs) such as engine management, infotainment/navigation systems, anti-lock braking system (ABS), electronic stability control (ESC), Park Assist and so on which is driving the demand for ECUs. Increased safety awareness amongst consumer is also fuelling the demand for ABS and airbags, while demand for convenience features are driving uptake of body control systems, telematics market (comprising of vehicle tracking system and vehicle navigation systems) particularly from commercial transport and truck operators. Some of the other representative products for focus within the industry are airbag igniters, engine control units, tire pressure monitor systems, vehicle stability control systems and adaptive cruise control units.

In addition to automotive electronics, there is a large presence of power electronics companies in the catchment. Within power electronics there is strong focus on the energy sector with products such as UPS, inverters, power converters, energy meters etc. In addition a large number of companies focusing on the lighting sectors with products such as CFL, LED products etc. are also available in the region. Therefore the TC should also focus on the energy and lighting segments with power

electronics. There is also a large focus by the government on renewable energy such as solar electronics and wind electronics. Therefore the TC should also provide designing and manufacturing support for small and large scale solar and wind energy solutions.

Based on the data available, discussions with O/o DC-MSME and industry associations in Noida and Greater Noida and domain experts, a ESDM TC focused on automotive electronics and power electronics is proposed at Greater Noida in the state of Uttar Pradesh. It is important to note that O/o DC-MSME has three other TCs focussed on the ESDM sector across India including Mumbai (Maharashtra), Ramnagar (Uttaranchal), Bengaluru (Karnataka) and Puducherry. Therefore, Greater Noida TC is planned in such a way that it complements the existing investment and overall improves the capability of ESDM focussed MSMEs in India.

The Greater Noida TC is planned to provide support to entrepreneurs from the point of concept creation to development of prototype and low volume production. The diagram below provides a snapshot of the services that will be provided by the TC:

Figure 11: Proposed Services to be provided by Greater Noida TC

Innovation and Design Centre	Prototyping, Testing and Calibration Centre	Manufacturing Incubation Centre	Training Centre
Concept Creation support	Prototyping	Shell Infrastructure	Electronic Product Eng./ Embedded System
Product Design and Validation Centre	Electronic Assembly	Business Facilities Centre	PCB Assembly
Patent Registration and Harnessing	Electronic Testing	Machinery and Equipment on rent	Hardware Repair and Maintenance
Entrepreneurship Club	Electronic Calibration		Computer Software
Consultancy Services			

The key services of the TC are divided into four independent profit centres:

- a) Innovation and Design Centre - This will provide support for concept creation, product design, patent registration and harvesting along with related consultancy services for entrepreneurs, MSMEs and other large players in the ESDM sector

- b) Prototyping, Testing and Calibration Centre - This will provide facilities for additive manufacturing, PCB prototyping, electronic assembly, testing and calibration for electronic products
- c) Manufacturing Incubation Centre - This facility will provide shell infrastructure, business facility centre and machinery and equipment for entrepreneurs/MSMEs to rent for a period of 2 years
- d) Training Centre- The TC will provide a number of long, medium and short term courses on embedded system design, PCB Design and Assembly, hardware maintenance and repair and computer hardware and software

Details of each of these centres is provided in the following sub-sections:

6.1 Innovation and Design Centre

The innovation and design centre will provide consultation support to entrepreneurs, MSMEs and other large players in the ESDM sector on various areas such as concept creation, product design, patent registration and harvesting, process design and development, lean manufacturing, cost engineering etc. The key services to be provided by the centre have been further divided into the following:

6.1.1 Concept Creation Support

Generating a successful product requires product ideation, testing of an idea in the market, confirming if the idea would work in practice, checking the patent landscape, defining a roadmap, developing a proof of concept etc. The TC would provide the following services to support this:

- ▶ Product ideation - Generate & shape ideas in a structured way, identify opportunities, develop and test concepts, develop processes that foster creativity & improves the quality
- ▶ Innovation roadmap - Set-up, design and implement robust, future-proof innovation roadmaps covering everything from business strategy to project initiation that can be translated into sound product architectures and platforms that form the basis of current and future range with support of Manufacturing Technology Partner
- ▶ Proof of concepts - Developing schematics, CAD designs, hands-on lab support, feasibility judgments, and early feedback on manufacturability
- ▶ Business Plan - planning product and services, support for market research, marketing plan, financial assessment etc.

- ▶ Legal advisory - Support from legal and financial experts for assistance/ advisory regarding firm incorporation, tax compliance etc.
- ▶ Assistance for secure financial assistance - Support for seeking financial assistance through banks, government schemes (of central and state government) to support entrepreneurs/MSMEs and facilitating angel/venture capitalist funding
- ▶ Market Linkages - Assist entrepreneurs in creation of market linkages with OEMs, suppliers, research institutes and labs through support of the Cluster Network Manager

The TC will have a dedicated team of coaches and mentors who will provide the above mentioned consultancy services to entrepreneurs and MSMEs who sign up for this service. It is suggested that a team of at least 4 dedicated professionals with prior experience of providing similar services be hired to provide these services. The 4 professionals include an innovation coach, a finance guide and two consultants for support and institutional memory. In addition, the TC would hire the expertise of the required resources e.g. sectorial experts, legal experts to increase their in-house capability in specific domains as per the market demand.

6.1.2 Product Design Centre

The TC will provide product design related services for electronics products including

- ▶ Product architecture and specifications
- ▶ Electronic Design - Electronic System Design including circuit, PCB, FPGA, analog and digital components, Power/Transformer etc.
- ▶ Mechanical Design - Mechanical components, packaging & housing

This will require the need to procure the following software and equipment:

Table 6: Product Design Centre: Software and Equipment

S.No.	Design Type	Equipment/Software
1.	Electronic Design	1. PCB and Electronic Design Software such as OrCAD, PADS, Eagle etc. 2. DSP/ ARM/ Microcontroller/ FPGA/ CPLD Development Board + Software
2.	Mechanical Design	1. CAD Software like CATIA, UG etc.

The design centre would require a dedicated manager support by two senior design engineers for electronics and one senior design engineer for mechanical design.

6.1.3 Patent Registration and Harnessing

The TC will provide support for a broad range of Intellectual Property matters including patent search, drafting, filing and prosecution. These services require inputs from a large number of experts such as patent attorneys, registered patent agents and technologists. The TC will utilize the services of the Cluster Network Manager to create an ecosystem of such expertise whose services can be utilized by MSMEs as per their requirements at subsidized costs.

In addition the TC will have a dedicated IPR guide who will assist MSMEs for filing patents as well as harnessing existing patent information to accelerate innovation. Patents contain large amounts of technical, business, and policy-related information that can help entrepreneurs to generate ideas and drive innovation. In addition, it can be useful for MSMEs and entrepreneurs to identify expired or abandoned patents in relevant areas to check if they can be utilized by them for their products. The specific objectives of this facility will be as follows:

- i. Provide facility for searching/mapping of patents, electronic designs etc.
- ii. Provide basic information to file application for grant of patent, GI, electronic design etc.
- iii. Facilitate successful transfer and commercialization of technologies
- iv. Facilitate collaboration with potential clients for exploring possibilities for technology tie-ups and upscaling needs
- v. Provide information on best IPR practices
- vi. To provide guidance in filing applications with national/international agencies and execution of other documents concerning to licensing technology transfer agreements, etc.
- vii. To advise beneficiaries on legal remedies available on issues such as infringement, duplication of patent/ industrial designs, etc.

The facility should work in close association with the National Patent Offices/ Regional Patent Offices and other National/ International Agencies administering implementation of IPR related matters.

6.1.4 Entrepreneur Club

This facility at the TC would be tasked to attract potential entrepreneurs in the ESDM sector. Entrepreneurs would be encouraged to submit technology centric business ideas to the TC which would be assessed by an Appraisal Committee with help of the industry and selected entrepreneurs would be asked to join the Entrepreneur Club. Joining the club would provide entrepreneurs with the following:

- a) All services of the TC including concept creation support, product design, intellectual property services, consultancy services, prototyping, assembly testing, calibration, access to Manufacturing Incubation Centre would be provided at a subsidized rate.

- b) The TC would facilitate access of entrepreneur club members to service providers who can help in creation of start-up. e.g. Chartered accountants , Banks, Intellectual property office, etc.
- c) The TC would organize workshops and group discussions for entrepreneurs with key experts to help and guide members with their ideas

6.1.5 Consultancy services

MSMEs in every sector are plagued with bottlenecks and inefficiencies that compromise their competitiveness and presence in the market. Handholding is required to enable MSMEs to develop competencies in the areas of product & process development, operation improvement, streamlining and standardisation of processes through adoption of international norms, new technologies and capacity enhancement. Quality and technical relevance of products need to be maintained by supporting innovation for product development, component manufacturing, precision engineering, process automation and adherence to quality norms.

Therefore, the Greater Noida TC would have a dedicated professional wing to assist MSMEs by providing consultancy services in the field of electronic product design, manufacturing processes and innovations for improved quality and productivity. The support of Technology Partner will be taken wherever required. Consultancy will be provided in the following areas:

Table 7: Proposed Consultancy Services

S.No.	Area
1	Product Road mapping and Architecture
2	Electronic Product Design and Engineering
3	Process Design and Engineering
4	Value Engineering/ Cost Competitiveness
5	Development Productivity and Lean Manufacturing
6	Financial Services (Project Financial , Business Plans for funds, Book Keeping, etc)
7	End User Driven innovation and Open innovation
8	Certifications and accreditations for automotive and power electronics (Electronic Testing and Calibration)
9	Environment Health and Safety Standards for ESDM Units
10	Market Development Support to find the vendors, customers and other enablers

To start with, the staff of the innovation and design centre will provide consultancy services as well. In addition, the TC would hire the required resources to increase the in-house capability. Illustrative phasing of the areas/domains where the TC can provide consulting services has been suggested below. This has been designed keeping in mind the resource planning and future revenue projections as well. The table below represents the projected revenue estimates for 10 years, keeping in mind the impetus on the consulting services for the proposed TC.

Table 8: Suggestive Consulting Revenue

S. No.	Consulting Areas	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
				30%	30%	40%	50%	10%	10%	10%	10%	10%
1	Product Road mapping and Architecture	0	3	3.9	5.1	7.1	10.6	11.7	12.9	14.2	15.6	17.1
2	Concept Creation Support	0	15	19.5	25.4	35.5	53.2	58.6	64.4	70.9	77.9	85.7
3	Electronic and PCB Design	0	57.6	74.9	97.3	136.3	204.4	224.9	247.4	272.1	299.3	329.2
4	Process Design and Engineering	0	3	3.9	5.1	7.1	10.6	11.7	12.9	14.2	15.6	17.1
5	Value Engineering/ Cost Competitiveness	0	6	7.8	10.1	14.2	21.3	23.4	25.8	28.3	31.2	34.3
6	Development Productivity and Lean Manufacturing	0	3	3.9	5.1	7.1	10.6	11.7	12.9	14.2	15.6	17.1
7	Financial Services (Project Financial , Business Plans for funds, Book Keeping, etc)	0	9	11.7	15.2	21.3	31.9	35.1	38.6	42.5	46.8	51.4
8	End User Driven innovation and Open innovation	0	9	11.7	15.2	21.3	31.9	35.1	38.6	42.5	46.8	51.4
9	Certifications and accreditations for Automotive and Medical electronics (Electronic Testing and Calibration)	0	3	3.9	5.1	7.1	10.6	11.7	12.9	14.2	15.6	17.1
10	Environment Health and Safety Standards for ESDM Units	0	3	3.9	5.1	7.1	10.6	11.7	12.9	14.2	15.6	17.1
11	Market Development Support to find the vendors, customers and other enablers	0	6	7.8	10.1	14.2	21.3	23.4	25.8	28.3	31.2	34.3

*The above mentioned estimates are on a conservative side and are purely based on the expert judgement and prevailing market rates.

6.2 Prototyping, Testing and Calibration Centre

This facility will provide MSMEs and entrepreneurs with support to develop prototypes for their electronic items, test and calibrate them and also produce pilot orders using this facility before embarking upon the regular manufacturing. To provide these services this centre would have the following facilities:

- a) Prototyping facility - with 3-D additive machines to produce mechanical components to be used in developing an electronic product
- b) Electronic Assembly facility - basic electronic assembly facility with PCB assembly workstations and technicians for assembling prototypes and low volume production for pilot orders required by entrepreneurs
- c) Testing facility - full-fledged electronic testing facility to provide environmental, safety, EMI/EMC, ingress and performance testing for automotive and power as well as other electronic item
- d) Calibration facility - secondary level electronic calibration facility for calibration of electronic items

The sections below provide details of the machinery and equipment planned in each of these facilities.

6.2.1 Electronic prototyping facility

This facility will be used for developing prototypes of electronic products including development of prototyping of PCBs and development of plastic body, casing and smaller components for electronic products using additive manufacturing machines. This facility will not be used for mass production. The TC will provide prototyping machines for multi-layer PCB and additive manufacturing machines for polymers and plastics and will be staffed with a dedicated senior technician supported by the design team.

The following machines have been identified for the electronic prototyping facility at the proposed TC. The list will be further validated by technology partner for finalisation and to initiate procurement. The budgetary cost of these machines is approximately estimated at around INR 600 lakhs.

Table 9: Electronic Prototyping Facility: Machinery

SN	Machine	No.	Unit Cost (INR Lakhs)	Total Cost (INR Lakhs)
1.	Rapid PCB Prototyping machine	1 each	300	300
2.	PCB assembly machine including PCB pressing, galvanic plating, Solder mask & Legend printing, solder paste printing, component pick and place and reflow soldering	1 each		
3.	3D Polymer Additive Manufacturing Machine	1		
Total			600	600

In the first phase only a polymer additive machine has been planned for the facility. A metal additive machine may also be required at the facility but the feasibility for the same will be assessed by the Technology Partner. In the meantime the Metal 3-D printing facilities along with the mechanical tool room facilities at other private/government Tool Room in NCR region or MSME TCs in other cities will be utilized for manufacturing metal components as when required by MSMEs.

6.2.2 Electronic Assembly Facility

As part of the first phase, a 20 workstation electronic assembly unit has been planned at the TC, to provide basic manual electronic assembly services for assembling prototypes and low volume production for pilot orders required by entrepreneurs. This facility will not support high volume production. It will be housed in a 500 square feet 10,000 grade clean room. Details of the same are provided in the infrastructure section. This facility will be staffed with one dedicated manager, one senior engineer and two senior technicians. In addition to the above, trainees being trained in electronic product assembly will also support the above manpower.

The following machines have been identified for the electronic prototyping facility at the proposed TC. The list will be further validated by technology partner for finalisation and to initiate procurement. The budgetary cost of these machines is approximately estimated at around INR 500 lakhs.

Table 10: Electronic Assembly Facility: Machinery

SN	Machine
1.	Pre Forming Machine
2.	PCB Assembly Jig
3.	PCB Storage Rack
4.	Component Storage Bins
5.	Tool kit consisting of (Soldering iron, De soldering pump, Wire cutter, Wire cutter/stripper, Automatic wire stripper, Different types of Screw drivers , Pliers, Tweezers, IC Slip extractor etc.)
6.	Soldering Station
7.	Temperature Controlled Soldering Station
8.	De soldering Station.
9.	SMD Rework/Repair Station
10.	Wave Soldering Machine
11.	SMT Pick & Place Machine
12.	LCR Meter
13.	Digital Multimeter

In addition, the facility would also need to provision for items for antistatic assembly such as antistatic mat, antistatic bags , antistatic component storage bin, wrist strap , static charge meter, antistatic PCB storage rack, antistatic tools etc.

In addition to the above, the facility will also include an automated PCB assembly line for SMT including line loader, soldering paste printer, pick and place machine, SMD components soldering oven, THD components soldering oven, automatic optical inspection, conveyer system and line downloader with an approximate cost for 500 lakh. This will be used for low volume production as well as training purposes.

6.2.3 Electronic Testing Facility

The testing facility at the TC will provide environmental, safety, EMI/EMC, ingress and performance testing for electronic products. While most of the equipment included in this facility can be utilized for testing of all electronic items, a few specialized equipment for performance testing of automotive and power electronics have been included as well.

The following machines have been identified for the electronic testing facility at the proposed TC. The list will be further validated by technology partner for finalisation and to initiate procurement. The budgetary cost of these machines is approximately estimated at around INR 3,726.3 lakhs.

Table 11: Electronic Testing Facility: Machinery

SN	Machine	No.	Unit Cost (INR Lakhs)	Total Cost (INR Lakhs)
	Basic Requirement			
1.	Voltage Stabilizer/ CVT	3	1.5	4.5
2.	Three phase regulated variable power source	1	20	20
3.	Single Phase regulated variable power source	1	10	10
4.	Split AC	15	0.5	7.5
5.	Dehumidifier	5	0.5	2.5
6.	Purchase of New IEC/IS/UL/ISO/EN and other standards, etc.	1	10	10
	Safety Testing			
7.	Temperature Recorder	1	15	15
8.	Winding resistance meter	1	10	10
9.	Digital storage Oscilloscope	1	10	10
10.	High voltage probe	1	5	5
11.	Electronic load	1	15	15
12.	Digital multimeter	3	0.6	1.8
13.	(Handheld/desktop)			0
14.	Digital clamp on meter	2	0.5	1
15.	Electrical Safety Tester	1	30	30
16.	Impulse generator	2	20	40
17.	Defibrillator Proof test set	1	8	8
18.	Radiation meter	1	5	5
19.	Gas detector	1	5	5
	Environmental Testing			
20.	Environmental chamber	1	100	100
21.	Thermal Shock Chamber	1	175	175
22.	Vibration Test system	1	100	100
23.	Salt spray chamber	1	50	50
24.	Bump/ Shock Test system	1	100	100
25.	Vibration plus Environmental Chamber	1	150	150
26.	Altitude Test Chamber	1	100	100
	Fire Safety Test Equipment			
27.	Horizontal and Vertical Flame Chamber	1	50	50
28.	Heat deflection temperature test set	1	60	60
29.	Needle flame test chamber	1	10	10
30.	Tracking test apparatus	1	10	10
31.	Glow wire Test apparatus	1	10	10
	Ingress Protection Test			
32.	Test Probe IEC 61032 - 1 set	1	8	8
33.	Digital force Gauge	2	1	2
34.	Dust Chamber	1	10	10
35.	Ingress of water test system- 1 set	1	200	200
	Other Tests			
36.	Microscope	1	3	3
37.	Digital LCR meter	1	10	10
38.	Endurance test set for switches	1	10	10

SN	Machine	No.	Unit Cost (INR Lakhs)	Total Cost (INR Lakhs)
39.	Test apparatus for devices forming a part of the MAINS plug	1	10	10
40.	Cord anchorage test set	1	10	10
41.	Weights	1	5	5
42.	Creepage Gauges	1	1	1
43.	Ball pressure test apparatus	1	2	2
44.	Oven	1	5	5
45.	Digital power analyser	1	20	20
46.	Tumbling Barrel	1	10	10
47.	Digital pressure gauge	1	5	5
48.	Flexing test apparatus	1	10	10
49.	Free fall test apparatus	1	10	10
50.	Coated PCB test apparatus	1	10	10
51.	Isolation transformer	1	5	5
52.	UV meter	1	10	10
53.	Sound level Analyzer	1	25	25
54.	Microwave radiation meter	1	5	5
55.	XRay radiation meter	1	5	5
56.	Illuminance meter/ Luxmeter	1	2	2
57.	Gas pressure gauge	1	1	1
58.	Digital Nano volt/ micro ohmmeter	1	20	20
59.	Thermostat endurance test set	1	5	5
60.	Temperature limiter endurance test set	1	5	5
61.	AC DC current source	1	5	5
EMI/EMC Test Equipment				
62.	ESD Simulator	1	15	15
63.	Anechoic Chamber,	1	850	850
64.	Radiated susceptibility and Radiated Emission test system	1		
65.	RF Shielded chamber	1	50	50
66.	Electrical fast transient/burst simulator	1	40	40
67.	Surge Simulator	1	85	85
68.	Conducted RF immunity simulator	1	40	40
69.	Power frequency magnetic field test system	1	30	30
70.	Pulse magnetic field test system	1		
71.	Harmonics/Flicker Measurement test System	1	60	60
72.	Line Impedance stabilizing network	1	12	12
Specialized equipment for Performance Testing of Automotive and power electronics			1000	1000
Total		101		3726.3

While there may be a need for a RoHS testing lab, provision for RoHS testing has not been included at the TC facility as part of Phase 1. The Technology Partner will be asked to assess the required of the same at the TC at a later stage.

6.2.4 Electronic Calibration Facility

The TC will provide a secondary level electronic calibration facility for calibration of all basic electronic products. The following machines have been identified for the electronic calibration facility at the proposed TC. The list will be further validated by technology partner for finalisation and to initiate procurement. The budgetary cost of these machines is approximately estimated at around INR 662 lakhs.

Table 12: Electronic Calibration Facility: Machinery

S N	Machine	No.	Unit Cost (INR Lakhs)	Total Cost (INR Lakhs)
	Electro-Technical Calibration			
1.	Multifunction Calibrator	2	50	100
2.	6 and Half DMM	3	5	15
3.	4 and half DMM	2	1	2
4.	Decade Mega Ohm Box	1	20	20
5.	Decade Resistance Box	1	15	15
6.	Process Calibrator	1	10	10
7.	LCR Bridge	1	15	15
8.	Standard Resistors	1	10	10
9.	Sound Level Calibrator	1	10	10
10.	Sound Level Meter	1	5	5
11.	Tachometer Calibrator	1	10	10
12.	Stroboscope	1	5	5
13.	Tachometer	1	2	2
14.	Frequency Counter	1	20	20
15.	Time-Interval meter	1	5	5
16.	Energymeter test System (3 position)	1	70	70
17.	HV Divider	1	25	25
18.	Decade Capacitance Box	1	15	15
19.	Decade Inductor Box	1	15	15
20.	AC/DC Current source	1	15	15
21.	CT Analyzer	1	10	10
22.	CT/PT Calibration System	1	100	100
	Infrastructure			
23.	Constant Voltage Transformer	1	2	2
24.	Split Air Conditioners	8	0.5	4
Total		37		500

Under TCSP, IEDMI Mumbai is planned to become a primary calibration centre, therefore any MSMEs requiring calibration services of precision greater than the one planned at the Greater Noida TC will be referred IEDMI Mumbai

6.3 Manufacturing Incubation Centre

One of the key bottle necks for any entrepreneur is finding support for setting up and running a manufacturing unit in the first 2-3 years of inception. The pressure of finding space to set up a manufacturing unit and obtaining all necessary registration and clearances itself is a big challenge for MSMEs. It has often been observed that entrepreneurs suffer due to complex processes for setting up of plants and non-transparent decision making by various agencies. In addition, it is also observed that MSMEs, in a race to survive, ignore focus on quality and EHS practices and this becomes a hurdle which precludes them from being part of global value-chains.

The Manufacturing Incubation Centre proposed at the Greater Noida TC will provide the basic shell infrastructure with area ranging from 400-600 square-feet and world class manufacturing plant and machinery on rental basis for a 2 year period. This MIC is expected to fuel the growth of enterprise which has successfully crossed the stage of pilot order and ready to execute larger orders. The MIC would comprise of the following facilities:

- a) Shell infrastructure for setting up an EMS facility with space between 400-600 square feet
- b) Support Business facilities like office space, conference rooms, reception area etc.
- c) IT Support services like internet, video conferencing, Wifi etc.
- d) Electricity and power connection with sub-meters
- e) Registrations and Clearances for setting of a manufacturing unit such as environmental clearances, fire safety, license for running a factory, registration for commercial establishment etc.

No common plant and machinery has been planned for the first phase of the TC. The Technology Partner will assess the required common equipment than can be purchased by the TC and offered to MSMEs on rent. This will also be driven by the need of the entrepreneurs and will become a part of the incubation centre.

The Manufacturing Incubation Centre would not only provide space but also help in connecting with suppliers and skilled workers. One of the key points this MIC aims to achieve is to ensure focus on quality control from the get-go. Members of the MIC would be encouraged to start work in a setup concentrated on following environment, protocols and ethics from day one. It is therefore expected that when these enterprises come out of the MIC they could be examples of world class manufacturing practices.

6.4 Training Centre

The TC at Greater Noida will provide professional training in various courses with focus on the ESDM sector. The TC will be able to produce highly skilled technical workforce, with greater career prospects in the ESDM sector. The duration of courses will be both short and long term, ranging from 1 month to 12 months in various areas:

- a) Electronic Design and Manufacturing - Embedded Systems, PCB Design and Manufacturing, Electronic Assembly
- b) Electronic Repair and Maintenance
- c) Computer Hardware and software

The batch size, number of batches per annum and respective fees has been decided on the basis of capacity of existing TCs and NCVT norms. The TC will start training activity from the first year of its operation across all specialisations. The total capacity intake is expected to be approximately 9,500 trainees over 5 years and reach a capacity of 2,900 by the fifth year. The detail of courses in various specialisations is given below:

No.	Trade	Course name	Duration (months)	Part Time/Full Time	Batch size	No. of Batch / year	Capacity Intake
1	Electronic Design and Manufacturing	Advanced course in Embedded Technology	6	FT	40	2	80
		Basic course in Embedded Technology	3	FT	40	4	160
		Electronic/PCB Design and Manufacturing	6	FT	40	2	80
		PLC Based Automation Techniques	3	FT	20	2	40
		Microcontroller Programming Skills	3	FT	20	2	40
		Microprocessor Programming	3	FT	20	4	80
		SCADA	1	FT	20	4	80
		Computer Aided PCB Design and Manufacturing	12	PT	40	4	160
		PCB Assembly	6	PT	40	4	160
2	Hardware Repair and Maintenance	Computer Hardware, Maintenance, Installation, Networking and Multimedia	2	FT	20	4	80
		Mobile/HDD Repair and Maintenance	2	FT	40	4	160
		Refrigerator Repair and Maintenance	3	FT	20	4	80
		Electronic Mechanic	12	PT	20	2	40
		Electrician Trade Practices	12	PT	20	2	40
		Auto Electrician	6	PT	20	2	40
		Electronic and Instrumentation Technician	12	PT	20	2	40
		SMD Work and rework and electronic repair	1	FT	20	4	80
		Small Transformer and Stabilizer Manufacturing and Repair	1	FT	20	4	80

No .	Trade	Course name	Duration (months)	Part Time/Full Time	Batch size	No. of Batch / year	Capacity Intake
		Repair and Maintenance of Telecom Equipment	1	FT	20	4	80
3	Computer Hardware and Software	Advance course in Computer Software	6	FT	30	2	60
		Advanced Course in Computer Hardware	6	FT	30	2	60
		Advanced Computer Networking	2	FT	30	4	120
		Diploma in Information Security Management	4	FT	30	3	90
		Diploma in Software Programming	3	FT	30	4	120
		Diploma in Oracle PL, SQL and DBA	4	FT	30	3	90
		Diploma in Software Testing	3	FT	30	4	120
		Core Java and Java Programming	2	FT	30	4	120
		Visual Basics	2	FT	30	4	120
		C	2	FT	30	4	120
		C++	2	FT	30	4	120
		Computer Fundamentals	2	FT	30	4	120
Total							2860

No	Trade	Course name	Fee/ student (INR)	Capacity Intake	Minimum Qualification	Classrooms		Laboratories		Workshops	
						#	Area	#	Area	#	Area
1	Electroni c Design and Manufact uring	Advanced course in Embedded Technology	1,00,000	80	Degree/Diploma in Engineering/ITI in relevant field	1	75				
		Basic course in Embedded Technology	30,000	160	Degree/Diploma in Engineering/ITI in relevant field	1	75				
		Electronic/PCB Design and Manufacturing	30,000	80	Degree/Diploma in Engineering/ITI in relevant field	1	75	1	54		
		PLC Based Automation Techniques	20,000	40	Degree/Diploma in Engineering/ITI in relevant field	1	75	1	54		
		Microcontroller Programming Skills	12,000	40	Degree/Diploma in Engineering/ITI in relevant field			1	54		
		Microprocessor Programming	10,000	80	Engineering/Polytechnic Students			1	54		
		SCADA	6,000	80	Engineering/Polytechnic Students			1	54		
		Computer Aided PCB Design and Manufacturing	20,000	160	High School					1	108

No	Trade	Course name	Fee/ student (INR)	Capacity Intake	Minimum Qualification	Classrooms		Laboratories		Workshops	
						#	Area	#	Area	#	Area
		PCB Assembly	10,000	160	8th Pass						
2	Hardware Repair and Maintena nce	Computer Hardware, Maintenance, Installation, Networking and Multimedia	8,000	80	ITI/Intermediate (Science)	1	75	1	54		
		Mobile/HDD Repair and Maintenance	12,000	160	ITI/Intermediate (Science)						
		Refrigerator Repair and Maintenance	6,000	80	8th Pass	1	75	1	54		
		Electronic Mechanic	12,000	40	High School	1	75	1	54		
		Electrician Trade Practices	12,000	40	High School	1	75				
		Auto Electrician	7,000	40	8th pass						
		Electronic and Instrumentation Technician	12,000	40	ITI/Intermediate (Science)						
		SMD Work and rework and electronic repair	5,000	80	Engineering/Polytechnic Students			1	54		
		Small Transformer and Stabilizer Manufacturing and Repair	5,000	80	Engineering/Polytechnic Students						
		Repair and Maintenance of Telecom Equipment	5,000	80	Engineering/Polytechnic Students			1	54		

No	Trade	Course name	Fee/ student (INR)	Capacity Intake	Minimum Qualification	Classrooms		Laboratories		Workshops	
						#	Area	#	Area	#	Area
3	Computer Hardware and Software	Advance course in Computer Software	30,000	60	Degree/Diploma in IT/CS	1	75	1	54		
		Advanced course in Computer Hardware	30,000	60	Degree/Diploma in IT/CS	1	75	1	54		
		Advanced Computer Networking	7,500	120	Degree/Diploma in IT/CS	1	75				
		Diploma in Information Security Management	40,000	90	Degree/Diploma in IT/CS						
		Diploma in Software Programming	25,000	120	Degree/Diploma in IT/CS						
		Diploma in Oracle PL, SQL and DBA	30,000	90	Degree/Diploma in IT/CS						
		Diploma in Software Testing	18,000	120	Degree/Diploma in IT/CS						
		Core Java and Java Programming	5,000	120	High School						
		Visual Basics	5,000	120	High School						
		C	5,000	120	Engineering/Polytechnic Students						
		C++	5,000	120	Engineering/Polytechnic Students						

No	Trade	Course name	Fee/ student (INR)	Capacity Intake	Minimum Qualification	Classrooms		Laboratories		Workshops	
						#	Area	#	Area	#	Area
		Computer Fundamentals	5,000	120	8th Pass						
		Total		2860		11	825	12	648	1	108

The TC will have adequate installed capacity of infrastructure like equipment, software, tool kits, computers etc. required to provide training to the proposed student capacity under various specialisations. The estimated cost of these machines is approximately INR 930 lakhs. The following table provides the details of the same;

Table 13: Training Lab Infrastructure

S.No.	Training Labs	Nos	Value (lakhs)	Total
1	PCB Assembly Setup (40 person)	40	2	80
2	Clean Room Facility	1	100	100
3	FPGA Kits + Software	25	4	100
4	8052 Kits + Software	25	4	100
5	PIC Kits + Software	25	4	100
6	PLC Kits + Software	25	4	100
7	Electronic Repair and Maintenance Kits	100	0.5	50
8	PCB Design Software - 40 users Education license	40	1	40
9	Computers	500	0.5	250
			Sub-Total	920
10	Furniture for labs	12	3	36
11	Classroom Furniture @ 60 seats	11	3	33
			Sub-Total	69
12	Transformer @2000KVA			25
13	DG Set @ 500KVA			40
14	UPS			25
			Sub-Total	90
15	Misc, Unforeseen & Contingency			54
			Total	1,133

6.5 Industry collaborations and associations

The objective of this section to understand the potential areas of collaboration and association the new TC at Greater Noida can form and further support MSMEs. The key stakeholders have been identified in section 4.3.

Figure 12: Potential areas for collaboration or association with key stakeholders

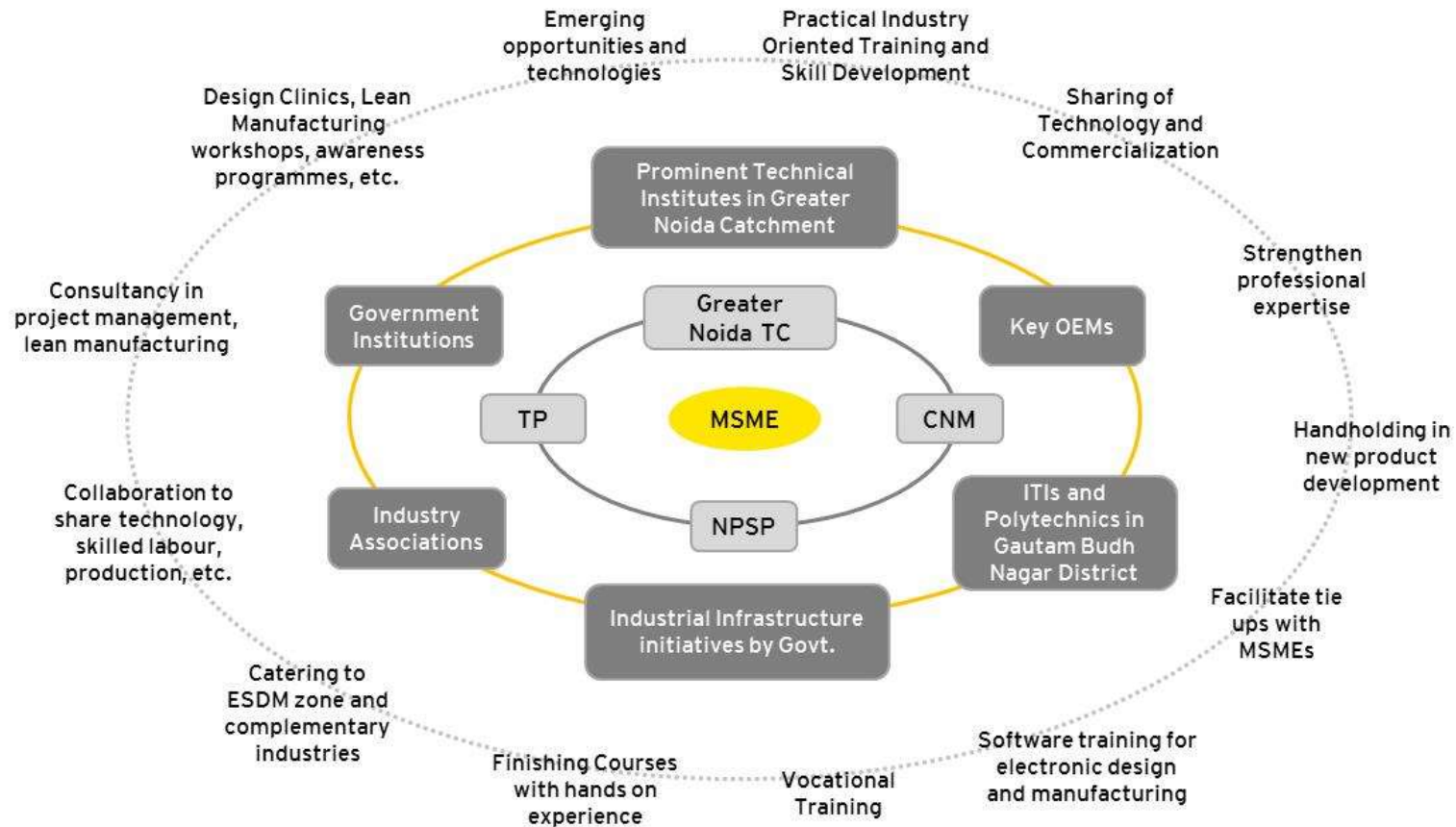


Table 14: Potential Areas for Industry Collaborations and Associations

SN	Stakeholder type	Potential areas of Collaborations and association for Greater Noida TC[1]
1	Prominent technical institutes in Greater Noida catchment	<ul style="list-style-type: none"> ▶ The Greater Noida TC can collaborate with technical institutes and centres of excellence, with the objective to strengthen its professional expertise and skilled manpower in the field ESDM. ▶ Further, emerging opportunities and technologies can be jointly met with respect to the global technology trends. ▶ TC can tie up with these prominent institutes for student exchange programmes to provide better practical industry oriented training and skill development. ▶ TC can become partner for commercialisation of the research by these institutes in ESDM and help in technology sharing among MSMEs through CNM. ▶ To form technology collaboration with these institutes for technology innovation through TP.
2	Key OEM's and their MSME vendor and supplier base	<ul style="list-style-type: none"> ▶ Provide handholding in new product development. ▶ Facilitate tie ups with MSMEs for production outsourcing etc. ▶ Support suppliers to meet OEM requirements. ▶ Provide tailor made training programmes to the OEMs and MSME vendor and supplier base.
3	ITI and Polytechnics in Gautam Budh Nagar district	<ul style="list-style-type: none"> ▶ The Greater Noida TC can tie up with the ITI /Polytechnics/ engineering colleges in the district to provide training to the students for the development of various skill sets like; ▶ Software training to its students for electronic design and production. ▶ During summer vacation, the TC can conduct vocational training programmes for students. ▶ TC can further conduct finishing courses for students post completion of their diploma/ITIs. Finishing courses provide for sufficient hands on experience, which helps students develop expertise and increase the employability of the students. ▶ TC can help in development of similar finishing courses to train students in the premises of these institutes.
4	Industrial infrastructure Initiatives by Government	<ul style="list-style-type: none"> ▶ Existing infrastructure of the ESDM zone and industrial zone can be leveraged by new TCs by catering to the industry. ▶ TC can further collaborate with these zones/ clusters above to share technology, produce, skilled labor etc. ▶ TP can guide them in different high-end technologies for manufacturing and other process.

		<ul style="list-style-type: none"> ▶ These clusters will have easy access to market. CNM can collaborate with them in future for different initiatives.
5	Industry associations	<ul style="list-style-type: none"> ▶ TC can conduct various initiatives with industry associations and MSME members ▶ During these workshops, TC can educate about the details of different promotional policies and schemes of DC, MSME, Govt. of India for benefit and sustainable growth of MSMEs. ▶ TC can also provide consultancy services in the areas of project management, lean manufacturing etc. to these associations and MSME members.

6.6 Technology collaboration

The proposed TC at Greater Noida should venture into multiple new areas and to facilitate technology transfer and improve market linkages, role of TP and a CNM has been planned under TCSP.

▶ The TP will help identify and define globally competitive technological capabilities required in the cluster and assist proposed TC in building this capability through planning and handholding over a period of five years. The Technology Partner (TP) is required to enhance the capability and service offerings of TCs such that they transform to become models of manufacturing excellence for MSME. They need to become a trusted partner for MSMEs to learn how to attain manufacturing excellence and attain associated excellence in skills development. The services of the TCs include being exposed to the potential impact of new and relevant technologies, trainings on use of technologies/equipment, providing access to cutting-edge equipment, developing and testing new products and patenting. The key objectives of the TP include:

- In conjunction with all stakeholders of the TCSP identify and define the globally competitive technological capability required by TCs, assist in their execution and provide handholding during their roll out.
- Supporting the up gradation of the existing TCs and establishment of new TCs for the manufacturing sector
- Augment services being offered by the TCs with respect to identified technologies and clusters with respect to training, production assistance (including optimization of equipment utilization) and technical advisory, resulting in increase in revenues of TCs focused at the manufacturing sector
- Support TCs to increase productivity and competitiveness of general engineering (specially automotive and precision engineering) focused MSMEs by
 - Exposing them to existing and expected future technologies

- Develop skills of the workers and students in the identified technologies and clusters
- Offering advice/recommendations to MSMEs (clients) who directly or indirectly supply to large auto OEMs or automotive and automotive component manufacturers.

All investment decisions (technological & other) and work prioritization in TCs must be intrinsically connected with the market place and efficiently translate market needs to products and services that (satisfy these needs), & will be enabled by technology and enriched by global knowledge & expertise of the various stakeholders including the TP, empowered by global networks and people.

- ▶ The CNM will be appointed for a period of five years to facilitate cluster and market development to realise improved competitiveness. The CNM will work closely with the MSME clusters to understand their needs and requirements and get OEMs/ buyers involved in the program. The CNM will strengthen market linkages of TC with the MSMEs in the cluster it serves, trade and industry associations, academia, educational institutions, applied research institutions, service providers, other government support institutions, workers and skill seekers. Existing research institutions which could be potential collaborators for specific technologies are - CMRI, SAMEER, NML, IISc etc. The CNM would work towards the following key objectives:

- Increase of business opportunity for MSMEs through new market linkages.
- Increase competitiveness of supply chains of large firms by enhancing the quality, reliability and productivity of MSME suppliers.
- Increase the number of MSMEs utilizing the services of TCs resulting in increase in revenues of TCs
- Enhance competitiveness of the cluster business environment:
 - Increase access by MSMEs to a network of business development services (BDS) which address needs not in the domain of TC expertise
 - Increase access by MSMEs to network of financial service providers
 - Increase awareness of opportunities in the public sector to contribute to a more competitive business environment.
- Establish closer cooperation of key innovation stakeholders to enhance product and process innovation. This would include linking the research agendas of applied research and education institutes/organizations to industry and market requirements and promoting joint research and development projects.

- Facilitate closer cooperation amongst skills development and labor market stakeholders to increase the number of workers/ trainees from TCs finding long term employment to improve their livelihood.
- Establish a business model which ensures financial self-sustainability of the CNM as before the end of the TCSP funding window.

All investment decisions (technological and other) and work prioritization in TCs must be intrinsically connected with the market place and efficiently translate market needs to products and services that (satisfy these needs), and will be enabled by technology and enriched by global knowledge and expertise of the various stakeholders including the CNM, empowered by global networks and people.

Social and Environmental Safeguards



7. Social and environmental safeguards

7.1 Socio-economic profile

- ▶ **Composition of workforce:** The main source of living for the people of Gautam Buddha Nagar district is agriculture. However, due to Noida and Greater Noida industrial area under Bisrakh block, the main means of livelihood in these areas are industrial workers, technical, engineering and management services.
- ▶ **Sector Composition:** Being in the purview of the NCR, the development of the district is moving at a fast pace. Noida and Greater Noida have developed into world class industrial hubs, and several large scale industries have been established in the area. Industrialisation is taking place in other areas of the district as well. Thus, the district has gained importance at a state as well as national level. Approximately 25% of the total revenue of Uttar Pradesh is received from Gautam Budh Nagar³¹. The district's GDDP (gross district domestic product) was Rs. 17,223 crores at current prices in 2009-2010. Uttar Pradesh's GSDP (gross state domestic product) in the same time period was Rs. 4,22,787 crores.

Primary sector: Agriculture is the main occupation of people in the district. However, due to the rapid industrialization in the area, the land size under cultivation is decreasing quickly. Wheat, paddy, barley, jawar, bajra, corn, etc. are the main crops cultivated in the area. Livestock rearing is also an important occupation in the area. Net sown area in the State was 62,588 hectare in 2011-2012³².

Secondary sector: Gautam Budh Nagar has vast industrial development potential due to its proximity to Delhi and the presence of the industrial areas of Noida and Greater Noida. Noida and Greater Noida have attracted several industries and boosted manufacturing in the area.

- As of 2013, there are 4 industrial areas in the district. The district has 17,679 registered industrial units, of which 377 are medium and large industrial units. There are 14,066 MSMEs in the district
- MSMEs have an investment of approximately Rs. 44,919 crore, providing employment to 2,32,141 persons.
- The types of industries registered include hosiery & garments, paper products & printing, rubber & plastic products, electrical machinery & apparatus, machinery, and basic metal industries.
- Major exportable items include electronics, textile products, and computer software.

³¹ Gautam Buddha Nagar district website - Geographical and Economic Structure

³² http://www.msmedinewdelhi.gov.in/PDF2014-15/DIPS_Gautam%20Budh%20Nagar%2012.6.14.pdf

Tertiary sector: The service industry in the area is growing due to the increasing development and population in the area. Gautam Budh Nagar is becoming a hub for IT companies. The district also has a large concentration of firms specializing in Research and Development and software production. Several MSMEs specialize in repair and servicing in the district. In addition to this, the district is famous for its catering industry.

- ▶ **Education:** Gautam Budh Nagar’s literacy rate is 80.12%, significantly higher than that of the rest of the state. At the Intermediate college level, courses are available in the area of science, arts and commerce. The following table gives information regarding the number of educational institutions present in Gautam Budh Nagar district;

Educational Institutions in the District (2012-2013)³³

Education	Number
Primary schools	936
Middle Schools	330
Secondary / senior secondary schools	132
Colleges	14
Technical Institutes	1

- ▶ **Health:** Gautam Budh Nagar was the best performing district in Uttar Pradesh in terms of Human Development Index (HDI) in 2005³⁴.

Health Infrastructure in Gautam Budh Nagar District

SN	Type	Numbers
1.	Allopathic Hospital	4
2.	Beds in Allopathic Hospitals	186
3.	Ayurvedic Hospitals	12
4.	Beds in Ayurvedic Hospitals	43
5.	Unani Hospitals	-
6.	Homeopathic Hospitals	12
7.	Community Health Centres	3
8.	Primary Health Centres	18

³³ http://www.msmedinewdelhi.gov.in/PDF2014-15/DIPS_Gautam%20Budh%20Nagar%2012.6.14.pdf

³⁴ http://www.nrcddp.org/HDR_Reports/HDR%20UTTARPRADESH%202008.pdf

Tribal Population: As per the census 2011, 0.57% of the population in the district is scheduled tribes.

7.2 Social and environmental screening

Environmental and social screening enables the envisaged risks to be addressed at the very beginning of designing and conceptualizing the implementation of the expansion or the green-field development. The two main objectives of environmental and social screening are to:

- ▶ Enhance the environmental and social sustainability of a proposed project. This aspect of screening focuses on the environmental and social benefits of a project.
- ▶ Identify and manage environmental and social risks that could be associated with a proposed project. This aspect of screening focuses on the possible environmental and social costs of an intervention and may point to the need for environmental and social review and management.

7.2.1 Social screening

As per World Bank guidelines TCSP has a two-tier approach³⁵ to Social Screening Process (SSP) as defined by World Bank which is as follows;

- ▶ **No Social Screening Process (NSSP)** is applicable if,
 - Expansion/modernization of an existing TC takes place within its existing complex/campus and/or within an established and operational sites such industrial estates, industrial parks, export promotion zones etc.
 - New TC is to be established within established and operational sites such as industrial estates, industrial parks, export promotion zones etc.
- ▶ **Full Social Screening Process (FSSP)** is applicable if a new TC is to be established on land acquired from private title holders and/or on Government land under different tenure systems provided by the Government to establish a new Centre
- ▶ **Indigenous People's Social Screening Process (IPSSP)** will be undertaken
 - If a new TC is to be established in an area with high indigenous population comprising tribal populace and
 - If the area is covered by Govt. Policies and Plans such as Tribal Sub Plans and Panchayati Raj Extension to Scheduled Areas

Further, Resettlement Policy Framework (RPF) applies to all components of Technology Centre Systems Program that requires acquisition of private land and transfer of Government/public land and that are likely to have adverse social impact including involuntary resettlement.

³⁵ As per TCSP Environmental management framework - Draft (9 December 2013), MoMSME

In context of Greater Noida TC;

- ▶ The identified site for the proposed TC at Greater Noida
 - Land has been allocated by Greater Noida Industrial Development Authority for a period of 90 years to O/o DC-MSME for the development of the TC by O/o DC-MSME.
 - Declaration has been received from the state government to go ahead with the TC development.
 - Clearances received from the department for being free from any kind of encumbrances and squatter settlements. Further during site visit by PMU consultants the same has been verified (Social screening documents in respect of land is attached in Annexure 18.3).
- ▶ The allocated site for the proposed new TC at Greater Noida is at the Ecotech Industrial Area. So, FSSP would not be applicable as *'the land for the establishment of the TC is not acquired from any private title holders and/or on Government land under different tenure systems'*.
- ▶ Hence, in this case NSSP will be applicable since the new TC is to be established within an established and operational site of an industrial estate,

Also, the proposed location of the TC is not established in an area with high indigenous population comprising tribal populace and the area is not even covered by any Govt. Policies and Plans such as Tribal Sub Plans and Panchayati Raj Extension to Scheduled Areas. Hence, this rules out the undertaking of IPSSP.

The responsibilities related to social management will ultimately reside with the respective TC. The PMU will facilitate, support the implementation of the Social Management Plans and prepare a six-monthly report on all aspects of Resettlement Policy Framework and Process.

The detailed social screening certificate can be found in Annexure 18.3.

7.2.2 Environmental screening

TCs are like mini industries; hence planning, development and management of the TCs involve several critical environmental, health and safety obligations. Good environment practices and processes are required to be an integral part of any expansion or development of any green-field TC. The foremost and most essential stage of environment management is to conduct an environmental screening that highlights appropriate level and type of Environmental aspects and their likely associated environmental impact. The screening process aims to quickly identify those projects in which no potential environmental and social issues exist, so that only those with potential environmental and

social implications will undergo a more detailed screening process. As a consequence, the outcome of the screening process will be a categorization of the project into one or more of the following categories:

- ▶ No further action is needed, either because no significant environmental impact and risks were identified, or because sufficient environmental review has already been conducted and environmental management recommendations have been incorporated into the project;
- ▶ Environmental sustainability elements need to be integrated into project design because there are possible environmental and social benefits, impact, and/or risks associated with the project (or a project component) but these are limited in nature, predominantly indirect or very long-term and so extremely difficult or impossible to directly identify and assess.
- ▶ Further environmental and social review and management is needed because potential environmental and social impact or risks are associated with the project (or a project component) and it is possible to identify these with a reasonable degree of certainty. In some cases, determining the significance of these impact or risks will require environmental and social assessment which, in turn, will lead to the identification of specific environmental and social management measures that need to be incorporated into the project.

The methodology for screening includes desk study, site visit and study of available literature.

- ▶ **Desk study** involves collection and review of the secondary data available in the public domain. This may involve the seismic activity of the area where new TC is proposed, soil type, land use pattern, etc. This will enable one to decide the methodology and level of Environment assessment and distributing the responsibility amongst the team members.
- ▶ **Site visit/s** is/are conducted to collect first hand data/information about the new site. This enables a cross check of the secondary data available during the desk review and assessing the likely environmental aspects and health and safety hazards. Also, this involves interaction with different stakeholder in the region to gauge any possibility of conflict related to TC.
- ▶ During the study phase the team conducted a site visit and held discussions with Greater Noida Department of Industries and Commerce officials.

Site Description and environmental setting

The allocated land/ Site has flat terrain and was vacant during the Site visit. No structures were observed during the visit. Based on the discussions with site representatives, no details could be gathered about the past usage of the Site.

The land use type of the area is predominantly vacant. The Site surroundings are as follows:

- ▶ North: Access road followed by vacant land;
- ▶ West: Access road followed by vacant land;
- ▶ East: Vacant land; and
- ▶ South: Vacant/ Agricultural land

Nearest village is Khanpur village located in the north.

The Site was vacant during the Site visit. No structures were observed during the visit. No details could be gathered about the past usage of the Site. The Site has road access from two sides and the surrounding land use is either vacant. The water for the operations shall be provided by Greater Noida Authority and the site operations are not expected to put additional pressure on the water sources. Earthquake and flood resilience should be considered during designing phase.

Based on the discussions with the Site representative and site visit conducted, no evident environmental concerns were identified on/ near the Site.

7.3 Gender equity and social inclusion strategy

Gender, Equity and Social Inclusion Plan (GESIP) is an important aspect of the social management framework. TCSP also aims to create more choices for young people entering labour force (including women and those who belong to vulnerable sections of society) in terms of providing opportunities for hands-on-technical skills development at varying levels and types through TCs. This is in accordance with Government of India's focus on inclusive growth focusing on poverty reduction and group equality and also with World Bank's Country Partnership Strategy with emphasis on engagement, transformation and inclusion.

GESIP will be formulated for the proposed Greater Noida TC, during its operational phase which would not only be an outcome of the participatory process but also be rooted in the national and state policies for gender and social inclusion. Areas to be considered while preparing GESIP will also be in line with the RFD of the programme and would comprise the following (but not limited to):

- ▶ Criteria for admission into vocational education and training for skills development
- ▶ Increased opportunities for employment to women trainees
- ▶ Timings of training
- ▶ Ease of Location of TC
- ▶ User friendly campus infrastructure esp. for differently abled sections
- ▶ No. of women rest rooms
- ▶ Training Aids and infrastructure
- ▶ Any other component

The PMU will prepare and monitor the strategy to help with the preparation and implementation of a GESIP with particular emphasis on inclusion of young women as well as those who belong to weaker and underprivileged sections of society. For example, those who belong to SC/STs, backward castes, minorities and those who are differently abled. Good practices coming out of the GESIP will be documented and replicated/scaled up further in new TCs.

GESIP Strategy roadmap (Suggestive)

- ▶ Develop a module/ guidance notes for preparing TC specific GESIPs covering the following aspects:
 - Gender gaps
 - Importance of gender
 - Identification of gender specific issues and constraints that hinder the implementation of GESIP (human capital, access to information, access to finance, institutional factors, socio-cultural norms, structural factors, political/ legal)
 - Use of gender-disaggregated data to analyse the business environment
 - Identify communication channels to reach intended program beneficiaries
 - Useful links and tools
 - Case studies/ best practices
 - Core questions and indicators
- ▶ Capacity building of TC focal points identified to work on GESIP. Analysis of existing pool of potential trainees and their eligibility in terms of gender and social inclusion and in terms of eligibility criteria as set out in national and State policies
- ▶ Hand holding support for planning and implementing GESIP
- ▶ Setting up institutional arrangements at TC level for transparent and accountable implementation and monitoring of GESIP based, among others, on specific and measurable indicators. Develop reporting and monitoring formats to assess progress every 6 months
- ▶ Organize and facilitate monthly meetings (for 6 months) for GESIP coordinators to identify issues and best practices and synthesize learning's' within and across sectors

7.4 Sample monitoring and reporting template

The monitoring of environmental parameters would be undertaken on quarterly basis. Carrying out timely monitoring of the required parameters will be the responsibility of the concerned TC parameters. A copy of the consolidated performance monitoring will be sent to the O/o DC MSME for their records and recommendations. The suggestive template for monitoring and reporting to be adopted by the TC's is given below.

All the potential environmental impacts (discussed in the EHS section of the DPR) that are expected during operation and maintenance of TCs should be addressed.

Table 15: Sample monitoring and reporting template

SN	Parameter	Frequency of monitoring and reporting
1	Water consumption	Quarterly
2	Water Cess Report	Quarterly
3	Energy consumption	Quarterly
4	Waste generation and disposal - Municipal Solid Waste - Hazardous waste - Non-hazardous waste - Other categories	Quarterly
5	Safety records Near Misses First Aid cases	Quarterly
6	Training No of students and other trained	Quarterly
7	Air pollution and Noise pollution	6-monthly
8	Internal audit report	Quarterly
9	Update of legal register	6-monthly

8. Clearances required and respective authorities

The proposed TC at Greater Noida is one of the Greenfield projects proposed under TCSP. This would include development of physical infrastructure including facilities like production, training, administration, hostel, canteen, utilities etc. keeping in view the long-term sustainability. The same would require clearances at different levels during construction such as approval of layout plan, environmental clearance, electricity and water supply connection, health and safety clearance and other associated clearances. Obtaining these clearances would be crucial for timely completion of the project and therefore needs to be planned well in advance. The following table gives indicative details of the various clearances along with the respective approving authorities. However, considering that land has already been allotted, some of these regulations may not be applicable.

Table 16: Clearances required and respective authorities - Illustrative

SN	Required clearance/ approvals ³⁶	Department /agency
1.	Registration under VAT Act	Commercial Taxes Department
2.	Registration under CST Act	Commercial Taxes Department
3.	Tax Clearance Certificate	Commercial Taxes Department
4.	Land conversion - Conversion of land use	Greater Noida Industrial Development Authority
5.	Land Allotment	Greater Noida Industrial Development Authority
6.	Allotment of plots in Industrial Areas	Greater Noida Industrial Development Authority
7.	Issue of NOC to the authority concerned regarding conversion of land use	Greater Noida Industrial Development Authority
8.	Environmental Clearance and consent to establish from State Pollution Control Board (SPCB)	Uttar Pradesh Pollution Control Board
9.	Consent to operate under the Air Act and Water Act from SPCB. Also, under the hazardous Act, if hazardous materials are being handled and disposed from the facility	Uttar Pradesh Pollution Control Board
10.	Electricity Connection	NPCL
11.	Water connection	Greater Noida Authority
12.	NOC from Fire Department	Uttar Pradesh Fire Service

³⁶ Nivesh Mitra, Greater Noida Industrial Development Authority

SN	Required clearance/ approvals ³⁶	Department /agency
13.	Approval of place and for permission to construct building under the Factories Act	Greater Noida Industrial Development Authority
14.	Approval of factory layout plan under Factories Act, 1948	Greater Noida Industrial Development Authority
15.	License for running the factory	Labour and Employment Department
16.	Registration of shops and commercial establishments	Labour and Employment Department
17.	Stability Certificate	Greater Noida Industrial Development Authority
18.	Permission to establishments having more than 50 labours under Industrial Employment	Labour and Employment Department
19.	Safety certificate for Lift	Greater Noida Industrial Development Authority
20.	Permission to extract ground water, if applicable	Central Ground Water Authority
21.	Society registration	Indian Societies Registration Act 1960

9. Manpower and human resource development

The success of an institute or an organization majorly depends upon the skill set and experienced human resource available with them. Hence, it's planning, recruitment and development is one of the most important aspects while designing a new Technology Centre. As a part of the study we have analysed organizational structures of some of the existing Technology Centres to understand the major functional areas, number and level of employees, contractual staff and other related aspects. In continuation, we have also discussed the same with O/o DC-MSME and some of the heads/GMs of the existing TRs.

As per the existing structure, there are following functional areas/streams in a TR:

- ▶ Production
- ▶ Design
- ▶ Training
- ▶ Consultancy and Marketing
- ▶ Administration and Accounting

The level of employee heading a particular Functional area/stream/department varies in some of the TCs. In an Indo German TR Administration and Accounting is head by a Manager while in Indo Danish TCs this is being headed by a Senior Manager. Sanctioned employee strength in these existing TCs typically varies from 110-120.

9.1 Proposed organisation structure

While analysing the existing organizational structures and designing the new one, we have taken some considerations into account which have been discussed and validated with the O/o DC-MSME. Some of the key considerations are as below:

- ▶ As per the decision taken in the Empowered Finance Committee, the total sanctioned strength for any new TC would be 60 in contrary to the existing ones which have total sanctioned strength of 110-120.
- ▶ In the proposed organizational structure for the Greater Noida TC, the main revenue streams are Production (which includes Assemble, Testing, and Calibration), Innovation, Design and Consultancy, and Training. These departments will be headed by Senior Managers who would directly report to GM/DGM.
- ▶ Contrary to the existing structures and target of sanctioned employee strength of not more than 60, we have proposed only 7 levels as compared to the existing structures which have 9 levels in the hierarchy. Below these levels, the resources will be hired as contractual employees on need basis.

- ▶ In the proposed structure for Greater Noida TC, a separate vertical for the Manufacturing Incubation Centre (MIC) has been proposed.
- ▶ In the existing structure consultancy and marketing department were clubbed into one, but in the proposed structure for Greater TC it has been proposed to have marketing as a separate department and consultancy be clubbed with the design and innovation department.
- ▶ The other three departments namely, Marketing, Administration and Accounting, and MIC are proposed to be headed by Manager level position and they will directly report to GM/DGM. This has been done as the administration and accounts department is lean and a manager level employee would be able to manage the same. Also, as stated above, the total sanctioned strength cannot exceed 60.
- ▶ It is proposed that training in the Greater Noida TC will be focused solely on Electronics
- ▶ Based on our discussions with the O/o DC-MSME and heads of the existing MSME TCs, there was a need for dedicated manager for the short term trainings. In the structure for Greater Noida TC, we have proposed separate managers for long term and short term trainings. Keeping in mind the scale and the number of trainees in the short term courses, the manager short term would mainly be responsible for administration, planning, quality control, issue of certificate to trainees, fee collection and others. The managers would be additionally responsible for placement of students which will include industry interaction, managing training and placement, delivering presentations etc.

The proposed Technology Centre at Greater Noida will be divided into six functional areas/departments. These are:

- ▶ Production (Assembly, Testing, and Calibration)
- ▶ Training (Electronics)
- ▶ Design, Consultancy and Innovation
- ▶ Manufacturing Incubation Centre (MIC)
- ▶ Marketing
- ▶ Admin and Accounting

It is recommended that the GM and the DGM divide these six areas/departments between them, depending on competency, work-load and previous experience. Overall GM would be responsible for the management and financial health of the TC.

The chart consists of 5 levels in addition to the General Manager (GM) and the Deputy General Manager (DGM).

- ▶ The third level consists of Senior Managers as the departmental heads of innovation, design and consulting, production and training. They will report directly to either the GM or the DGM, depending upon the division of departments within them.
- ▶ The fourth level will consist of Managers who will be supporting Senior Managers in their respective domains. But for marketing, admin and accounting, and MIC department, as explained above manager will head this department and directly reporting to GM or DGM.
- ▶ The fifth level consists of senior engineers (Sr. Engg.) and Sr. Officers. Level six consists of engineers (Engg.) and offices.
- ▶ The final level consists of senior technicians with requisite operational level expertise.

The responsibilities of each position and qualifications required to fulfil roles are covered in the following section. Hence, the recommended final organisational structure for the proposed TC is based on experience from established MSME technology centres, discussions with O/o DC-MSME and heads of some of the existing TCs, expert opinion and knowledge and experience with organisational planning.

Based on the considerations stated above, the organisational chart provided below demonstrates the target organizational structure to be achieved in 5 years (by 2020-21) from inception. Though, we have provided the figures till 2025-26 since we are estimating the revenue and expenditures for next 10 years.

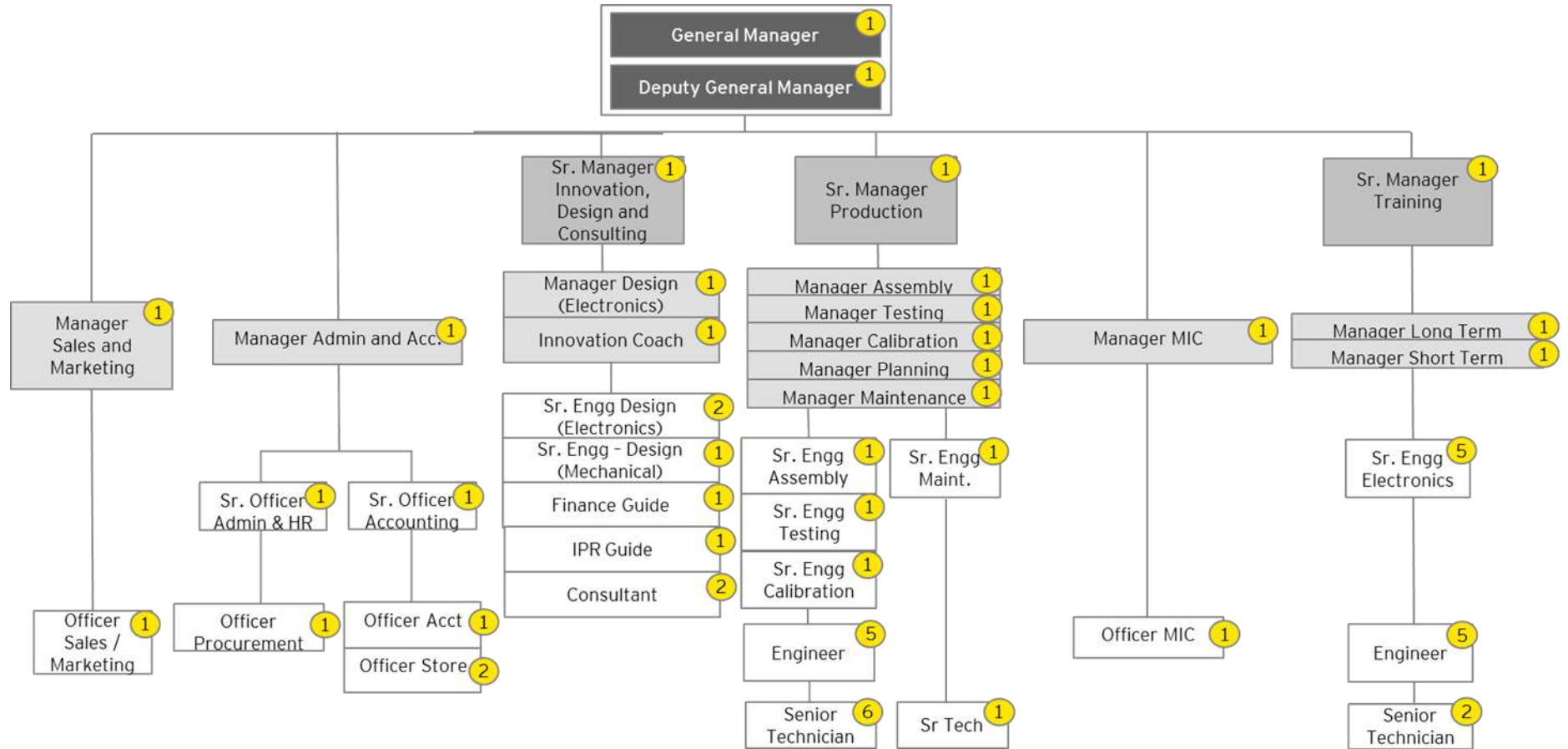
Table 17: Sanctioned strength of key resources

S. No.	Designation	Proposed Sanctioned Strength
1.	General Manager	1
2.	Deputy General Manager	1
Department		
3.	Marketing	2
4.	Administration and accounting	7
5.	Innovation, Design and consultancy	10
6.	Production	22
7.	MIC	2
8.	Training	15
Total		60³⁷

In addition to the above sanctioned strength, we have recommended additional employees as contractual employees.

³⁷ The details and basis of number of employees is provided in the next section

Figure 13: Proposed organisation structure



In addition to the above sanctioned strength, we have recommended additional employees as contractual employees. Based on the requirement, we have estimated around 59 contractual employees (45 in training, 12 in production, and 2 in consulting) by end of FY 2026. The figure for number of contractual employees have been arrived at by taking various factors into account namely - existing employees in training and production, the number of courses vis-à-vis the number of trainees, trainee to teacher ratio, projected revenue numbers over the years, number of shifts in production vis-à-vis the utilization and others.

While considering the ratio for trainee to teacher, we have used the following assumptions after discussion with existing GMs and O/o DC-MSME.

- Trainee to teacher ratio for theory classes - 60:1; with theory classes conducted for 20% of time
- Trainee to teacher ratio for practical classes - 20:1; with practical classes conducted for 80% of time

After calculating the weighted average of the above ratios we got the overall trainee to teacher ratio of 28:1. Post discussions, we have considered trainee to teacher ratio of 25:1 for calculating the number of employees in the training department (regular and contractual faculty) keeping in mind the employees who will be on leave at any given point of time.

9.2 Phase wise induction of human resources

As discussed in the above sections, the proposed TC will be have 60 employees as sanctioned strength and the target structure will be achieved within 5 years from 2015-16. Therefore due care have been taken during the study to phase the recruitment of employees. On the same lines, initially some positions have been proposed to be vacant when establishing the organisational structure of the TC. This has been proposed keeping in mind the time it will take to be fully operational. Vacant positions will also create incentives for high performers to obtain higher positions when the time comes for fulfilling these.

The phase wise estimated staffing over next few years as part of human resource planning has been done through the identification and analysis of the various types of activities and skill sets required for smooth and efficient functioning of the proposed TC. Multiple rounds of discussions with industry experts, World Bank, O/o DC-MSME and heads of some of the existing MSME TCs have been undertaken to arrive at the requirement of human resources needed to meet the business objectives in the short and long term of the proposed TC.

The following provides the details of recruitment in various phases over next few years. This phasing is suggestive and can be modified based on the need and revenue generating capabilities of the TC

during operations. Some of the considerations which have been taken into account while recommending the phasing of employees are as below:

▶ **Year 2015-16: 2 staff members**

- GM will be involved in project implementation and work out the strategy for marketing, training, production and consultancy with the help of CNM and TP. GM will also monitor the progress of construction and procurement of machines etc. GM will also be responsible for planning of recruitment of required manpower.
- Manager - Administration & Accounts will be responsible to get statutory registrations like sales tax and PF, opening of TC's bank account, getting power and water connection etc. Manger will also support GM in recruitment of people in the coming years.

▶ **Year 2016-17: 21 staff-members**

- Three senior managers (Innovation, Design and Consulting; Production; and Training) will be recruited to further recruit staff in respective departments. These would also be responsible for orientation and training of respective staff members.
- The first long term training programme will commence this year and one senior engineer, one engineer and one senior technician will be recruited for installation of machines and conducting theory and practical training
- By second half of this year, production and design staff will be recruited. The respective senior managers would be responsible for orientation and training of these staff members. These staff will undergo training for a period of 3-6 months to make them fully trained before start of the operations of the proposed TC
- An innovation coach and senior design engineer will also be recruited, in order to commence consultancy operations
- Manager - maintenance and senior technicians will be recruited to install and commission machines for production and training. They will also be responsible for installing the power supply system
- Manager MIC will be recruited in order to set up manufacturing infrastructure and provide for plug-and-play facilities
- Stores and accounts officers will be recruited to maintain statutory records and support the operations

▶ **Year 2017-18: 41 staff- member**

- Production will commence during this phase and hence more engineers and senior engineers will be recruited. The number of staff has been decided based on estimated number of machines commissioned during this phase and number of shifts in production
- This year some short term training courses will commence along with the starting of the second year of the long term course.

- Officer sales will be recruited to support manager marketing for preparation of detailed marketing plan of the TC. The staff would be engaged in various marketing activities for wider reach of the proposed TC across the region. This would be crucial for promotion of the TC and would help departments increase their revenue
- Officer MIC will be recruited in order to facilitate rental of space, and providing linkages with suppliers and skilled workers.
- The Innovation, Design and Consultancy department has been planned to commence its commercial services during this year and hence managers, consultants, and senior engineers will be recruited to meet the requirement.

► **Year 2018-19: 50 staff members**

The proposed TC would be fully operational by this period with activities in production, training, innovation, design and consultancy, MIC, etc. Additional staff will be recruited for smooth undertaking of the gradual increase in the activities across all the departments.

It is recommended to leave the position of the DGM vacant initially. The position of the DGM can be filled by a high performing senior manager within design and consulting, production or training depending upon the requirement, skill set and experience.

Rest of the positions will be filled gradually as TC activity escalates and the manpower requirements increase. The tables below summarise the phasing of the organisational completion within each area; Administration and Accounting, Innovation, Design and Consulting, Production, MIC, Training and Sales and Marketing, in addition to the positions of the GM and DGM. The numbers represent the numbers of employees within the specific position at a given point in time. The timeline spans from 2015 to 2026.

Table 18: Summary of phase wise induction of resources

Year	15-16	16-17	17-18	18-19	19-20	20-21	21-22	22-23	23-24	24-25	25-26
Full time employees											
Total	2	21	41	50	55	60	60	60	60	60	60
Sub-Contractors											
Total	0	3	13	21	21	31	34	44	49	54	59

The tables below depict the hiring of number resources in every department every year starting from 2015-16 to 2025-26. In the year 2020-21, the TC is recommended to hire the complete sanctioned strength of 60 employees.

Table 19: Department wise induction of fulltime resources - Illustrative

Year	15-16	16-17	17-18	18-19	19-20	20-21	25-26
General Manager							
General Manager	1	1	1	1	1	1	1
Total	1	1	1	1	1	1	1
Deputy General Manager							
Deputy GM	0	0	0	0	0	1	1
Total	0	0	0	0	1	1	1
Sales and Marketing							
Manager Sales and Marketing	0	1	1	1	1	1	1
Officer Sales and Marketing	0	0	1	1	1	1	1
Total	0	1	2	2	2	2	2
Administration and Accounting							
Manager Admin. and Accounting	1	1	1	1	1	1	1
Sr. Officer Admin and HR	0	0	0	0	0	1	1
Sr. Officer Accounting	0	0	0	0	0	1	1
Officer Procurement	0	0	1	1	1	1	1
Officer Accounting	0	1	1	1	1	1	1
Officer Store	0	1	1	2	2	2	2
Total	1	3	4	5	5	7	7
Innovation, Design and Consulting							
Senior manager	0	1	1	1	1	1	1
Manager Design (Electronics)	0	0	1	1	1	1	1
Innovation Coach	0	1	1	1	1	1	1
Sr. Engg. Design (Electronics)	0	1	1	1	2	2	2

Year	15-16	16-17	17-18	18-19	19-20	20-21	25-26
Sr. Engg. Design (Mechanical)	0	0	1	1	1	1	1
Finance Guide	0	0	1	1	1	1	1
IPR Guide	0	0	1	1	1	1	1
Consultant	0	0	1	1	2	2	2
Total	0	3	8	8	10	10	10
Production							
Senior Manager Production	0	1	1	1	1	1	1
Manager Assembly	0	0	1	1	1	1	1
Manager Testing	0	0	1	1	1	1	1
Manager Calibration	0	0	1	1	1	1	1
Manager Planning	0	1	1	1	1	1	1
Manager Maintenance	0	1	1	1	1	1	1
Sr Engg. Assembly	0	0	0	1	1	1	1
Sr Engg. Testing	0	0	0	1	1	1	1
Sr Engg. Calibration	0	0	0	1	1	1	1
Sr. Engg. Maintenance	0	1	1	1	1	1	1
Engineer	0	2	3	4	5	5	5
Senior Technician	0	1	2	2	4	6	6
Senior Technician Maintenance	0	1	1	1	1	1	1
Total	0	8	13	17	20	22	22
Manufacturing Incubation Centre							
Manager MIC	0	1	1	1	1	1	1
Officer MIC	0	0	1	1	1	1	1
Total	0	1	2	2	2	2	2
Training							

Year	15-16	16-17	17-18	18-19	19-20	20-21	25-26
Senior Manager	0	1	1	1	1	1	1
Manager Long Term	0	0	1	1	1	1	1
Manager Short Term	0	0	1	1	1	1	1
Sr. Engg.	0	1	3	5	5	5	5
Engg.	0	1	3	5	5	5	5
Senior Technician	0	1	2	2	2	2	2
Total	0	4	11	15	15	15	15

9.3 Roles and responsibilities

Below is summary of the suggestive roles and responsibilities (including the minimum qualification levels) of the individual employees which can be referred to while recruiting.

Table 20: Roles and responsibilities of proposed positions

Profile/ Designation	Minimum Qualification	Minimum Experience	Other Skill set/ requirements	Key Responsibilities
General Manager	B.Tech (CS / Electrical / Electronics) with MBA or M.Tech	15 Years with 8 years in similar role	<ul style="list-style-type: none"> ▶ Electronics Manufacturing / Design / Testing and Calibration / Training. ▶ Experience in Project Implementation will be preferred ▶ Networking skills with industrial associations, key players, etc. 	<ul style="list-style-type: none"> ▶ Over all responsible for the administration and financial health of the TC ▶ Key responsibility areas include (but not limited to); Marketing, Administration, HR, Accounts, Production, Design & consultancy etc. ▶ Responsibility for achieving the target KPIs set by the Governing Council
Deputy General Manager	B.Tech (CS / Electrical / Electronics) with MBA or M.Tech	12 Years with 5 years in similar role	<ul style="list-style-type: none"> ▶ Electronics Manufacturing / Design / Testing and Calibration / Training. ▶ Experience in Project Implementation will be preferred 	<ul style="list-style-type: none"> ▶ Head of Production, Innovation and Design, Consultancy and Training
Manager- Sales & Marketing	M. Tech. in CS / Electrical / Electronic	10 years with 5 years in similar role	<ul style="list-style-type: none"> ▶ Marketing of TC product range ▶ Supporting Sr. Managers of respective departments to acquire orders 	<ul style="list-style-type: none"> ▶ Plan and evaluate marketing activities towards all stakeholders ▶ Stakeholder analysis ▶ Sales according to targets

Profile/ Designation	Minimum Qualification	Minimum Experience	Other Skill set/ requirements	Key Responsibilities
			<ul style="list-style-type: none"> ▶ Follow up with prospective and existing customers 	
Sales Officer	MBA or Equivalent	3 years	<ul style="list-style-type: none"> ▶ Experience of invoicing and sales accounting ▶ Payment collection from customers ▶ Should be familiar with Computerised accounting procedures 	<ul style="list-style-type: none"> ▶ Execute marketing and sales activities ▶ Sales invoicing, taxes etc.
Manager - Admin. and Accounting	CA/ICWA or MBA with bachelor's degree in Commerce/ Accounting / Finance	8 Years with 3 years in similar role	<ul style="list-style-type: none"> ▶ Experience in the area of Administration, HR and Accounting ▶ The Manager must also have basic knowledge of government laws, regulations and state specific compliances ▶ Familiarity with ERP/accounting softwares 	Head of Accounts, Administration and HR: <ul style="list-style-type: none"> ▶ General housekeeping of TC ▶ Bookkeeping, accounting and finance including financial analysis ▶ TC security ▶ Payroll ▶ Procurement management and store keeping
Sr. Officer - Admin. & HR	MBA or Equivalent	5 Years	<ul style="list-style-type: none"> ▶ Experience in the area of HR and Administration ▶ Familiarity with Industrial laws and compliances 	<ul style="list-style-type: none"> ▶ Housekeeping of TC ▶ Security systems operation ▶ Transport System and management ▶ Payroll
Sr. Officer - Accounting	Bachelor's degree in commerce/Accounting / Finance	5 Years	<ul style="list-style-type: none"> ▶ Experience in accounting and Tax ▶ Should be familiar with latest accounting software 	<ul style="list-style-type: none"> ▶ Bookkeeping and accounting ▶ Financial analysis

Profile/ Designation	Minimum Qualification	Minimum Experience	Other Skill set/ requirements	Key Responsibilities
	with M.Com. or MBA			
Officer - Accounting	M. Com. or MBA or Equivalent in Accounting	3 Years	<ul style="list-style-type: none"> ▶ Experience in accounting and Tax. ▶ Should be familiar with latest accounting software 	<ul style="list-style-type: none"> ▶ Bookkeeping and accounting ▶ Handling of Cash, Banking etc.
Officer Store	Diploma in CS / Electrical / Electronic or Equivalent	3 Years	<ul style="list-style-type: none"> ▶ Experience in Store keeping, including inventory management ▶ Experience in Computer systems / software for store keeping operation 	<ul style="list-style-type: none"> ▶ Managing store ▶ Issue of consumable and non-consumable stores and keeping records
Officer Procurement	M. Com. or MBA or Equivalent	3 Years	<ul style="list-style-type: none"> ▶ Experience in Procurement processes ▶ Knowledge of Govt. Procurement rules and processes will be desirable 	<ul style="list-style-type: none"> ▶ Procurement ▶ Vendor Development
Senior manager - Innovation, Design & Consultancy	M.Tech in CS / Electrical /Electronic engineering	10 Years with 5 years in similar role	<ul style="list-style-type: none"> ▶ Proficiency in Electronics design ▶ Practical Experience in use of software for electronics design like OrCAD, PADS, CAD Soft Eagle, etc. ▶ Knowledge of Quality systems ▶ Experience in technical consultancy will be preferred ▶ Experience with ESDM Start ups ▶ Providing Consultancy Services 	<p>Responsible for supporting MSMEs and entrepreneurs w.r.t:</p> <ul style="list-style-type: none"> ▶ Concept creation support, including product ideation, innovation roadmap, development of proof of concepts, business planning, and market linkages ▶ Product architecture and design ▶ Consulting Services in areas such as process design, value engineering, lean manufacturing, EHS, etc.

Profile/ Designation	Minimum Qualification	Minimum Experience	Other Skill set/ requirements	Key Responsibilities
				In charge of entrepreneur club and patent registration and harnessing centre
Manager- Design (Electronics)	B. Tech in Electronic engineering.	8 years with 3 years in a similar role	<ul style="list-style-type: none"> ▶ Experience in product modelling, design ▶ Proficiency in Electronics design ▶ Practical Experience in use of software for PCB and electronics design ▶ Experience of manufacturing and assembly of electronics ▶ Knowledge of Quality systems ▶ Experience in technical consultancy will be preferred 	<ul style="list-style-type: none"> ▶ Designing electronics and components ▶ Product development ▶ Prototyping
Manager - Design (Mechanical)	B. Tech in Mechanical engineering	8 years with 3 years in a similar role	<ul style="list-style-type: none"> ▶ Experience in product modelling, design, tool design ▶ Proficiency in one of the areas in Tool Design, either Sheet metal press tool or Plastic mould ▶ Practical Experience in use of CAD/CAM/CAE in product and tool design ▶ Knowledge of Tool trial ▶ Knowledge of Quality systems ▶ Experience in technical consultancy will be preferred 	<ul style="list-style-type: none"> ▶ Designing tools, moulds and die casting ▶ Product development ▶ Quality systems ▶ Value engineering ▶ Tool try outs and proving ▶ Consultancy to MSMEs: Deliver functional consulting on assigned areas to ensure MSMEs are able to successfully use the solutions

Profile/ Designation	Minimum Qualification	Minimum Experience	Other Skill set/ requirements	Key Responsibilities
Innovation Coach	B. Tech in CS / Electrical /Electronic engineering	8 years with 3 years in a similar role	<ul style="list-style-type: none"> ▶ Proficiency in Electronics design ▶ Practical Experience in use of software for electronics design like OrCAD, PADS, CAD Soft Eagle, etc. ▶ Experience in product ideation and innovation ▶ Knowledge of Quality systems ▶ Experience in business planning ▶ Experience with ESDM Start ups ▶ Providing Consultancy Services 	Providing consultancy services in the following fields: <ul style="list-style-type: none"> ▶ Product ideation, development and testing of concepts ▶ Setting up innovation roadmap including business strategy, product architecture ▶ Proof of concepts including developing schematics, lab support, feasibility judgements ▶ Business planning ▶ Market Linkages
Sr. Engineer- Design (Electronics)	B. Tech in CS / Electrical / Electronic engineering	5 Years	<ul style="list-style-type: none"> ▶ Experience with designing electronic components / electronics ▶ Knowledge of high software in electronic design such as OrCAD, PADS, CAD Soft Eagle, etc. ▶ Experience of consultancy in the areas of product and component development, quality systems and value engineering 	<ul style="list-style-type: none"> ▶ Designing electronics and electronic components ▶ Product and prototype development ▶ Quality systems ▶ Value engineering ▶ Consultancy to MSME
Finance Guide	B. Sc. / Diploma in Finance or equivalent	5 Years	<ul style="list-style-type: none"> ▶ Experience in financial assessment ▶ Experience in financial consultancy and business plan creation 	<ul style="list-style-type: none"> ▶ Consultancy services for financial assessment and feasibility, business planning

Profile/ Designation	Minimum Qualification	Minimum Experience	Other Skill set/ requirements	Key Responsibilities
IPR Guide	LLB / PGDM in IPR or equivalent	5 Years	<ul style="list-style-type: none"> ▶ Experience in patent creation and harnessing 	<ul style="list-style-type: none"> ▶ Consultancy services for patent creation and harnessing
Consultant	B. Tech in CS / Electrical / Electronic engineering	5 Years	<ul style="list-style-type: none"> ▶ Proficiency in Electronics design ▶ Practical Experience in use of software for electronics design like OrCAD, PADS, CAD Soft Eagle, etc. ▶ Experience in product ideation and innovation ▶ Prototyping experience ▶ Knowledge of Quality systems ▶ Experience in business planning ▶ Experience with ESDM Start ups ▶ Providing Consultancy Services 	<ul style="list-style-type: none"> ▶ Assistance and consultancy in concept creation, product and process development, quality and reliability, sustainability, prototyping
Sr. Manager Production	M. Tech. in CS / Electrical / Electronic Engineering	10 Years with 5 years in similar role	<ul style="list-style-type: none"> ▶ Experience with manufacturing and assembly, testing and calibration, and at least 3 years of leadership experience ▶ The Sr. Manager should also have hands on experience with programming software for electronics production 	<ul style="list-style-type: none"> ▶ Responsible for assembly, testing, and calibration centres ▶ Quality assurance of services ▶ Overall responsible for machine maintenance and upkeep ▶ Ensuring on-time deliveries ▶ Deliver budgeted quantities as per required quality standards

Profile/ Designation	Minimum Qualification	Minimum Experience	Other Skill set/ requirements	Key Responsibilities
			<ul style="list-style-type: none"> ▶ Experience to debug, analyse problems, root causes & take corrective improvement actions 	<ul style="list-style-type: none"> ▶ Manpower deployment and controlling manpower costs as per target
Manager- Assembly	B. Tech CS / Electrical / Electronic Engineering	8 Years with 3 years in a similar role	<ul style="list-style-type: none"> ▶ Experience with electronic product and PCB assembly (SMT and through hole / manual and automated) ▶ Hands on experience with PCB design software ▶ Experience of de-bugging, analysing problems, root cause and taking corrective improvement actions when PCB is not functional as per specifications ▶ Should have good knowledge of quality inspection 	<ul style="list-style-type: none"> ▶ Product and PCB assembly centre ▶ Responsible for timely delivery of products ▶ Overall responsible for machine maintenance and upkeep ▶ Ensuring on-time deliveries
Manager- Testing	B. Tech in CS / Electrical / Electronic Engineering	8 Years with 3 years in a similar role	<ul style="list-style-type: none"> ▶ Experience with using testing equipment and software ▶ Safety testing and fire safety testing ▶ Environmental testing and Ingress testing ▶ EMI / EMC ▶ RoHS Testing 	<ul style="list-style-type: none"> ▶ Supervise testing department staff. Planning, organizing, and monitoring testing assignments and ensuring work expectations for scope, schedule, cost and responsiveness. ▶ Interface with engineering for technical resolutions for tolerance failure's ▶ Increase through-put of testing department

Profile/ Designation	Minimum Qualification	Minimum Experience	Other Skill set/ requirements	Key Responsibilities
				<ul style="list-style-type: none"> ▶ Overall responsible for machine maintenance and upkeep
Manager- Calibration	B. Tech in CS / Electrical / Electronic Engineering	8 Years with 3 years in a similar role	<ul style="list-style-type: none"> ▶ Experience in conducting calibration of basic electronic / physical sensors and meters used in electronic items ▶ Electro-Technical Calibration ▶ Thermal Calibration ▶ Mass and Volume Lab ▶ Pressure Calibration 	<ul style="list-style-type: none"> ▶ Supervise calibration department staff. Planning, organizing, and monitoring calibration assignments and ensuring work expectations for scope, schedule, cost and responsiveness. ▶ Interface with engineering for technical resolutions for tolerance failure's ▶ Increase through-put of calibration department ▶ Overall responsible for machine maintenance and upkeep
Manager- Planning	B. Tech in CS / Electrical / Electronic Engineering	8 Years with 3 years in a similar role	<ul style="list-style-type: none"> ▶ Experience in electronics assembly, testing, and calibration ▶ Experience in programming, knowledge of programming software 	<ul style="list-style-type: none"> ▶ Preparation of stage wise / machine wise scheduling in co-ordination with head of production team ▶ Production Planning and Control, and further despatching of jobs ▶ Estimate & manage to get component requirements

Profile/ Designation	Minimum Qualification	Minimum Experience	Other Skill set/ requirements	Key Responsibilities
				<ul style="list-style-type: none"> ▶ Responsible from issue of raw components to despatch of final product to customers including routing
Manager- Maintenance	B. Tech in Mechanical/ Electrical/ Electronics Engineering	8 Years with 3 years in a similar role	<ul style="list-style-type: none"> ▶ Knowledge of Installation and commissioning of machines and equipment ▶ Practical experience in preventive and repair maintenance of machines and equipment ▶ Practical experience of maintaining utility equipment like sub-station, UPS, water treatment plant, DG set etc. 	<ul style="list-style-type: none"> ▶ Head of Machinery maintenance including preventive maintenance, repair etc. of machines and equipment ▶ Responsible for Power supply, energy conservation water system in the campus
Senior Engineer- Assembly	B. Tech in Electronics Engineering	5 Years	<ul style="list-style-type: none"> ▶ Prior experience with electronic assembly 	<ul style="list-style-type: none"> ▶ Electronic product and PCB assembly (SMT and through hole / manual and automated) ▶ Running PCB design software ▶ De-bugging, analysing problems, root cause and taking corrective improvement actions when PCB is not functional as per specifications ▶ Quality inspection

Profile/ Designation	Minimum Qualification	Minimum Experience	Other Skill set/ requirements	Key Responsibilities
Senior Engineer - Testing	B. Tech in Electronics Engineering	5 years	<ul style="list-style-type: none"> ▶ Prior experience with electronic testing 	<ul style="list-style-type: none"> ▶ Safety testing and fire safety testing ▶ Environmental testing and Ingress testing ▶ EMI / EMC ▶ RoHS Testing
Senior Engineer - Calibration	B. Tech in Electronics Engineering	5 years	<ul style="list-style-type: none"> ▶ Prior experience with electronic calibration 	<ul style="list-style-type: none"> ▶ Conducting calibration of basic electronic / physical sensors and meters used in electronic items ▶ Electro-Technical Calibration ▶ Thermal Calibration ▶ Mass and Volume Lab ▶ Pressure Calibration
Senior Engineer - Maintenance	B. Tech in Electronics Engineering	5 years	<ul style="list-style-type: none"> ▶ Experience in Maintenance of machines and equipment (electronics or mechanical) ▶ Experience in machine programming and operation (electronics) 	<ul style="list-style-type: none"> ▶ Machine maintenance including preventive maintenance, repair, etc. of machines and equipment ▶ Responsible for power supply, energy conservation water system in the campus
Engineer	Diploma in Electronics	3 years	<ul style="list-style-type: none"> ▶ Knowledge and experience in electronics assembly / testing / calibration / prototyping ▶ Machine programming and operation (electronics) 	<ul style="list-style-type: none"> ▶ Machine programming and operation for testing / calibration / prototyping ▶ Assembly of electronics

Profile/ Designation	Minimum Qualification	Minimum Experience	Other Skill set/ requirements	Key Responsibilities
Senior Technician (Assembly / Testing / Calibration / Prototyping)	Diploma / ITI in respective areas	3 years as Sr. Technician	<ul style="list-style-type: none"> ▶ Knowledge and experience electronics and component manufacturing ▶ Electronics assembly ▶ Testing and calibration ▶ Prototyping ▶ Knowledge of machine programming and operation for testing / calibration / prototyping 	<ul style="list-style-type: none"> ▶ Machine programming and operation for testing / calibration / prototyping ▶ Assembly of electronics
Senior Technician - Maintenance	Diploma/ ITI in respective areas	1 year after Diploma or 5 Years after ITI in respective areas	<ul style="list-style-type: none"> ▶ Experience in Maintenance of machines and equipment (electronics) / ▶ Experience in machine programming and operation ▶ Experience in electronics assembly, testing and calibration 	<ul style="list-style-type: none"> ▶ Maintenance of machines and equipment ▶ Machine programming and operation (electronics)
Manager - MIC	M. Com. Or MBA or Equivalent	8 Years	<ul style="list-style-type: none"> ▶ Experience in management, administration, and marketing in the ESDM sector ▶ Familiarity with regulations and compliances 	<ul style="list-style-type: none"> ▶ Helping members of Incubation centre in getting orders and execution of the same
Officer - MIC	M. Com. or MBA or Equivalent	3 Years	<ul style="list-style-type: none"> ▶ Experience in the area of Administration and Marketing 	<ul style="list-style-type: none"> ▶ Administration and Promotion

Profile/ Designation	Minimum Qualification	Minimum Experience	Other Skill set/ requirements	Key Responsibilities
			<ul style="list-style-type: none"> ▶ Familiarity with Industrial laws and compliances ▶ Prior experience of marketing and promoting in the ESDM sector 	
Senior Manager- Training	M. Tech. in Electronics engineering	10 Years with 5 years in a similar role	<ul style="list-style-type: none"> ▶ Experience with electronics manufacturing and training in the field of ESDM ▶ Experience with designing curriculum and preparing lecture plans and course material for long term and short term training 	<ul style="list-style-type: none"> ▶ Overall responsible for planning and executing training activities ▶ Overall responsible for designing curriculum and preparing lecture plans and course material ▶ Responsible for Quality and Certification in training
Manager Training- Long Term	B. Tech. in Electronics Engineering	8 years with 3 years in a similar role	<ul style="list-style-type: none"> ▶ Experience with electronics manufacturing and training in ESDM ▶ Experience with designing of curriculum and preparing lecture plans and development of course material for long term and short term training 	<ul style="list-style-type: none"> ▶ Planning and implementing of training activities in designing, manufacturing, assembly, testing ▶ Focus on long term training courses ▶ Evaluation of training activities and identify improvements ▶ Curriculum design ▶ Lecture plans and course material
Manager Training - Short Term	B. Tech. in Electronics Engineering	8 years with 3 years in a similar role	<ul style="list-style-type: none"> ▶ Experience with electronics manufacturing and training in ESDM 	<ul style="list-style-type: none"> ▶ Planning and implementing of training activities in designing, manufacturing, assembly, testing

Profile/ Designation	Minimum Qualification	Minimum Experience	Other Skill set/ requirements	Key Responsibilities
			<ul style="list-style-type: none"> ▶ Experience with designing of curriculum and preparing lecture plans and development of course material for short term training 	<ul style="list-style-type: none"> ▶ Focus on short term training courses ▶ Evaluation of training activities and identify improvements ▶ Curriculum design ▶ Lecture plans and course material
Senior Engineer- Electronics (Training)	B. Tech. Electronics Engineering	5 Year	<ul style="list-style-type: none"> ▶ Experience with electronics and component manufacturing and training in ESDM ▶ Experience with designing curriculum and preparing lecture plans and development of course material for long term and short term training ▶ Knowledge of software for electronic design and manufacturing 	<ul style="list-style-type: none"> ▶ Undertake training courses in electronics and component manufacturing
Engineer- Training	Diploma in Electronics	3 Years	<ul style="list-style-type: none"> ▶ Experience in electronics manufacturing and training in ESDM 	<ul style="list-style-type: none"> ▶ Undertake training courses ▶ Demonstrate practical skills to trainees ▶ Deliver theory lectures
Senior Technician - Training	Diploma / ITI in respective areas	1 year after Diploma or 5 years after ITI in respective areas	<ul style="list-style-type: none"> ▶ Experience in Maintenance of machines and equipment (electronics) ▶ Experience in machine programming and operation (electronics) 	<ul style="list-style-type: none"> ▶ Machine programming and operation for equipment used in trainings

Profile/ Designation	Minimum Qualification	Minimum Experience	Other Skill set/ requirements	Key Responsibilities
			▶ Experience in electronics assembly, testing and calibration	

9.4 Governance structure

9.4.1 Selection of the Governance Model for the new TCs

All the existing 18 TCs have been set up under the Societies Registration Act, 1860. The management of affairs mainly rest with the Governing Council constituted by MoMSME, Government of India with the Additional Secretary and Development Commissioner of Ministry of Micro, Small and Medium scale Enterprises (DC-MSME) acting as the President of the Society and Chairman of the Governing Council (GC).

This arrangement has proved effective as most TCs have supported local MSMEs well and have performed financially. Each TC has a separate society and has very decentralised authority and governance structure. DC, MSME being chairman and other two members Director -Tool Room and representative of IF-wing of MoMSME are common members in all 18 GCs.

During the study and preparation phase of this DPR, we analysed different governance models for the new TCs. Under Indian law, there are three legal forms that exist for non-profit organisations. Mainly two forms are relevant for the purpose of the TCSP Program.

- ▶ Society as per society Registration Act, 1860
- ▶ Section 25 companies as per Companies Act, 1956

The two forms mentioned above have distinguishing features as per their respective acts.

Table 21: Comparison of Society Registration Act and Companies Act

Features	Registered Society	No-for-profit Company u/s 25
Setting up and running cost	Nominal	Comparatively more than the society & trust
Formation	Simple	Takes 2-3 months, required to comply with provisions of Companies Act
Jurisdiction	Registrar of society	Registrar of companies
Meetings	Annual Meeting As per Law. Governing Body meeting as per the rules of Society.	Quite Extensive as per the provision of Company Law
Governance	Vests with governing body as per the rules framed by them. Law specifies no rules & regulation	Vests with Board of directors & management committee. Specific provisions for quorum, adoption, ratification and compliance

Features	Registered Society	No-for-profit Company u/s 25
Membership transfer	Impossible	Free or control as per desire
Statutory Regulations	Limited	Exhaustive
Transparency	Transparent (As society act is not so exhaustive requiring statutory compliance for each and every step of business operation)	Fully Transparent (The Companies Law is quite exhaustive requires specific compliance in each activity of business operation)
Perception commercial lenders	Less comfortable	More comfortable
Interest of commercial lenders	Less secured, as Act doesn't provide any rules regarding how the interest of lenders can be settled in the case of bankruptcy	More secured, as exhaustive provisions in companies act about how the interest of lenders can be secured by distributing the assets of the company in case of liquidation
Accountability	More (Can be established, if the rules, regulation and by-laws of the Society are framed in manner to fix accountabilities)	More, (As per the statutory regulations)
Financial Management & Disclosures	Best practices can be adopted through framing regulations. However, Act doesn't provide anything specific on this	Exhaustive provisions in Companies Act providing for financial management and disclosure policies
Modification of Objects	Easy Legal Procedure	Complicated legal procedure
Penalties	Lesser	Higher
External audits	Subject to lesser audit requirement. As Act doesn't provide for various kind of audits of the Society. However, generally the society provide for audit regulations and compliance to audit observations as part of their bye-laws and rules and regulations	Greater degree of control through Auditing framework as per companies Act. E.g. Statutory Audit, tax audit, cost audit etc.
Basic Document	Memorandum of Association Articles of Association with rules & regulations	Memorandum of Association Articles of Association

The Table above outlines difference in the two prominent governance structures. Generally, Companies are construed as more reliable legal entity in the commercial world or to attract private participants because the transparency inherits from the statute itself under which it is incorporated.

However, a society may also bring forward discipline by framing rules and regulations of the society through the governing body. This fact together with the minimal cost of setting up and running and simplicity in its formation makes the society a popular model in the case where purpose is not to finance the cost of the project but optimise the cost and delays.

The existing 18 TCs formed as per society model have made it proven model because of the following facts:

- ▶ Very clear cut authority flow and ownership by other GC members and GMs (as permanent member secretary). It instils competition among individual TCs to excel.
- ▶ The Incentive schemes work better in small groups (individual TCs). It also allowed better performing and surplus generating TCs to retain surplus fund and deploy them best suited to them.
- ▶ Rules and regulation framed by the societies fix the accountability of various authorities in organisation.
- ▶ Delegation of financial power has been developed which fix the authority of each of the officer in management body.
- ▶ Well established system for procurement is being followed as per GoI guidelines and GFR, 2005
- ▶ Matters have been identified on which decision van be taken only by the Governing Body.
- ▶ Annual accounts are audited by the statutory auditors well in time and audit report is placed and adopted by the Governing Body in its annual meeting
- ▶ Compliance to audit observations are strictly complied with and observed by the O/o DC-MSME

Overall the present system is working well and at this stage raising fund is not the sole purpose, it is recommended to continue with the societies for proposed Greater Noida TC with following few minor modifications

- ▶ Governing council can make provision for more membership from OEMs
- ▶ Provision of membership from state technical University who controls most private Engineering colleges
- ▶ One more sector expert in the GC
- ▶ GC usually meets once in six months only and it is suggested to have one executive committee or advisory committee consisting of local MSME/Cluster association members,

sector experts and other stakeholders who can meet quarterly and can advise TCs and can also be delegated with powers higher than GMs

9.4.2 Composition of the Governing Council

As mentioned above, the proposed TC will be set up under the Societies Registration Act, 1860. The management of affairs primarily rest with the Governing Council constituted by MoMSME, Government of India with the Additional Secretary and Development Commissioner, Ministry of Micro, Small and Medium Enterprises (DC-MSME) acting as the President of the Society and Chairman of the Governing Council of each TC.

The Governing Council of TC will comprise four types of members as explained below:

Table 22: Governing Council of Greater Noida TC

Representation in the Governing Council
(i) Ex-officio members
<p>Representative from Government of India</p> <ul style="list-style-type: none"> ▶ Development Commissioner, Ministry of MSME as Chairman, ▶ Industrial Advisor or Director of TR or Program Coordinator, ▶ Director DI-MSME of the respective States, ▶ Representative from Integrated Finance Wing of the Ministry of MSME. <p>Representative from State Government</p> <ul style="list-style-type: none"> ▶ Official from concerned industry department, ▶ Official from concerned department of technical education/training.
(ii) Institutional members
<ul style="list-style-type: none"> ▶ Representative of state level industrial promotion body ▶ Representative of association of small scale industries ▶ Representative of the local chambers of commerce and industries/ Industry Promotion Institution/NSIC.
(iii) Professional and other members
<ul style="list-style-type: none"> ▶ One expert representing the fields of finance & accounts/ law/management, ▶ One representative of small scale electronics producers, ▶ One representative of OEM, ▶ One representative of major ESDM manufacturer in the region ▶ Representative of Technical University of the state which governs engineering colleges
(iv) MD/Executive Director/GM/PD of the Society

Representation in the Governing Council

On his appointment, the Executive Director or General Manager of the Society shall automatically become ex-officio member of the Governing Council during the tenure of his office, as *Member Secretary*.

► Role of the governing council

The Governing Council will discharge such duties and responsibilities, exercise such powers and undertake and carry out such activities as considers essential with a view to attain the aims and objectives as per the Memorandum of Association of the Society, with particular reference to the following;

- To prepare and execute plans and programmes for the establishment of the TC based on the plan of operation and to carry on its administration and management after such establishment.
- To prepare, consider and approve the policies and strategies of the Society and to reconsider and amend the said policies and strategies whenever appropriate.
- To receive grants and contributions and to have custody of the funds of the society.
- To prepare, consider and approve the budget estimates of the society every year.
- To prepare and maintain accounts and other relevant records and annual statement of accounts including the balance sheet of the society.
- To open, conduct and prescribe courses of study, training and research in ESDM (design and manufacturing) and subjects.
- To fix and receive such fees and other charges from persons undergoing training as may be necessary.
- To prescribe rules and regulation for the admission of candidates to the various courses of training.
- To lay down standards of proficiency to be demonstrated before the award of diplomas, certificates and other distinctions to the trainees.
- To institute and award scholarships, prizes and medals.
- To provide for and supervise the residence, health, discipline and the well-being of the trainees in the Society.
- To create subject to the provisions of Rule 68 supra technical, training, research, administrative, ministerial and other posts under the Society and to make appointments thereto on such terms and conditions as deemed appropriate.
- To co-operate with any other organisation in the matters of education, training, management and allied subjects.
- To enter into arrangements for and on behalf of the society.
- To sue and defend all legal proceedings on behalf of the Society.

- To appoint committee or committees for the disposal of any business of the Society or for advice in any matter pertaining to the Society.
- To delegate to such extent it may deem necessary any of its power to any officer or committee of the Governing Council.
- To consider and pass such resolution on the Annual Report, the annual accounts and the financial estimates of the Society as it thinks fit.
- To make, inform, adopt, amend, vary or rescind from time to time rules and by-laws for the regulation of and for any purpose connected with the management and administration of affairs of the Society and for the furtherance of its aims and objectives.
- To make, adopt, amend, vary or rescind from time to time rules and by-laws for
 - For the conduct of the business of the Governing Council and the committee(s) to be appointed by it,
 - For delegation of its powers,
 - For fixing quorum.
- To sell, lease, mortgage or exchange and otherwise transfer all or any portion of the properties of the Society.
- To establish a provident fund for the benefit of the employees of the Society.
- To perform such additional functions and to carry out such duties as may from time to time be assigned to it by the Society.
- To establish procedure in respect of services and technical advice to be rendered to the industry by the Society and the levy and collection of charges for the same.
- To delegate its powers as may be deemed fit and appropriate but not the powers for:
 - Altering, extending or abridging the purposes of the TC within the meaning of the Societies Registration Act, 1860.
 - Amalgamating the TC either wholly or partially with any other TC having similar aims and objectives.
 - Altering, extending or abridging the Rules and Regulations of the TC within the meaning of the Societies Registration Act, 1860.
 - Shifting the existing location or altering the capacity of the TC.
 - Making capital investment exceeding the approved budget.
 - Borrowing money except for working capital exceeding the approved budget.
 - Transferring by way of mortgage, pledge, hypothecation or otherwise any assets, moveable or immovable, except as security for working capital.
 - Appointing bankers and auditors.
 - Generally anything extraordinary and of major importance.

► **Roles and responsibilities of the member secretary (GM/PD/MD)**

- Plan, direct, co-ordinate, organize and supervise day-to-day work of the society.

- Implement policies, strategies and such programs of the society and attend to all statutory requirements imposed thereon.
 - Prescribe the functions, duties and responsibilities for all officers and staff of the society, give them appropriate instructions and exercise such supervision and disciplinary control as may be necessary.
- ▶ **Roles and responsibilities of the O/o DC-MSME in management of the TCs**
- Support DC-MSME in executing the responsibilities as the Chairman of the Governing Council of all TCs.
 - Support in implementation of strategic projects and policies from the central to the TC levels.
 - Act as the nodal point of coordination between the TCs and the DC-MSME.

Marketing Plan



10. Marketing plan of Greater Noida TC

The marketing of Greater Noida TC would require specific actions in order to engage with potential customers and clients in the catchment area. A series of activities is therefore required to be planned for effective marketing of Greater Noida TC to promote its business, product or services. The broad suggestive framework for marketing of Greater Noida TC would include the following;

Figure 14: Suggestive framework for marketing of TC



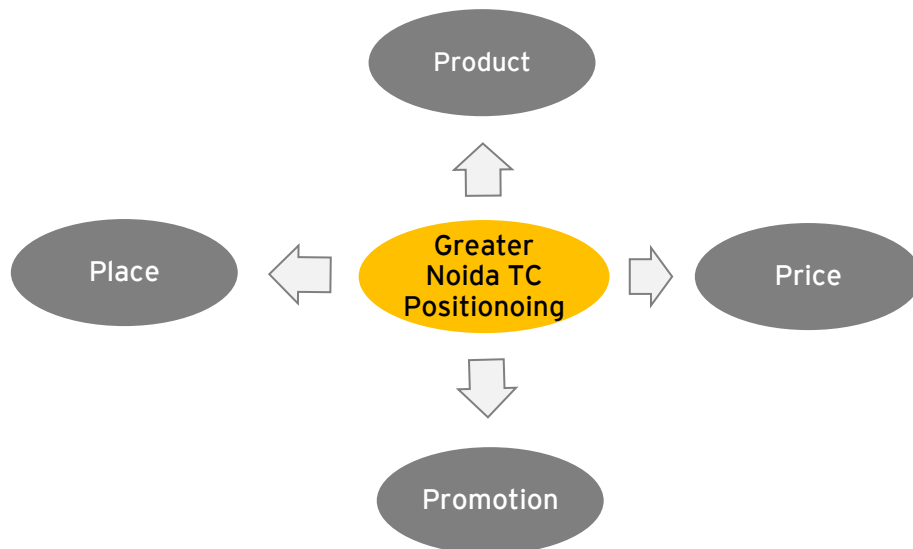
In line with the above suggestive framework, a detailed Go to Market plan of the proposed TC will be prepared subsequently by the Cluster Network Manager (CNM) along with the GM and marketing team of the TC. The role of CNM for marketing would be very crucial and will act as an additional arm of the marketing wing of the proposed TC. It will further strengthen its market linkages with the MSMEs in the cluster it serves. CNM will also market the TC within the trade and industry associations, academia, educational institutions, applied research institutions, service providers, other government support institutions, workers and skill seekers.

As part of the marketing initiative, CNM would work closely with MSME clusters in the region to understand their needs and requirements and involve OEMs/ tier 1 players in the region. Based on the observations, the marketing strategy of the TC would be customized targeting various focus groups including technical and training institutes. Further, the CNM would be part of the consolidation of the results and recommendations of the diagnostic into a strategic plan for cluster development. The CNM would also represent the TC in various industry oriented outreach programmes and workshops. This would help in two ways; promoting the TC and understanding industry perspective and future areas of focus. The same will help to identify key areas of focus for the TC and align the future marketing strategies accordingly.

Hence, the CNM would promote the TCs in among the newly developed partnerships for mutual benefit around identified programmes / initiatives.

The plan should clearly position the proposed TC’s marketing mix with respect to its four Ps - product, price, place and promotion. The suggestive points which needs to be taken care while designing the Go To Market Plan for the Greater Noida TC has been highlighted below:

Figure 15: Positioning of marketing mix for proposed TC



Product
<p>An ESDM TC with a focus on Automotive and Power Electronics sector is proposed to be developed at Greater Noida. The product and service offering of the proposed TC therefore has been carefully derived keeping in view the existing gaps to address specific requirements of this sector. Further the shortlisted specialisations and respective courses to be offered by the proposed TC have been done keeping in view the shortage in the availability of required skill sets in the labour force across the industry.</p> <p>The existing ESDM focussed MSME TCs majorly focus on tool room requirements for the ESDM industry, PCB design and manufacturing, and design, testing and repairs. There is a need for a unit for electronics assembly, as well as for end-to-end consultancy services for entrepreneurs, including concept creation, product ideation, and creation of prototypes. As a differentiator and keeping the market needs in mind, we have proposed an ESDM TC in Greater Noida with a focus on automotive and power electronics. We have also proposed an electronics assembly unit, testing and calibration services, and an innovation centre for budding entrepreneurs. The centre would encourage final year trainees to start their own ventures by providing necessary support like finance, machining, availing benefits of Government schemes etc. for a period of 3 years.</p>

The summary is provided below:

The key offerings of the proposed TC will be ESDM focused (with a special emphasis on automotive and power electronics) like; design and consultancy, creation of prototypes, electronics assembly, testing and calibration, training for skill development with respect to various specialisations. Focus areas would include:

- Innovation, design, and consultancy services: This includes concept creation, product ideation, business plan creation, and manufacturing prototypes, as well as consultancy services in the field of product design.
- Electronics Assembly, Testing and Calibration services.
- Long and short term training programmes in software for electronic design and manufacturing, etc.
- Incubation support to the trainees/budding entrepreneurs for their start-up ventures

Price

As per the study and discussions with GMs of some of the existing TCs, the proposed TC should adopt the cost plus pricing approach for its products and services during its initial years of operation and thus ensuring operating profit for sustainability. Most of the existing MSME TCs follow the cost plus pricing approach only for all of their products and services

As a differentiator from the existing MSME TCs, it is proposed that once the TC will strengthen its brand and credibility in the market it should gradually move towards market-based pricing with defined margin levels (margin based costing). Then, the TC will have to work towards optimisation of its processes and operations to sustain its margins in the competitive environment.

The above mentioned pricing models are suggestive and will depend on the detailed analysis while preparing the Go To Market Plan with the support of the CNM

Promotion

Promotion of TCs products and services is one of the most important components of the Go To Market Plan for a new set-up. Hence, below are some of the suggestive points which might be considered while making the final Go To Market Plan for the proposed Greater Noida TC.

► Increasing visibility to external audience

- Encourage and execute early communication and promotion of activities by TC which are relevant to key external audiences including industry, media, technical media etc.
- Producing a steady, reliable stream of quality outbound communications that highlights;
 - Research innovations and technology evaluations coming from the TC and its partnerships.
 - Special events and conferences hosted or supported by TC.

- Working with industry partners to identify projects for joint publicity.
- Develop Facebook/ LinkedIn/ Twitter/ YouTube presence to connect to students.
- Ensure current marketing message is being maintained with all social media platforms administered by these TC.
- ▶ **Engaging internal stakeholders**
 - Conduct media and website training on a regular basis for all interested faculty and staff.
 - Leverage active partnerships with the industry and community, inviting departmental and staff participation.
 - Ensure department faculty and staff are informed of the progress of the TC with respect to each goal.
- ▶ **Other Activities**
 - **Website:** Develop a website showcasing all highlights of the TC.
 - **TC fast facts:** Fast fact can be a two-page information sheets describing the highlights of TC. It can be made available online and increase the visibility to external audiences.
 - **TC online email newsletters:** Preparation and delivery of high-quality email newsletters from TC to industrial units, associations and other partners with the latest research announcements, news and more of engaging and interesting information to these external audiences.
 - **High quality print promotions:** High quality print promotions coordinated by TC communications, which maintains the Greater NoidaTC as a brand to be utilised in outreach efforts.
 - **Industry tie-ups:** Partner with Industries and other technical education institutes to increase the visibility of TC. Explore opportunities to participate in publications and other co-branding opportunities with these partners from time to time.
 - **Maintain consistent social media presence:** Ensuring consistent, exciting messaging is posted on active social media platforms including the TCs Facebook page, Twitter account, YouTube channel and others. Promote the presence of TC on these platforms to students, alumni and supporters while acting as a social media hub for internal departments
 - **Roadshows** to promote the TC and engage industry players

Place

Greater Noida and its neighbouring districts in NCR are all part of an ESDM hub, with several large players as well as MSMEs. An ecosystem for ESDM is already in place, with MSMEs across the value chain located around the region. Noida and Greater Noida are key locations for foreign investments in the ESDM sector. All these location advantages will be leveraged while preparing the detailed marketing plan to establish the proposed TC as one of the prominent TCs catering to the ESDM Sector.

As a part of developing the go to market plan GM would work with the CNM, during the final stages of the construction, to prepare a detailed marketing plan keeping in view the focus areas of the TC. This team, with support from CNM, would be responsible to conduct the suggestive activities as mentioned in the promotion component and lead the marketing initiative for the TC.

In view of the above broad framework the following would be undertaken for marketing of the TC during its inception to start with. It is proposed to keep aside an initial one time marketing budget for completing most of the below mentioned activities through third party vendors:

Table 23: Suggestive marketing activities, ownership and timeline

Phases	Activity	Ownership	Timeline
Preparation of promotional materials	<ul style="list-style-type: none"> Designing brochure of TC (through outsourcing) Short video film of TC infrastructure and facilities available (through outsourcing- post completion of the infrastructure/construction) Development of TC website (through outsourcing) 	Marketing team, GM and CNM	Construction and Post construction phase
Pre marketing activities	<ul style="list-style-type: none"> Preparing list of industrial association bodies in the catchment, district and state. Preparing list of industries in consultation with DIC. Shortlisting of perspective players' with respect to product range and process. Design a brief questionnaire. Preparing list of engineering colleges, ITIs, polytechnics, in the catchment area. 	CNM and GM	Construction phase
Targeting the manufacturing units	<ul style="list-style-type: none"> Send the brochure along with cover letter and short questionnaire to the shortlisted industries. Seek time from large industries and industry body associations to give presentation on the capability statement of Greater Noida TC with respect to Assembly, testing and calibration, design and consultancy services, etc. Send representatives to get the filled questionnaire or fill the questionnaire circulated earlier. 	GM, Manager Marketing, CNM and TP	During installation and commissioning of machines for manufacturing

Phases	Activity	Ownership	Timeline
	<ul style="list-style-type: none"> • Analyse the questionnaires received with respect to production, consultancy, training requirements of industries. • Meeting the key industrial units identified in the analysis to further understand their needs with respect to Assembly, testing and calibration, design and consultancy services, etc. • Organise as well as participate in industry oriented outreach programmes/ seminars/ workshops/ boot camps etc. 		
Targeting OEMS	<p>OEMs are important because they involve many industries including MSMEs in the manufacturing of a product. The TC will plan for targeting the same through the following;</p> <ul style="list-style-type: none"> • Take appointment and meet the OEMs in the region to understand their specific needs with respect to support required in the ESDM sector and training of employees etc. • Presentation on the capability statement of Greater Noida TC with respect to Assembly, testing and calibration, design and consultancy services, etc. • Get their vendor details and understand their portfolio of product requirement at various levels • Plan to Increase product portfolio to cater to the OEMs and their vendors 	GM, Manager Marketing, CNM and TP	During installation and commissioning
Targeting technical and vocational training institutes and high schools	<ul style="list-style-type: none"> • Meet the principle/ HoD of the institutes and present on the capability statement of Greater Noida TC with respect to training infrastructure, faculty, real time learning with on job learning etc. • Seeking permission and presenting the same to final and pre final year students • Getting permission to display the brochure of TC on the notice board of these institutes. 	Marketing team (GM) and CNM	During installation and commissioning of machines for training

Phases	Activity	Ownership	Timeline
	<ul style="list-style-type: none">Organise as well as participate in industry oriented outreach programmes/ seminars/ workshops/ boot camps etc.		

11. Quality system

The new TC would further aim to obtain various process certificates to enhance its competitiveness. These include:

Table 24: Indicative certifications of quality systems

Name of certification	Area	Details
ISO 9001	Quality Management System (QMS)	<ul style="list-style-type: none"> ▶ This would help to monitor, control, and improve quality of the TC ▶ It is a series of standards that define, establish, and maintain a quality assurance system for manufacturing and service industries ▶ ISO 9001 deals with the requirements that organizations wishing to meet the standard must fulfil
ISO 14000	Environmental Management System (EMS)	<ul style="list-style-type: none"> ▶ Will help to address various aspects of environmental management of the TC ▶ It provides practical tools to identify and control environmental impact and constantly improve their environmental performance ▶ EMS will equip the TC with procedures appropriate to ensure that TC operations do not lead to any significant environment impact.
ISO 29990	Learning services for non-formal education and training	<ul style="list-style-type: none"> ▶ For quality professional practice, performance and enhance transparency ▶ Allows for comparison on a worldwide basis of learning services, and management standards in the field of non-formal learning
ISO 50001	Energy management systems	<ul style="list-style-type: none"> ▶ Gives requirement for energy management systems ▶ Establishes framework for industrial plants; commercial, institutional and government facilities and entire organisations to manage energy usage
OHSAS 18001	Occupational Health and Safety standard	<ul style="list-style-type: none"> ▶ Is an internationally-applied British Standard for occupational health and safety management systems ▶ It provides for the elements of an effective safety management system which can be integrated with other management systems and help organizations achieve better occupational health and safety performance

Name of certification	Area	Details
		▶ It helps the organization to assess the potential hazards and their associated risks due the operations
ISO / IEC 17025	General requirements for the competence of testing and calibration laboratories	▶ Main ISO standard used by testing and calibration laboratories. In most major countries, ISO/IEC 17025 is the standard for which most labs must hold accreditation in order to be deemed technically competent.
IPC-A-610	Acceptability of Electronic Assemblies	▶ Used worldwide by original equipment manufacturers and EMS companies.

▶ The TC will essentially adopt the 5S technique for process improvement to clean and organise its workspace to improve the workflow. Further trainees will be trained and exposed to 5S process improvement technique. This would require the TC to do the following;

- **Sort:** To de-clutter the workspace and prioritise tools and materials used frequently, the TC will sort everything in the work area so that unnecessary items (tools, parts, equipment, storage bins, etc.) can be removed and either discarded or stored elsewhere.
- **Straighten:** This will involve creating storage solutions that would facilitate orderly work flow of everything in the TC by placing more frequently used items for quick and easy access.
- **Shine:** This will require efforts in the initial phase involving painting and installing better lighting to make the workspace clean and tidy. Further during ongoing activities at the TC, the work space and equipment will be cleaned and restored to their proper place at the end of each shift. Basic preventative maintenance tasks like tightening, oiling, restocking will also be part of this. The workstation would then be ready for the next user (or the next day) and the order created in the first two steps will be preserved.
- **Standardize:** The objective of the same would be to make everyone in the TC familiar about the current steps in order to follow and establish expectations. TC would conduct training, create documented procedures, work instructions, use visual guides, checklists, and/or photos for easy understanding of any changes made. Standardised ways will increase efficiency and be user friendly for TC employees and others.

- **Sustain:** Sustaining the processes would be important to ensure that focus doesn't drift away from 5S. TC would adopt strategies like daily meetings, mini-audit and ongoing continuous improvement efforts to sustain the 5s.

Infrastructure and Facilities



12. Infrastructure and facilities

The infrastructure of the proposed TC at Greater Noida has been developed based on the requirements, recommended norms, capacity data of the existing TCs capacity, discussions with key stakeholders and the experience of the team in providing professional advice on similar projects. The team has studied the applicable AICTE/ NCVT norms for development of infrastructure facilities for engineering and technology institutes and detailing out the infrastructure provisions for the proposed TC in view of the same. Leading practises form international training institutes have also been considered. The TC will be built on area of around 15 acres and the layout will have following blocks with required infrastructure:

- ▶ **Electronics Block:** This block will house the Prototyping, Testing and Calibration Centre and highest priority has been given to the allocation of space for installation of machines for product prototyping, assembling, and testing and calibration activities. Depending on the space required by the machines, the area for these activities should be demarcated which would also include other facilities like toilets, washrooms and change rooms, adequate space for their mobility, clean drinking water in their vicinity etc. In addition to the other facilities this block will house a 500 square feet ISO Class 7 (Class 10,000) Cleanroom for assembly of PCB and product assembly. Details on the Cleanroom classification, requirements and cleaning and maintenance procedures are provided at the end of this section.
- ▶ **Training Block:** This area will have classrooms, labs, conference hall, faculty rooms and facilities for training / seminars/ workshops etc.
- ▶ **Administrative Block:** This block will have GM and DGMS Office and secretariat. It will also house office and desk space of all management, professional staff, administrative and support staff, library and other amenities such as conference room with video conferencing facility, meeting rooms etc. This block will also house the Innovation and Design Centre which will consist of office for the innovation and design teams and conference rooms for client interactions.
- ▶ **Manufacturing Incubation Block:** This block will consist of 20 demarcated rooms of 400-600 square feet for house EMS facilities for 20 entrepreneurs. In addition the block will include office facilities, conference room with video conferencing facility, meeting rooms, reception area etc. for common use of the entrepreneurs.
- ▶ **Utilities Block:** The utilities block comprises of areas that will house main electrical meter, VCBs, HT panel, distribution panel and power back up DG plant. The utilities block will also house water pumps, purification plant and chilling plant, water treatment plant, etc. The open

areas around the building will also have some utilities provision such as rain water harvesting pits and panels for the operation of external lighting. Utility will also include sewage treatment plant at an appropriate location.

- ▶ **Hostel and staff accommodation:** The hostel blocks will comprise of accommodation for the students (separate for males and females). A few staff quarters (for driver, security officer, wardens - boys and girls hostel, maintenance -mechanical and electrical, electrician, store keeper etc.) will also be constructed to house some of the emergency staff or on need basis.
- ▶ **Open Areas:** The open areas comprise of drive way, rain water harvesting pit and landscaped areas including the facade and main entry of the TC. The size of the open area will depend on the design strategy adopted by the CMC.
- ▶ **Others:** This will include canteen, parking, security room etc.
- ▶ **Basic amenities:** Apart from the above facilities the campus will have basic amenities with provision for;
 - Drinking water
 - Toilets
 - Dining room as a hygienic area and place away from the work environment for rest breaks and the consumption of food
 - Change rooms to enable employees to change (e.g. uniforms or dirty work clothing) with privacy and security. Such facility helps to reduces employee exposure to and potential spread of contaminating substances used in work processes
 - Personal storage for the secure and clean storage of personal belongings or clothing, lockable where necessary
 - Immediate availability of doctors, health supervisors and ambulance and sufficient first aid kits
 - Fire safety with smoke alarms to protect people against death and injury from fires. Providing fire safety awareness to employees and conduct fire drill from time to time
 - Fire assembly area in case of fire or natural calamity
 - Dustbins with proper colour coding in green for organic, yellow for glass, white for paper, grey for metal, blue for plastic, red for hazardous products

Table 25: Details of proposed infrastructure

Details	Nos.	Total Area (Sq. mt.)
Production Block		4918.8
Entrance/Reception	1	50
HOD room/Senior manager room	1	33

Details	Nos.	Total Area (Sq. mt.)
Design office -2	1	124.8
Conference room	1	34.2
Design office-1	1	124.8
Seminar hall	1	250
Multi purpose room	1	60
Toilet	1	150
Electronic Assembly Unit/Clean room	2	216
Testing labs	10	540
Calibration labs	3	162
EMI Production units+office space	22	880
Server room/AHU room/Electrical room		250
EMI/EMC Room	1	219
Staircase/circulation etc		1825
Training Block		3880.91
Reception	1	40
Placement cell with VC	1	50
HOD room and training office	1	50
Counselling/placement cell	1	25
Manager room	1	24
Faculty room	1	34.65
Record room	1	22.68
Classroom	9	675
Labs	10	660
Examination cell	1	75.94
Tool store	1	21.6
Server room	1	14.04
Language lab	1	50
Electronic assembly workshop	1	108
Workshop	1	125
Drawing hall	1	175
Library	1	350
Toilet		180
Staircase/circulation etc.	1	1200
Admin Block		455
Director office with secretary	1	30
Board room	1	20

Details	Nos.	Total Area (Sq. mt.)
Purchase	1	10
Account	1	10
HR/Admin	1	10
Reception Area	1	50
IT server room	1	10
Sr. Manager	1	15
DGM	1	15
Manager	1	10
Toilet (Male and Female)	1	50
UPS/Electrical	1	10
Pantry	1	10
Examination control office	1	30
Staircase		50
Maintenance	1	10
Housekeeping	1	10
Circulation and wall		105
Admin Block		814
Entrance		10
Dining	1	350
Kitchen and its accessories	1	100
Hand wash area	1	15
Preliminary washing	1	10
Dispensary	1	10
Stationary/Printer room	1	10
Boys common room	1	100
Girls common room	1	100
Staircase		25
ATM	1	10
Circulation and wall	1	74
Other Functional Areas		225
Utilities room		200
Security room (Guard room)	2	25
Staff Quarters		580
Staff	8	580
Hostel Block		1975
Boys Hostel	1	1155

Details	Nos.	Total Area (Sq. mt.)
Girls Hostel	1	820
Total		12848.71

- **Hostel and staff accommodation:** The hostel block will comprise of accommodation for students enrolled under fulltime courses along with the hostel warden. Based on calculations, it has been estimated that around 800 trainees will be in fulltime courses at any given point of time. Further, on the basis of study conducted and discussions with heads of some of the existing MSME TCs, the provisioning of hostel facility has been done for approximately 25% of the above mentioned capacity. Therefore, it is proposed to develop the hostel capacity for around 130 trainees and out of which 25% (around 30) will be reserved for female trainees. The hostel building for boys has been planned to be G + 2 structure, and for girls G + 1 structure with provision for further vertical expansion depending on future requirements. Part of the ground floor of the hostel building will be reserved for use as hostel office, other common facilities etc. The space on rest of the floors will be developed as rooms for accommodation of students. The details of proposed hostel infrastructure have been given in the following table. Additionally, eight emergency staff quarters will also be constructed to house some of the key management officials as per requirement. Initially the staff quarters block will be a G+1 structure with a provision of further expanding it vertically depending on future requirements.

Table 26: Details of proposed infrastructure for hostel

Hostel	Category	Floors	Number of trainees	Total Area (sq. mt.)
Hostel No.1	Boys	G+2	96	1155
Hostel No.2	Boys	G+1	36	820
Total			132	1975

Note: All viable options will be studied to decide on the design of the proposed block for hostel and staff quarters.

As per the details of proposed infrastructure given in above two tables, the construction of the Greater Noida TC will include development of 12848.71 square metre of built up area in total. Per square metre cost of construction has been estimated to be INR 41,500. Further, the tentative cost for development of external infrastructure (external electrical, street lighting, external firefighting, sewerage, drainage, water supply, roads, landscaping, etc.) has been estimated to be around INR 1095 lakh. Further the development of boundary wall is estimated to cost around INR 577 lakh. The detail for development of campus infrastructures is as follows;

Table 27: Cost for development of campus infrastructures

SN	Hostel	Cost (in INR lakh)
1.	Cost of development of build-up area @ 41,500 per sq. mt. for 12,848.71 sq. mt.	5332.21
2.	External infrastructure and boundary wall	1672
3.	Total	7004.21
4.	Contingency @ 5%	350.21
5.	Grand total	7,354

Further provisioning towards establishment of other associated infrastructure will be done for the planned capacity and is listed in the following table;

Table 28: Details of other infrastructure

SN	Other Infrastructure	Nos.	Unit Cost (INR lakhs)	Total Cost (INR lakhs)
1	Office & Storage Furniture	0.5	60	30
2	Hostel Furniture	0.25	210	52.5
3	Canteen and Hostel Dining hall furniture	0.6	20	12
4	Kitchen equipment	20	2	40
5	Other Office equipment, IT infra etc	1	50	50
6	Laptop	0.6	20	12
7	Desktop	0.5	50	25
8	Photocopier cum printer	2	8	16
9	Vehicle	12.5	2	25
10	Preliminary and Pre-operative expenses	258		258
11	Others (Misc & Unforeseen)	50	1	50
12	Total			570.50
13	Contingency @ 5%			28.5
14	Grand Total			599.03

Above all, the development of campus infrastructure will be done keeping the following guidelines in mind;

- **Campus Layout/ Plan:** Campus layout is crucial for successful performance of the TC. At least 30% green area will be maintained and landscaping will be done to improve aesthetics of the surrounding while maintaining habitats conducive to natural fauna. Also, efforts will be made to conserve existing vegetation and other rich biodiversity in the premises as well as vicinity. Apart from this, there will be the following considerations while planning the campus layout:

- **Site drainage:** Existing drainage pattern of the available site will be studied and the drainage system required for the TC will be constructed in line with the drainage pattern. Storm water drain will be constructed separately so as avoid mixing of the fresh and the waste water.
- **Heat island effect:** Site will be planned properly to mitigate the heat island effect (Thermal gradient difference between developed and undeveloped areas) by following measures:
 - At least 40% of the non-roof impervious surfaces on the site (including parking lots and walkways) will be shaded
 - Pavements and walkways should be painted in light colour (solar reflectance index > 0.5)
- **Boundary:** The campus will be provided with boundary wall in all the directions to avoid encroachment, theft and safety.
- Trees will be planted in large numbers to provide natural shade in the open areas. This helps to reduce the temperature on campus in comparison to the vicinity
- Efforts will be made to utilize natural light to the maximum possible extent and provision should be made for natural ventilation
- Green building codes may be adopted while designing the building layout so as to ensure following environmental safeguards;
 - Renewable energy in terms of solar water heater, solar panels, solar street light may be used
 - LED/CFL lights will be used within the premises to reduce the energy consumption
 - Provisioning of water treatment and recycling facility to reduce water consumption
 - Water harvesting arrangement to recharge the ground water and/or reduce dependency on ground water
 - Provisioning of waste management including practices to minimize waste generation, etc.
- Criteria mentioned in the National building code will be followed so as to ensure that all the safety precaution like escape routes/emergency exits, setting of machinery providing appropriate working space, etc. is maintained
- Hazardous material like asbestos sheets should be avoided in any part of the structure
- Substitutes to natural resources will be encouraged in appropriate ratio so as to decrease natural resource consumption while maintaining the required strength (example: Fly ash may be used in small percentage instead of cement for construction, composite material may be used construction of doors instead of wood, etc.
- Provision of toilets for both men and women will be made in appropriate number so as to ensure comfortable and hygienic working conditions
- Energy efficient products like 5 star rated air conditioner, refrigerator, energy efficient motors, etc. will be used in the TC's

- ▶ **Detailed building plan preparation:** The building design is crucial for sustainable performance of the TCs. A number of factors including energy efficiency, materials of construction, natural light and ventilation, insulating, etc. must be kept in mind in order to maintain eco-friendly operations. Also, adherence to aspects related to safety like, resistant to earthquakes, proper evacuations, etc. will ensure successful operations of the TC.
- ▶ **Construction management:** Construction at the site involves a number of activities. These activities may lead to certain EHS impact on the existing natural settings and therefore, appropriate mitigation measures will be required to be put in place so as to minimize or avoid this impact. A snapshot of the issues with the basic principles to be kept in mind during construction is given in the EHS section of this DPR.

ISO 7 (Class 10,000) Clean Room requirements, cleaning and maintenance procedures

A cleanroom is a controlled environment, typically used in manufacturing processes and scientific research facilities. A cleanroom is designed to control contamination by monitoring airborne and surface particles, liquid levels, and static electricity. More accurately, a cleanroom has a controlled level of contamination that is specified by the number of particles per cubic meter at a specified particle size. The following table indicates the maximum allowed particles in a ISO 7 or Class 10,000 (as per US FED STD 209E) clean room

US FED STD 209E Class	ISO Equivalent	maximum particles/ft3				
		≥0.1 μm	≥0.2 μm	≥0.3 μm	≥0.5 μm	≥5 μm
10.000	ISO 7	350,000	75,000	30,000	10,000	70

Contamination can be caused by a number of environmental factors such as people, activities (such as movement), outside contaminants, HVAC systems and more. Therefore contamination control needs to be achieved by using the proper high-efficiency particulate air (HEPA) filtration system, installation of air shower at entry (may not be required for an ISO 7 air shower), furniture, procedures, garments, cleaning tools, wipes and more. In addition, to maintain an anti-static clean room for electronic assembly, provision for antistatic mats on the floor and working benches, Antistatic bags, antistatic component storage bin, wrist strap , static charge meter, antistatic storage rack, antistatic tools etc. needs to be made.

Some of the common do’s and don’t’s for the clean room include:

- a) Only authorized personnel will be allowed inside the cleanroom.
- b) All personnel entering the clean room should use a face mask, hair cover, gown, antistatic wrist bands and anti-static slipper.

- c) Before entering the anti-static areas personnel must use the static charge meter to ensure they are safe to enter the area.
- d) Wooden/mechanical pen/pencils, perfumes, colognes, watches, jewellery, cassette players, phones, beepers, combs, cardboard or non-cleanroom approved papers are not allowed inside a clean room
- e) The clean room workstations, floor and ceiling must be cleaned regularly using specialized equipment only
- f) The clean room should be tested on annual basis to ensure that the air quality within the clean room is being managed.

Expenditure pattern



13. Expenditure pattern

13.1 Capital expenditure

Total capital expenditure to the tune of around INR 14,543 lakhs is envisaged for the setting up of new TC at Greater Noida. Summary of the Capital Expenditure is provided as below:

Table 29: Capital expenditure

Capex	Cost (INR Lakhs)
Production Machinery and equipment (incl. contingency)	5697.62
Training machines and equipment (incl. contingency)	891.45
Infrastructure (Training and Production) (incl. contingency)	7953.45
Total Capex including contingency	14,543

Note: The final Bill of Materials and the cost estimate for construction of the TC are yet to be finalized by the CMC

The above mentioned capital expenditure includes pre-operative expenses to the tune of INR 258 lakhs will be incurred towards consultancy fees, obtaining clearances and approvals.

13.1.1 Plant and machinery

Total expenditure on machines to the tune of around INR 6,589 lakhs is envisaged for the setting up of new TC at Greater Noida.

Table 30: Plant & Machinery

Capex	INR Lakhs
Production Machinery and equipment	5426
Training machines and equipment	849
Contingency @ 5% of capex	314
Total Capex including contingency	6,589

The capital cost estimate for the proposed modernisation project has been prepared jointly by O/o DC-MSME and EY team based on inputs from the following:

- ▶ Discussions at existing technology centres such as IDEMI Mumbai and ESTC Ramnagar
- ▶ Market opportunity assessment by EY team
- ▶ Validation of technology needs by detailed discussions with EMS players such as Samsung, MKG Capital, Capital Powers, etc.
- ▶ Site visits and discussions with local industry and industry associations such as IESA, DeitY.
- ▶ Inputs from Office of DC MSME

13.1.2 Land & building cost

Greater Noida has around 15 acres of land available for setting up of the facility of the TC.

Table 31: Land & building cost

SN	Building & Other Infrastructure	Cost (in INR lakh)
1	Cost of development of build-up area @ 41,500 per sq. mt. for 12,848.71 sq. mt.	5332.21
2	External Infrastructure (External electrical, street lighting, external firefighting, sewerage, drainage, water supply, roads, landscaping, etc.)	1095
3.	Boundary wall construction	577
4.	Other Infrastructure (furniture, office, kitchen equipment, office equipment, desktops, vehicle, etc.)	570.5
5.	Total	7574.71
6.	Contingency @ 5%	378.74
Grand total		7953.45

Note: The final Bill of Materials and the cost estimate for construction of the TC are yet to be finalized by the CMC

13.2 Operating expenditure

The operating expenditure for the TC has been classified into variable operating expenditure and fixed operating expenditure.

13.2.1 Variable operating expenditure

Variable operating expenditure has two key heads. Expenditure under each head has been identified for the key income streams:

- a) **Raw materials and Consumables**
 - ▶ Raw materials for electronic assembly
 - ▶ Raw materials for 3-D prototyping
- b) **Utilities (electricity and water)**

Table 32: variable cost assumptions

Assumptions for Variable operating cost	Unit	Norms
Raw material and consumables		
RM for Electronic Assembly	% of Assembly revenue	10.0%
RM for 3-D Polymer Additive Machine	% of 3-D printing revenue	10.0%
Utilities		
Electricity and Water	% of total revenue	4.0%

13.2.2 Fixed Operating expenditure

Fixed operating expenditure has four key heads. Expenditure under each head has been identified for the key income streams:

- c) **Salary and wages/ establishment expenses**

The salary expenses include salary for employees of proposed TC at Greater Noida. There will be 60 employees on regular contract and ~ 59 will be on temporary contract/honorarium visiting.

d) Repairs and maintenance (R&M)

Cost of repair and maintenance has been calculated for

▶ **Plant and machinery installed**

R&M for plant and machinery has been taken as a percentage of plant cost in an operating year.

▶ **Buildings**

R&M for plant and machinery has been taken as a percentage of building cost in an operating year

e) Calibration Charges

All the testing and calibration equipment will need to be calibrated on a regular basis.

Calibration charges has been taken as a percentage of plant and machinery cost for the testing and calibration equipment.

f) Training expenses

Training expenses primarily comprise of expenses incurred for external faculty visiting to the TC from time to time as part of Short term and Long term trainings. These expenses typically include faculty fees, hotel and transportation.

g) Other production and administration expenses

These include expenditure on heads like transportation/entry tax/ freight, Vehicle expenses, Printing and stationery, traveling and conveyance, audit, consultancy, advertisement, publicity, marketing, telephone, internet, bank charges, miscellaneous expenses. Expenditure under each head has been identified for the key income streams- Finished goods and Training

h) Insurance of new plant and machinery

Insurance expense for new plant and machinery includes the insurance cost for the new machinery to be installed. The same has been calculated as a percentage of the gross block of new machines.

i) Marketing Expenses

Marketing expenses have been taken as fixed values for first year and second year onward

Table 33: Fixed Operating Cost assumptions

Assumptions for Fixed Operating Cost	Unit	Norms
Salaries & Wages	Detailed assumptions given in a separate table	
R&M (Plant & Mach)	% of Plant	3.5%
R&M (Building) per year	% of Building	2.0%
Calibration Charges (take as 10% of P&M cost after every 5 years)	% of P&M cost for testing and calibration equipment	2.0%
Training Expenses	% of training revenue	10%
Other Prod. & Admin. Exps	% of overall revenue	8%
Insurance cost (New P&M)	% of P&M	0.5%
Marketing expenses (1st year)	Rs. Lakhs p.a	50
Marketing expenses (2 year onward)	Rs. Lakhs p.a	25

► **Manpower and Salary Cost**

Manpower numbers have been designed in line with the expansion plan of the TC and ramp up of the production, training and consultancy.

Manpower salary numbers are in line with the salary structure of existing TCs

Table 34: Manpower and salary assumptions

Top Management													
	GM	1,53,861	1	1	1	1	1	1	1	1	1	1	1
	DGM	1,29,327						1	1	1	1	1	1
Sub Total			1	1	1	1	1	2	2	2	2	2	2
Management and Support staff													
Sales and marketing	Manager Marketing	82,777		1	1	1	1	1	1	1	1	1	1
	Officer Sales	35,744			1	1	1	1	1	1	1	1	1
Administration and accounting	Manager Admin. and Accounting	69,204	1	1	1	1	1	1	1	1	1	1	1
	Sr. Officer Admin and HR	62,371						1	1	1	1	1	1
	Sr. Officer Accounting	62,371						1	1	1	1	1	1
	Officer Procurement	35,744			1	1	1	1	1	1	1	1	1
	Officer Accounting	35,744		1	1	1	1	1	1	1	1	1	1
	Officer Store	35,744		1	1	2	2	2	2	2	2	2	2

Innovation, Design and consultancy	Senior manager	86,857		1	1	1	1	1	1	1	1	1	1
	Manager Design (Electronics)	82,777			1	1	1	1	1	1	1	1	1
	Innovation Coach	82,777		1	1	1	1	1	1	1	1	1	1
	Sr. Engg. Design (Electronics)	64,806		1	1	1	2	2	2	2	2	2	2
	Sr. Engg Design (Mechanical)	64,806			1	1	1	1	1	1	1	1	1
	Finance Guide	64,806			1	1	1	1	1	1	1	1	1
	IPR Guide	64,806			1	1	1	1	1	1	1	1	1
	Consultant	64,806			1	1	2	2	2	2	2	2	2
Production	Senior Manager Production	86,857		1	1	1	1	1	1	1	1	1	1
	Manager Assembly	82,777			1	1	1	1	1	1	1	1	1
	Manager Testing	82,777			1	1	1	1	1	1	1	1	1
	Manager Calibration	82,777			1	1	1	1	1	1	1	1	1
	Manager Planning	82,777		1	1	1	1	1	1	1	1	1	1
	Manager Maintenance	82,777		1	1	1	1	1	1	1	1	1	1
	Sr Engg. Assembly	64,806				1	1	1	1	1	1	1	1

	Sr. Engg. Testing	64,806				1	1	1	1	1	1	1	1
	Sr. Engg Calibration	64,806				1	1	1	1	1	1	1	1
	Sr. Engg. Maintenance Engineer	64,806	1	1	1	1	1	1	1	1	1	1	1
	Engineer	34,240	2	3	4	5	5	5	5	5	5	5	5
	Senior Technician	29,512	1	2	2	4	6	6	6	6	6	6	6
	Senior Technician Maintenance	29,512	1	1	1	1	1	1	1	1	1	1	1
Manufacturing Incubation Centre	Manager MIC	82,777	1	1	1	1	1	1	1	1	1	1	1
	Officer MIC	35,744		1	1	1	1	1	1	1	1	1	1
Training	Senior Manager	86,857	1	1	1	1	1	1	1	1	1	1	1
	Manager Long Term	82,777		1	1	1	1	1	1	1	1	1	1
	Manager Short Term	82,777		1	1	1	1	1	1	1	1	1	1
	Sr. Engg.	64,806	1	3	5	5	5	5	5	5	5	5	5
	Engg.	34,240	1	3	5	5	5	5	5	5	5	5	5
	Senior Technician	29,512	1	2	2	2	2	2	2	2	2	2	2
Sub Total			1	20	40	49	54	58	58	58	58	58	58

Total (Management and Support Staff)			2	21	41	50	55	60	60	60	60	60	60
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Number of Employees on Contract													
	Training	15,000		3	8	10	10	20	20	30	35	40	45
	Contractual Employees (Production)	10,000			4	10	10	10	12	12	12	12	12
	Contractual Employees (Consulting)	2,00,000			1	1	1	1	2	2	2	2	2
Sub Total			0	3	13	21	21	31	34	44	49	54	59

14. Financial analysis

14.1 Key assumptions

Project construction and commencement of operations

The project construction is expected to start in the financial year 2015-2016. It is assumed that, the construction period and installation of machines shall be completed in 15 months. Full-scale operations will commence at the end of the construction period of 15 months. The infrastructure development will coincide with the arrival of machines to be able to start the operations as planned.

Table 35: Key assumptions

Start of Project	1-Sep-16	(2016-17)
Construction period (Months)	15	
Commencement of operation, date	1-Dec-17	
Number of years, useful life of machines and equipment (as per depreciation rules)	10	
Maximum days of operation in a year	300	

14.1.1 Income assumptions

► Production

Table 36: Production Assumptions

Equipment	Estimated Machine Rate/Hour	Shift	Hours
Electronic Testing			
Safety Testing			
Temperature Recorder	150	2	16
Winding resistance meter	100	2	16
Digital storage Oscilloscope	100	2	16
High voltage probe	50	2	16
Electronic load	150	2	16
Digital multimeter	18	2	16
(Handheld/desktop)	0	2	16
Digital clamp on meter	10	2	16
Electrical Safety Tester	300	2	16
Impulse generator	400	2	16
Defibrillator Proof test set	80	2	16
Radiation meter	50	2	16

Equipment	Estimated Machine Rate/Hour	Shift	Hours
Gas detector	50	2	16
Environmental Testing			
Environmental chamber	1,000	2	16
Thermal Shock Chamber	1,750	2	16
Vibration Test system	1,000	2	16
Salt spray chamber	500	2	16
Bump/ Shock Test system	1,000	2	16
Vibration plus Environmental Chamber	1,500	2	16
Altitude Test Chamber	1,000	2	16
Fire Safety Test Equipment			
Horizontal and Vertical Flame Chamber	500	2	16
Heat deflection temperature test set	600	2	16
Needle flame test chamber	100	2	16
Tracking test apparatus	100	2	16
Glow wire Test apparatus	100	2	16
Ingress Protection Test			
Test Probe IEC 61032 - 1 set	80	2	16
Digital force Gauge	20	2	16
Dust Chamber	100	2	16
Ingress of water test system- 1 set	2,000	2	16
Other Tests	0	2	16
Microscope	30	2	16
Digital LCR meter	100	2	16
Endurance test set for switches	100	2	16
Test apparatus for devices forming a part of the MAINS plug	100	2	16
Cord anchorage test set	100	2	16
Weights	50	2	16
Creepage Gauges	10	2	16
Ball pressure test apparatus	20	2	16
Oven	50	2	16
Digital power analyzer	200	2	16
Tumbling Barrel	100	2	16
Digital pressure gauge	50	2	16
Flexing test apparatus	100	2	16
Free fall test apparatus	100	2	16
Coated PCB test apparatus	100	2	16
Isolation transformer	50	2	16
UV meter	100	2	16
Sound level Analyzer	250	2	16
Microwave radiation meter	50	2	16
XRay radiation meter	50	2	16
Illuminance meter/ Luxmeter	20	2	16

Equipment	Estimated Machine Rate/Hour	Shift	Hours
Gas pressure gauge	10	2	16
Digital Nano volt/ micro ohmmeter	200	2	16
Thermostat endurance test set	50	2	16
Temperature limiter endurance test set	50	2	16
AC DC current source	50	2	16
EMI/EMC Test Equipment			
ESD Simulator	150	2	16
Anechoic Chamber,	8,500	2	16
Radiated susceptibility and Radiated Emission test system	0	2	16
RF Shielded chamber	500	2	16
Electrical fast transient/burst simulator	400	2	16
Surge Simulator	850	2	16
Conducted RF immunity simulator	400	2	16
Power frequency magnetic field test system	300	2	16
Pulse magnetic field test system	0	2	16
Harmonics/Flicker Measurement test System	600	2	16
Line Impedance stabilizing network	120	2	16
Automotive and Power Electronics Performance Testing			
Automotive and Power Electronics Performance Testing	10,000	2	16
Electronic Calibration			
Electro-Technical Calibration			
Multifunction Calibrator	1,000	2	16
6 and Half DMM	150	2	16
4 and half DMM	20	2	16
Decade Mega Ohm Box	200	2	16
Decade Resistance Box	150	2	16
Process Calibrator	100	2	16
LCR Bridge	150	2	16
Standard Resistors	100	2	16
Sound Level Calibrator	100	2	16
Sound Level Meter	50	2	16
Tachometer Calibrator	100	2	16
Stroboscope	50	2	16
Tachometer	20	2	16
Frequency Counter	200	2	16
Time-Interval meter	50	2	16
Energymeter test System (3 position)	700	2	16
HV Divider	250	2	16
Decade Capacitance Box	150	2	16
Decade Inductor Box	150	2	16
AC/DC Current source	150	2	16

Equipment	Estimated Machine Rate/Hour	Shift	Hours
CT Analyzer	100	2	16
CT/PT Calibration System	1,000	2	16
Infrastructure			
Hydraulic Pressure comparitor (0-1000 bar)	-	-	-
Pneumatic Pressure Pump (1-20 bar)	-	-	-
Electronic Assembly Unit			
20 person Electronic Assembly Unit with Class 10,000 Clean Room	5,000	2	16
Automated PCB assembly line for SMT including line loader, soldering paste printer, pick and place machine, SMD components soldering over, THD components soldering oven, automatic optical inspection, conveyer system and line downloader	1,000	1	8
Prototyping Unit			
3D Polymer Additive Manufacturing Machine	3,000	2	16
PCB Prototyping machines including machines for Rapid PCB Prototyping , PCB pressing, galvanic plating, Solder mask & Legend printing, solder paste printing, component pick and place and reflow soldering	1,000	1	8
Design Unit			
Electronic Design Softwares	6,000	1	8

Machine utilisation	Year	
1 st year of production	2016-17	10%
2 nd year of production	2017-18	20%
3 rd year of production	2018-19	30%
4 th year of production	2019-20	40%
5 th year of production	2020-21	55%
6 th year of production	2021-22	70%

Post the 6th year, the machine utilization has been kept constant at 70%, and a year-on-year increase 5% is assumed in the production revenue owing to price inflation.

► Training revenue assumptions

No.	Trade	Course name	Duration (months)	Fee/ student (INR)	Batch size	No. of Batch/ year
1	Electronic Design and Manufacturing	Advanced course in Embedded Technology	6	1,00,000	40	2
		Basic course in Embedded Technology	3	30,000	40	4

No.	Trade	Course name	Duration (months)	Fee/ student (INR)	Batch size	No. of Batch/ year
		Electronic/PCB Design and Manufacturing	6	30,000	40	2
		PLC Based Automation Techniques	3	20,000	20	2
		Microcontroller Programming Skills	3	12,000	20	2
		Microprocessor Programming	3	10,000	20	4
		SCADA	1	6,000	20	4
		Computer Aided PCB Design and Manufacturing	12	20,000	40	4
		PCB Assembly	6	10,000	40	4
2	Hardware Repair and Maintenance	Computer Hardware, Maintenance, Installation, Networking and Multimedia	2	8,000	20	4
		Mobile/HDD Repair and Maintenance	2	12,000	40	4
		Refrigerator Repair and Maintenance	3	6,000	20	4
		Electronic Mechanic	12	12,000	20	2
		Electrician Trade Practices	12	12,000	20	2
		Auto Electrician	6	7,000	20	2
		Electronic and Instrumentation Technician	12	12,000	20	2
		SMD Work and rework and electronic repair	1	5,000	20	4
		Small Transformer and Stabilizer Manufacturing and Repair	1	5,000	20	4
		Repair and Maintenance of Telecom Equipment	1	5,000	20	4
3	Computer Hardware and Software	Advance course in Computer Software	6	30,000	30	2
		Advanced Course in Computer Hardware	6	30,000	30	2
		Advanced Computer Networking	2	7,500	30	4
		Diploma in Information Security Management	4	40,000	30	3
		Diploma in Software Programming	3	25,000	30	4
		Diploma in Oracle PL, SQL and DBA	4	30,000	30	3
		Diploma in Software Testing	3	18,000	30	4
		Core Java and Java Programming	2	5,000	30	4
		Visual Basics	2	5,000	30	4
		C	2	5,000	30	4

No.	Trade	Course name	Duration (months)	Fee/ student (INR)	Batch size	No. of Batch/ year
		C++	2	5,000	30	4
		Computer Fundamentals	2	5,000	30	4

► **Consultancy revenue assumptions**

Revenue from consultancy is expected to start in 1st year of operation when the TC is fully operational and all infrastructures are in place.

S. No.	Consulting Areas	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
				30%	30%	40%	50%	10%	10%	10%	10%	10%
1	Product Road mapping and Architecture	0	3	3.9	5.1	7.1	10.6	11.7	12.9	14.2	15.6	17.1
2	Concept Creation Support	0	15	19.5	25.4	35.5	53.2	58.6	64.4	70.9	77.9	85.7
3	Electronic and PCB Design	0	57.6	74.9	97.3	136.3	204.4	224.9	247.4	272.1	299.3	329.2
4	Process Design and Engineering	0	3	3.9	5.1	7.1	10.6	11.7	12.9	14.2	15.6	17.1
5	Value Engineering/ Cost Competitiveness	0	6	7.8	10.1	14.2	21.3	23.4	25.8	28.3	31.2	34.3
6	Development Productivity and Lean Manufacturing	0	3	3.9	5.1	7.1	10.6	11.7	12.9	14.2	15.6	17.1
7	Financial Services (Project Financial , Business Plans for funds, Book Keeping, etc)	0	9	11.7	15.2	21.3	31.9	35.1	38.6	42.5	46.8	51.4
8	End User Driven innovation and Open innovation	0	9	11.7	15.2	21.3	31.9	35.1	38.6	42.5	46.8	51.4
9	Certifications and accreditations for medical electronics (Electronic Testing and Calibration)	0	3	3.9	5.1	7.1	10.6	11.7	12.9	14.2	15.6	17.1
10	Environment Health and Safety Standards for ESDM Units	0	3	3.9	5.1	7.1	10.6	11.7	12.9	14.2	15.6	17.1
11	Market Development Support to find the vendors, customers and other enablers	0	6	7.8	10.1	14.2	21.3	23.4	25.8	28.3	31.2	34.3

14.1.2 Project cost and financing

The project construction will be undertaken in a phased manner. In the initial phase, construction of infrastructure for basic training courses is planned along with procurement of basic machines.

Table 37: Project cost and financing

Project cost and phasing		In lakhs
Particulars	2016-17	2017-18
Project Cost	1,988	12,554
Total	14,543	

The Greenfield TC project will be funded by a grant from Government of India which would be sourced through World Bank loan and equity funding from MoMSME.

14.1.3 Other Financial Assumptions

Terminal value assumptions:	
Discount rate	9.25%
Growth rate in perpetuity	5.0%
Cost of equity	9.25%

Working Capital Assumptions		
Margin Money	%	100%
Cash in Hand	Days	60
Accounts Receivables	Days	90
Suppliers Credit (A/P)	Days	30
Finished goods Storage	Days	30
Inventories (RM, Consumables)		
Finished goods	Days	90
Jobwork	Days	90
Training	Days	90

Inflation (Salary etc)	10%
------------------------	-----

Depreciation Rates				
Asset Class		WDV	SLM	Max Depn
Tangible Assets				

Plant and machinery	13.91%	10.34%	95.00%
Buildings	10.00%	3.34%	95.00%
Vehicles	15.00%	9.50%	95.00%
Furniture & fixture	10.00%	6.33%	95.00%
IT hardware & software	60.00%	16.21%	95.00%
Pre-operative expenses		20.00%	100.00%

14.2 Working capital and cash flow statement

Overall net working capital requirement for the TC is expected to grow from about INR 114 lakhs in 2017-18 to INR 841 lakhs by year 2025-26.

Figure 16: Net working capital requirement

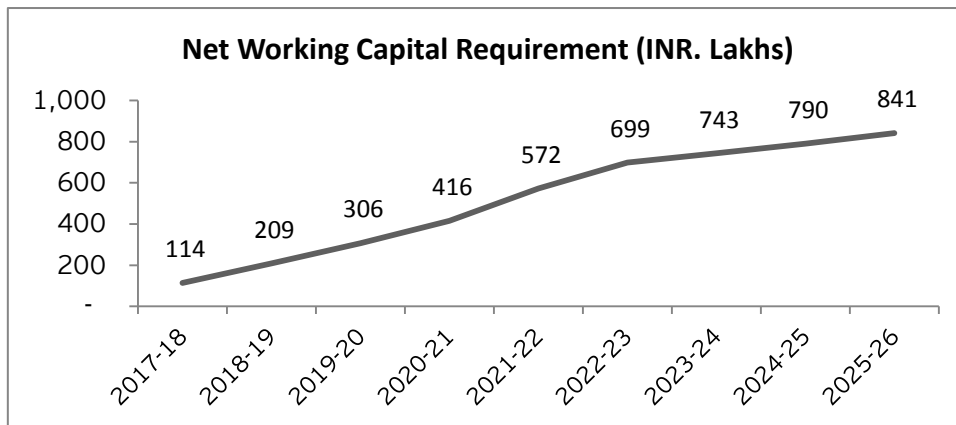


Figure 17: Cash flow closing balance

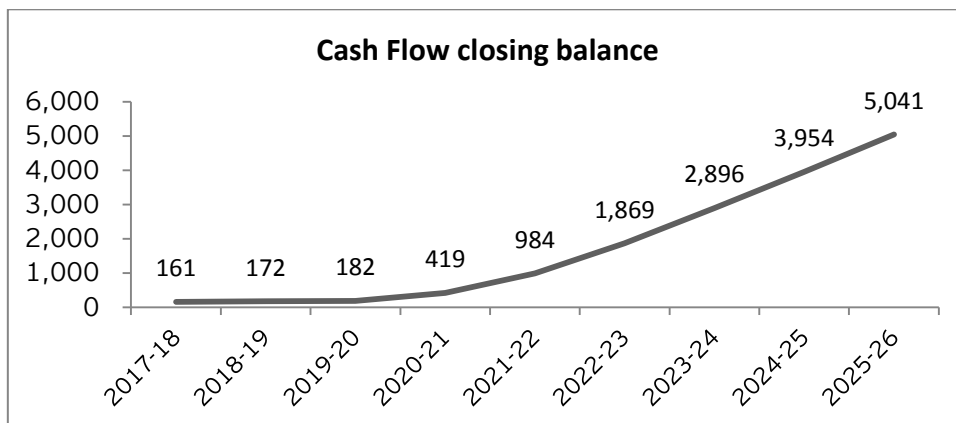


Table 38: Working Capital Schedule

Working Capital Schedule (in Rs. Lakh)												
Year	Construction Period	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	
Raw Material Storages												
Electronic Assembly and Prototyping	-	0.86	1.73	2.59	3.46	4.75	6.05	6.35	6.67	7.00	7.35	
Accounts Receivables	-	113.84	207.60	304.60	413.60	568.59	694.74	738.69	785.75	836.17	890.24	
Gross Working Capital	-	115	209	307	417	573	701	745	792	843	898	
Suppliers Credit	-	0.29	0.58	0.86	1.15	1.58	2.02	2.12	2.22	2.33	2.45	
Advance for training	-	-	-	-	-							
Net Working Capital Requirement	-	114	209	306	416	572	699	743	790	841	895	
Increase/Decrease In Net Working Capital	-	114	94	98	110	156	127	44	47	51	54	

Table 39: Cash flow statement

Cash Flow (in Rs. Lakh)												
Years	Construction Period		Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Income post Depn and interest	-27	-379	-2,108	-1,642	-1,221	-782	-277	130	290	415	526	644
Add: Depreciation		199	1,640	1,448	1,278	1,129	998	882	781	691	612	542
Inflow from Equity	1,988	12,554										
Equity to balance -ve cash flows, if any	100	250	600	300	50							
Inflow from debt												
Increase in short term debt												
Total Cash Inflow	2,062	12,624	132	105	108	347	721	1,012	1,071	1,106	1,137	1,186
Investment in Assets	1,988	12,554										
Sustenance Capex												
Pre-operative expenses												
Net Change in WC			114	94	98	110	156	127	44	47	51	54
Debt Repayment of principal												
Total Cash Outflow	1,988	12,554	114	94	98	110	156	127	44	47	51	54

Opening Balance		73	143	161	172	182	419	984	1,869	2,896	3,954	5,041
Surplus/Deficit	73	70	17	11	10	237	565	885	1,027	1,059	1,087	1,132
Closing Balance	73	143	161	172	182	419	984	1,869	2,896	3,954	5,041	6,173

14.3 Income & expenditure statement

The income to the proposed centre from training will start accruing from year 2016-17 with completion of phase 1 (basic training infrastructure and procurement of basic machines) and start of basic courses. Initially an income of INR 95 lakhs is expected in the second half of the construction period. Once the overall construction is complete, the TC revenue is expected to grow from INR 569 lakhs in Year 1 to INR 3,699 lakhs by year 10.

Income and Expenditure (Rs. Lakhs)	Construction period		Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Income												
Training Income		95	190	332	427	475	522	575	632	664	697	732
Prototyping, Assembly ,Testing and Calibration			238	486	729	973	1,337	1,702	1,787	1,877	1,970	2,069
Consultancy Income		-	118	153	199	278	417	459	505	556	611	672

Income and Expenditure (Rs. Lakhs)	Construction period		Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
	Manufacturing Incubation Centre			24	53	87	128	141	155	170	187	206
Total Income	0	95	569	1,024	1,443	1,853	2,418	2,890	3,094	3,283	3,484	3,699
Expenditure												
Variable Operating expenditure												
Raw materials and Consumables												
Electronic Assembly			3	6	9	12	16	20	21	22	23	25
3-D Prototyping			2	3	5	7	9	12	12	13	14	14
Utilities (Electricity & water)			23	41	58	74	97	116	124	131	139	148
Total Variable Operating expenditure			26	47	66	86	113	136	145	154	163	172
Fixed Operating Expenditure												
Salary & Wages/ Establishment expenses	27	208	447	581	685	749	863	978	1,092	1,219	1,360	1,496
Repairs and Maintenance												
P&M			186	186	186	186	186	186	186	186	186	186
Buildings			147	147	147	147	147	147	147	147	147	147

Income and Expenditure (Rs. Lakhs)	Construction period		Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Calibration charges for Testing and Calibration Equipment			91	91	91	91	91	91	91	91	91	91
Training Expenses		9	19	33	43	47	52	57	63	66	70	73
Other Prod. & Admin. Exps		8	46	82	115	148	193	231	248	263	279	296
Marketing expenses		50	50	25	25	25	25	25	25	25	25	25
Insurance of new machines			27	27	27	27	27	27	27	27	27	27
Fixed Operating Expenditure	27	275	1,012	1,172	1,319	1,421	1,584	1,743	1,878	2,023	2,184	2,341
Total Expenditure	27	275	1,038	1,219	1,385	1,506	1,697	1,878	2,023	2,177	2,347	2,513
Income (Gross Margin)	(27)	(180)	(468)	(195)	58	347	721	1,012	1,071	1,106	1,137	1,186
Depreciation	0	199	1640	1448	1278	1129	998	882	781	691	612	542
Total interest on debt	-	-	-	-	-	-	-	-	-	-	-	-
Interest on Working Capital	-	-	-	-	-	-	-	-	-	-	-	-
Income post Depn and interest	-27	-379	-2108	-1642	-1221	-782	-277	130	290	415	526	644
Income TAX	-	-	-	-	-	-	-	-	-	-	-	-
Income after tax	-27	-379	-2108	-1642	-1221	-782	-277	130	290	415	526	644

Note: Figures may not match due to rounding

14.4 Balance sheet

Table 40: Balance sheet

Balance Sheet (INR Lakhs)												
Years	1-Apr-15	1-Apr-16	1-Apr-17	1-Apr-18	1-Apr-19	1-Apr-20	1-Apr-21	1-Apr-22	1-Apr-23	1-Apr-24	1-Apr-25	1-Apr-26
Liabilities												
Capital fund	1,988	14,543	14,543	14,543	14,543	14,543	14,543	14,543	14,543	14,543	14,543	14,543
Capital for -ve cashflows	100	350	950	1,250	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300
Reserves & Surplus	(27)	(406)	(2,514)	(4,156)	(5,377)	(6,159)	(6,436)	(6,306)	(6,016)	(5,601)	(5,075)	(4,431)
Long Term Debt	-	-	-	-	-	-	-	-	-	-	-	-
Short Term Debt	-	-	-	-	-	-	-	-	-	-	-	-
Total	2,062	14,487	12,979	11,636	10,466	9,684	9,407	9,536	9,827	10,242	10,767	11,411
Assets												
Gross Block	1,988	14,543	14,543	14,543	14,543	14,543	14,543	14,543	14,543	14,543	14,543	14,543

Less: Depreciation	-	199	1,839	3,287	4,565	5,694	6,692	7,574	8,355	9,046	9,657	10,199
Net Block	1,988	14,344	12,703	11,256	9,978	8,849	7,851	6,968	6,188	5,497	4,885	4,343
Capital WIP												
Cash	73	143	161	172	182	419	984	1,869	2,896	3,954	5,041	6,173
Current Assets	-	-	114	209	306	416	572	699	743	790	841	895
Total	2,062	14,487	12,979	11,636	10,466	9,684	9,407	9,536	9,827	10,242	10,767	11,411

Note: Figures may not match due to rounding

During the operational period of the Greater Noida TC, the TC may utilise the accumulated depreciation towards upkeep, maintenance of existing machines or purchase of new machines to offset any impact of change in technology.

14.5 Profitability

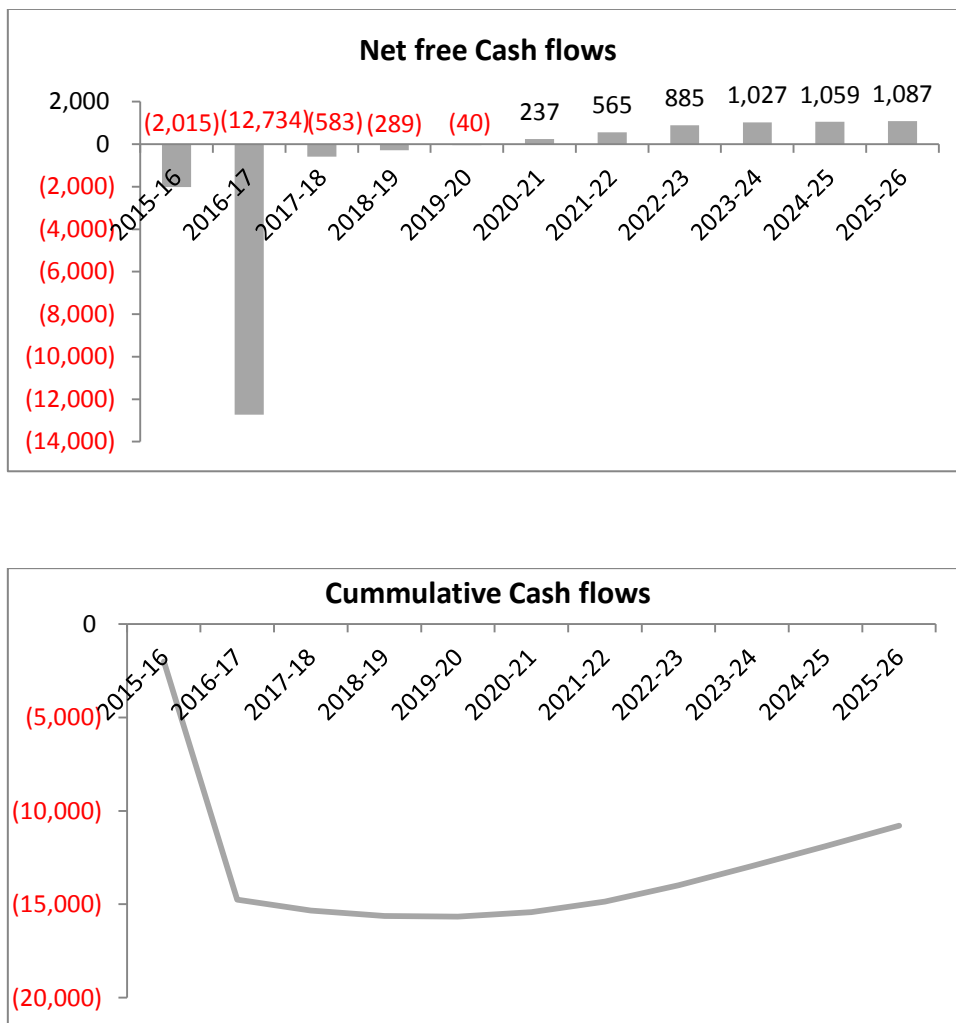
Overall project profitability has been estimated considering phased investment in plant & machinery and infrastructure. The full-fledged operations are expected to start from the year 2017-18. The project IRR for a period of 12 years till 2026-27 is 8.4%.

Table 41: Profitability with investment plant & machinery

Project IRR	8.4%
Payback period	>11 years

The project is expected to generate positive net free cash flows starting year 2018-19. However equity of about INR 1300 lakhs will have to be infused in first five years to balance the negative cash flows.

Figure 18: Net free Cash flows and Cumulative Cash flows



14.6 Sensitivity analysis

Sensitivity analysis of Project IRR has been carried out with respect to the key project parameters.

- ▶ Project cost
- ▶ Construction period
- ▶ Revenue from Training
- ▶ Revenue from Finished Goods
- ▶ Revenue from Job work
- ▶ Revenue from Consultancy

The project IRR is most sensitive to changes in Prototyping, testing and calibration, followed by changes in project cost, training revenue, and consultancy revenue.

Prototyping, Testing and Calibration form majority of revenue for the TC followed by project cost, training and consultancy. 5 percent increase/decrease in training revenue increases / decreases the project IRR by about 0.95%.

5 percent increase/decrease in project cost decreases/ increases the project IRR by about 0.52%.

5 percent increase/decrease in consulting revenue increases / decreases the project IRR by about 0.30%.

5 percent increase/decrease in training revenue increases / decreases the project IRR by about 0.28%.

Sensitivity of IRR to

		Construction period 15.00	
Increase in Project cost	-5%		9.0%
	0%		8.4%
	5%		7.9%
	10%		7.4%

		Construction period 15.00	
Increase in Training revenue	-7.5%		7.9%
	-5%		8.1%
	0%		8.4%
	5%		8.7%
	10%		9.0%

		Construction period 15.00	
Increase in Consultancy revenue	-10%		7.8%
	-5%		8.1%
	0%		8.4%
	5%		8.7%
	10%		9.0%

		Construction period 15.00	
Increase in PTC revenue	-10%		6.4%
	-5%		7.4%
	0%		8.4%
	5%		9.3%
	10%		10.2%

Environment , Health and Safety



15. Environment, health and safety

Effective management of environmental, health, and safety (EHS) issues entails the inclusion of EHS considerations at various stages of project implementation. An assessment of the proposed TC operations has been performed and presented below:

15.1 Planning and design

The TC is located in an industrial zone developed by the Greater Noida Industrial Development Authority (GNIDA). The land has been allocated to MSME by the Government and does not involve acquisition of land from private players. There is no archaeological or cultural/heritage structure in the vicinity of the site. Also, there is no biodiversity sensitive or protected area in the vicinity which is likely to be affected by the operations of the tool room.

15.2 Construction phase

The activities during the construction phase in this project have potential to cause some environment impacts if they are not managed appropriately. Major issues associated with this phase include management of debris waste, the top soil, the waste generated during the construction activities, the use and storage of diesel for the running of D.G sets, the concrete mix plant and the labor camps at the construction site.

Table 43 provides a snapshot of various expected EHS issues along with and mitigation measures.

Table 42: Activities and anticipated EHS issues during construction phase

Activity	Associated impact	Mitigation measures
Clearing of land (before initiating construction work, clearing of the mango and coconut trees shall be carried out)	Loss of green cover	<ul style="list-style-type: none"> ▶ Planning of the TC should be done in such a way so as to minimize the number of trees required to be cut at the site.
Excavation, drilling and levelling for the construction of foundation and base of building and roads	Air pollution	<ul style="list-style-type: none"> ▶ Water sprinkling at regular intervals during excavation and drilling activities should be practiced to avoid generation of dust; ▶ The excavated soil should not be stored in the direction of the wind. Also, the pile of excavated soil should be covered to avoid dust; and ▶ Construction machinery should be properly maintained to minimize exhaust emissions.

Activity	Associated impact	Mitigation measures
	Loss of Top soil	<ul style="list-style-type: none"> ▶ Effort should be made to use the overburden, especially top soil, within premises for landscaping; and ▶ During levelling, gradation across the land (If any) would be reduced to the extent possible.
	Noise pollution	<ul style="list-style-type: none"> ▶ Noise prone activities should be planned during day time and shall be avoided, to the extent possible, during night time.
	Occupational health hazards	<ul style="list-style-type: none"> ▶ Adequate personal protective equipment like safety helmets, face masks, safety shoes, safety goggles etc. should be provided for the safety of workers; ▶ The excavated area should be provided with a visible boundary (Usually created using a tape and sticks) to ensure safety at site; and ▶ Training should be imparted to workers on occupational safety and technical aspects of job undertaken by them.
	Disposal of debris and other wastes	<ul style="list-style-type: none"> ▶ The waste and debris should be disposed of at an identified place preferably wasteland and appropriate approval should be taken for the same from land owner or revenue authorities; and ▶ The disposal site would be at least 1000 meters away from the areas including notified forest land, water bodies and productive lands.
Establishing labour camp (The labour camps at the project site will be temporary in nature)	Health Risks	<ul style="list-style-type: none"> ▶ Contractor should provide garbage bins to all workers' accommodation for dumping wastes regularly in a hygienic manner in the area; ▶ Awareness program shall be undertaken for the construction workers to make them aware about diseases including AIDS; ▶ Adequate drinking water facilities should be provided in the temporary sheds of the construction workers; ▶ First aid box would be provided at every construction campsite and under the charge of a qualified person to provide first aid. Availability of such person should

Activity	Associated impact	Mitigation measures
		<p>be ensured at all time. The first aid box would contain the following in case of less than 50 workers at the site;</p> <ul style="list-style-type: none"> i) Twelve small sterilized dressings ii) Six medium size sterilized dressings iii) Six large size sterilized dressings iv) Six large size sterilized burn dressings v) Six (1/2 oz.) packets sterilized cotton wool vi) One (2 oz.) bottle containing a 2 per cent alcoholic solution of iodine vii) One (2 oz.) bottle containing sal-volatile having the dose and mode of administration indicated on the label viii) One roll of adhesive plaster ix) One snake-bite lancet x) One (1 oz) bottle of potassium permanganate crystals xi) One pair of scissors xii) One copy of the first-aid leaflet approved by the Chief Inspector of Factories
	Water pollution and/or land contamination	<ul style="list-style-type: none"> ▶ Provision of separate mobile toilet facilities for men and women should be made. The effluent from the toilets should be disposed in soak pits.
Movement of vehicles (Vehicle movement shall prevail at the site to transfer the material and workers at site. Apart from this, third party vehicles delivering the material and equipment shall also be there.)	Air pollution	<ul style="list-style-type: none"> ▶ All the vehicles entering the site should be asked to have updated PUC (Pollution under control) certificate; ▶ Trucks/dumpers will be covered by tarpaulin sheets during off site transportation of friable construction materials and spoil; ▶ Maintenance of vehicles will be carried out regularly; and ▶ Sprinkling of water will be practiced at the site.
	Water contamination	<ul style="list-style-type: none"> ▶ Proper maintenance of vehicle will be carried out to avoid any leakage of oil or grease.

Activity	Associated impact	Mitigation measures
	and / or Soil contamination	
	Safety risks	<ul style="list-style-type: none"> ▶ Vehicle speed will be restricted to 15km/hour at site; and ▶ Necessary safety trainings will be provided to the drivers.
Use of D.G set (D.G sets shall be used at site to provide electricity to labour camps and construction activity)	Air pollution	<ul style="list-style-type: none"> ▶ D.G should be optimally used with proper orientation and adequate stack height; and ▶ Proper maintenance of the DG should be carried out on regular basis.
	Noise pollution	<ul style="list-style-type: none"> ▶ Acoustic enclosures should be provided with the D.G sets to minimize the noise levels.
Storage of diesel	Soil contamination	<ul style="list-style-type: none"> ▶ A covered area should be defined for storage of HSD with concrete flooring.
	Safety risks	<ul style="list-style-type: none"> ▶ The diesel storage area should not be in proximity of the labour camps; and ▶ Inflammable substance should not be allowed at the project site
Handling of waste (During construction phase there may be generation of both hazardous and non-hazardous waste which needs to be carefully handled to ensure environment safeguard)	Land contamination and Water contamination	<ul style="list-style-type: none"> ▶ Waste will be stored at designated place after segregation on the basis of category (hazardous and non-hazardous); ▶ Hazardous waste should be disposed of to the authorized vendors only; and ▶ A waste management plan should be chalked out to properly dispose the debris generated from the site
	Safety risks	<ul style="list-style-type: none"> ▶ Adequate PPE's should be identified and provided to the workers at site.
Installation and operation of concrete mix plants and batching plants (In case, these are installed on temporary basis at the project site)	Noise pollution	<ul style="list-style-type: none"> ▶ Noise shielding will be used where practicable and fixed noise sources will be acoustically treated for example with silencers, acoustic louvers and enclosures; and ▶ Provision of make shift noise barriers near high noise generating equipment will be made to minimize horizontal propagation of noise in case of residential area in the vicinity

Activity	Associated impact	Mitigation measures
Construction labour management	Child labour and forced labour	<ul style="list-style-type: none"> ▶ Provision of clause in contractor's agreement will be made that bans child labour and forced labour at project site; ▶ Adequate procedures to avoid or prevent hiring/entry of child labour at the project site will be undertaken; and ▶ Random check will be undertaken at the site to confirm the enforcement.
	Health and safety risks for children of workers	<ul style="list-style-type: none"> ▶ Temporary crèche facility will be provided in case of migrant labourers children residing in the camps to ensure safety.
	Loss of green cover	<ul style="list-style-type: none"> ▶ Fuel will be made available to construction workers for food preparation; and ▶ Construction workers will be warned not to cut and use the trees available on the project site as fuel wood. Random checks will also be done to ensure same.

15.3 Operation and maintenance

The operations at TC will involve assembly of PCB units and testing and calibration of the electronic equipment apart from imparting training. Some potential EHS issues that may be related to these activities are as follows:

15.3.1 Operation of the TC

a) Assembly of PCBs

Table 43: Potential hazards during assembly of PCBs

Activity	Associated impact	Mitigation measures
Handling of raw material	Cut injury	<ul style="list-style-type: none"> ▶ Gloves should be provided to workers handling the raw material.
Soldering	Health hazard	<ul style="list-style-type: none"> ▶ Lead free soldering paste shall be used in the process;

Activity	Associated impact	Mitigation measures
		<ul style="list-style-type: none"> ▶ Appropriate fume extracting equipment shall be installed in the TC where soldering operations are undertaken; and ▶ Appropriate gloves shall be provided to the operators.
Use of solvents for cleaning	Land contamination	<ul style="list-style-type: none"> ▶ Solvents should be kept in small quantities at the workstation; and ▶ Permission for solvent storage and quantity should be taken where required by law.
	Air pollution	<ul style="list-style-type: none"> ▶ Fumes extraction shall be installed in the TC where solvents will be used
	Contact with eye	<ul style="list-style-type: none"> ▶ Eye wash shall be installed in the TC so as to enable eye wash in case of contact with solvent ▶ Eye goggles may be provided to employees and trainees in case there is a risk of splashing of solvent.
	Skin reaction with solvent	<ul style="list-style-type: none"> ▶ Appropriate gloves must be provided to the operators and trainees handling the solvent
Disposal of rejected PCBs	Land contamination / water pollution	<ul style="list-style-type: none"> ▶ All the electronic waste including rejected PCBs shall be collected and stored in an appropriate place and disposed to an authorised e-waste recycler and appropriate records shall be maintained for the same ▶ Approval for storage and transport of hazardous waste storage should be obtained, if required.
Use of UPS	Land contamination due to leakage of battery	<ul style="list-style-type: none"> ▶ Dry batteries shall be used in the UPS room.
Use of D.G sets	Noise pollution	<ul style="list-style-type: none"> ▶ D.G sets with acoustic enclosures shall be purchased to avoid noise pollution.
	Land contamination	<ul style="list-style-type: none"> ▶ Concrete flooring shall be provided under around the DG and diesel storing area; ▶ Diesel day tanks shall be provided with secondary containment to avoid any accidental oil spills; and ▶ Diesel should be poured in D.G set using funnel to avoid land contamination due to oil spillage
	Air pollution	<ul style="list-style-type: none"> ▶ Chimney with appropriate height shall be provided to minimize air pollution and ensure compliance with the legislation

Activity	Associated impact	Mitigation measures
	Water contamination due to leakage and/or spill over	<ul style="list-style-type: none"> ▶ All the waste shall be stored under a closed shed with impermeable flooring so as to avoid contamination and washing away of waste in nearby water stream or ground water in case of rain
Generation of domestic effluent	Land contamination	<ul style="list-style-type: none"> ▶ Sewage treatment plant will be installed in the TC to treat the domestic effluent released from the hostel and the toilets in the TC.
Canteen operations	Fire incident	<ul style="list-style-type: none"> ▶ Fire extinguishers should be provided in the canteen; ▶ Cylinders should be regularly checked for leakage; and ▶ Hose pipes should be regularly replaced to avoid any incident of leakage.
	Land contamination to due food waste	<ul style="list-style-type: none"> ▶ Efforts should be made to reduce food waste; and ▶ Option of converting food waste into compost shall be explored.

b) Testing and calibration activities:

Testing and calibration will involve a range of activities. The following section provides some expected activities during testing and its mitigation.

During the testing and calibration e-waste will be generated that should be disposed to an authorised e-waste recycler.

Rotation policy shall be adopted for employees who are engaged on the testing process to mitigate/minimise fatigue and ergonomic issues.

If radioactive testing is being used for the components following precautions shall be taken to ensure that there is not radioactive pollution and the employees and trainees in the TC are not exposed to the same:

- ▶ Only authorised personal should be allowed to operate the machine;
- ▶ Proper protective suite should be worn while operating the machine;
- ▶ In no circumstance the check door should be opened while the machine is operating;
- ▶ Training shall be imparted to all the employees and trainees on the measures to be adopted in case of a radioactive leakage or incident

15.3.2 Maintenance of the TC

Some of the environment aspects and health and safety hazards which may commonly arise during TC maintenance and due to negligence towards appropriate maintenance work in a TC, are highlighted as follows:

Table 44: Potential hazards during O & M phase

Potential impact	Recommendation for mitigation
Deterioration of the structure over the period of time	<ul style="list-style-type: none"> ▶ A structural stability certificate would be taken from a chartered engineer every 5 years; ▶ Approvals would be taken for any change in the layout of the TC from the factory inspector; and ▶ Regular maintenance and repair work shall be undertaken throughout the TC over the period of time.
Fire risk	<ul style="list-style-type: none"> ▶ Fire extinguishers shall be placed throughout the TC; ▶ Fire extinguishers will be checked for pressure on a regular basis; and ▶ Electrical wiring in the premises would be regularly checked and repair should be undertaken wherever required.

The protection of public health, safety and general welfare will also be ensured through adherence to the building codes since these are related to the construction and occupancy of buildings and structures.

15.4 Basic requirements for EHS management

The following section outlines the details of the essential measures to be undertaken for sound EHS management within the TC;

- ▶ Storm water management;
- ▶ Fire risk management;
- ▶ Rain water harvesting, if practical;
- ▶ Sewage treatment;
- ▶ Ventilation system; and
- ▶ Monitoring of EHS performance.

15.4.1 Storm Water Management

Storm water includes any surface runoff and flows resulting from precipitation, drainage or other sources. Typically, storm water runoff contains suspended sediments, metals,

petroleum hydrocarbons, Polycyclic Aromatic Hydrocarbons (PAHs), coliform, etc. Rapid runoff, even of uncontaminated storm water, also degrades the quality of the receiving water by eroding streambeds and banks. In order to reduce the need for storm water treatment, the following principles would be applied:

- Storm water would be separated from process and sanitary wastewater streams in order to reduce the volume of wastewater to be treated prior to discharge;
- Surface runoff from process areas or potential sources of contamination should be prevented;
- Where this approach is not practical, runoff from process and storage areas would be segregated from potentially less contaminated runoff;
- Runoff from areas without potential sources of contamination would be minimized (e.g. by minimizing the area of impermeable surfaces) and the peak discharge rate would be reduced (e.g. by using vegetated swales and retention ponds);
- Where storm water treatment is deemed necessary to protect the quality of receiving water bodies, priority would be given to manage and treat the first flush of storm water runoff where the majority of potential contaminants tend to be present;
- When water quality criteria allows, storm water would be managed as a resource, either for groundwater recharge or for meeting water needs at the facility;
- Oil water separators and grease traps would be installed and maintained as appropriate at refuelling facilities, workshops, parking areas, fuel storage and containment areas; and
- Sludge from storm water catchments or collection and treatment systems will contain elevated levels of pollutants and would be disposed in compliance with local regulatory requirements, in the absence of which disposal has to be consistent with protection of public health and safety, and conservation and long term sustainability of water and land resources.

15.4.2 Fire risk management

a) Fire alarm system

- ▶ Automatic Fire alarm system will be provided in all buildings of the campus excluding student hostels and emergency staff quarters;
- ▶ The system will have appropriate provisioning of smoke detectors and beam detectors with respect to the sensitivity and probability of fire;
- ▶ Fire alarm panels will be provided at appropriate locations with easy and convenient accessibility for manual activation of alarm in case failure of automatic system;

- ▶ A control panel will be provided at control station with a repeater panel in security cabin to activate, deactivate and reset the fire alarm system;
- ▶ The instrumentation, panels, sensors and equipment used will be of certified make confirming to relevant standards; and
- ▶ Smoke detectors and beam detectors will be installed above and below false ceiling as applicable.

b) Firefighting system - overview

- ▶ Mapping of potential fire risk shall be done across TC and fire extinguishers (CO₂ and powder based) should be placed in relevant areas;and
- ▶ Maintenance of fire extinguishers shall be undertaken on regularly, as required.

15.4.3 Rain water harvesting

- ▶ The campus will be divided into 4 or 5 areas and the storm water from the roof top of each building in each area will be collected in the specified area;
- ▶ The storm water outlets on building roofs will be checked for adequacy with respect to size considering maximum rainfall intensity in past 100 years;
- ▶ Additional outlets will be provided to the building roof, in case the existing outlets are found to be insufficient;
- ▶ The outlets will be provided with vertical down take pipes, which will be connected to the existing underground storm water lines through nearby chambers;
- ▶ Suitable locations for ground water recharge pit will be identified in each area as mentioned above;.
- ▶ Considering geology, ground water tables, applicable rules and regulations and available space, ground water recharge pits with bore holes and pipes will be designed with adequate capacity;
- ▶ The ground water recharge pits will be connected to the storm water line through nearest chamber to fetch storm water (collected on roof) to the pit;
- ▶ Overflow will be provided to the ground water recharge pit at suitable level, to take off excess water back to the storm water network and discharge off;
- ▶ The ground water recharge pits will be protected with fence around to prevent ingress of people, animals etc; and
- ▶ Suitable provision will be made to cut off and on the flow to the ground water recharge pits.

15.4.4 Sewage treatment plant

- ▶ Sewage Treatment plant with integral effluent treatment will be provided for primary and secondary treatment; and

- ▶ The treated effluent will be used for gardening and/or recycled for use in toilets to the extent possible.

15.4.5 Ventilation system

a) Internal buildings

- ▶ The TC premises will have provision for sufficient ventilation. This will be done keeping in view the amount of space in the TC, number of people expected to occupy the space, type and amount of machines/equipment, and overall size of the space. The designing will be done keeping in view proper distribution of air for ventilation throughout all occupied spaces across the TC;
- ▶ Natural ventilation - The premises will have adequate openings, such as doors, windows and/or vent opening to clean environment. Roof vents would be placed wherever applicable to reduce the reliance on air conditioning systems; and
- ▶ Air input, smoke exhaust will also be installed and maintained for proper ventilation.

b) **Manufacturing/ Production area:** The production area will be provided with central air conditioning.

c) UPS room

- ▶ Appropriately designed ventilation system will be provided to the UPS room;
- ▶ The ventilation system will mainly comprise of air conditioning units providing cold air at lower temperature and exhaust system taking out hot air coming out of the UPS; and
- ▶ The system will be designed to maintain adequate temperature around the UPS equipment as per manufacturer's requirements/ specifications.

15.4.6 Monitoring

EHS monitoring programs would be undertaken to verify the effectiveness of prevention and control strategies. The selected indicators should be representative of the most significant EHS aspects, and the implementation of prevention and control strategies. The monitoring program would include;

- ▶ EHS inspection/Audits;
- ▶ Calibration of the equipment;
- ▶ Surveillance of the working environment; and
- ▶ Surveillance of workers health.

16. Key risks and mitigation

The key risks associated with implementation of the project along with possible mitigation measures are summarized in this section. It must be noted that risks universe is dynamic and is likely to change periodically. It is recommended that frequent analysis is carried out and mitigation plans are drawn. Below are risks that may impact this project;

Table 45: Risk & mitigation

Key broad area	Risk	Mitigation	Impact on		
			Cost	Time	Resources
Project Planning	Risk of inadequate planning of time, effort and resources required to complete the project	<ul style="list-style-type: none"> ▶ Adequate time and cost buffer to be kept to deal with contingencies. ▶ Appointment of CMC for detail design and project management during construction of the TC 	✓	✓	✓
Approvals and Clearances	Risk of delay in clearances from local authorities like <ul style="list-style-type: none"> ▶ Plan Sanction - Town Planning Authority/ Local Body ▶ Commencement Certificate - Town Planning Authority/ Local Body ▶ Fire NOC - Provisional and Occupancy - Local Fire Authority 	<ul style="list-style-type: none"> ▶ Appointment of PMC firm. ▶ Timely application of approvals for relevant authorities by CMC ▶ Monitoring of status of Approvals. 		✓	

Key broad area	Risk	Mitigation	Impact on		
			Cost	Time	Resources
	<ul style="list-style-type: none"> ▶ Plinth Checking Certificate - Town Planning Authority/ Local Body ▶ Building Completion Certificate - Town Planning Authority/ Local Body ▶ Consent to Establish and Operate - Pollution Control Board ▶ MAP Approval and Factory License - Directorate of Industrial Health and Safety ▶ Labour License - Labour Commissioner ▶ Fuel Storage - Chief Controller of Explosives ▶ Tools, Tackles, Pressure Vessels, Hoists - Competent Engineer ▶ Electrical Systems - Electrical Inspector 				
Environmental risk	Loss of top soil	<ul style="list-style-type: none"> ▶ Top soil excavated from the site should be carefully handled. It should be collected separately and stored as a heap which is appropriately covered. The heap should not be put in the direction of wind to avoid dust generation 	✓		✓

Key broad area	Risk	Mitigation	Impact on		
			Cost	Time	Resources
		<ul style="list-style-type: none"> ▶ Maximum effort should be made to utilize the top soil for landscaping within the site 			
	Air pollution due to digging and levelling activities	<ul style="list-style-type: none"> ▶ Water sprinkling shall be practiced ▶ Construction machinery shall be properly maintained to minimize exhaust emissions of CO, SPM and Hydrocarbons ▶ These activities shall be avoided in very high wind and cover should be provided for loose construction material 	✓		✓
	Water contamination and health risks associated with setting labour camp for construction	<ul style="list-style-type: none"> ▶ Toilet shall be earmarked for both men and women contractual workers ▶ Adequate drinking facilities shall be provided at the construction site; ▶ Temporary crèche facility may be provided in case of migrant labourers children residing in the camps to ensure safety 	✓		✓
	Land and water contamination due to waste generated at site	<ul style="list-style-type: none"> ▶ Waste shall be stored at designated place after segregation on the basis of category (hazardous and non-hazardous) ▶ Hazardous waste shall be disposed of to the authorized vendors only 	✓		✓

Key broad area	Risk	Mitigation	Impact on		
			Cost	Time	Resources
	Air pollution due to use of D.G set.	<ul style="list-style-type: none"> ▶ D.G set to be optimally used with proper orientation and adequate stack height ▶ Stack monitoring carried out on regular basis ▶ Proper maintenance of the DG Set should be carried out on regular basis ▶ Acoustic enclosures are to be provided with the D.G sets to minimize the noise levels 			
Construction	Delay in construction due to cost overrun, management of building contractors.	<ul style="list-style-type: none"> ▶ Appoint a PMC for a design and build contract for managing construction. ▶ Strict timeline will be made and agreed with PMC. ▶ Regular M&E, Built in mechanism for penalty for delays and incentive for timely completion, ensuring timely payment based on milestones. 	✓	✓	
Deviation in project scope	Change in project scope <ul style="list-style-type: none"> ▶ initiated by MoMSME, ▶ Machinery supplier constraints ▶ Product discontinuation 	<ul style="list-style-type: none"> ▶ Clear buy in on project plan and execution planning. ▶ Identification of Machinery suppliers based on the top current suppliers and technology available. 	✓	✓	✓

Key broad area	Risk	Mitigation	Impact on		
			Cost	Time	Resources
Maintaining World Class Construction quality	Construction quality may not be up to the mark.	<ul style="list-style-type: none"> ▶ Appointment of third party Government quality assurance agency. 			
On-boarding of Key players	Delay in on boarding of key project stakeholders <ul style="list-style-type: none"> • Technology Partner • Construction Network Manager • Construction Management Consultant Quality Assurance 	<ul style="list-style-type: none"> ▶ Clearly defined scope and incentives for stakeholders. ▶ Timely contracts with the project stakeholders. 		✓	✓
Procurement of machinery	Delay in procurement of machines and goods due to high Lead time and time taken for clearances	<ul style="list-style-type: none"> ▶ Machines and equipment chosen should be standard and popular models available in market. Early release of order confirmation and advance if any. ▶ Appointment of efficient and pre-approved Clearing & Handling Agency (CHA) to ensure timely clearances and transportation of machines. 		✓	
	Variation in Equipment required and finally procured. Too stringent specs may lead to high price and low competition, loose specs may lead to low price but low quality	<ul style="list-style-type: none"> ▶ Neutral specifications to be drafted based on thorough research on TC requirements and current models available. 	✓	✓	

Key broad area	Risk	Mitigation	Impact on		
			Cost	Time	Resources
Trained resource availability	Availability of trained manpower for operation of new machines	▶ Machine specific training programmes to be conducted for training of key personnel and knowledge sharing.			✓
Market	<ul style="list-style-type: none"> ▶ Change in product mix ▶ Change in customer mix ▶ Change in technology ▶ Change in product pricing ▶ Competition from Govt./Public tool rooms ▶ Lack of cluster development in the target region 	<ul style="list-style-type: none"> ▶ Expansion of product base. ▶ Increase in customer base. ▶ Develop a backup plan for retiring of obsolete machines. 			
Policy	Change in Government Policy/ Schemes for <ul style="list-style-type: none"> ▶ Training ▶ key sectors E.g. Change in Government space programme, increase in imports may affect orders from major clients	<ul style="list-style-type: none"> ▶ Increase existing customer base. ▶ Diversify into new sectors. 	✓		✓
Taxation	Change in service tax policy on training may adversely affect training revenue	▶ Institute should keep abreast with policy changes and the same should be considered while designing the course and fee structure.			
Human resource	▶ Labour availability	▶ Planning for holidays and lean periods.	✓		✓

Key broad area	Risk	Mitigation	Impact on		
			Cost	Time	Resources
	▶ Retention of key employees (Flight of key talented people can make it difficult to achieve centre's growth plans)	▶ Good incentive scheme and career development plans.			
Management risk	Lack of capable management to run the TC	▶ Leadership training. ▶ Succession planning.			✓
Maintenance risk/ spares - Availability of spares & services	Delay in availability of spares and service support at a reasonable cost	▶ Procure models that are likely to continue for at least next 5 yrs. to ensure better availability of spares and services.	✓		
Performance of key stakeholders	Poor performance of Outsourced agencies like TP, CNM and PMC	▶ Establishment of KPIs ▶ Periodic review of performance. Suitable penalty clauses to be added in the ToRs.			✓
Weather	Delay in construction due to monsoon season	▶ Planning for lean periods and periods of low construction activity.	✓	✓	

17. Conclusion

The TC at Greater Noida is proposed to be an ESDM focused TC with an emphasis on automotive and power electronics. Assembly, prototyping, testing, and calibration of electronics; Consultancy services for product design and development, manufacturing, and innovations in process and productivity; Manufacturing incubation services; and training would be the prominent activities to be undertaken by the TC. This also includes support to MSME clusters in technology and engineering solutions, for improvement of their quality systems and productivity, and for patent registration and harnessing. The TC will make a concerted effort in reaching out to MSMEs for these works

TC will contribute towards skilling youth to make them employable in industry by designing courses relevant to them. The focus areas for the proposed TC are in line with objectives of the program. This will be further be complemented by the proposed innovative ideas for the TC like;

- ▶ The new TC will take steps to form consortium with MSMEs including TRs to jointly cater to the focus sectors. Once formed, the TC would further formalise and institutionalise the consortium. The TC should provide handholding/ support and special machining & testing facility to members of this consortium and prepare a road map for the next 3-5 years to ensure that these MSME can develop the required expertise and become more competitive
- ▶ Manufacturing Incubation Centre: A MIC is proposed at the Greater Noida TC will the basic shell infrastructure and world class manufacturing plant and machinery on rental basis for a 2 year period (as part of Phase 2). This MIC is expected to fuel the growth of enterprises which have successfully crossed the stage of pilot order and are ready to execute larger orders. The MIC would provide shell infrastructure, support business facilities, provide IT support, provide electricity and power connection, and assist with registration and clearances for setting up a manufacturing unit. In addition to this, the MIC would help entrepreneurs to connect with suppliers and skilled workers.
- ▶ The TC will form an Entrepreneur Club. By joining this club, entrepreneurs would receive all services of the TC including concept creation support, product design, intellectual property services, consultancy services, prototyping, assembly testing, calibration, access to Manufacturing Incubation Centre at a subsidized rate. The TC would facilitate access of entrepreneur club members to service providers who can help in creation of start-up. e.g. Chartered accountants, Banks, Intellectual property office, etc. The TC would organize workshops and group discussions for entrepreneurs with key experts to help and guide members with their ideas

All these initiatives of the TC would not only strengthen the expertise of MSMEs in manufacturing but also help to develop a sustainable ecosystem for MSMEs in the region in the long run. On the same

line, even investments have been proposed keeping the focus area and adherence to EHS guidelines in mind.

Above all, TCSP program will enable TC to showcase the best practices not only in the adoption of new technologies and skilling the youth but also managing all the associated environmental and social aspects.

18. Annexure

18.1 Key questions asked primary survey

ESDM: Market Need Assessment Survey

Organization Name				CEO/MD/Owner name	
Person Filling form				Location:	
Email ID				Phone Numbers	
Range of Turnover	Less than 25 Cr	25 -50 Cr	50-150 Crore	Above 150 Cr	
Number of Employee	Less than 25	25 - 100	100-250	Above 250	
% of Employee (Tech Skill wise)	Unskilled []	Skilled (ITI+)[]	Graduate[]	P.G. []	

1. Which segment of Electronic industry your firm belongs to?

- | | | | |
|---|--------------------------|---|--------------------------|
| (a) Consumer Electronics | <input type="checkbox"/> | (b) Medical Electronics | <input type="checkbox"/> |
| (c) Semiconductor design service | <input type="checkbox"/> | (d) Electromechanical Electronics | <input type="checkbox"/> |
| (e) Embedded systems | <input type="checkbox"/> | (f) Strategic (Defence & Aero) Electronics | <input type="checkbox"/> |
| (g) Industrial Electronics | <input type="checkbox"/> | (h) Power Electronics | <input type="checkbox"/> |
| (i) Automotive Electronics | <input type="checkbox"/> | (j) Light Emitting Diodes | <input type="checkbox"/> |
| (k) Renewable (Solar/Wind) Electronics | <input type="checkbox"/> | (l) Electronics Components (PCB, etc.) | <input type="checkbox"/> |
| (m) Telecom Electronics | <input type="checkbox"/> | (n) Electronics Manufacturing Systems | <input type="checkbox"/> |
| (o) Other Please specify..... | | | |

2. Please tick the activity (s) of your firm:

(a)	Raw Material Supplier	
(b)	Basic Component Manufacturing	
(c)	Component Assembly	
(d)	System / Subsystem Assembly	
(d)	Electronics Manufacturing Design Services	
(e)	Semi-Conductor design services	
(f)	Electronics Component / Product Sourcing	
(g)	Testing, Calibration, and Quality Assurance	
(h)	Packaging	
(i)	Warehousing & Logistics	
(j)	Any other	

3. Please list top three types of products from your firm. If required please expand the list.

1.

4.

- 2.
- 3.

- 5.
- 6.

4. If diversification is planned in your firm, what will be the new products produced/services?

- 1.
- 2.
- 3.

- 4.
- 5.
- 6.

5. If expansion is planned by your firm which will the capabilities/resources required additionally?

- 1.
- 2.
- 3.

6. Which are major raw materials for your firm? If needed extra space please use additional pages.

S.N.	Raw Material	Imported (%)

7. Manpower requirement of your firm :

S. No	Option	Area 1	Area 2	Area 3
(a)	Skilled Workers			
(b)	Engineers & Technicians			
(c)	Managerial			
(d)	Unskilled/Others			

Area e.g. Assembly, Testing, Soldering, printing, etc.

7. What are the top three manufacturing process trends in your sector?

- 1.
- 2.
- 3.

8. Which are the top three requirements of your firm with respect to improvement in Manufacturing Technology that will improve firm's competitiveness? If needed extra space please use additional pages.

- 1.
- 2.
- 3.

9. Which are the top requirements your organization needs with respect to common facilities?

S.N.	Focus	Requirement 1	Requirement 2
(a)	Common Hi-Tech Production Machinery		
(b)	Research & Development Centre		
(c)	Testing Labs		
(d)	Integrated Logistic system		
(e)	Training Centre		
(f)	E-waste management		
(g)	Any other (Please suggest)		

If required please provide additional details in the last page.

10. What are the top skill gaps or areas of skill upgrade you have identified in the workforce that is holding you from being more competitive in the market?

1. Un-skilled workers
2. Skilled Workers
3. Engineers & Technicians
4. Managerial

11. Name three requirements you would like access to that will help in improving Quality of your output?

- 1.
- 2.
- 3.

12. What are the top three challenges you face in catering to the needs of international customers?

- 1.
- 2.
- 3.

13. What are the top three areas of improvement for you suppliers that will help the quality of your output?

- 1.
- 2.
- 3.

14. What are the top three priorities you need assistance in the product development to grow your market?

- 1.
- 2.
- 3.

15. Please list name of technical institutes from where you have been taking technical support / guidance?

- 1.
- 2.
- 3.

16. Please list the sources from where you have been hiring the work force?

- 1.
- 2.
- 3.

17. Please list the industry association / chambers you are part of and for which purpose?

- 1.
- 2.
- 3.

18. Please list the conferences / workshops / seminars where your firm is regular participant?

- 1.
- 2.
- 3.

19. Please suggest ideas or actions which can expand the ESDM sector rapidly?

- 1.
- 2.
- 3.

20. In which of the areas have you taken the support of MSME Technology Centre (Please tick all services used)?

- | | |
|-------------------------------|-------------------------------------|
| 1. Testing | 2. Production Support |
| 3. Skill Development | 4. Process improvement |
| 5. Product / Tool Development | 6. Technical / Business Consultancy |

21. How would you like to rate the overall services offered by centre?

- Very Bad 2. Bad 3. Average 4. Good 5. Excellent

22. Suggest at least three areas of improvement for MSME Technology Centre? Use additional pages if needed.

- 1.
 - 2.
 - 3.
-

18.2 AICTE norms for engineering and technology institutes

a) Land requirement for technical institutions

Other than Rural Places			Rural Areas		
UG Programs	Diploma	Standalone PG Programs	UG Programs	Diploma	Standalone PG Programs
2.5	1.5	2.5	10	5	10

Land area requirements in acres

- ▶ Land Area Requirements:
 - Land area shall cover hostel facilities, if any
 - Land shall be in one continuous piece
 - Considering hilly nature of land in North Eastern States, land may be made available in 3 pieces which are not away from each other by more than 1 Km
- ▶ Number of students generally allowed per acre land available when FSI = 1 is 300.
- ▶ Built up Area Requirements
 - The Institution area is divided in, Instructional area (INA, carpet area in sq. m.), Administrative area (ADA, carpet area in sq. m.), Amenities area (AMA, carpet area in sq. m.)
 - Circulation area (CIA) is equal to 0.25 (INA+ADA+AMA).
 - Total built up area in sq. m. is equal to (INA+ADA+AMA) + (CIA)

► Instructional area (carpet area in sqm)

	Number of Divisions (UG class of 60)	Duration of course (in yrs)	Class Rooms (C)	Tutorial Rooms(D) PG class rooms (H)	Laboratory	Research Laboratory	Work Shop	Additional WS/Labs for Category X courses	Computer centre	Drawing Hall	Library and Reading Room	Seminar Halls
Carpet area in sqm per room			66	33	66	66	200	200	150	132	400	132
Engineering/ Technology (Degree Institute)												
Number of rooms required for new institution	A	4	C=A	D=C/4	10	-	1	-	1	1	1	1
Total number of rooms (UG)	A	4	C=Ax 4	D=C/4	10/Course*	-	1	2/Course (Max 4)	1	1	1	1/Course
Total number	F	2	-	H=Fx2	1/Specialization	1/Specialization	1	2/Course (Max 4)	1	1	1	1/Course

	Number of Divisions (UG class of 60)	Duration of course (in yrs)	Class Rooms (C)	Tutorial Rooms (D) PG class rooms (H)	Laboratory	Research Laboratory	Work Shop	Additional WS/Labs for Category X courses	Computer centre	Drawing Hall	Library and Reading Room	Seminar Halls
of rooms (PG)												
<p>Where,</p> <ul style="list-style-type: none"> • Category X of courses: Mechanical, Production, Civil, Electrical, Chemical, Textile, Marine, Aeronautical and allied courses of each. • Classrooms, Tutorial rooms and Laboratories required for 2nd, 3rd and 4th year may be added progressively to achieve total number as stated. • Additional Library (Reading room) area of 50 sq m / per 60 student (UG+PG) intake beyond 420. • UG laboratories if shared for PG courses shall be upgraded to meet requirements of PG curriculum • Progressive requirement, 2nd year onwards shall be calculated as 3+3+2 labs/course • Additional 5 Labs/Course when number of divisions are more than 2/course. • Round off fraction in calculation to the next integer. 												
Engineering/ Technology (Diploma and Post Diploma Institute)												
Carpet area in sqm per room				66	33	66	200	200	150	132	400	132
Number of rooms required for new	A		Y	C=A	D=C/4	06	1	-	1	1	1	-

	Number of Divisions (UG class of 60)	Duration of course (in yrs)	Class Rooms (C)	Tutorial Rooms (D) PG class rooms (H)	Laboratory	Research Laboratory	Work Shop	Additional WS/Labs for Category X courses	Computer centre	Drawing Hall	Library and Reading Room	Seminar Halls
institution												
Total number of rooms	A	Y	$C=A \times Y$	$D=C/4$		$06/\text{Course}^*$	1	$2/\text{Course}$ (Max 4)	1	1	1	1

Where;

- Category X of courses: Mechanical, Production, Civil, Electrical, Chemical, Textile, Marine, Aeronautical and allied courses of each.
- Classrooms, Tutorial rooms and Laboratories required for 2nd, 3rd and 4th year may be added progressively to achieve total number as stated.
- Additional Library (Reading room) area of 50 sq m / per 60 student (UG+PG) intake beyond 420.
- Progressive requirement, 2nd year onwards shall be calculated as 2+2 labs / course
- Round off fraction in calculation to the next integer.

b) Duration and Entry Level Qualifications for the Technical Program (Engineering and Technology Programs/ Degrees)

SN	Diploma/ Degree	Duration	Eligibility
1	Under graduate degree program (full time)	4 years	<ul style="list-style-type: none"> ▶ Passed 10+2 examination with Physics and Mathematics as compulsory subjects along with one of the Chemistry / Biotechnology / Biology ▶ Obtained at least 50% marks (45% in case of candidate belonging to reserved category) in the

			above subjects taken together
2	Diploma Programs (full time)	3 / 4 years	▶ Passed 10 std. / SSC examination Obtained at least 35% marks at the qualifying examination
3	Post diploma programs	1.5 years/ 2 years	▶ Passed Diploma examination ▶ Obtained at least 50% marks (45% in case of candidate belonging to reserved category) at the qualifying examination.

c) Norms for Intake & Number of Courses / Divisions in the Technical Campus

Diploma/ Degree	Intake per division	Maximum Number of UG/PG courses and/ or divisions allowed in the new division (single shift working)	
		Divisions	Intake
Diploma/ Post diploma level	60	5	300
Undergraduate level	60	5	300
Post graduate degree and post graduate diploma level	18	6	108

New technical campus in Engineering and technology shall necessarily opt for courses from the following:

- ▶ Applied Electronics & Instrumentation
- ▶ Chemical Engineering/Technology
- ▶ Civil Engineering/Technology, Construction Engineering Computer Science, Computer Science and Engineering, Computer Science & Information Technology
- ▶ Computer Technology Electrical Engineering or Electrical & Electronics Engineering
- ▶ Electronics and Communication Engineering

- ▶ Information Technology
- ▶ Instrumentation and Control Engineering
- ▶ Mechanical Engineering
- ▶ Production Engineering

d) Norms for Essential and Desired requirements for Technical Campus (Marked as essential need to be made available at the time of the Expert committee visit)

SN	Details of requirement	Provisioning
1.	Language Laboratory The Language Laboratory is used for language tutorials. These are attended by students who voluntarily opt for Remedial English classes. Lessons and exercises are recorded on a weekly basis so that the students are exposed to a variety of listening and speaking drills.	Essential
2.	Potable Water supply and outlets for drinking water at strategic locations	Essential
3.	Electric Supply	Essential
4.	Backup Electric Supply	As required
5.	Sewage Disposal	Essential
6.	Telephone and FAX	Essential
7.	First Aid facility	Essential
8.	Vehicle Parking	Essential
9.	Institution web site	Essential
10.	Barrier Free Built Environment for disabled and elderly persons including availability of specially designed toilets for ladies and gents separately	Essential
11.	Safety provisions including fire and other calamities	Essential

SN	Details of requirement	Provisioning
12.	General Insurance provided for assets against fire, burglary and other calamities	Essential
13.	All weather approach road	Essential
14.	General Notice Board and Departmental Notice Boards	Essential
15.	Medical and Counselling Facilities	Essential
16.	Public announcement system at strategic locations for general announcements/paging and announcements in emergency.	Desired
17.	Enterprise Resource Planning (ERP) Software for Student-Institution-Parent interaction	Desired
18.	Transport	Desired
19.	Post, Banking Facility / ATM	Desired
20.	CCTV Security System	Desired
21.	LCD (or similar) projectors in classrooms	Desired
22.	Group Insurance to be provided for the employees	Desired
23.	Insurance for students	Desired
24.	Staff Quarters	Desired

e) Norms for Faculty requirements and Cadre Ratio for Technical campus

▶ Diploma

Diploma	Faculty: Student ratio	Principal/ Director	Head of the Department	Lecturer	Total
		A	B	C	D
Diploma/ Post diploma	1:20	1	1 per department	S/20	A+B+C

S = Sum of number of students as per Approved Student Strength at all years

► Degree

Degree	Faculty: Student ratio	Principal/ Director	Professor	Associate professor	Assistant professor	Total
		A	B	C	D	A+B+C+D
Undergraduate	1:15	1	$(S/15 \times R) - 1$	$(S/15 \times R) \times 2$	$(S/15 \times R) \times 6$	$S/15$
Postgraduate	1:12	-	$(S/12 \times R)$	$(S/12 \times R)$	$(S/12 \times R)$	$S/12$

Note:

For undergraduate: S = Sum of number of students as per Approved Student Strength at all years, $R = (1+2+6)$

For Postgraduate: S = Sum of number of students as per Approved Student Strength at all years * $R = (1+2)$, $\#R = (1+2+6)$

18.3 Social Screening Certificate

ANNEX 3B – ESTABLISHMENT OF NEW TECHNOLOGY CENTRE IN CLEARLY DEMARCATED, PROTECTED AND FUNCTIONING INDUSTRIAL AREA – SOCIAL SCREENING CERTIFICATE

Location and Address of the Technology Centre

NAME OF THE TECHNOLOGY CENTRE	NAME OF THE CLUSTER
Street Address: Technology Centre System Programme (TCSP) Greater Noida ,UP	Phone: 011- 26847223 Fax: 011- 26838016
Email ID: dcdi-adelhi@demsme.gov.in	Website: www.msmedinewdelhi.gov.in

Person-in-charge of Technology Centre

NAME OF PERSON-IN-CHARGE	DESIGNATION
R.K.Panigrahi	Director
CONTACT DETAILS Phone: 011- 26847223 Fax: 011- 26838016 Mobile: 91-9810800185	Email ID: rk.panigrahi@nic.in

Name, Location, Address and Details of Industrial Area

NAME OF INDUSTRIAL AREA (e.g.Industrial Growth Centre, Borai) Plot No. 3, Eco-Tech VIII Greater Noida	YEAR OF ESTABLISHMENT
	2016-17
TOTAL AREA OF LAND (IN ACRES): 60,000 Sq. Meter 14.82 Acres	TYPES OF INDUSTRIES (Tick Appropriate Ones) Manufacturing: Service: Energy: Others (Specify) - Technology Institution

List of Industrial Units Surrounding the Allotted Plot

SI No	NAME OF INDUSTRIAL UNITS	TYPE OF INDUSTRY
	Technology Institution	- NA-- NA-

Details of Plot of Land Allotted:

PLOT/SERIAL NO.	AREA OF LAND (IN ACRES)	DATE OF ALLOTMENT	DATE OF POSSESSION
3	14.82 acres	14-2-2014	---
NAME OF ALLOTING OFFICIAL	NAME OF ALLOTING ORGANIZATION	ALLOTMENT LETTER NUMBER	DATE OF LETTER
I/e Sr. Manager (Industries)	Greater Noida Industrial Development Authority, Gr. Noida , UP	IND02495/2014-5224	14-2-2014

CERTIFICATION

This is to certify that the proposed Technology Centre will be located on a plot of land allotted by a Competent Authority of the State Government and that the plot of land is located within clearly demarcated, protected and functioning Industrial Area and that the allotted land is free from any claims, use and encumbrances.

This is also to certify that copies of the following original documents are attached with this Social Screening Certificate.

1. Site Plan of the Industrial Area with clearly marked allotted plot;
2. Letter of Allotment of Land;
3. Certificate of Handing Over of Land;
4. Certificate of Non-Incumbency

SIGNATURE OF COMPETENT AUTHORITY


Name: - R.K.Panigrahi

Designation: Director

Date:- 14-7-2014-

Place: New Delhi -

DR. R. K. PANIGRAHI
Director
Ministry of Industries, Government of India
101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 414, 415, 416, 417, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 441, 442, 443, 444, 445, 446, 447, 448, 449, 450, 451, 452, 453, 454, 455, 456, 457, 458, 459, 460, 461, 462, 463, 464, 465, 466, 467, 468, 469, 470, 471, 472, 473, 474, 475, 476, 477, 478, 479, 480, 481, 482, 483, 484, 485, 486, 487, 488, 489, 490, 491, 492, 493, 494, 495, 496, 497, 498, 499, 500, 501, 502, 503, 504, 505, 506, 507, 508, 509, 510, 511, 512, 513, 514, 515, 516, 517, 518, 519, 520, 521, 522, 523, 524, 525, 526, 527, 528, 529, 530, 531, 532, 533, 534, 535, 536, 537, 538, 539, 540, 541, 542, 543, 544, 545, 546, 547, 548, 549, 550, 551, 552, 553, 554, 555, 556, 557, 558, 559, 560, 561, 562, 563, 564, 565, 566, 567, 568, 569, 570, 571, 572, 573, 574, 575, 576, 577, 578, 579, 580, 581, 582, 583, 584, 585, 586, 587, 588, 589, 590, 591, 592, 593, 594, 595, 596, 597, 598, 599, 600, 601, 602, 603, 604, 605, 606, 607, 608, 609, 610, 611, 612, 613, 614, 615, 616, 617, 618, 619, 620, 621, 622, 623, 624, 625, 626, 627, 628, 629, 630, 631, 632, 633, 634, 635, 636, 637, 638, 639, 640, 641, 642, 643, 644, 645, 646, 647, 648, 649, 650, 651, 652, 653, 654, 655, 656, 657, 658, 659, 660, 661, 662, 663, 664, 665, 666, 667, 668, 669, 670, 671, 672, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682, 683, 684, 685, 686, 687, 688, 689, 690, 691, 692, 693, 694, 695, 696, 697, 698, 699, 700, 701, 702, 703, 704, 705, 706, 707, 708, 709, 710, 711, 712, 713, 714, 715, 716, 717, 718, 719, 720, 721, 722, 723, 724, 725, 726, 727, 728, 729, 730, 731, 732, 733, 734, 735, 736, 737, 738, 739, 740, 741, 742, 743, 744, 745, 746, 747, 748, 749, 750, 751, 752, 753, 754, 755, 756, 757, 758, 759, 760, 761, 762, 763, 764, 765, 766, 767, 768, 769, 770, 771, 772, 773, 774, 775, 776, 777, 778, 779, 780, 781, 782, 783, 784, 785, 786, 787, 788, 789, 790, 791, 792, 793, 794, 795, 796, 797, 798, 799, 800, 801, 802, 803, 804, 805, 806, 807, 808, 809, 810, 811, 812, 813, 814, 815, 816, 817, 818, 819, 820, 821, 822, 823, 824, 825, 826, 827, 828, 829, 830, 831, 832, 833, 834, 835, 836, 837, 838, 839, 840, 841, 842, 843, 844, 845, 846, 847, 848, 849, 850, 851, 852, 853, 854, 855, 856, 857, 858, 859, 860, 861, 862, 863, 864, 865, 866, 867, 868, 869, 870, 871, 872, 873, 874, 875, 876, 877, 878, 879, 880, 881, 882, 883, 884, 885, 886, 887, 888, 889, 890, 891, 892, 893, 894, 895, 896, 897, 898, 899, 900, 901, 902, 903, 904, 905, 906, 907, 908, 909, 910, 911, 912, 913, 914, 915, 916, 917, 918, 919, 920, 921, 922, 923, 924, 925, 926, 927, 928, 929, 930, 931, 932, 933, 934, 935, 936, 937, 938, 939, 940, 941, 942, 943, 944, 945, 946, 947, 948, 949, 950, 951, 952, 953, 954, 955, 956, 957, 958, 959, 960, 961, 962, 963, 964, 965, 966, 967, 968, 969, 970, 971, 972, 973, 974, 975, 976, 977, 978, 979, 980, 981, 982, 983, 984, 985, 986, 987, 988, 989, 990, 991, 992, 993, 994, 995, 996, 997, 998, 999, 1000

18.4 Environment Screening

Table 46: Environmental screening

SN	Issues	Yes/No	Remarks
1	Will the new TC affect the land use pattern?	No	The allotted land is in a designated industrial area earmarked for industrial operations.
2	Will the development include significant land disturbance or site clearance?	No	The development of the Site will not include significant land disturbance The land is clear from vegetation except for a few trees.
3	Will the project involve acquisition of land from private players?	No	Therefore, does not involve acquisition of land from private players. Land has been allocated by Greater Noida Industrial Development Authority for a period of 90 years to O/o DC-MSME for the development of the TC by O/o DC-MSME.
4	The selected site is defined as industrial / commercial / residential?	Yes	Industrial zone
5	Is there any protected area or biodiversity sensitive area in the vicinity which is likely to be affected by the operations of the TC?	No	There is no protected area of biodiversity sensitive area in the 10 km radius of the allotted land.
6	Is there any archaeological or cultural/heritage structure in the vicinity of the site?	No	There is no archaeological or cultural/heritage structure in the vicinity of the site.
7	Is there any group of indigenous people in and around the selected site?	No	There are no indigenous people in and around the selected site.
8	Will the construction activity affect the surrounding around the TC?	No	The allocated land has road access from northern and western sides and is vacant from southern and eastern portions. As such construction activity is not envisaged to have any impact of the surrounding area.
9	What is the source of water available at the site (Ground water, surface water, municipal supply, etc.)? Is the water requirement envisaged	No	Water in the area will be provided by Greater Noida Authority. Therefore water requirement is

SN	Issues	Yes/No	Remarks
	to put additional pressure on the water sources?		not envisaged to put additional pressure on the water source.
10	Were any sources of air emissions identified?	No	No sources of air emissions were identified on/in the vicinity of the Site.
11	Were any sources of noise pollution identified in the area?	No	No sources of noise were observed on the Site.
12	Were any chemicals used on or in the vicinity of the Site?	No	No chemicals were being used on the Site during the Site visit.
13	Does the Site involve handling, storage and disposal of hazardous waste? If yes, what are the different types of waste envisaged from the TC?	No	As the Site did not involve any operations, no chemicals were handled on the Site.
14	Is the project located in the area of seismic faults? In case yes, in which seismic does the location lie?	No	The TC location falls in the Seismic zone - III and these may be designed to be capable of handling an earthquake in case there is one in the future.
15	Is there any record of natural calamity in the area in the past? If yes, what is the probability of the same effecting the operations of TC in the future?	No	NCR region is sensitive to earthquakes. The history of past earthquakes experienced in and around Delhi shows that it is situated in region liable to moderate damage by earthquake. Six historical earthquakes of magnitude 5.5 to 6.8 are known to have occurred in NCR and its surrounding area since 1720 AD. Further, NCR region is prone to flooding. The main causes of floods are heavy rainfall, inadequate capacity of rivers to carry the high flood discharge, inadequate drainage to carry away the rainwater quickly to streams/rivers, flash floods occur due to high rate of water flow as also due to poor permeability of the soil.

CONCLUSION AND RECOMMENDATION

Based on the discussions with the Site representative and site visit conducted, no evident environmental concerns were identified on/ near the Site.

Earthquake and flood resilience should be considered during designing phase.

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