“Indian Electrical Equipment including Consumer Electronics Industry”

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Outline

- **Indian Electrical sector**
  - Introduction, Market status, Major players & Growth drivers
- **Indian Electronics/consumer Electronics sector**
  - Introduction, Market status, Major players & Growth drivers
- Government Policy & New initiatives
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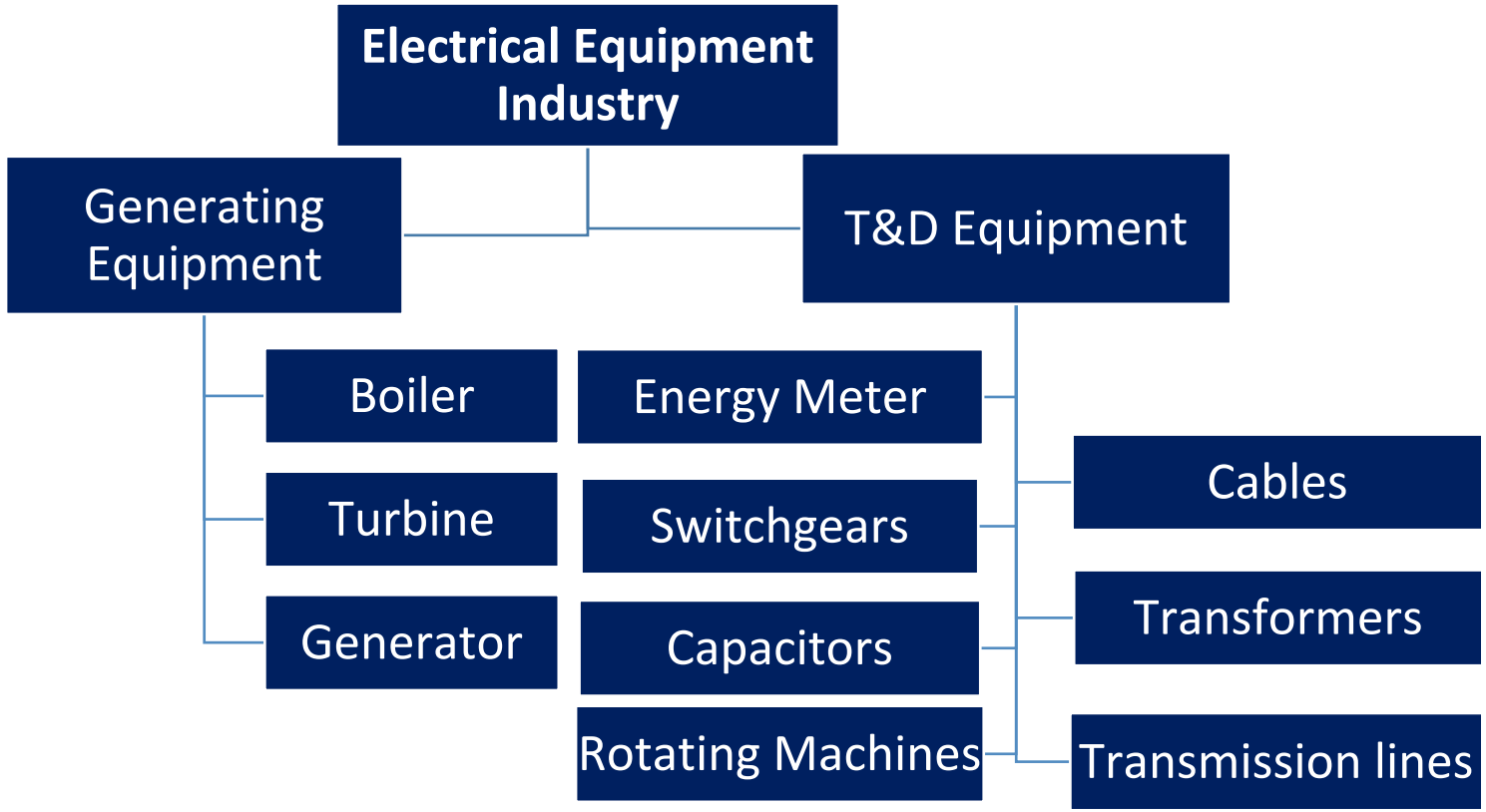
- R&D and Innovation
- Conclusion

Indian Electrical Sector

Introduction

- Generation equipment sector accounts 15%, while T&D equipment sector accounts 85% of the total market.
- Contributes 8.1% of the manufacturing sector is terms of value and 1.35% of India's GDP, providing a direct employment to 5 lakh persons and indirect employment to 10 lakh people and over 50 lakhs across the entire value chain
- India is world's third largest producer and consumer of electricity
- Various sources of power generation in India are Thermal Power, Renewable Power, Hydro Power and Nuclear Power.
- With development of new technologies, the **smart grid** and **smart meters** across the world are undergoing a massive transformation.
- Power sector attracted US$ 14.18 billion in Foreign Direct Investment (FDI) between April 2000 and June 2018.



Current Status

Electrical Equipment trends

- **Production Trends (INR billion (bn)):**
  - 2016-17: over 1,592 (€19.7 bn)
  - 2017-18: 1,750 (€21.7 bn)
  - During FY18, Production has witnessed a record double-digit growth of 9.9%
- **Exports Trends:**
  - 2016-17: Around 393 bn (€4.9 billion)
  - 2017-18: Around 418 bn (€5.2 billion)
  - During 2017-18, exports registered an annual growth of around 6.4%
  - Major export markets are United States of America, United Arab Emirates, Germany, United Kingdom, Nigeria, Saudi Arabia, Australia, Brazil, Canada, and France.
  - Major Export Products are Switchgear and Control gear, Transformers & Parts, Industrial Electronics, Cables, Transmission Line Towers, Conductors, Rotating Machines (Motors, AC Generators, and Generating Sets) & Parts.
- **Imports Trends:**
  - 2016-17: Around 553 bn (€6.8 billion)
  - 2017-18: 556 bn (€6.9 billion)
  - During FY18, Imports of Electrical Equipment registered a marginal growth of 0.56%

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Power generation scenario:

- As per **CEA website**, as of December 2018, **total installed power capacity** stood at around 350 GW including **thermal power (223.5 GW), Renewable power (74 GW), Hydro (45.5 GW) and Nuclear (over 6.5 GW)**

Thermal (63.85%)

- **Coal power** (54.57%) accounts for over 191 GW of the total installed generation,
- **Natural gas** at 7.12% (24.9 GW)
- **Lignite** at 1.71% (6.36 GW) and
- **Diesel** with a minute 0.18% (0.64 GW) share

Renewable (21.2%)

Renewable Energy accounting for over 74 GW of the total installed power capacity includes:

- Wind accounts for 35.1 GW (10%)
- Solar Power accounts for 25 GW (7.14%)
- Small hydro has cumulative installed capacity of 4.5 GW (1.28%)
- Bio Power stood at 9.2 GW

Hydro (13%)

Hydro power's cumulative installations stood at 45.4 GW, making up 12.97% of India's total installed capacity

Nuclear (1.91%)

India has over 6.5 GW of net electricity generation capacity using nuclear fuels, which is 1.91% of the total installed power capacity

- Government of India has released its roadmap to achieve 175 GW capacity in renewable energy by 2022, which includes 100 GW of solar power and 60 GW of wind power.
- With aims to reduce AT & C losses, India is deploying smart grid and smart meter at distribution as well as transmission level.

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Smart Grid In India

- Vision of India on Smart Grids is to "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
- Recognizing the growing importance of smart grid technologies, the Ministry of Power (MoP) constituted the India Smart Grid Task Force (ISGTF) and the India Smart Grid Forum (ISGF) in 2010.
- In 2013, MoP released "Smart Grid Vision and Road map for India" that offers a series of time-framed, specific, target driven measures, across these different areas, with which to enable the development of an Indian Smart grid model
- In 2015, Government of India established National Smart Grid Mission (NSGM) to accelerate smart grid deployment in India.
- So far, 5 projects have been sanctioned under NSGM and 12 Smart Grid pilot projects sanctioned by MoP which are completed / under implementation
- Government of India is promoting deployment of Smart Grid projects under the NSGM through funding support of 30% on capital expenditure
- In July 2017, Central Electricity Authority (CEA) submitted a report titled "**Cyber Security in Power System**" to MoP, recommended new "testing standards" for power utilities, the creation of a "test bed" at CPRI, modified procurement guidelines for equipment used in power utilities and security audits of all Supervisory Control and Data Acquisition (SCADA) systems and Energy Management Systems (EMS).

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Smart Meter in India:

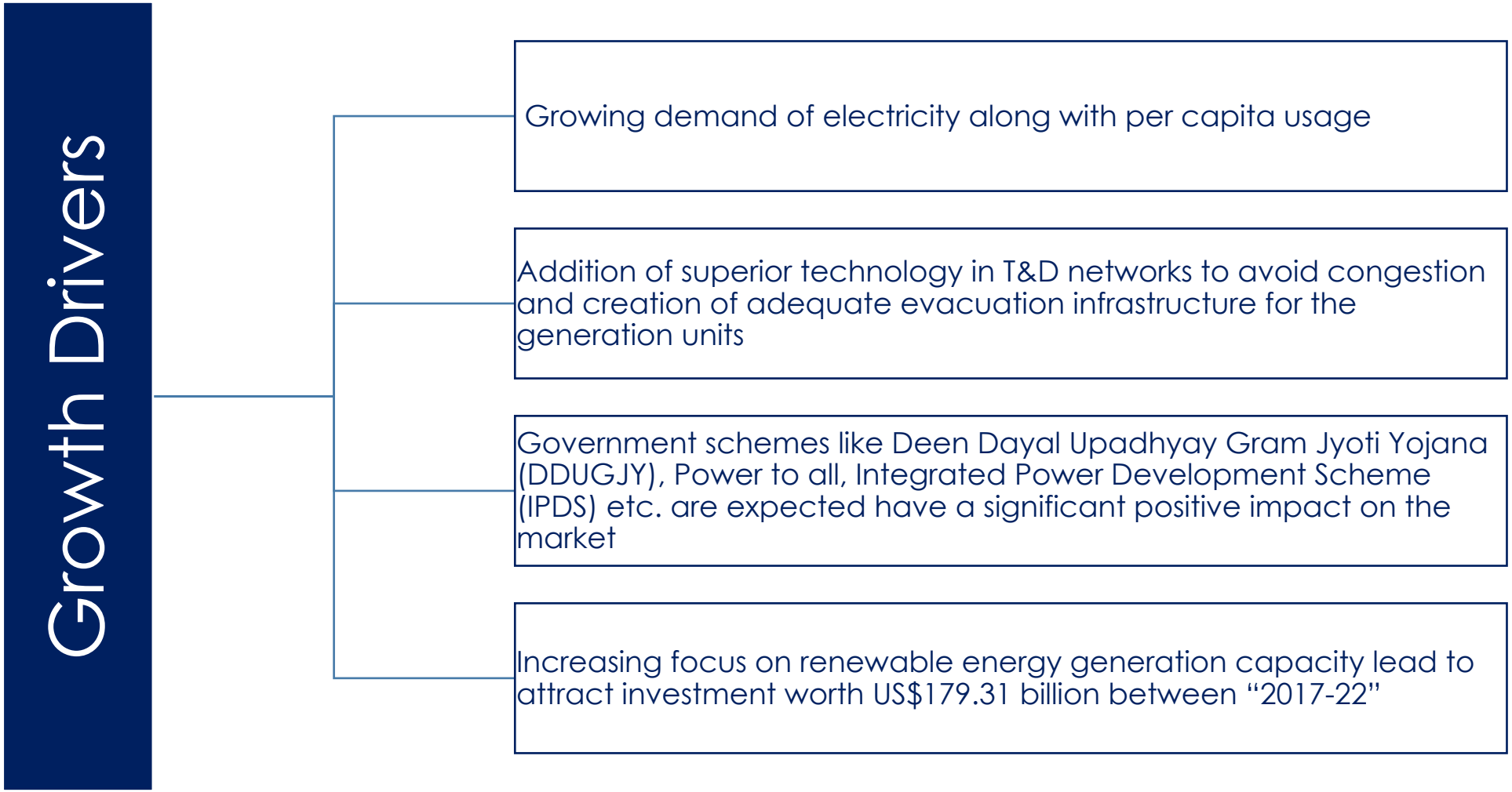
- An electronic device that records consumption of electricity and communicates that information for monitoring and billing.
- Implementation of smart meter is the first steps to reduce Aggregate Technical and Commercial (AT&C) losses, which is about 20% in T&D in India to below 12% by 2022, and below 10% by 2027.
- National Tariff Policy 2016 had mandated that consumers with monthly consumption of over 500 units (or kilowatt hour) had to be switched to smart meters by December 2017; and consumers with monthly usage above 200 units, has to be switched to smart meters by December 2019
- In 2017, ISGF along with Bloomberg New Energy Finance (BNEF) prepared a knowledge paper on 'Advanced Metering Infrastructure: Rollout Strategy for India' in order to help the power distribution companies to tackle the challenge of capital availability to implement the projects
- Government has urged electricity meter manufacturers to scale up production, as it plans to shift all connections to smart prepaid meters over the next three years, starting from April, 2019.
- Many state governments have begun installing smart meters under Smart Cities Mission.

Market Players

Top 5 companies:

1. **BHEL:** India's largest power generation equipment manufacturer and also engaged in engineering, design, manufacturing, construction, testing commissioning, and servicing of a wide range of products.
2. **ABB India**: It is operating mainly in power, heavy electrical equipment and automation technology areas.
3. **CG Power and Industrial Solutions Limited**: An Indian MNC engaged in design, manufacturing, and marketing of products related to power generation, T&D.
4. **Diamond power infrastructure limited** manufactures and sells power T&D equipment .
5. **GE T&D India Limited:** Leading player in the Power T&D business with a product portfolio ranging from Medium Voltage to Ultra High Voltage (1200 kV) for Power Generation, Utility, Industry and Infrastructure markets

Growth Drivers



Indian Electronics Sector

- Consumer Electronics

Introduction

- Electronics Sector in India can be classified into following segments:
  - **Consumer Electronics**
  - Industrial Electronics
  - Electronic Components
  - Communication & Broadcasting (C&B) Electronics
  - Computer Industry
  - Strategic Electronics
  - Automotive Electronics
- **Consumer Electronics** can be further classified into following segments:
  - Mobile Phones
  - Televisions,
  - Refrigerators
  - Set-top Boxes
  - Digital Cameras
  - Air Conditioners
  - Washing Machines etc.
- Market for electronics in India is huge and is anticipated to reach $400 billion (€351.5 billion) by 2022
- Consumer Electronics is one of the fastest growing segments and has market share of 53% in total production of electronics goods.

Market Status

Electronics Sector trends in FY18:

Production:

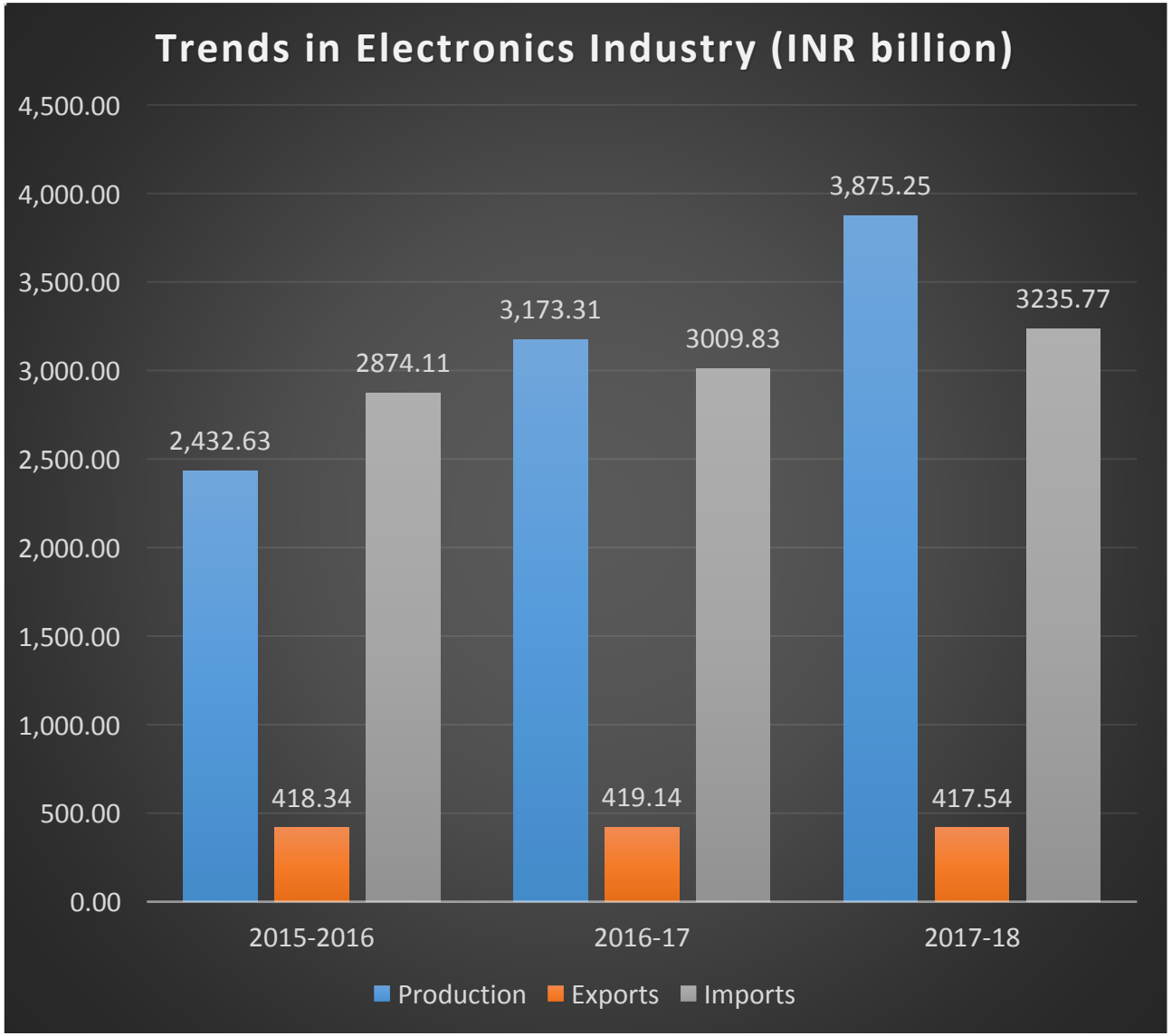
- In FY 18, production of electronics goods is stood at about INR 3,875 billion (€47.9 bn) as compared to about INR 3,173 bn (€39.2 bn) in FY17 and over INR 2,432 bn (€30 bn) in FY16.
- Registered an annual growth of 22% during FY18.

Exports:

- Exports of Electronics goods are increased to about INR 417.5 billion (€5.2 bn) in FY18 and have remained almost constant since last three years.

Imports:

- Imports have been growing YoY and have reached at around INR 3236 billion (€40.5 billion) at the end of FY18.
- With rising imports, there lies a huge opportunity for companies to look at the Indian market as their next destination.



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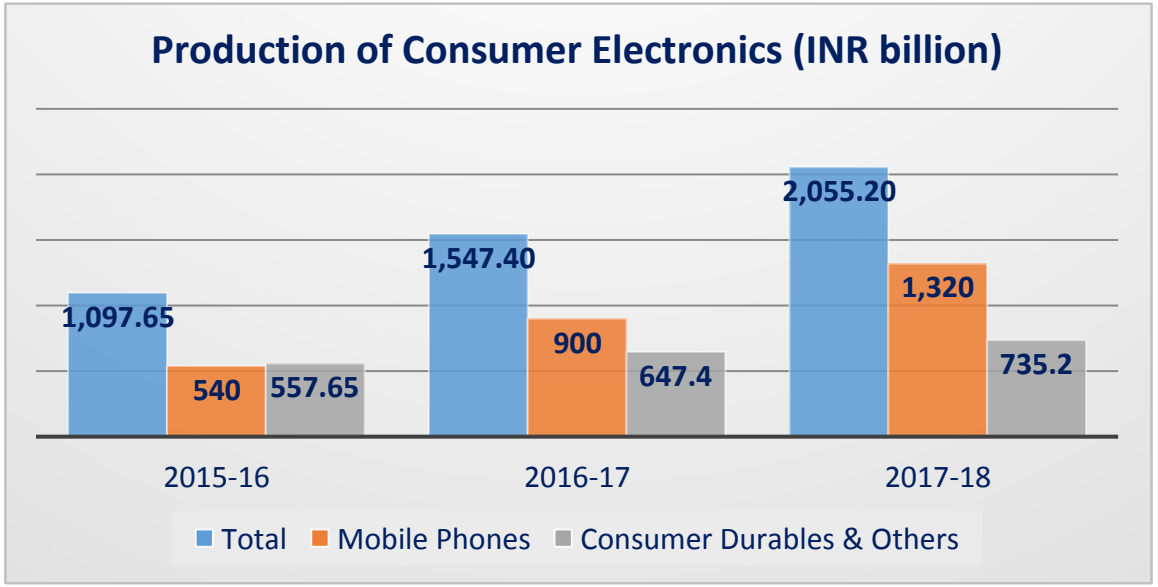
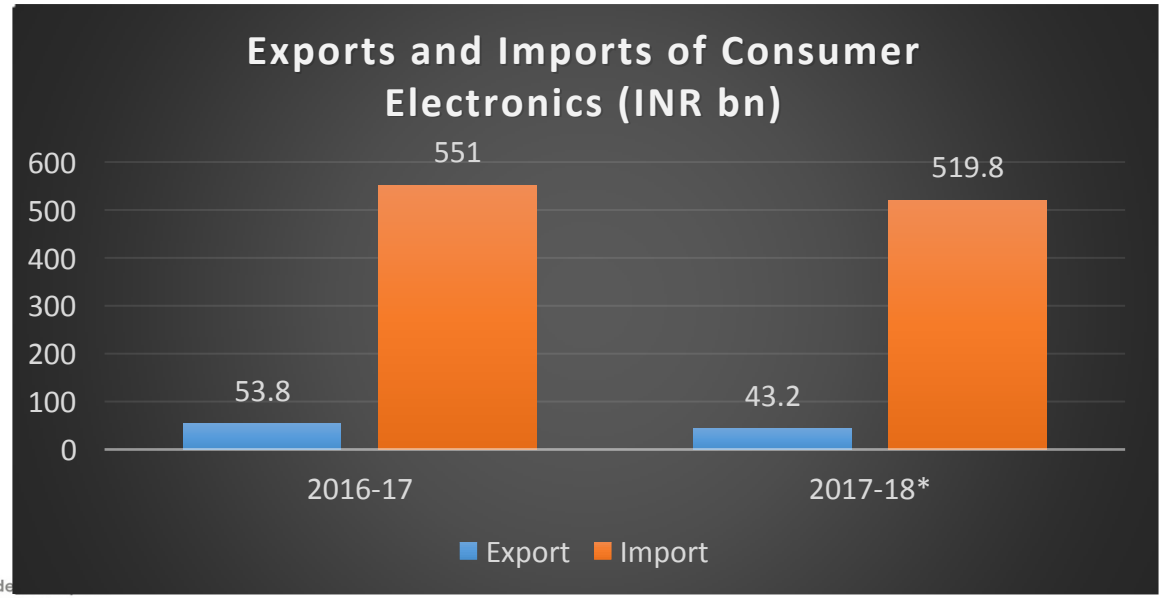
Production of Consumer Electronics:

- Overall production has reached to about INR 2,055 bn (€25.4 bn) in FY18 as compared to over INR 1547 bn (€19 bn) in FY17, registered a growth of 32.8%.
- Production of Mobile handsets grew to about INR 1,320 billion (over €16 billion) in FY18.
- Production of Consumer Durables / Home Appliances grew by 13.6% to about INR 735 billion (€9 billion) in FY18 against over INR 647 bn (€8 bn) in FY17.

Exports & Imports of Consumer Electronics:

- Overall export is stood at INR 43.2 billion (€0.54 billion) in FY18 as compared to INR 53.8 billion (€0.67 billion) in FY17, registered a decline of around 20% during FY18
  - Mobile Phones exports have remained constant at around INR 11.3 billion (€0.14 bn).
  - Consumer Durables exports declined by around 11% to INR 28.3 billion (€0.35 billion) in FY18 from INR 31.9 billion (€0.4 billion) in FY17.
  - Exports of other items such as TV, Home theater etc. declined from about INR 9.9 billion (€0.12 billion) in FY17 to INR 3.5 billion (€ 0.04 billion) during FY18
- Overall import has declined to INR 519.8 billion (€6.45 billion) during FY18 from around INR 551 billion (€6.84 billion) in FY17
  - Mobile Phones import has declined to around INR 235 billion (€2.9 billion) in FY18 from INR 268.4 billion (€3.3 billion) in FY17.
  - Consumer durables import increased to INR 120.4 billion (€1.5 billion) during FY18 from INR 114 billion (€1.4 billion) in FY17.
  - Imports of other items such as TV, Home theater etc. stood at around INR 164.3 billion (€2 billion) in FY18, compared to INR 168.5 billion (€2 billion) in FY17.





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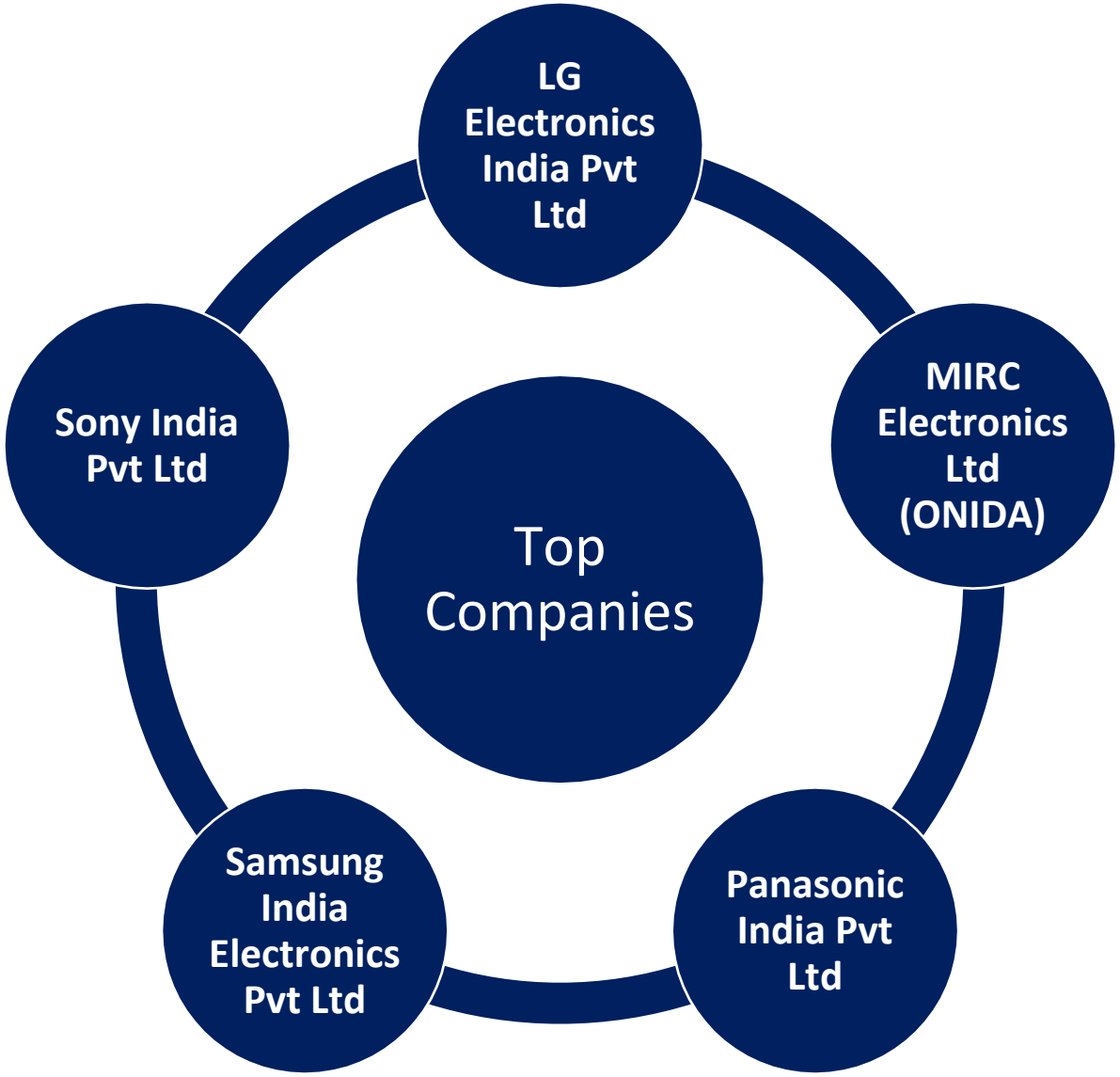
Major Players

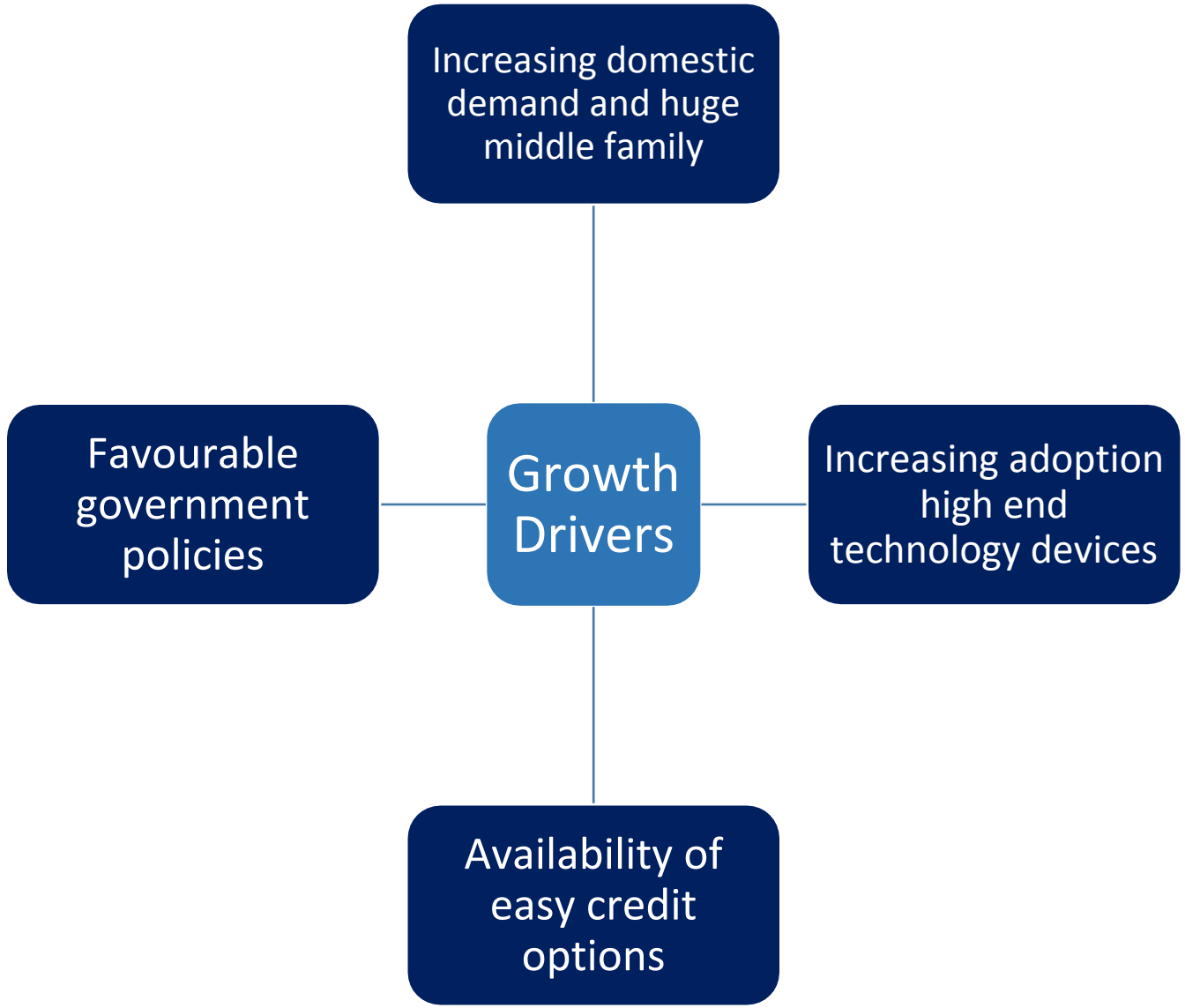
Top consumer durable companies in India:

- **LG Electronics India Pvt Ltd**: LG Electronics' products include televisions, home theater systems, refrigerators, washing machines, computer monitors, wearable devices, smart appliances, and smartphones.
- **MIRC Electronics Ltd (ONIDA)** is offering a huge range of products including LCD, Plasma, Televisions, DVD, Air Conditioners, Washing Machines, Microwaves Ovens, Mobile Phones, LED TV, LCD Monitor, LCD TV and smartphones. It is among the most trusted brands in India.
- **Panasonic India Pvt Ltd** is one of the largest consumers durable product manufacturing companies in India.
- **Samsung India Electronics Pvt** Ltd is one of the world's largest manufacturer of smartphone and mobile phones.
- **Sony India Pvt Ltd** has its footprint across all major towns and cities in the country through a distribution network. Sony's principal Indian businesses include Marketing, Sales and After-Sales Service of electronic products & software exports Products.



Growth Drivers

- Demand for consumer electronics such as mobiles, modern computers, LEDs, etc. are growing rapidly because of rising disposable income, increasing middle class family
- Rising awareness of consumers about benefits of modern electronics products has led to the adoption of high end technology devices.
- Nowadays, it has become easier for consumers to buy consumer electronics because of availability of easy EMI and credit cards.
- Various Government's initiatives such as Make in India and Digital India, Modified Special Incentive Package Scheme (M-SIPS), Electronic Development Fund (EDF)etc. are fueling the growth of sector and attracting huge investments



Government Policies and new Initiatives

National Energy Policy (NEP) (Draft)

- NITI Aayog, policy think tank of the GoI released draft National Energy policy (NEP) in June 2017 with aims to chart the way forward to meet the Government's recent bold announcements in the energy domain
- **Key objectives are as follow**:
  - Access at affordable prices
  - Improved security and Independenc
  - Greater Sustainability
  - Economic Growth

- This policy targets to achieve a 175 GW renewable energy capacity by 2022, and share of non-fossil fuel based capacity in the electricity mix is aimed at above 40% by 2030.
- Policy aims to increase share of manufacturing in GDP up to 25% from the present level of 16% by 2022.
- 24×7 electricity by 2022
- the period 2017-2040 is expected to witness a quantum leap in the uptake of renewable energy, drastic reduction in energy intensity, doubling of per-capita energy consumption and tripling of per-capita electricity consumption

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National Smart Grid Mission (NSGM)

- Ministry of Power (MoP) launched NSGM in 2015 with aims to accelerate Smart Grid deployment in India
- Major activities envisaged under NSGM are:
  - Development of smart grid,
  - Development of micro grids,
  - Consumer engagements and training & capacity building etc.
- NSGM functions with three tier hierarchical structure as follows:
  - 1st Level – Governing Council, headed by Minister of Power.
  - 2nd Level – Empowered Committee, headed by Secretary (Power).
  - Supportive Level – Technical Committee, headed by Chairperson CEA.
  - 3rd Level – NSGM Project Management Unit.
- Development and deployment of Smart Grids are presently being carried out through ISGTF and ISGF under the aegis of MoP
- MoP has allocated **14 Smart Grid pilot projects** that will be implemented by various state-owned distribution utilities in India

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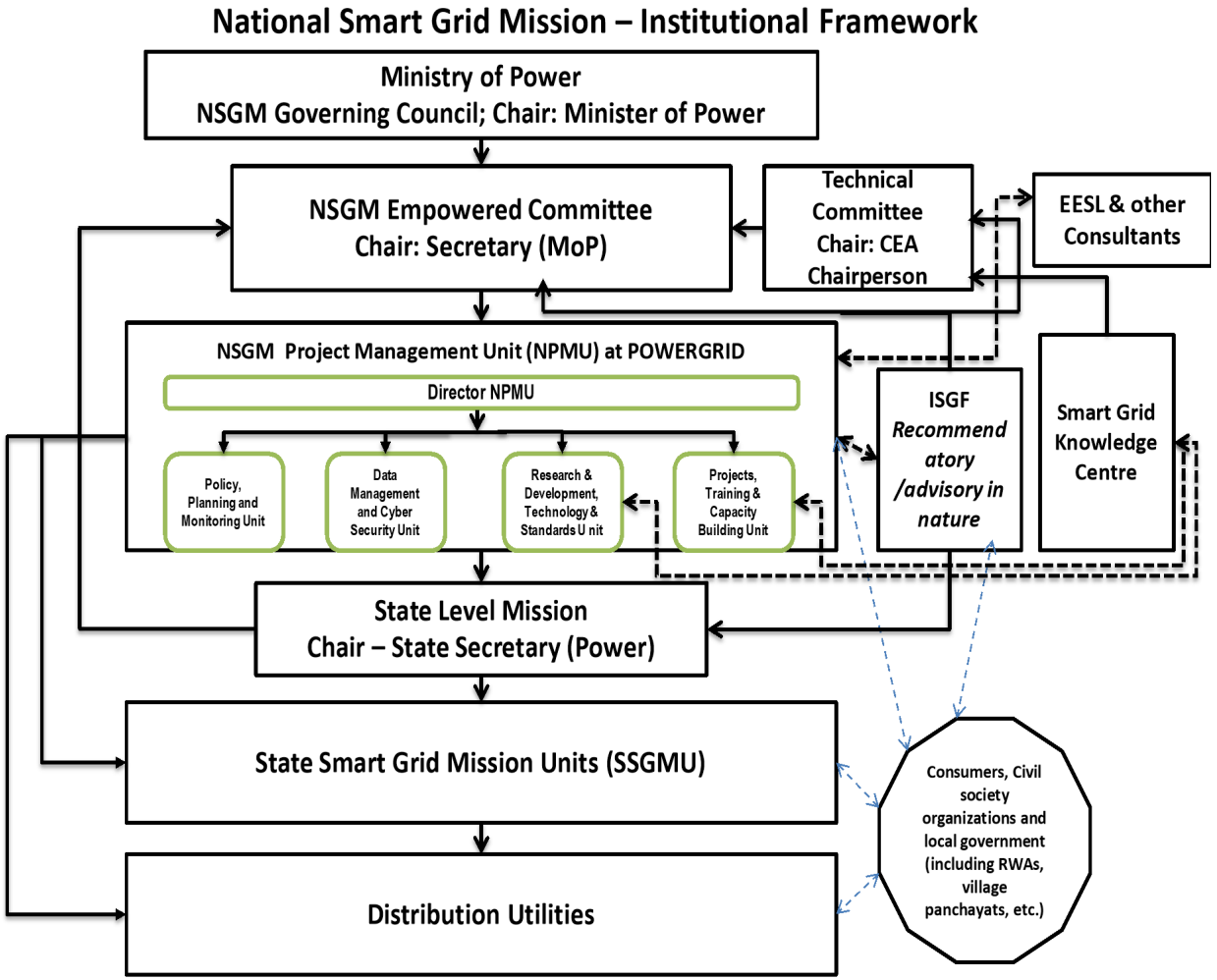
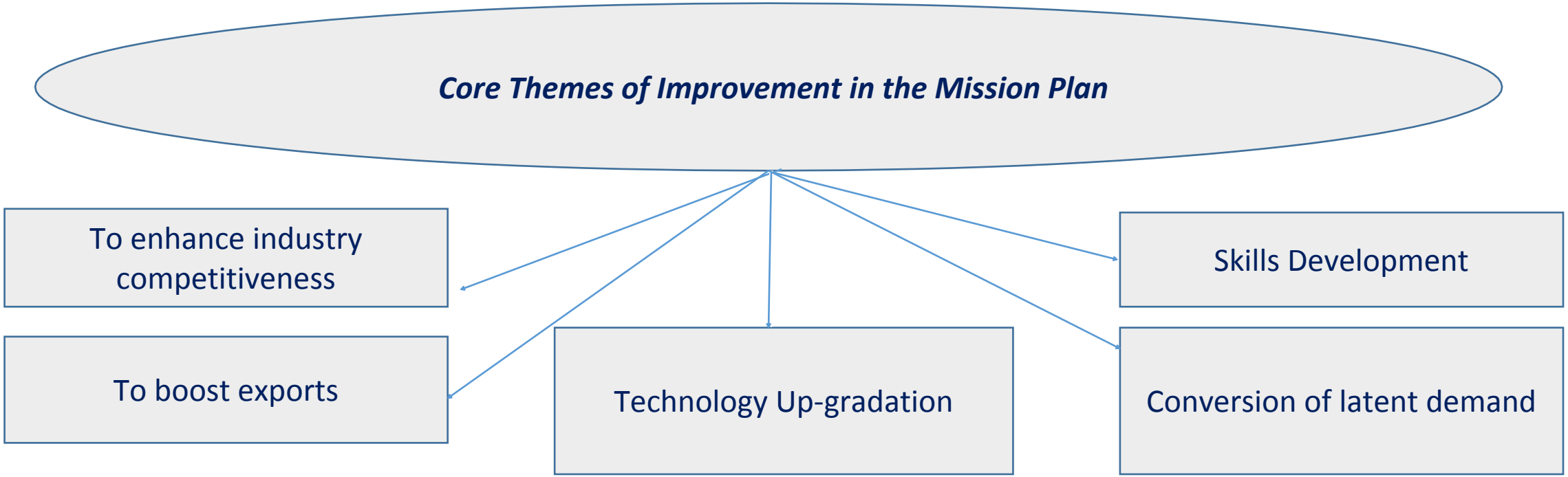


Indian Electrical Equipment Industry Mission Plan 2022

- Developed by DHI in consultation with all stakeholders and with support from IEEMA
- Vision 2022:
  - To make India the country of choice for the production of electrical equipment
  - and reach an output of US$100 billion by balancing exports and imports



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National Electronics Policy (NEP) 2019

- Government approved new electronics policy in February 2019, which was proposed by MEITY in 2018 and it replaces NEP 2012.

Vision:

- Policy aims to position India as a global hub for Electronics System Design and Manufacturing (ESDM) by encouraging and driving capabilities for developing core components and creating an enabling environment for the industry to compete globally.

Objectives:

- To promote domestic electronics manufacturing industry
- To improve ease of doing business
- Promotion of Industry-led R&D and innovation in all sub-sectors of electronics
- To support a comprehensive Start-up ecosystem in emerging technology areas such as such as 5G, IoT/ Sensors, Artificial Intelligence (AI), Machine Learning, Additive Manufacturing etc.
- Promotion of research, innovation and support to industry for green processes and sustainable e-Waste management, including 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.

Targets:

- Promote domestic manufacturing and export in the entire value-chain of ESDM for economic development to achieve a turnover of USD 400 billion (approx. INR 26,000 billion) by 2025.
- Targeted production of 1.0 billion (100 crore) mobile handsets by 2025, valued at USD 190 billion (approximately INR 13,000 billion), including 600 million (60 crore) mobile handsets valued at USD 110 billion (approximately INR 7,000. billion) for export

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National Policy on Universal Electronic Accessibility

- Government launched National Policy on Universal Electronic Accessibility in 2013
- Policy recognized the need to eliminate discrimination on the basis of disabilities as well as to facilitate equal access to electronics and Information and Communication Technologies (ICTs).
- Policy also covered accessibility requirements in the area of Electronics & ICT and recognized the need for ensuring that accessibility standards and guidelines and universal design concepts are adopted and adhered to.

Strategy and action plan:

- Creating awareness through media, campaigns, conferences, workshops, seminars, etc. about Electronics & ICTs accessibility - barriers and solutions in urban and rural areas.
- Capacity building and infrastructure development.
- Setting up of model electronics and ICTs centres for providing training and demonstration to special educators and physically as well as mentally challenged persons.
- Conducting R&D, use of innovation, ideas, technology etc. whether indigenous or outsourced from abroad.
- Developing programme and schemes with greater emphasis for differently abled women/children.
- Developing procurement guidelines for electronics and ICTs for accessibility and assistive needs.

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Compulsory Registration Scheme (CRS)

- Ministry of Electronics and Information Technology (MeitY) and Bureau of Indian Standards (BIS) introduced Compulsory Registration Scheme (CRS) in 2012
- Scheme covered **49 items** notified by Meity and Ministry of New and Renewable Energy (MNRE)
- BIS is operating CRS as per the provision of Scheme - II of the **BIS (Conformity Assessment) Regulations, 2018**
- Under this scheme it is mandatory for manufacturers to get their products registered before launching them in market.
- Overseas Manufacturers are required to have a local representative in India to represent the manufacturer locally and will be responsible for placing the product in the market
- To make this program robust, **Market Surveillance** has been designed to ensure compliance

For more information please click here>>

For the list of BIS approved labs, please click here>>

Some other policy and new initiatives

- **Smart Meter National Programme** is being implemented by Energy Efficiency Services Limited (EESL), a Joint Venture (JV) of Public Sector Undertakings (PSUs) under Ministry of Power to eventually replace 25 crore (250 million) conventional meters with smart meters across India.
- Ministry of Power (MoP) has announced **guidelines and standards** for the development of electric vehicle charging infrastructure in India
- Government of India (GoI) launched **Saubhagya scheme** in September 2017, with the objective of electrifying over 2.5 crore (over 25.25 million) un-electrified households by March 2019. total cost of the Saubhagya project is pegged at INR 163.20 billion (about 2 billion euros).
- GoI launched **Deendayal Upadhyaya Gram Jyoti Yojana (DDUGJY)** with an aim to provide electrification to all villages and to strengthen sub transmission and distribution network to prevent power losses. Rural Electrification Corporation is the Nodal Agency for implementation of DDUGJY.
- MoP launched **Ujwal DISCOM Assurance Yojana (UDAY)** in 2015 with aims to help to make discoms financially and operationally healthy so they can supply adequate power at affordable rates.
- MoP launched **Integrated Power Development Scheme (IPDS)** envisages strengthening of sub-transmission and distribution network, Metering, IT application etc. in order to reduce AT&C losses, establish IT enabled energy accounting / auditing system, improve billed energy based on metered consumption and improvement in collection efficiency.
- **Modified Special Incentive Scheme (M-SIPS):** M-SIPS scheme launched in 2012, to boost large scale manufacturing and attractive investments in ESDM sector.
  - Provides subsidy for capital expenditure 20% for investments in Special Economic Zones (SEZs) and 25% in non-SEZs.
  - 419 investment proposals involving investment of INR 1,13,089 crore (14.3 billion euros) has been received by December 2018

Some other policy and new initiatives

- **Electronics Manufacturing Clusters Scheme** to provide support for creation of world-class infrastructure for attracting investments in ESDM Sector.
  - Under the scheme, 50% of project cost for greenfield EMC and 75% for brownfield is given as grant.
  - As on date 20 Green EMCs and 3 Brownfield EMCs have been final approved.
- **Electronics Development Fund (EDF):** in order to promote startups and innovation, Government launched EDF policy as a Fund of Funds which invests in venture funds.
  - So far, investment in 13 daughter funds has been approved by the Government with a total targeted corpus of Rs 69.5 billion (0.86 billion euros). The amount committed by EDF to these 13 daughter funds is Rs 8,570 million (106.3 million euros) which will be invested in them over a period of 4-5 years.
- **Make in India**, a National programme, designed to facilitate investment, foster innovation, enhance skill development, protect intellectual property and build best in class manufacturing infrastructure in the country has 25 sectors to be focused and **Electronic System Design and Manufacturing (ESDM)** is one of the major sectors.
- As part of "**Digital India programme** " agenda of the Government, it is envisaged to develop the Electronics System Design and Manufacturing (ESDM) sector to achieve "Net Zero Imports" by 2020
- **100% Foreign Direct Investment (FDI)** through the automatic route is allowed in Electrical Equipment, Power as well as in Electronics sector in India

Standardization

Standardization

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

- **BIS has two division council**
  - **Electro-technical division council (ETD):** Covers Standardization 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 1600 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 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

  - **Electronics and Information Technology division council (LITDC):** Covers standardization in the field of electronics and telecommunications including information technology and has developed more than 1600 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**

Standardization

Telecommunication Engineering Center (TEC) of Department of Telecommunications (DoT)

- 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

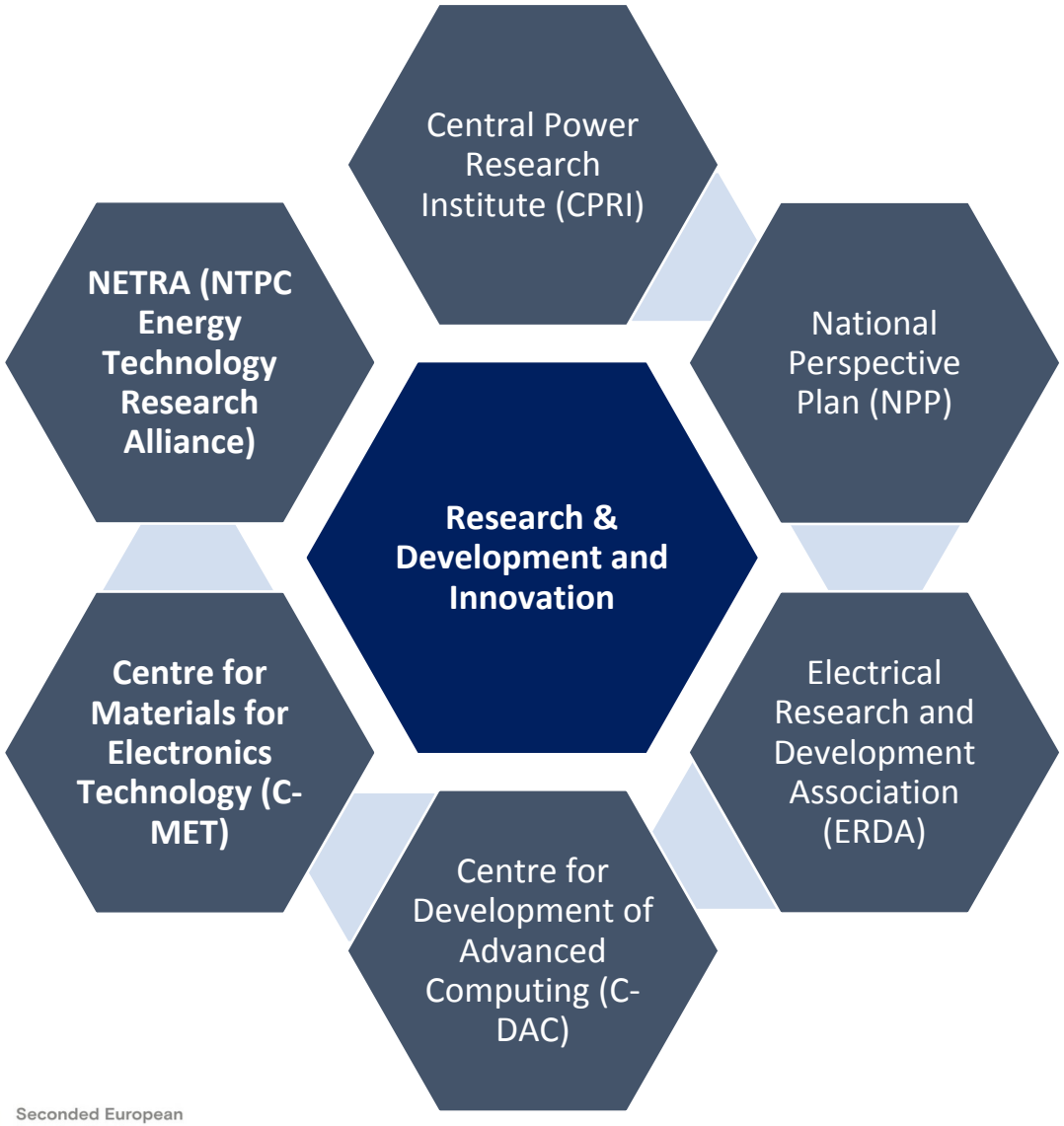
Compulsory Registration Scheme(CRS):

- Introduced by Meity and BIS in 2012
- MeitY notified "Electronics and Information Technology Goods (Requirement for Compulsory Registration) Order, 2012" for fifteen categories of electronics products in 2012. Another 15 product categories were added in 2014.
- Ministry of New Renewable Energy (MNRE) issued new set of quality norms and standards for all solar equipments 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 49 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.

Research & Development (R&D) and Innovation

Research & Development and Innovation

- **CPRI** functions as a centre for applied research and also serves as an independent authority for testing and certification of power equipment.
- **NPP** aims to promote innovation, forge industry-institute cooperation, strengthen the National Innovation capability & R&D infrastructure and to Develop and sustain man power for R&D in power sector
- **ERDA**: ERDA's services are provided under the three business verticals i.e. Testing & Evaluation, Field Services and R&D and Expert Services.
- **C-DAC**, of MeitY for carrying out R&D in IT, Electronics and associated areas.
- **C-MET**, a Registered Scientific Society under DeitY/Meity as a unique concept for development of viable technologies in the area of materials mainly for electronics.
- **NETRA**, fully aligned to the needs of adapting to emerging technologies and upgrading the technologies through R&D in climate change, waste management, carbon capture and Utilization, new & renewable energy, efficiency improvement and cost reduction.



Conclusion

- In India, Electrical and Electronics/Consumer sector are witnessing a major transformation in respect of demand growth, energy mix and market operations.
- Industry's record performance is attributed to Government's schemes like DDUJGY, IPDS and Saubhagya where the country is racing to provide electricity to households in the villages. According to World Bank report, nearly 85% of the India's population has access to electricity
- In order to reduce AT&C losses in T&D, smart meter and smart grid are being implemented by Government
- Government is focusing more on renewable energy generation as it has targeted to achieve 175GW renewable energy installed capacity by 2022.
- As technologies continue to evolve, Indian Consumer Electronics sector is at the threshold of a decisive phase and the mantra of the industry today is convergence - whether of technologies or products or markets.
- Recently released new National Electronics Policy and other schemes such as Make in India, Digital India, Modified Special Incentive Package Scheme (M-SIPS) and Electronic Development Fund (EDF) etc. are fueling the growth of sector.
- Government of India 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. in collaboration with global SDOs.

Note: For additional information on smart energy Covering Smart Grid, Smart Meter, LVDC, Micro Grid please click here and download the study report which was released during 3rd Indo European Conference of standards and Emerging Technology, held in April 2018 in New Delhi.

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