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# Indian Electrical Power Equipment Industry and Electronics Industry including Consumer Electronics

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EU PROJECT SESEI

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## Contents

1. Glossary .....	3
2. Executive summary .....	5
3. Electrical Power Equipment Industry .....	7
3.1 Introduction .....	7
3.2 Top companies/key player in Indian Electrical Power Equipment sector .....	14
3.3 Top companies/key player in Indian Power sector .....	15
3.4 Key growth drivers in Indian Electrical Equipment and Power Sector .....	15
3.5 Policy Initiatives .....	16
3.5.1 Electricity Act 2003 & its amendments .....	16
3.5.2 Electricity (Rights of Consumers) Rules, 2020 .....	16
3.5.3 National Electricity Policy 2021 (draft) .....	16
3.5.4 Indian Electrical Equipment Industry Mission Plan 2022 .....	17
3.5.5 National Wind-Solar Hybrid Policy .....	19
3.5.6 Pradhan Mantri Sahaj Bijli Har Ghar Yojana (SAUBHAGYA) .....	19
3.5.7 Deen Dayal Upadhyaya Gram Jyoti Yojana (DDUGJY) .....	19
3.5.8 Ujwal Discom Assurance Yojana (UDAY) .....	20
3.5.9 Integrated Power Development Scheme (IPDS) .....	21
3.5.10 Power for ALL .....	21
3.5.11 Revamped Distribution Sector Scheme (RDSS) .....	21
3.5.12 Smart Grid Vision and Roadmap for India .....	22
3.5.13 National Smart Grid Mission (NSGM) .....	22
3.5.14 Smart Meter National Programme (SMNP) .....	23
3.5.15 Solar Parks Scheme .....	24
3.5.16 CEA cybersecurity guidelines for the power sector .....	24
3.5.17 Guidelines & Standards for Charging Infrastructure for Electric Vehicles (EV) .....	25
3.5.18 Unnat Jyoti by Affordable LEDs for All (UJALA) .....	25
3.5.19 Street Lighting National Programme (SLNP) .....	25
3.5.20 Gram Ujala .....	26
4. Electronics sector including consumer electronics .....	26
4.1 Introduction .....	26
4.2 Top companies/key player in Indian Electronics sector .....	28

<b>4.3</b>	<b>Key growth Drivers in Indian Electronics Sector</b> .....	<b>29</b>
<b>4.4</b>	<b>Policy Initiatives</b> .....	<b>30</b>
<b>4.4.1</b>	<b>National Policy on Electronics 2019 (NPE 2019)</b> .....	<b>30</b>
<b>4.4.2</b>	<b>Modified Special Incentive Package Scheme (M-SIPS)</b> .....	<b>31</b>
<b>4.4.3</b>	<b>Electronics Manufacturing Clusters (EMC)</b> .....	<b>32</b>
<b>4.4.4</b>	<b>Electronics Development Fund (EDF)</b> .....	<b>32</b>
<b>4.4.5</b>	<b>Production Linked Incentive Scheme (PLI) for Large Scale Electronics Manufacturing</b> .	<b>33</b>
<b>4.4.6</b>	<b>Scheme for Promotion of Electronic Components and Semiconductors (SPECS)</b> .....	<b>33</b>
<b>4.4.7</b>	<b>EMC 2.0 Scheme</b> .....	<b>34</b>
<b>4.4.8</b>	<b>Five-year roadmap for electronics sector in India</b> .....	<b>34</b>
<b>4.4.9</b>	<b>Compulsory Registration Scheme by Ministry of Electronics and Information Technology (MEITY)</b> .....	<b>35</b>
<b>5.</b>	<b>Standardisation</b> .....	<b>Error! Bookmark not defined.</b>
<b>5.1</b>	<b>Bureau of Indian Standards (BIS), National Standards Body of India</b> .....	<b>35</b>
<b>5.2</b>	<b>Telecommunication Engineering Center (TEC)</b> .....	<b>37</b>
<b>6.</b>	<b>Conclusion</b> .....	<b>37</b>
<b>7.</b>	<b>References</b> .....	<b>38</b>

## 1. Glossary

S. No.	Acronym	Expansion
1	AI	Artificial Intelligence
2	AT&C	Aggregate Transmission and Commercial
3	BIS	Bureau of Indian Standards
4	CDMA	Code-Division Multiple Access
5	CEA	Central Electricity Authority
6	CEAMA	Consumer Electronics and Appliances Manufacturers Association
7	CESL	Convergence Energy Services Limited
8	CPRI	Central Power Research Institute
9	CRS	Compulsory Registration Scheme
10	DDUGJY	Deen Dayal Upadhyaya Gram Jyoti Yojana
11	DPIIT	Department for Promotion of Industry and Internal Trade
12	DWDM	Dense wavelength-division multiplexing
13	EDF	Electronic Development Fund
14	EESL	Energy Efficiency Services Limited
15	EMC	Electronics Manufacturing Clusters
16	ESDM	Electronics System Design and Manufacturing
17	ETD	Electrotechnical Division Council
18	EV	Electric Vehicle
19	FDI	Foreign Direct Investment
20	GDP	Gross Domestic Product
21	GoI	Government of India
22	GPON	Gigabit Passive Optical Network
23	GSM	Global System for Mobile Communications
24	GVA	Gross Value Added
25	GW	Giga Watt
26	ICT	Information and communications technology
27	IEC	International Electrotechnical Commission
28	IEEMA	Indian Electrical and Electronics Manufacturers' Association
29	IoT	Internet of Things
30	IPDS	Integrated Power Development Scheme
31	IP PBX	Internet Protocol Private Branch Exchange
32	ISGF	India Smart Grid Forum
33	ISO	International Organization for Standardisation
34	IT	Information Technology
35	LITDC	Electronics and Information Technology Department
36	LVDC	Low Voltage Direct Current
37	M2M	Machine to Machine

38	MEITY	Ministry of Electronics and Information Technology
39	MHI	Ministry of Heavy Industries
40	MII	Make in India
41	MNC	Multinational Corporation
42	MoP	Ministry of Power
43	MoU	Memorandum of Understanding
44	M-SIPS	Modified Special Incentive Package Scheme
45	NCIIPC	National Critical Information Infrastructure Protection Centre
46	NEP	National Electricity Policy
47	NFV	Network Functions Virtualization
48	NPE	National Policy on Electronics
49	NSGM	National Smart Grid Mission
50	OEMs	Original Equipment Manufacturers
51	ONT	Optical Network Terminal
52	PCBA	Printed Circuit Board Assembly
53	PCE	Process Control Equipment
54	PEE	Power Electronics Equipment
55	PLI	Production Linked Incentive
56	R&I	Research and Innovation
57	RDSS	Revamped Distribution Sector Scheme
58	RE	Renewable Energy
59	REC	Rural Electrification Corporation
60	RFC	Power Finance Corporation
61	SCADA	Supervisory control and data acquisition
62	SDG	Sustainable Development Goals
63	SDO	Standards Developing Organisation
64	SESEI	Seconded European Standardisation Expert for India
65	SLPMUs	State Level Project Management Unit
66	SMNP	Smart Meter National Programme
67	SPECS	Scheme for Promotion of Manufacturing of Electronic Components and Semiconductors
68	T&D	Transmission & Distribution
69	T&ME	Test & Measuring Equipment
70	WG	Working Group
71	WiMax	Wireless Inter-operability for Microwave Access
72	WTO	World Trade Organization
73	YoY	Year on Year

## 2. Executive summary

The Indian Electrical equipment including Consumer Electronics is one of the key priority sectors of the Project SESEI. Through this sector profile report, it is our endeavour to bring an update on this sector to our stakeholders by providing important insights into the Indian market dynamics, opportunities and challenges, important players, key policy initiatives and legislations as introduced by the Government of India for the growth of this important and critical sector including updates on the key Standardisation bodies responsible and ongoing work around its standardisation.

Electrical Power Sector is among the most critical component of infrastructure and is crucial for the economic growth and welfare of nations (Electricity for All). India is the third largest electricity producer in the world, 2nd largest coal producer in the world and the 3rd largest number of nuclear reactors being installed in the world and is fast becoming the largest source of energy producer through renewable sources, i.e., solar and wind. With this, India is the world's third-largest energy consuming country, and thanks to its rising incomes and improving standards of living. Energy use has doubled since 2000, with 80% of demand still being met by coal, oil, and solid biomass.<sup>1</sup>

India jumped 115 positions to 22<sup>nd</sup> in 2020 from 137<sup>th</sup> in 2014 on World Bank's Ease of doing business - 'Getting Electricity' ranking. The future of the power sector looks bright as by 2026-27, India power generation installed capacity will be nearly 620 GW, 38% of which will still be from coal but with 44% from renewable energy (Total Installed Capacity as on December 2021 is more than 393 GW of which 38.5% is getting generated from renewable sources).

The power sector in India is forecasted to attract investments worth approx. €110-115 billion between 2019-23. 100% FDI in the power sector in India is allowed for generation from all sources (except atomic energy), transmission and distribution of electric energy, and Power Trading under the automatic route<sup>2</sup>.

The advanced energy management and increased use of renewable energy resources are the foremost areas to be concentrated by the governments for the development of the sector and the country. For this, Ministry of Power's had established ISGF (Indian Smart Grid Forum), which works very closely with public, private and research organizations for developing standards and policies to deploy the 'Smart Grid' for the efficient and cost-effective power for all. The Smart Meter is a very important constituent for the Smart Grid deployment and is expected to provide cost-effective, social, and ecological advantages for various stakeholders. The most significant key factors that determines the success of the smart meters is the data analysis that deals with data acquisition, communication, processing, and elucidation which extends benefits to the consumer, utility company and the government. Smart Grid using Smart Metering including Advanced metering infrastructure (AMI)

<sup>1</sup> <https://www.iea.org/reports/india-energy-outlook-2021>

<sup>2</sup> <https://www.investindia.gov.in/sector/thermal-power#:~:text=Moreover%2C%20the%20power%20sector%20in,and%2044%25%20from%20renewable%20energy.>



technologies have been introduced in various pilot trials to establish the wide area monitoring, protection, and control.

According to the recent data released by the National Smart Grid Mission, Ministry of Power, 3.73 million smart meters have been installed across the country out of total allocated capacity of 11.16 million as of January 2022. Among various agencies, Energy Efficiency Services Limited (EESL) is the leading smart meters provider, have installed more than 2.28 million smart meters across the country<sup>3</sup>.

Indian power sector is undergoing a significant change and sustained economic growth continues to drive electricity demand in India. The Government of India's focus on attaining 'Power for all' has accelerated capacity addition in the country and to achieve the objective of "Power for All", various schemes have been launched. Some of the important schemes especially deployed for rural electrification are

- "Deendayal Upadhyaya Gram Jyoti Yojana (DDUGJY)" for creation of basic electricity infrastructure in villages / habitations, strengthening & augmentation of existing infrastructure, metering of existing feeders / distribution transformers / consumers.
- "Pradhan Mantri Sahaj Bijli Har Ghar Yojana – Saubhagya" to provide energy access to all by last mile connectivity and electricity connections to all remaining un-electrified households in rural as well as urban areas to achieve universal household electrification in the country.

India has also witnessed a substantial spike in demand for Consumer Electronic products in the last few years and it has emerged as one of the largest markets for electronic products in the world. The global electronic devices market is estimated to be approx. €2.5 trillion in 2020<sup>4</sup>. India's share in the global electronic systems manufacturing industry has grown from 1.3% in 2012 to 3.6% in 2019<sup>5</sup>. This is mainly credited to India's position as second-largest mobile phone manufacturer worldwide and surge in internet penetration rate. Also, some of the key factors for the unprecedented growth in this sector is due to 1.2 billion consumers engaged in rapid urbanization and digitization with increasing penetration of electronic products, third largest start-up ecosystem, new innovations, designs, and technology propelling digitization, and creation of robust research & development ecosystem.

The Government of India attributes high priority to electronics hardware manufacturing, as it is one of the crucial pillars of Make in India, Digital India, and Start-up India programmes. The electronic devices industry valued at approx. €100.7 bn in 2019-20 is segmented as Mobile Phones (24%), Consumer Electronics (22%), Strategic Electronics (12%), Computer Hardware (7%), LEDs (2%) and Industrial Electronics (34%) comprising of Auto, Medical and other industrial electronic products<sup>6</sup>.

<sup>3</sup> <https://mercomindia.com/smart-meter-installations-grow-steadily/>

<sup>4</sup> <https://static.pib.gov.in/WriteReadData/specificdocs/documents/2022/jan/doc20221247801.pdf>

<sup>5</sup> <https://www.investindia.gov.in/sector/electronic-systems#:~:text=India's%20share%20in%20the%20global,accelerated%20adoption%20of%20electronics%20products.>

<sup>6</sup> <https://www.investindia.gov.in/sector/electronic-systems#:~:text=India's%20share%20in%20the%20global,accelerated%20adoption%20of%20electronics%20products.>

The Electronics System Design & Manufacturing (ESDM) plays a vital role in the government's goal of generating approx. €850 billion of economic value from the digital economy by 2025. By 2025, India's consumer electronics and appliances market is predicted to be the fifth largest in the world<sup>7</sup>.

With various government initiatives aiming to boost domestic manufacturing under Make in India, India has already started witnessing initial movement with increased production and assembly activities across products such as mobile phones and other consumer electronics. To position India as a global hub for ESDM, the Production Linked Incentive Scheme (PLI) for Large Scale Electronics Manufacturing, PLI for IT Hardware, Scheme for Promotion of Manufacturing of Electronic Components and Semiconductors (SPECES) and Modified Electronics Manufacturing Clusters Scheme (EMC 2.0) have also been notified. Additionally, the Semicon India Program with an incentive outlay of approx. € 8.5 billion was launched with the vision to develop a sustainable semiconductor and display ecosystem in the country<sup>8</sup>. This program is expected to establish India as global hub for semiconductor and display manufacturing, promote self-reliance, strengthen resilience in global supply chains, and pave the way for India's technological leadership in the industry.

The government has set up an automatic route for 100% Foreign Direct Investment (FDI) in the ESDM industry to attract investors, including original equipment manufacturers (OEMs) and integrated device makers (IDMs). By 2021-22, the government wants to attract approx. €2.2 billion in investments in the electronics manufacturing sector<sup>9</sup>. FDI equity inflows were approx. €2,703 million from April 2000 to March 2021. FDI inflows into the defense electronics sector is allowed up to 49% under the automatic route and beyond with government approval.

This sector profile report on "Indian Electrical Power Equipment Industry and Electronics Industry including Consumer Electronics", is an important deliverable of the project SESEI and is prepared to provide in brief the sector profile, developments, challenges & opportunities in India, i.e., the regulatory, policy, market insights, latest developments and current state of play covering standards development & policy initiatives in India to support the sectorial growth.

## 3. Electrical Power Equipment Industry

### 3.1 Introduction

Indian Electrical Power Equipment Industry comprises of two segments:

- **Generation equipment (boilers, turbines, generators) and**
- **Transmission & Distribution (T&D) and allied equipment** like transformers, cables, transmission lines, switchgears, capacitors, energy meters, instrument transformers, surge arrestors, stamping

<sup>7</sup> <https://inverted.in/blog/growth-of-indian-consumer-electronics-industry>

<sup>8</sup> <https://www.telecomlead.com/telecom-chips/india-okays-10-bn-scheme-for-development-of-semiconductor-102799>

<sup>9</sup> <https://www.firstpost.com/tech/news-analysis/govt-expects-around-rs-18000-crore-investment-in-the-electronics-manufacturing-segment-by-2021-22-9264501.html>



and lamination, insulators, insulating material, industrial electronics, indicating instruments, winding wires, etc. The T&D equipment sector comprises of 85% of the industry whereas generation equipment sector is 15%.

### Sector snapshot:

- Industry Production (Estimated) for 2019-20: Approx. €22 Billion
- Exports: Approx. €7.4 Billion
- Imports: Approx. €8.3 Billion
- 7.8% of manufacturing sector is terms of value and 1.23% of India's GDP
- Direct employment to 500k persons, indirect to 1 million, and over 5 million across the entire value chain
- Diversified, matured and strong manufacturing base, with robust supply chain
- Rugged performance design of equipment to meet tough network demand
- Presence of large SMEs, large conglomerate with major foreign players, either directly or through technical collaborations with Indian manufacturers
- State-of-art technology in most sub-sectors at par with global standards
- Focus on green manufacturing technology
- Major Export Markets: United States of America, United Arab Emirates, Germany, United Kingdom, Nigeria, Saudi Arabia, Australia, Brazil, Canada, France
- Major Export Products: Switchgear and Control gear, Transformers & Parts, Industrial Electronics, Cables, Transmission Line Towers, Conductors, Rotating Machines (Motors, AC Generators, Generating Sets) & Parts
- The size of Capital Goods industry market size is approx. €78.5 Billion while Power Equipment share in it is about 55%.

### Power Sector:

India is the third-largest producer and second-largest consumer of electricity in the world and has an installed power capacity of 393.389 GW as of December 2021. In India, the gross electricity consumption in 2020 was 1,208 kWh per capita.

The country's installed Renewable Energy (RE) capacity stands at 151.39 GW (solar: 49.34 GW, wind: 40.08 GW, Small hydro Power: 4.83 GW, Bio-power: 10.17 GW, Large Hydro: 46.51 GW) as on December 31, 2021, while its nuclear energy based installed electricity capacity stands at 6.78 GW. This brings the total non-fossil based installed energy capacity to 158.17 GW which is 40.2% of the total installed electricity capacity of 393.38 GW.

Category	Installed generation capacity (GW)	Share (%) in total
<b>Fossil Fuel</b>		
Coal	203.19	51.7%

Category	Installed generation capacity (GW)	Share (%) in total
Lignite	6.62	1.7%
Gas	24.9	6.3%
Diesel	0.51	0.1%
<b>Total Fossil Fuel</b>	<b>235.22</b>	<b>59.8%</b>
<b>Non-Fossil Fuel</b>		
<b>RES (Incl. Hydro)</b>	<b>151.39</b>	<b>38.5%</b>
Hydro	<b>46.51</b>	<b>11.9 %</b>
Wind, Solar & Other RE	104.87	26.5 %
Wind	40.08	10.2 %
Solar	49.34	12.5 %
BM Power/Cogen	10.17	2.6 %
Waste to Energy	0.43	0.1 %
Small Hydro Power	4.83	1.2 %
<b>Nuclear</b>	<b>6.78</b>	<b>1.7%</b>
<b>Total Non-Fossil Fuel</b>	<b>158.17</b>	<b>40.2%</b>
<b>Total Installed Capacity</b> (Fossil Fuel & Non-Fossil Fuel)	<b>393.38</b>	<b>100%</b>

Source : <https://powermin.gov.in/en/content/power-sector-glance-all-india>

During the last 7.5 years, India has witnessed the fastest rate of growth in renewable energy capacity addition among all large economies, with renewable energy capacity (including large hydro) growing 1.97 times and solar energy expanding over 18 times. The wind power installed capacity has grown

1.9 times during past 7.5 years to about 40 GW. India has the 4th largest wind power capacity in the world. Government of India has committed to achieving 500 GW of installed electricity capacity from non-fossil fuel sources by the year 2030.

## Smart Grid:

The Smart Grid represents an unprecedented opportunity to move the energy industry into a new era of reliability, availability, and efficiency that will contribute to our economic and environmental health. The benefits associated with the Smart Grid include:

- Reduction of T&D losses.
- Peak load management, improved QoS and reliability.
- Reduction in power purchase cost.
- Better asset management.
- Increased grid visibility and self-healing grids.
- Renewable integration and accessibility to electricity.
- Increased options such as ToU tariff, DR programs, net metering.
- Satisfied customers and financially sound utilities etc.

Realizing the growing importance of the smart grid technologies in Indian power sector, Ministry of Power had taken early steps in 2010 by constituting India Smart Grid Task Force (ISGTF), an inter-ministerial task force and India Smart Grid Forum (ISGF), a public-private partnership initiative.

Mandate of both these agencies is to advise ministry of power on appropriate policies and programs for accelerated development of smart grid technologies, work with national and international agencies in standards development and to help utilities, regulators and the industry in technology selection, training, and capacity building.

ISGF work closely with government institutions such as Central Electricity Authority (CEA), Central Power Research Institute (CPRI), Central Electricity Regulatory Commission (CERC), National Smart Grid Mission (NSGM) and National Critical Information Infrastructure Protection Centre (NCIIPC); ministries such as Ministry of New and Renewable Energy (MNRE), Department of Telecommunications (DoT), Ministry of Housing and Urban Affairs (MoHUA), Ministry of Heavy Industry (MHI) etc. and other stakeholders like state governments, electric utilities, and electricity regulatory commissions. With 170+ members comprising of ministries, utilities, technology providers, academia, and research, ISGF has evolved as a Think-Tank of global repute on Smart Grids and Smart Cities. The main objectives of ISGF are:

- To help the Indian power sector deploy smart grid technologies in an efficient, cost effective, innovative, and scalable manner by bringing together all key stakeholders and enabling technologies.
- To create a platform for public and private stakeholder members, research institutions and power utilities to exchange ideas and information on smart grids and develop use case scenarios for India.
- To bring together experts from regulation, policy, and the corporate sector to build support for smart grid policies.

- To conduct research on the capabilities of smart grids in the Indian context through case studies, cost-benefit analysis, study of technical advancements in renewable energy sources and other ancillary activities.
- To make recommendations to the Government, Regulators, Utilities and Consumers through reports, white papers, technical seminars, etc.

ISGF has 8 working groups focussed on different aspects of smart grid such as: WG1: Grid Modernization & Smart Cities; WG2: IoT, Smart Metering, AI & Analytics; WG3: Digital Architecture and Cyber Security; WG4: Policy, Regulations and Business Models; WG5: Renewables & Microgrids; WG6: Flexibility & Electric Mobility; WG7: Smart Gas; WG8: Smart Water. Some of the major activities undertaken (and under progress) by India Smart Grid Forum are:

- [Work with Ministry of Power](#)
- [Work with other Ministries and Government Institutions](#)
- [Work at States Level](#)
- [Training and Capacity Building Programs](#)
- [Research Papers and Publications](#)
- [Standards Development Work](#)
- [Conferences and Workshops](#)
- [Advisory Services](#)

For more information on ISGF, [click here](#) to download ISGF flyer and [click here](#) to download ISGF Presentation.

In August 2013 the Ministry of Power approved a Smart Grid Vision and Roadmap for India, which also envisaged the launch of a National Smart Grid Mission (NSGM) with its own resources, authority, and functional and financial autonomy to plan and monitor the implementation of the policies and programmes prescribed in the roadmap. The NSGM was approved by the Government of India in 2015 and it became operational in 2016. The NSGM through its Empowered Committee approved many projects and the status of these Smart Grid projects under NSGM and Integrated Power Development Scheme (IPDS) are given below:

Status of NSGM Smart Grid Projects – January 2022						
S. No.	Utility/Project Area	Location	Project Functionalities	Consumers	Project Cost (approx. in million Euro)	Project Status
1	CED, Chandigarh (Sub Div-5)	Sub Division 5 of Chandigarh	AMI, DTMU, SCADA	29.43K	Approved Project Cost: 3.5 Gol Support: 1.04 Released: 0.94	Till date, 19.025K smart meters installed in field
2	JVVNL, Rajasthan (6 Urban Towns)	Baran, Bharatpur, Bundi, Dholpur,	AMI	150K	Approved Project Cost: 10.6 Gol Support: 3.2 Released: 0.3	Till date, 87.646K smart meters

		Jhalawar, Karauli				installed in field
3	CED, Chandigarh (Complete City Excl. SD-5)	Complete Chandigarh City (excl. SD5)	AMI	184K	Revised Project Cost: 16 (Revised). Gol Support: 4.8 Released: 0.9	Revised sanction for AMI / Smart Metering with MBC and additional service cables issued on December 9, 2021

Source : <https://www.nsgm.gov.in/sites/default/files/SG-Projects-Status-January-2022.pdf>

Status of Smart Grid Pilot Projects (Under IPDS) – January 2022						
S. No.	Utility/Project Area	Location	Project Functionalities	Consumers	Project Cost (approx. in million Euro)	Project Status
1	IIT Kanpur Smart City Pilot	Smart City Pilot in IITK Campus	NA	NA	Project Cost: 1.4 Gol Support: 0.7	Completed
2	CESC, Mysore	V Mohalla, Mysore	AMI, OMS, PLM, MG/DG	21.82K	Project Cost: 4 Gol Support: 2	Completed
3	UHBVN, Haryana	Panipat City Sub-Division	AMI, PLM, OMS	10.18K	Project implemented under grant from NEDO (Japan).	Completed
4	Smart Grid Knowledge Center, Manesar	POWERGRID Complex, Manesar	AMI, OMS, MG/DG, EVCI, HEMS, Cyber Security & Training Infra	NA	Project Cost: 0.7 Gol Support 0.7	Completed
5	HPSEB, Himachal Pradesh	Kala Amb Industrial Area	AMI, OMS, PLM	1.33K	Project Cost: 2.37 Gol Support: 1.2	Completed
6	UGVCL, Gujarat	Naroda	AMI, OMS, PLM, PQ	22.23K	Project Cost: 2.8 Gol Support: 1.4	Completed
7	PED, Puducherry	Division 1 of Puducherry	AMI	33.49K	Project Cost: 4.3 Gol Support: 2.16	Completed
8	WBSEDCL, West Bengal	Siliguri Town	AMI, PLM	5.26K	Project Cost: 0.85 Gol Support: 0.42	Completed

9	APDCL, Assam	Guwahati Division	AMI, PLM	14.51K	Project Cost: 2.4 Gol Support: 1.16 Released: 1.16	Completed
10	TSSPDCL, Telangana	Jeedimetla Industrial Area	AMI, PLM, OMS, PQ	11.90K	Project Cost: 4.25 Gol Support: 2.13 Released: 1.7	Project Completed Final claim with closure report submitted.
11	TSECL, Tripura	Electrical Division No.1, Agartala	AMI, PLM	45.29K	Project Cost: 7.7 Gol Support: 3.8 Released: 3.09	Project termination intimated in Jan 2022.

Source : <https://www.nsgm.gov.in/sites/default/files/SG-Projects-Status-January-2022.pdf>

### Smart Meters:

In India, the implementation of smart meters is at a very early stage. According to recent data released by National Smart Grid Mission, more than 3.94 million smart meters have been installed in the country out of the total allocated quantity of 11.24 million smart meters as of February 2022.

All India Status				
Agency Wise	Sanctioned	Installed SM	Installed SM Prepaid	In Stock
EESL	7.81 Mn	~2.34 Mn	~592.94K	~266.61K
PFCCL	~151.74K	~70.35K	0	~12.03K
RECPDCL	~144.93K	~51.14K	0	~6.19K
Utility	~3.13 Mn	~1.47 Mn	~55.49K	~87.55K
<b>Grand Total</b>	<b>~11.24 Mn</b>	<b>~3.94 Mn</b>	<b>~648.44K</b>	<b>~372.39K</b>
Scheme Wise	Sanctioned	Installed SM	Installed SM Prepaid	In Stock
DDUGJY	~39.20K	~38.40K	0	0
IPDS	~2.10 Mn	~1.34 Mn	~527.50K	~212.87K
NSGM	~723.43K	~122.55K	0	~50.92K
PMDP	~115.50K	~30.37K	0	~2.22K
SG Pilot	~156.53K	~156.53K	0	0
UDAY	~338K	~208.33K	~6.89K	~15.68K
Utility Owned	~7.77 Mn	~2.04 Mn	~114.04K	~90.68K
<b>Grand Total</b>	<b>~11.24 Mn</b>	<b>~3.94 Mn</b>	<b>~648.44K</b>	<b>~372.39K</b>

Source : <https://www.nsgm.gov.in/en/sm-stats-all>

Various agencies are yet to install the remaining 7.3 million smart meters that the government has sanctioned. Among the agencies, Energy Efficiency Services Limited (EESL) has installed 2.34 million



Smart meters out of the total allocated quantity of 7.81 million smart meters. EESL has installed approx. 592.94K prepaid smart meters out of the total installed smart meters.

Power Finance Corporation Consulting Limited (PFCCCL) is the second on the list, installing 70.36K smart meters out of the total allocated quantity of approx. 151.74K smart meters. REC Power Development and Consultancy Limited (RECPDCL) has installed 51.14K smart meters as of February 2022.

Other power utilities across the country have installed 1.47 million smart meters out of the 3.13 million smart meters allocated by the Government.

For more information, please [click here>>](#)

## 3.2 Top companies/key player in Indian Electrical Power Equipment sector

- **Bharat Heavy Electricals Ltd.:** BHEL is India's one of the largest power generation equipment manufacturers and engaged in design, engineering, construction, testing, commissioning, and servicing of a wide range of products and services with over 180 product offerings to meet the ever-growing needs of the core sectors of economy. [Read more>>](#)
- **ABB Ltd.:** ABB is a leading global technology company that energizes the transformation of society and industry to achieve a more productive, sustainable future. By connecting software to its electrification, robotics, automation and motion portfolio, ABB pushes the boundaries of technology to drive performance to new levels. With a history of excellence stretching back more than 130 years, ABB's success is driven by about 110K talented employees in over 100 countries. [Read more>>](#)
- **Siemens AG:** Siemens India Electrical Company manufactures steam turbines, turbo compressors, high-voltage switchgear (circuit breakers, disconnectors, and gas-insulated switchgear), switchboards, remote monitoring systems (RMS), fire detectors and suppression systems, motors and generators, relays and Smart Grid systems, transformers, and advanced medical imaging equipment. The factories replicate global, best-in-class manufacturing systems and practices, with a facility to overhaul and repair gas turbines, compressor blades and rotors. Siemens has 22 factories located across the country, 8 Centres of Competence, 11 R&D centres and a nationwide sales and service network. [Read more>>](#)
- **CG Power and Industrial Solutions Ltd.:** CG Power and Industrial Solutions Limited is an Indian multinational company engaged in design, manufacturing, and marketing of products related to power generation, transmission, and distribution. CG has been aggressively investing in R&D, product certifications, product quality, productivity enhancement and operational excellence. [Read more>>](#)
- **EMCO Ltd.:** EMCO LIMITED is one of India's leading products and solutions providers up to 765 kV/ ± 800 kV for power generation, transmission, distribution utilities and industry. EMCO has been supplying its products and solutions to its customers comprising electric utilities and Industries in India and abroad in more than 50 countries internationally in conformance with National and International Standards like IS, IEC, ANSI, etc. [Read more>>](#)

Other major companies in Indian Electrical Power Equipment industry are Larsen and Toubro Ltd., Schneider Electric SE, Fuji Electric Co. Ltd., TD Power Systems Pvt. Ltd., Toshiba Corp. etc.

### 3.3 Top companies/key player in Indian Power sector

- **NTPC Limited:** NTPC is India's largest power utility with an installed capacity of 67.9 GW (including JVs), plans to become a 130 GW company by 2032. Under JV, NTPC has nine coals based, four gas based and thirteen renewable energy projects. [Read more>>](#)
- **Power Grid Corporation of India Limited:** Power Grid Corporation of India Limited (POWERGRID), is an Indian state-owned electric utility company. Its transmission network consists of 168,140 circuit kilometers and 252 EHVAC and HVDC substations, with total transformation capacity of 422,430 MVA as on 31 January 2021, and an availability of over 99%. Power Grid's interregional capacity is 75.05 GW. [Read more>>](#)
- **Suzlon Energy Ltd.:** Suzlon is one of India's leading renewable energy companies with an installed capacity of approx. 19 GW. Its services span the entire life of wind energy projects. It designs, develops, manufactures wind turbine generators (WTGs). It also provides allied services, providing it a strong presence across the wind power value chain. [Read more>>](#)
- **Tata Power:** Tata Power is India's largest integrated power company with a significant international presence. The Company together with its subsidiaries & joint entities, has a generation capacity of over 13GW of which 32% comes from clean energy sources. TATA power has also established the first public electric vehicle charging station in Mumbai. [Read more>>](#)
- **Adani Power Limited:** Adani Power Limited (APL), a part of the diversified Adani Group, is the largest private thermal power producer in India. Company has a power generation capacity of 12.45GW comprising thermal power plants in Gujarat, Maharashtra, Karnataka, Rajasthan, and Chhattisgarh and a 40 MW solar power project in Gujarat. [Read more>>](#)
- **Reliance Power:** Reliance Power has been established to develop, construct, and operate power projects both in India as well as internationally. The Company on its own and through its subsidiaries has a large portfolio of power generation capacity, both in operation as well as capacity under development. The company has close to 6GW of operational power generation assets. The projects under development include three coal-fired projects to be fueled by reserves from captive mines and supplies from India and elsewhere; one gas-fired projects; and twelve hydroelectric projects, six of them in Arunachal Pradesh, five in Himachal Pradesh and one in Uttarakhand. [Read More>>](#)

Other key power generation companies are Torrent Power, Adani Green Energy Ltd., ReNew Power, JSW Energy Ltd etc.

### 3.4 Key growth drivers in Indian Electrical Equipment and Power Sector

- **Increasing energy demand:** Electricity demand in the country has increased rapidly and is expected to rise further in the years to come. To meet the increasing demand for electricity in the country, massive addition to the installed generating capacity is required.
- **Technological upgradation:** The government focus on implementation of smart technologies like an evolved grid system, smart metering, digital asset management will help transform the seemingly traditional, manpower-heavy sector into a smarter, more efficient power system with each element in the value chain re-imagining their processes and streamlining infrastructure.
- **Increasing residential and commercial sectors:** the growth of the residential and commercial sectors in India will lead to an increase in the demand for power, thereby driving the demand for cables.
- **Policy reforms:** Government schemes such as Deen Dayal Upadhaya Gram Jyoti Yojana (DDUGJY), Power to All, Integrated Power Development Scheme, UDAY, UJALA etc. have augmented electrification across the country.

## 3.5 Policy Initiatives

### 3.5.1 Electricity Act 2003 & its amendments

Electricity Act 2003 has been enacted and came into force from June 15, 2003. The objective is to introduce competition, protect consumer's interests and provide power for all. The Act provides for National Electricity Policy, Rural Electrification, Open access in transmission, phased open access in distribution, mandatory SERCs, license free generation and distribution, power trading, mandatory metering, and stringent penalties for theft of electricity.

There have been various attempts to amend the Electricity Act, 2003, such as the Electricity (Amendment) Bill, 2014 and the Draft Electricity Bill, 2018, and the most recent, [Electricity \(Amendment\) Bill 2020](#). The aim is to push the sector onto a trajectory of sound commercial growth and to enable the States and the Centre to move in harmony and coordination.

### 3.5.2 Electricity (Rights of Consumers) Rules, 2020

The Ministry of Power has notified Electricity (Rights of Consumers) Rules, 2020 on December 31, 2020, under section 176 of the Electricity Act, 2003. These Rules shall empower the consumers of electricity and emanate from the conviction that the power systems exist to serve the consumers and the consumers have rights to get the reliable services and quality electricity.

### 3.5.3 National Electricity Policy 2021 (draft)

The Ministry of Power (MoP) has released the draft National Electricity Policy (NEP) in April 2021. The National Electricity Policy aims at laying guidelines for accelerated development of the power sector, providing supply of electricity to all areas and protecting interests of consumers and other stakeholders keeping in view availability of energy resources, technology available to exploit these resources, economics of generation using different resources, and energy security issues.

The National Electricity Policy 2021 aims at achieving the following objectives:

- Promote clean and sustainable generation of electricity
- Development of efficient and adequate transmission system
- Revitalization of Discoms
- Development of efficient markets for electricity
- Supply of reliable and quality power of specific standards in an efficient manner
- Move towards light touch regulation
- Promotion of manufacturing of good and services in India in the generation, distribution, and transmission segments of power sector under make in India initiative and Aatmanirbhar Bharat Abhiyan.

National Electricity Policy address various issues such as rural electrification, generation, transmission, distribution, recovery of the cost of services and targeted subsidies, technology development and research and development, energy conservation, environmental issues, protection of consumer interests and quality standards, a competition aimed at consumer benefits and more.

Central Electricity Authority or CEA frames the National Electricity Plan once in five years and revise it from time to time according to the National Electricity Policy. The plan is approved by the Central Government to be used by the prospective generating companies, transmission utilities and more. While evolving NEP, CEA consults all the stakeholders including state governments. CEA also interacts with institutions and agencies having economic expertise, especially regarding demand forecasting. [Click here for more details on Draft National Electricity Policy 2021.](#)

### 3.5.4 Indian Electrical Equipment Industry Mission Plan 2022

[Indian Electrical Equipment Industry Mission plan](#) seeks to steer, coordinate, and synergise the efforts of all stakeholders to accelerate and sustain the growth of the domestic electrical equipment industry. It identifies five key areas for action:

- (i) Industry competitiveness
- (ii) Upgrading technology
- (iii) Skill development
- (iv) Promotion of exports and
- (v) Conversion of latent demand.

Detailed recommendations have been formulated for strategic and policy interventions in these five critical areas that need to be addressed by the industry, with support from the government. The Mission Plan envisages to make India the country of choice to produce electrical equipment and reach an output of approx. €85.4 billion by balancing imports and exports. It has been evolved by the Department of Heavy industry through an elaborate exercise involving all stakeholders and with the support of the Indian Electrical and Electronics Manufacturers' Association (IEEMA).

- I. **To enhance industry competitiveness**, the Mission Plan calls for providing a level playing field in the country to domestic electrical equipment manufacturers vis-à-vis foreign manufacturers, replacing the L1 criteria of procurement by power utilities in India with two part bidding, augmenting domestic testing facilities to cover the type testing of all equipment, mandating type testing of imported small equipment in Indian labs, supporting SMEs in technology up gradation and testing, standardisation of product ratings and specifications of electrical equipment, providing funds at globally competitive rates of interest to domestic manufacturers, establishing clusters of electrical and component manufacturers and providing them funds for technology up gradation.
- II. **For technology up gradation**, the Mission Plan recommends a coordinated and collaborative effort by industries and utilities. For any R&D project, the user organisation or main beneficiary should be supported by the government for leading the research in a planned and committed manner. It also recommends public-private partnership (PPP) for fast development of new technology / systems.
- III. **Under skills development**, it is suggested to set up a Sector Skill Council (SSC), which will undertake skill mapping and interact with the industry to provide training to the workers and train the trainers / teachers, propose changes in curriculum, etc. It will also arrange for accreditation of the institutes and certification of the students. The Mission Plan calls for greater involvement of industry in the periodic review of the curriculum of technical institutes, summer training of students and for guest lectures by industry experts.
- IV. **To boost exports of electrical equipment**, the Mission Plan recommends providing policy support to domestic manufacturers to enhance their competitiveness in the global market and address issues of quality of the products, high transaction costs, non-recognition of test certificates of CPRI by some countries, high cost of production, high cost of finance, etc. The Mission Plan calls for more project specific lines of credit by the EXIM Bank to other countries with an emphasis on acceptance of equipment / material only from India for such projects.
- V. **To convert the latent demand for power in the country**, the Mission Plan calls for timely completion of power generation projects and the downstream transmission projects for evacuation of power and improvement in the health of power distribution companies. It recommends the State Governments to acquire land, construct approach roads, and arrange construction power supply and other clearances, with the project developers reimbursing the costs. It suggests that urban areas with high aggregate technical & commercial losses be handed over to private sector on the input-based franchisee model with the provision for investment by the franchisee for system improvement, with the franchisee being asked to set up decentralised distribution-cum-generation (DDG) projects in identified rural areas.

[Read more/Download>>](#)



### 3.5.5 National Wind-Solar Hybrid Policy

The Ministry of New and Renewable Energy (MNRE) released the National Wind-Solar Hybrid Policy in May 2018 to provide a framework for promotion of large grid connected wind-solar PV hybrid system for optimal and efficient utilization of transmission infrastructure and land, reducing the variability in renewable power generation and achieving better grid stability. The policy also aims to encourage new technologies, methods and way-outs involving combined operation of wind and solar PV plants. [Read more>>](#)

### 3.5.6 Pradhan Mantri Sahaj Bijli Har Ghar Yojana (SAUBHAGYA)

Government of India launched the Pradhan Mantri Sahaj Bijli Har Ghar Yojana – Saubhagya on September 25, 2017. The aim of Saubhagya Scheme is to provide energy access to all by last mile connectivity and electricity connections to all remaining un-electrified households in rural as well as urban areas to achieve universal household electrification in the country.

Under Saubhagya scheme, as on March 31, 2021, all the States have reported 100% electrification of all the willing un-electrified households, identified before March 31, 2019. As reported by the States, 28.17 million households have been electrified since launch of Saubhagya, up to March 31, 2021. For more details, please [click here>>](#)

### 3.5.7 Deen Dayal Upadhyaya Gram Jyoti Yojana (DDUGJY)

In July 2015, the Government of India has launched the scheme “Deendayal Upadhyaya Gram Jyoti Yojana (DDUGJY)”, replacing an existing scheme- Rajiv Gandhi Grameen Vidyutikaran Yojana (RGGVY), for village electrification and providing electricity distribution infrastructure in the rural areas. The objectives of the schemes are:

- To provide electrification to all villages
- Feeder separation to ensure sufficient power to farmers and regular supply to other consumers
- Improvement of Sub-transmission and distribution network to improve the quality and reliability of the supply
- Metering at all levels (input points, feeders, and distribution transformers) to reduce the losses
- Micro grid and off grid distribution network

The Scheme has an outlay of approx. €9.25 billion. Rural Electrification Corporation is the Nodal Agency for implementation of DDUGJY. Projects with total cost of approx. €5.4 billion have been sanctioned in 33 States/UTs. Besides, additional amount of approx. €1.7 billion has been sanctioned for creation of additional infrastructure to support 100% household electrification. As on November



30, 2020, an amount of approx. €6 billion has been released as GoI grant since 2014-15<sup>10</sup>. As per the data released, a total of 38.4K smart meter have been installed under the DDUGJY, out of total allocated quantity of 39.2K. For more details, please [click here>>](#)

### 3.5.8 Ujwal Discom Assurance Yojana (UDAY)

Ministry of Power, Government of India launched Ujwal DISCOM Assurance Yojana (UDAY) in November 2015 with an objective to improve the operational & financial efficiency of the State Power Distribution Companies (DISCOMs). This scheme covers 32 states and all Union Territories. **The scheme envisages:**

- Financial Turnaround
- Operational improvement
- Reduction of cost of generation of power
- Development of Renewable Energy
- Energy efficiency & conservation

**UDAY: Progress (as per data available on website)**

<b>Financial</b>		
<b>Indicators</b>	<b>Progress</b>	<b>Target</b>
<b>Bonds Issued</b>	~€28.3 billion (86.29%)	~€32.8 billion
<b>AT&amp;C Loss</b>	20.52%	0%
<b>ACS – ARR Gap</b>	~€0.0048/Unit	<€0/Unit
<b>Tariff Revision</b>	Done for 25 states	27 States

Source : <https://www.uday.gov.in/home.php>

Under the Union Budget 2020-21, the Indian government has also launched '[UDAY 2.0](#)' scheme, with an aim to install smart prepaid metres, prompt payments by DISCOMs, ensure short-term availability of coal and revive gas-based plants. In addition, Finance Minister proposed an approx. €37.2 billion scheme, which will be implemented over five years, to revive DISCOMs and to develop a framework to provide an option to electricity consumers to choose from service providers. For more information about UDAY scheme please [click here>>](#)

<sup>10</sup> <https://pib.gov.in/PressReleaseDetailm.aspx?PRID=1684579>

### 3.5.9 Integrated Power Development Scheme (IPDS)

Ministry of Power, Government of India notified "Integrated Power Development Scheme" (IPDS) on December 3, 2014, with following components:

- I. Strengthening of sub-transmission and distribution networks in the urban areas.
- II. Metering of distribution transformers / feeders / consumers in the urban areas.
- III. IT enablement of distribution sector and strengthening of distribution network under R-APDRP for 12th and 13th Plans by carrying forward the approved outlay for R-APDRP to IPDS.
- IV. Schemes for Enterprise Resource Planning (ERP) and IT enablement of balance urban towns are also included under IPDS. Scope of IT enablement has been extended to all 4041 towns as per Census 2011.
- V. Underground cabling to include additional demand of States and smart metering solution for performing UDAY States and Solar panels on Govt. buildings with net-metering are also permissible under the scheme.

Under IPDS, government has sanctioned 2.106 million smart meters for deployment. Out of which, 1.345 million smart meters have been installed as of February 2022.

For more information, please [click here>>](#)

### 3.5.10 Power for ALL

Power for All is a Joint Initiative of Government of India (GoI) and State Governments with the objective to provide 24x7 power available to all households, industry, commercial businesses, public needs, any other electricity consuming entity and adequate power to agriculture farm holdings.

Ministry of Power, India started the joint initiative with 36 states and UTs for providing power for all. [Click here](#) for more information about Power for All scheme.

### 3.5.11 Revamped Distribution Sector Scheme (RDSS)

The Ministry of Power, Government of India has launched the Revamped Distribution Sector Scheme (RDSS) to help DISCOMs improve their operational efficiencies and financial sustainability by providing result-linked financial assistance to DISCOMs to strengthen supply infrastructure based on meeting pre-qualifying criteria and achieving basic minimum benchmarks. The scheme aims to meet the following objectives:

- Reduction of AT&C losses to pan-India levels of 12-15% by 2024-25.
- Reduction of ACS-ARR gap to zero by 2024-25.
- Improvement in the quality, reliability, and affordability of power supply to consumers through a financially sustainable and operationally efficient distribution sector.

The scheme has an outlay of approx. €37 billion with an estimated budgetary support from Central Government of approx. €11.9 billion, which would be available till 2025-26. Rural Electrification Corporation (REC) and Power Finance Corporation (PFC) are nodal agencies for facilitating the implementation of the scheme. For more information please [click here>>](#)

### 3.5.12 Smart Grid Vision and Roadmap for India

In 2013, Ministry of Power (MoP) released “[Smart Grid Vision and Roadmap for India](#)” which outlines how the country intends to leverage emerging smart grid technologies to transform its power sector.

*Smart Grid Vision Statement: “Transform the Indian power sector into a secure, adaptive, sustainable and digitally enabled ecosystem that provides reliable and quality energy for all with active participation of stakeholders.”*

The roadmap was in alignment with Ministry of Power's overarching policy objectives of “access, gavailability and affordability of power for all”.

[Download>>](#)

### 3.5.13 National Smart Grid Mission (NSGM)

National Smart Grid Mission has been established by Govt. of India vide MoP Office Memorandum dated Mach 27, 2015 to build a roadmap to plan, support and monitor the implementation of the Smart Grid policies and programs in India. The NSGM goals, aligned with the national power sector priorities, aim at the establishment of SLPUMs, Advance Metering Structure, Network mapping and Consumer Indexing, Microgrids & Renewable integration, and SCADA implementation – to create generation-side flexibility linked to the capability of the power system which can modify electricity production or consumption in response to renewable variability to ensure system security.

NSGM is housed under Ministry of Power (MoP) because most of the prominent stakeholders (DISCOMS, Regulators, Electrical manufactures, Central Electricity Authority etc.) for Smart Grid are associated with MoP. Other concerned Ministries like Ministry of New and Renewable Energy (MNRE), Ministry of Housing and Urban Affairs (MoHUA) and Ministry of Heavy Industry (MoHI) are also associated with the Mission.

Smart Grid Pilot Projects under IPDS (erstwhile RAPDRP Part-C): the following Smart Grid pilot projects sanctioned by Ministry of Power which are completed / under implementation are as follows:

- [AVVNL, Ajmer](#)
- [APDCL, Assam](#)
- [CESC, Mysore](#)
- [HPSEB, Himachal Pradesh](#)
- [PED, Puducherry](#)
- [TSECL, Tripura](#)
- [TSSPDCL, Telangana](#)

- [UHBVN, Haryana](#)
- [UGVCL, Gujarat](#)
- [WBSEDCL, West Bengal](#)
- [IIT Kanpur](#)
- [SGKC, Manesar](#)

**Smart Grid Projects under NSGM:** So far, following projects have been sanctioned under National Smart Grid Mission:

- [Subdivision 5 under CED Chandigarh](#)
- [Complete City excluding Subdivision 5 under CED Chandigarh](#)
- [Ranchi City under JBVNL Jharkhand](#)
- [6 Towns under JVVNL Rajasthan](#)

As per the data available on NSGM website, government has sanctioned more than 723k smart meter for deployment in four pilot projects under the NSGM (see table).

Pilot Projects under NSGM		
City	Smart Meters (nos)	Completion
Chandigarh (Sub-division 5)	29.5K	Mar-22
Chandigarh (Entire city except SD-5)	184K	Mar-22
Ranchi (Jharkhand)	360K	Mar-24
Rajasthan (six towns)	150K	Mar-22
<b>Total</b>	<b>723.5K</b>	

According to data, as of February 28, 2022, a total of over 122.5K smart meters were installed under these four projects.

For more information please [click here>>](#)

### 3.5.14 Smart Meter National Programme (SMNP)

Smart Meter National Programme (SMNP) aims to replace 250 million conventional meters with smart meters in India. Smart meters are connected through a web-based monitoring system which will help to reduce commercial losses of utilities, enhance revenues, and serve as an important tool in power sector reforms. EESL business model to roll out smart meters is revamping the current manual system of revenue collection which leads to low billing and poor collection efficiencies.

This programme is being implemented under the BOOT model on cost plus approach, which means all Capex/Opex is done by EESL, and the states/ utilities are not required to invest upfront.

EESL has signed MoUs/Agreements for smart meters with the states of Andhra Pradesh, Uttar Pradesh, Haryana, Bihar, NDMC-Delhi, Rajasthan, Telangana and for prepaid meters with the states of Uttar Pradesh and Tripura.

By EESL's smart metering project, NDMC becomes the first utility to have all their consumers with smart meters without any upfront investment from NDMC.

For more information, please [click here>>](#)

### 3.5.15 Solar Parks Scheme

To facilitate large scale grid connected solar power projects, a scheme for "Development of Solar Parks and Ultra Mega Solar Power Projects" is under implementation with a target capacity of 40 GW capacity by March 2022. Solar parks provide solar power developers with a plug and play model, by facilitating necessary infrastructure like land, power evacuation facilities, road connectivity, water facility etc. along with all statutory clearances. As on November 30, 2021, 52 solar parks have been sanctioned with a cumulative capacity of 37.92 GW in 14 states. Solar power projects of an aggregate capacity of around 9.2 GW have already been commissioned in these parks.

For more information, please [click here>>](#)

### 3.5.16 CEA cybersecurity guidelines for the power sector

In October 2021, the Ministry of Power (MoP) and Central Authority of Electricity (CEA) released the guidelines for cybersecurity in the power sector to be adhered by all Power Sector utilities to create cyber secure eco system. **Objective of issuing Guideline:**

- To create cyber security awareness
- To create a secure cyber ecosystem,
- To create a cyber-assurance framework,
- To Strengthen the regulatory framework,
- To create mechanisms for security threat early warning, vulnerability management and response to security threats,
- To secure remote operations and services,
- To protection and resilience of critical information infrastructure,
- To reduce cyber supply chain risks,
- To encourage use of open standards,
- Promotion of research and development in cyber security,
- Human resource development in the domain of Cyber Security,
- Developing effective public private partnerships,
- m)Information sharing and cooperation
- Operationalization of the National Cyber Security Policy

Guidelines are applicable to all Responsible Entities as well as System Integrators, Equipment Manufacturers, Suppliers/Vendors, Service Providers, IT Hardware, and Software OEMs engaged in the Indian Power Supply System for protection of Control Systems for System Operation and Operation Management, Communication System and Secondary Automation and Tele control technologies.

CEA is also working on cyber security regulations. This Cyber Security guideline is precursor to the same. For more information, please [click here>>](#)

### 3.5.17 Guidelines & Standards for Charging Infrastructure for Electric Vehicles (EV)

The guidelines & standards for charging infrastructure for electric vehicle were issued by the Ministry of Power (MoP) in December 2018 which were subsequently revised in October 2019, an amendment thereof in June 2020 and further revision in January 2021.

The objective is to enable a faster adoption of electric vehicles in India by ensuring safe, reliable, accessible, and affordable Charging Infrastructure and eco-system. This would also promote energy security and reduction of emission intensity of the country by promotion of entire EV ecosystem.

These guidelines are exhaustive and include provisions for a) individual owners of Electric Vehicles: b) for Public Charging Stations (PCS). In a significant step, Owners may charge their Electric Vehicles at their residence/offices using their existing electricity connections. Infrastructure requirements for Public Charging Infrastructure as well as for Public Charging Infrastructure for long range EVs and/or heavy duty EVs have been outlined. [Read more>>](#)

### 3.5.18 Unnat Jyoti by Affordable LEDs for All (UJALA)

Government of India, on January 5, 2015, launched UJALA programme to provide LED bulbs to domestic consumers for replacement of incandescent bulbs with LED bulbs at an affordable price. EESL's Unnat Jyoti by Affordable LEDs for All (UJALA) is the world's largest lighting replacement programme.

Till date, over 367.94 million LED bulbs, 7.20 million LED Tube lights and 2.34 million Energy efficient fans distributed by EESL across India. This has resulted in estimated energy savings of 47.77 billion kWh per year with avoided peak demand of 9.566GW, GHG emission reduction of 38.7 million t CO<sub>2</sub> per year. For more information, please [click here>>](#)

### 3.5.19 Street Lighting National Programme (SLNP)

Government of India launched SLNP programme on January 5, 2015, to replace conventional streetlights with smart and energy efficient LED streetlights. As on date, over 12 million LED Street lights have been installed by EESL across India. This has resulted in estimated energy savings of 8.41



billion kWh per year with avoided peak demand of 1.4 GW and estimated GHG emission reduction of 5.8 million t CO<sub>2</sub> per year. For more information please [click here>>](#)

### 3.5.20 Gram Ujala

Government of India launched “Gram Ujala” program on March 19, 2021, wherein old type of bulbs is replaced by efficient LED bulbs that consumes 88% less electricity. Under the scheme CESL is providing high quality 7-Watt and 12-Watt LED bulbs with 3 years guarantee at a cost of €0.12 per bulb in exchange of working incandescent bulbs. Every household can exchange a maximum of 5 bulbs. As on date, Convergence Energy Services Limited (CESL) has distributed over 6.9 million LED bulbs under this program. The distribution has resulted in energy savings of over 1K million Units per year with cost savings of approx. €43.4 million per year in the rural areas of states. The programme is active till March 31, 2022. For more information please [click here>>](#)

## 4. Electronics sector including consumer electronics

### 4.1 Introduction

The electronics industry is one of the largest and fastest growing industries in the world. Electronic products continue to impact and shape our lifestyle prominently in today’s digital era. With the world being more connected than ever and the digital push induced by COVID-19 pandemic; the demand for electronic devices is expected to grow steadily and continue to be a major economic driver across the globe. The global electronics industry is estimated at approx. €2.5 trillion in 2020. For comparison, the global value of electronics industry is almost equal to the economy size of India, which currently stands at approx. €2.5 trillion. The Indian Electronics industry can be broadly segmented into the following sectors:

- **Consumer Electronics:** Mobile Phones, Televisions, Refrigerators, Set-top Boxes, Digital Cameras, Air Conditioners, Washing Machines etc.
- **Computer Industry:** Desktops, notebooks, tablets, monitors, servers, storage flash memory cards, USB drives and printers/MFDs
- **Industrial Electronics:** Process Control Equipment (PCE), Automation and Analytical Instruments (A&AI), Power Electronics Equipment (PEE), Test & Measuring Equipment (T&ME) etc.
- **Electronic Components:** **Electro-Mechanical Components** include Printer Circuit Boards, Connectors, etc., **Active Components** include Integrated Circuits’ Diodes, Transistors, Picture Tubes, etc., **Passive Components** consist of Wound Components, Capacitors, Resistors, etc., **Associated Components** consist of Optical Discs, Magnets, RF Tuners, etc.
- **Communication & Broadcasting (C&B) Electronics:** Fixed-line and mobile telecommunication equipment, modems, routers, switches, IP PBX, BTS (GSM, CDMA), WiMax (BTS, CPE), PON/GPON ONT/OLT and DWDM.
- **Strategic Electronics:** Military Communication Systems, Radars and Sonars, Network Centric Systems, Electronic Warfare Systems, Weapon Systems Satellite Based Communication, Navigation and Surveillance Systems, Navigational Aids, Underwater Electronic Systems, Infra-

Red (IR) Based Detection and Ranging System, Disaster Management System, Internal Security System, etc.

- **Automotive Electronics:** Electric vehicles and connected mobility

## Market status:

In the last few years, India has emerged as one of the largest markets for electronic products in the world. Currently, the country's electronics production industry is stood at approx. €64 billion at the end of 2021 and is segmented as Mobile Phones (40.16%), Consumer Electronics (12.7%), Strategic Electronics (5.3%), Computer Hardware (4%), LEDs (3%) and Industrial Electronics (14%), Auto electronics (8%), Electronic components (12%) and PCBA (0.7%). The electronics production industry in expected to grow from the present ~€64 billion to ~€256 billion. by 2025-26.

## Electronics Industry: Roadmap for next 5 years:

Roadmap to manufacture €256 billion electronic products		
Product segment	2020-21 (approx. billion Euro)	2025-26 (approx. billion Euro)
Mobile Phones	25.6	107.56
IT hardware (laptops, tablets)	2.56	21.34
Consumer electronics (TV, audio)	8.1	19.63
Strategic electronics	3.4	10.24
Industrial electronics	8.96	21.34
Wearables and Hearables	-	6.82
PCBA	0.42	10.24
Auto electronics	5.12	19.63
LED lighting	1.87	13.65
Telecom equipment	-	10.24
Electronic components	7.68	15.36
<b>Total</b>	<b>63.76</b>	<b>256</b>

The consumer electronic sector in India is one of the major sectors of the country and contributes more than half (52%) of the total electronics production in country. The consumer electronics production industry is stood at approx. €33.7 billion (including Mobile phones, TV, and audio) at the end of 2021 and is expected to reach approx. €128 billion by 2025-26.

Electronics industry - estimated exports trend over next 5 years		
Product segment	2020-21 (approx. billion Euro)	2025-26 (approx. billion Euro)
Mobile Phones	2.64	44.4-49.5
IT hardware (laptops, tablets)	0.17	10.2-14.5
Consumer electronics (TV, audio)	-	1.7-2.5
Electric vehicles	-	-
LED lighting	-	7.7-10.2
Wearables and Hearables	-	1.7-2.5
PCBA	0.25	7.7-10.2
Industrial electronics & components	5.37	11.9-15.5
Sub-assemblies	0.17	1.7-2.5
Electronic fans	-	0.8-1.7
AC components (controller, BLDC Motor etc.)	-	0.8-1.7
<b>Total</b>	<b>8.62</b>	<b>89.6-110.9</b>

Mobile phones constitute a major chunk of the country's electronics exports. The exports of electronic products are to increase from the projected approx. €12.8 bn in 2021 to €102.4 bn by 2026.

## 4.2 Top companies/key player in Indian Electronics sector

The consumer electronics and appliances industry in India is expected to become the fifth largest in the world by 2025. Here is the list of some of the top Indian companies involved in the manufacturing of consumer electronics.

- **LG Electronics India Pvt Ltd:** LG Electronics India Pvt Ltd is South Korean MNC Company. LG comprises four business units: Home Entertainment, Mobile Communications, Home Appliance & Air Solution, and Vehicle Components, with Starion India as its main production vendor for refrigeration and washing machines in the Indian sub-continent. It is global company serving worldwide. LG Electronics' products include televisions, home theater systems, refrigerators, washing machines, computer monitors, wearable devices, smart appliances, and smartphones. [Read more>>](#)
- **Philips India Ltd:** Philips India Ltd is one of the top consumer durables companies in India. It is offering a range of products including Home Appliances, lighting, medical equipment, and audio equipment. [Read more>>](#)

- **Samsung India Electronics Pvt Ltd:** Samsung India Electronics Pvt Ltd leading consumer durable companies in flagship division of Samsung Group. Samsung electronics is manufacturing a range of electronics components batteries, chips, flash memory, semiconductors, and hard drive devices. It has marked its worldwide presence. It is one of the world's largest manufacturers of smartphone and mobile phones. [Read more>>](#)
- **Godrej and Boyce:** Godrej and Boyce, a Godrej Group Company, has a presence across 14 diverse businesses. Its journey began in 1897 with the manufacture of high-quality locks, then extending to other durables (refrigerators, washing machines, air conditioners, home security systems and safes, furniture), products for institutions (office furniture, audio-visual solutions, access control systems, perimeter security solutions, bank security solutions, beverage vending machines, interior solutions, hospital and laboratory furniture) and industrial products. [Read more>>](#)
- **Whirlpool India:** The Company is primarily engaged in the manufacturing and trading of Refrigerators, Washing Machines, Air Conditioners, Microwave Ovens, and small appliances and caters to both domestic and international markets. [Read more>>](#)
- **Crompton Greaves Consumer Electricals Ltd.:** The company is one of the leading consumer durable companies in India. The company manufactures and markets a range of consumer products. The company's main products and services include lighting products and electrical consumer durables. [Read more>>](#)
- **Havells India:** Havells India is one of the biggest consumer products manufacturing companies in India. The company has a leading market share in a wide range of smart home products. From lighting, switches, electrical circuitry and wiring to home & kitchen appliances, fans, air coolers and water heaters. The eco-friendly and power saving, Havells consumer products provide great functionality and durability, and look chic to suit the needs of your living spaces. [Read more>>](#)
- **Voltas:** The Company is engaged in room air conditioners, contract revenue, commercial refrigeration products, and the sale of services. The Company's segments include Electro-mechanical Projects and Services; Engineering Products and Services; Unitary Cooling Products for Comfort and Commercial use, and Others. The Company offers a range of products- including textile machinery; mining and construction equipment; heating, ventilation, air conditioning and refrigeration (HVAC&R), and water coolers and dispensers. [Read more>>](#)
- **Bajaj Electricals:** The company is one of the top consumer durable companies in India. It offers a wide range of products including Home Appliances, Fans, Lighting & Engineering, and products. [Read more>>](#)
- **Blue Star:** The Company's products include central air conditioning, room air conditioners, and specialty cooling products. [Read more>>](#)

### 4.3 Key growth Drivers in Indian Electronics Sector

- **Growing middle-class population and rising disposable incomes:** The growing middle-class population in the country is leading to an increase in the demand for more housing units. Demand for consumer electronics such as mobiles, modern computers, modern TVs, LEDs, etc. are growing rapidly because of rising disposable income, and awareness about benefits of using these modern electronic products.

- **Increasing adoption of high-end technology devices:** The adoption of high-end technologies is also contributing significantly to the growth in consumer electronic devices. Consumers are becoming increasingly technology-conscious and are demanding smart and connected devices. This has led to the development of electronics and consumer durable products that come with intelligent functions.
- **Supportive government Policies:** The Government of India has put in place several policy initiatives such as PLI scheme, Modified Special Incentive Package Scheme (M-SIPS) and Electronic Development Fund (EDF) etc. to make the country a global Electronics manufacturing hub.
- **Growth of Smart Factories:** In the era of Industry 4.0/Smart Manufacturing, everything in a factory will be connected through the Internet and the cloud, enabling it to function as one smart system rather than as individual parts. The concept of the Smart Factory, which is being adopted by electronics manufacturers to upgrade product lines, will also accelerate the pace of growth of Indian Electronics Industry.
- **Electric vehicles and connected mobility related applications:** EVs and mobility related appliances have already opened huge opportunities for power electronics devices and components, including power management semiconductors, etc. However, the desire for a longer driving range between charges, faster battery charging times, increasing electronics integration for infotainment, safety and security, and other applications will further technologically advance, increasing the total electronics content of EVs.

## 4.4 Policy Initiatives

### 4.4.1 National Policy on Electronics 2019 (NPE 2019)

In February 2019, the Union Cabinet had approved the National Policy on Electronics 2019 (NPE 2019) which aims to position India as a global hub for Electronics System Design and Manufacturing (ESDM). The National Policy of Electronics 2019 (NPE 2019) replaces the National Policy of Electronics 2012 (NPE 2012). The Policy is holistic, investor-friendly, and market-driven, and focused on upgradation of infrastructure, providing incentives to offset disabilities, promoting innovation and human resource development.

**VISION:** To position India as a global hub for Electronics System Design and Manufacturing (ESDM) by encouraging and driving capabilities in the country for developing core components, including chipsets, and creating an enabling environment for the industry to compete globally.

#### OBJECTIVES:

- Promote domestic manufacturing and export in the entire value-chain of ESDM for economic development to achieve a turnover of approx. €317 billion by 2025. This will include targeted production of 1.0 billion mobile handsets by 2025, valued at approx. €158 billion, including 600 million mobile handsets valued at approx. €85 billion for export.
- Improve ease-of-doing Business for the ESDM industry.
- Encourage industry-led R&D and innovation in all sub-sectors of electronics.



- Promote and create a framework for comprehensive Start-up eco-system in emerging technology areas such as 5G, IoT, Artificial Intelligence, Machine Learning, Drones, Robotics, Additive Manufacturing, Photonics, Nano-based devices etc., and their applications in areas such as defence, agriculture, health, cyber security, smart cities, and automation, with special focus on solving real-life problems.
- Provide incentives and support for significantly enhancing availability of skilled manpower, including re-skilling, in the ESDM sector.
- Provide fiscal incentives and support for export-led growth, including significantly enhancing economies of scale in electronics manufacturing.
- Develop core competencies in all the sub-sectors of electronics, including inter-alia electronic components, sub-assemblies and semiconductors, telecommunication and broadcasting equipment, IT hardware, medical electronics, defence and strategic electronics, automotive electronics, industrial electronics, consumer electronics, etc., and fabless chip design.
- Become a global leader in the Electronics Manufacturing Services (EMS) segment by promoting progressively higher value addition in manufacturing of electronic products.
- Provide policy support and special package of incentives for highly capital-intensive projects.
- Drive indigenization in the microchips used by strategic and critical infrastructure sectors viz., defence, space, atomic Energy, telecommunications, broadcasting, aviation, power, etc., through design and production of such microchips.
- Create specialized governance structures within the Government to cater to specific needs of the ESDM sector, in view of fast changes in technology and business models.
- Facilitate loans to the industry at competitive rates for setting up or expansion of electronics manufacturing units.
- Promote research, innovation, and support to the industry in the areas of packaging, interconnects, and micro photonics, as a long-term measure to counter the problems posed by the continued use of Silicon, like the limit of scaling and dark Silicon.
- Encourage and incentivize Transfer of Technology (ToT) for core technologies.
- Promote research, innovation, and support to industry for green processes and sustainable e-Waste management, including inter-alia facilitation of citizen engagement programmes for safe disposal of e-Waste in an environment friendly manner, development of e-Waste recycling industry and adoption of best practices in e-Waste management.

Ministry of Electronics and Information Technology (MeitY) will coordinate with the concerned Ministries/ Departments to provide support to industry for rapid and robust expansion of electronics hardware manufacturing within the country. [Read more/Download>>](#)

#### 4.4.2 Modified Special Incentive Package Scheme (M-SIPS)

To promote large scale manufacturing in the country, M-SIPS was announced by the Government of India in July 2012 to offset disability and attract investments in Electronics System Design and Manufacturing (ESDM) Industries. The scheme provides incentive for investments on capital expenditure- 20% for investments in Special Economic Zones (SEZs) and 25% in non-SEZs. The Scheme was [revised vide notification](#) dated August 3, 2015, which was further amended vide notification dated January 30, 2017.



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. Units across the value chain starting from raw materials including assembly, testing, packaging, and accessories of these categories of products are included.

Under M-SIPS, 419 investment proposals involving investment of approximately €13.8 billion have been received till December 31, 2018. Out of these 419 applications, 197 applications with proposed investment of approximately €5 billion have been approved; 19 applications with proposed investment of approximately €1.8 billion have been recommended by the Appraisal Committee for approval and 203 applications with proposed investment of approximately €6.9 billion are under appraisal. Out of 197 units which have been approved, 134 units have commenced commercial production. Total capital investment reported by these companies is approximately €1.2 billion. These 134 units have reported total sales of approx. €9.1 billion, out of which goods worth approx. €2 billion have been exported. The revenue paid to the Government on production by these units is approx. €1.1 billion. As per Quarterly Progress Reports received from approved applicants, employment generated by these units so far is 66.5k (direct and indirect).

The MSIPS Scheme is closed to receive new application on December 31, 2018. [Read more>>](#)

#### 4.4.3 Electronics Manufacturing Clusters (EMC)

The Electronics Manufacturing Clusters (EMC) Scheme, also launched in 2012, encouraged entities, including State Government entities to provide support for creation of world-class infrastructure for attracting investments in the Electronics Systems Design and Manufacturing (ESDM) Sector. Under the scheme, 50% of the project cost for Greenfield EMC and 75% for Brownfield EMC is given as grant.

So far, 19 Greenfield EMCs and 3 Brownfield EMC projects have been sanctioned with the project outlay of approx. €458 million, including approx. €187 billion from the Government of India as Grant-in-aid<sup>11</sup>. [Read more>>](#)

#### 4.4.4 Electronics Development Fund (EDF)

Electronics Development Fund (EDF) is set up as a “Fund of Funds” to participate in professionally managed “Daughter Funds” which provide risk capital to companies developing new technologies around Electronics, Nano-electronics, and Information Technology (IT). This fund is fostering R&D and innovation in these technology sectors. EDF enables creation of an ecosystem for providing risk capital to industry to undertake Research and Development in these technology areas. It is, in the process, enriching the intellectual property in the country and encouraging more entrepreneurs towards product and technology development. List of Daughter Funds of EDF along with their Status regarding Fresh Investments is available [here>>](#)

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<sup>11</sup> <https://emcpms.gov.in/site/login>

For more information please [click here>>](#)

#### 4.4.5 Production Linked Incentive Scheme (PLI) for Large Scale Electronics Manufacturing

As part of the National Policy on Electronics, the Production Linked Incentive Scheme (PLI) for Large Scale Electronics Manufacturing has been notified by Government of India in April 2019. The scheme proposes a financial incentive to boost domestic manufacturing and attract large investments in the electronics value chain including electronic components and semiconductor packaging. The scheme shall extend an incentive of 4% to 6% on incremental sales (over base year) of goods manufactured in India and covered under target segments, to eligible companies, for a period of five years after the base year as defined. Production Linked Incentives of up to ~€5 billion will be awarded over a period of 5 years.

After the success of the First Round of Production Linked Incentive Scheme in attracting investments in mobile phone and electronic component manufacturing, the proposal for accepting applications under Second Round of the PLI Scheme has been approved by the Competent Authority. The target segment for the purpose of this round shall be Specified Electronic Components.

Under the Second Round, incentives of 5% to 3% shall be extended on incremental sales (over base year i.e., 2019-20) of goods manufactured in India and covered under the target segment, to eligible companies, for a period of 4 years. For more information, please [click here>>](#)

#### 4.4.6 Scheme for Promotion of Electronic Components and Semiconductors (SPECS)

The Scheme for Promotion of Manufacturing of Electronic Components and Semiconductors (SPECS) [notified](#) by Government of India on April 01, 2020. The SPECS will help offset the disability for domestic manufacturing of electronic components and semiconductors to strengthen the electronics manufacturing ecosystem in the country.

The scheme will provide financial incentive of 25% on capital expenditure for the manufacturing of Electronics goods that comprise downstream value chain of electronic products, i.e., electronic components, semiconductor/ display fabrication units, ATMP units, specialized sub-assemblies, and capital goods for manufacture of aforesaid goods, all of which involve high value-added manufacturing.

The Scheme will be applicable to investments in new units and expansion of capacity/ modernization and diversification of existing units. Application under the Scheme can be made by any entity registered in India.

The capital expenditure will be total of expenditure in plant, machinery, equipment, associated utilities, and technology, including for Research & Development (R&D).

The Scheme is open for applications initially for 3 years from the date of its notification. Incentives under the Scheme will be applicable from the date of acknowledgment of the application. The

incentives will be available for investment made within 5 years from the date of acknowledgement of application.

The SPECS has a budget outlay of approx. €400 million spread over a period of eight years and the government estimates that push for manufacturing of electronics components and electronic chips will create around 600K direct and indirect jobs. [Read more>>](#)

The Scheme will be implemented through a nodal agency which will act as Project Management Agency (PMA) and be responsible for providing secretarial, managerial and implementation support and carrying out other responsibilities as assigned by MeitY from time to time.

#### 4.4.7 EMC 2.0 Scheme

To develop a robust electronics manufacturing ecosystem in the country to make India an Electronics Manufacturing Hub; Government of India launched “Modified Electronics Manufacturing Clusters (EMC 2.0) Scheme” on April 01, 2020. The objective of the scheme is to address the disabilities, by providing support for creation of world class infrastructure along with common facilities and amenities, including Ready Built Factory (RBF) sheds / Plug and Play facilities for attracting major global electronics manufacturers along with their supply chain to set up units in the country.

This Scheme will strengthen the linkage between domestic and international market by strengthening supply chain responsiveness, consolidation of suppliers, decreased time-to-market, lower logistics costs, etc.

The EMC 2.0 Scheme provides financial assistance for setting up of both EMC projects and Common Facility Centres (CFCs) across the country. The Scheme is open for receipt of applications for a period of 3 years from the date of notification. Further period of 5 years is available for disbursement of funds to the approved projects. For more information, please [click here>>](#)

#### 4.4.8 Five-year roadmap for electronics sector in India

Ministry of Electronics and Information Technology, in association with ICEA, released a 5-year roadmap and Vision Document for the electronics sector today, titled “\$300 bn Sustainable Electronics Manufacturing & Exports by 2026.” This roadmap is the second volume of a two-part Vision Document – the first of which titled “Increasing India’s Electronics Exports and Share in GVCs” was released in November 2021.

This report provides a year-wise break-up and production projections for the various products that will lead India’s transformation into a €256 billion electronics manufacturing powerhouses, from the current €64 billion. Amongst the key products that are expected to lead India’s growth in electronics manufacturing include Mobile Phones, IT Hardware (laptops, tablets), Consumer electronics (TV and audio), Industrial electronics, Auto electronics, electronic components, LED Lighting, Strategic electronics, PCBA, Wearables and hearables, and Telecom equipment. Mobile manufacturing that is expected to cross €85 billion annual production - up from the current €25 billion - is expected to constitute 40% of this ambitious growth.

## 4.4.9 Compulsory Registration Scheme by Ministry of Electronics and Information Technology (MEITY)

Ministry of Electronics and Information Technology (MEITY) along with Bureau of Indian Standards (BIS) has introduced “Compulsory Registration Scheme (CRS)” in 2012.

- MeitY notified "[Electronics and Information Technology Goods \(Requirement for Compulsory Registration\) Order, 2012](#)" for fifteen categories of electronics products in 2012. The order would be suppressed by the "[Electronics and Information Technology Goods \(Requirement of Compulsory Registration\) Order, 2021](#)"
- Another fifteen product categories were added in 2014.
- Ministry of New Renewable Energy (MNRE) issued [new set of quality norms and standards](#) for all solar equipment in 2017 that mandate the sellers and makers of solar modules, one of the key components of solar projects, to get their products registered under quality parameters set by BIS.
- So far, the scheme covers [forty-nine product categories](#) notified by Meity and MNRE
- BIS is operating the scheme as per the provision of Scheme - II of the [BIS \(Conformity Assessment\) Regulations, 2018](#).

## 5. Standardisation

### 5.1 Bureau of Indian Standards (BIS), National Standards Body of India

BIS is the National Standard Body of India established under the BIS Act 2016 for the harmonious development of the activities of Standardisation, marking and quality certification of goods and for matters connected therewith or incidental thereto. BIS has been providing traceability and tangibility benefits to the national economy in several ways – providing safe reliable quality goods; minimizing health hazards to consumers; promoting exports and imports substitute; control over proliferation of varieties etc. through Standardisation, certification, and testing. Within BIS, there are following two division council which have been working in the field of electrical and electronics.

- I. **Electro-technical division council (ETD):** Covers Standardisation in the field of electrical power generation, transmission, distribution, and utilization equipment; and insulating materials, winding wires, measuring and process control instruments and primary and secondary batteries and has issued over 1800 standards till date.
  - **ETD 28: Solar Photovoltaic Energy Systems:** National mirror committee of IEC TC-82 (P)
  - **ETD13: Equipment for Electrical Energy Measurement and Load Control (Smart Meter):** National mirror committee of IEC TC-13 (P)

- **ETD 25-Lifts, Escalators and Moving Walks:** To prepare standards and codes of practice for electrically operated lifts and escalators, including equipment and components. ETD 25 is national mirror committee of ISO TC- 178 (P).
- **ETD 47-Railway Electric Traction Equipment: National mirror committee of IEC TC-9 (O):** ETD 47 is responsible for preparing Indian Standards for the railways field which includes rolling stock, fixed installations, management systems (including communication, signalling, and processing systems) for railway operation, their interfaces, and their ecological environment. These standards cover railway networks, metropolitan transport networks (including metros, tramways, trolleybuses, and fully automated transport systems) and magnetic levitated transport systems. These standards relate to systems, components and software and they will deal with electrical, electronic, and mechanical aspects, the latter being limited to items depending on electrical factors. These standards deal with electromechanical and electronic aspects of power components as well as with electronic hardware and software protocols for achieving compatibility in interface.
- **ETD 46: Grid Integration** for preparing standards in the field of Grid Integration comprising of LT (ON Grid, Off Grid and Hybrid with and without storage), HT and EHT for all capacities.
- **ETD 50 – LVDC Power Distribution System:** National mirror committee of IEC TC-SyC LVDC (P): SyC LVDC Low Voltage Direct Current and Low Voltage Direct Current for Electricity Access.
- **ETD 51-Electrotechnology in Mobility** (National mirror committee of IEC TC-69 (P)): responsible for preparing Indian Standards for electrotechnical aspects of totally or partly electrically propelled road vehicles.
- **ETD 52-Electrical Energy Storage (EES) Systems:** 1) Standardisation in the field of grid integrated Electrical Energy Storage Systems. a) The Sectional Committee to focus on system aspects on EES Systems rather than energy storage devices and shall prepare Indian Standards dealing with the system aspects of electrical energy storage. 2) EES to include any type of grid-connected energy storages, which can both store electrical energy from a grid or any other source and provide electrical energy to a grid. a) The Sectional Committee to include Chemical Energy Storage as one of the EES. b) Thermal storage to be included in the scope, only from the electricity exchange point of view. c) Unidirectional energy storages such as UPS not to be included in the scope of the sectional Committee.

For more information about all technical committees of ETD and complete list of published standards, please [click here>>](#)

- II. **Electronics and Information Technology division council (LITDC):** Covers Standardisation in the field of electronics and telecommunications including information technology and has developed more than 1750 standards till date.



- **LITD 10: Power system Control and associated Communications:** To prepare Indian Standards relating to: a) Power system control equipment and systems b) Distribution Management System c) Supervisory Control and Data Acquisition d) Distribution automation, **Smart Grid**, tele-protection, and associated communications used in planning, operation, and maintenance of power systems. It is national mirror committee of IEC TC- 57 (P): Power systems management and associated information exchange; IEC TC- SC-PC 118 (P): Smart Grid User Interface.

For full list of standards published by LITDC, please [click here](#)

## 5.2 Telecommunication Engineering Center (TEC)

TEC released a technical report titled “[M2M Enablement in Power Sector](#)” in May 2015 to introduce the need of M2M communication in the power sector and identified use cases this sector which include smart metering, Supervisory Control and Data Acquisition (SCADA), Wide Area Monitoring System (WAMS), Electric Vehicles, Distributed Generation, Energy Storage, Microgrids and so on.

## 6. Conclusion

The Indian Electrical Power Equipment Sector and the Electronics Sector including Consumer Electronics are witnessing a major transformation in respect of demand growth, energy mix and market operations. Various socio-economic factors and technology developments are contributing to this.

In the Indian power sector, there is an urgent need to promote generation of electricity based on renewable energy sources due to its environment benefits coupled with energy security. The Government has been making special effort for research and development of various types of renewable energy technologies, retrofitting of existing coal-based power plants with new equipment to make them act as flexible generating plants and energy storage systems.

The government is also revising the National Electricity Policy 2005 and has released a draft National Electricity Policy, NEP 2021 which will focus on optimum regulatory arrangements for the future, outline a template of some successful initiatives, set new medium-term objectives that build upon past achievements, and identify pathways to achieve these objectives.

The Government of India has been installing Smart Meters under various schemes such as National Smart Grid Mission (NSGM) and Integrated Power Development Scheme (IPDS) etc. and is providing funding to the States for implementation of smart metering across the country. EESL is also implementing smart metering projects being launched by the DISCOMs at their own independent initiative in the States of Uttar Pradesh, Haryana, Bihar, Rajasthan, A&N Islands, Delhi etc. on OPEX basis wherein EESL is making the initial capital expenditure and DISCOMs are paying back to EESL on monthly rental basis.



The government has also released the guidelines for cybersecurity in the power sector for the first time, to create a secure cyber ecosystem.

The growth potential and strategic importance of the electronics industry has been widely acknowledged by the Government of India in the National Policy for Electronics, 2019 ('NPE'). To position India as a global hub for Electronics System Design and Manufacturing (ESDM) and push further the vision of NPE 2019, Government has launched three schemes namely the Production Linked Incentive Scheme (PLI), Scheme for Promotion of Manufacturing of Electronic Components and Semiconductors (SPECs) and Modified Electronics Manufacturing Clusters Scheme (EMC 2.0) were notified in April 2020.

The Government of India is also getting future ready and has started work on identifying and formalizing standards for implementing new emerging technologies such as Smart Grid, Smart Meter, 5G, AI, IoT/M2M, Blockchain etc. Work must be carried out at the international as well as national level for early adoption and implementation of these new emerging technology.

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