**[E-waste management](https://vikaspedia.in/energy/environment/waste-management/e-waste-management" \o "This section provides information about e waste management.)**

Introduction

The production of electrical and electronic equipment (EEE) is one of the fastest growing global manufacturing activities. Rapid economic growth, coupled with urbanization and a growing demand for consumer goods, has increased both the consumption and the production of EEE. The Indian information technology (IT) industry has been one of the major drivers of change in the economy in the last decade and has contributed significantly to the digital revolution being experienced by the world. New electronic gadgets and appliances have infiltrated every aspect of our daily lives, providing our society with more comfort, health and security and with easy information acquisition and exchange.The knowledge society however is creating its own toxic footprints.

E-waste broadly covers waste from all electronic and electrical appliances and comprises of items such as computers, mobile phones, digital music recorders/players, refrigerators, washing machines, televisions (TVs) and many other household consumer items.

The increasing ‘market penetration’ in the developing countries, ‘replacement market’ in the developed countries and ‘high obsolescence rate’ make e-waste one of the fastest waste streams. This new kind of waste is posing a serious challenge in disposal and recycling to both developed and developing countries. While having some of the world's most advanced high-tech software and hardware developing facilities, India's recycling sector can be called medieval. All this has made e-waste management an issue of environment and health concern.

Magnitude of the problem

In India, about 1.2 million tonne of e-waste is generated every year, as per a study conducted by the Central Pollution Control Board (CPCB). Of the total e-waste generated in the country, western India accounts for the largest population at 35%, while the southern, northern and eastern regions account for 30, 21 and 14%, respectively. The top states in order of highest contribution to waste electrical and electronic equipment (WEEE) include Maharashtra, [Andhra Pradesh](https://vikaspedia.in/e-governance/states/andhra-pradesh), [Tamil Nadu](https://vikaspedia.in/e-governance/states/tamil-nadu), [Uttar Pradesh](https://vikaspedia.in/e-governance/states/uttar-pradesh), [West Bengal](https://vikaspedia.in/e-governance/states/west-bengal), Delhi, Karnataka, Gujarat, [Madhya Pradesh](https://vikaspedia.in/e-governance/states/madhya-pradesh) and Punjab. The city-wise ranking of the largest WEEE generators is Mumbai, Delhi, Bengaluru, Chennai, Kolkatta, Ahmedabad, Hyderabad, Pune, Surat and Nagpur.

While northern India is not a leading generator, it happens to be the leading processing centres of e-waste in the country. Over 1 million poor people in India are involved in the manual recycling operations. Most of the people working in this recycling sector are the urban poor with very low literacy levels and hence very little awareness regarding the hazards of e-waste toxins. There are a sizeable number of women and children who are engaged in these activities and they are more vulnerable to the hazards of this waste.

The main sources of computer usage and thereby e-waste generations are the business sector (government departments, public or private sector, multinational corporation offices, etc.), accounting for 78% of the total installed PCs today. Other sources are individual households (22%), foreign embassies, PC manufacturing units, PC retailers, secondary markets of old PCs and imported electronic scrap of other countries.

The following three categories of WEEE account for almost 90% of the generation

* Large household appliances: 42%
* Information and communications technology equipment: 33.9 %
* Consumer electronics: 13.7%.

What is e-waste?

Electronic waste or e-waste is the term used to describe old, end-of-life electronic appliances such as computers, laptops, TVs, DVD players, mobile phones, mp3 players, etc., which have been disposed by their original users.

E-waste has been categorized into three main categories, i.e., Large Household Appliances, IT and Telecom and Consumer Equipment. Refrigerator and washing machine represent large household appliances; PC, monitor and laptop represent IT and Telecom, while TV represents Consumer Equipment.

Each of these e-waste items has been classified with respect to 26 common components found in them. These components form the ‘building blocks’ of each item and therefore they are readily ‘identifiable’ and ‘removable.’ These components are metal, motor/ compressor, cooling, plastic, insulation, glass, LCD, rubber, wiring/electrical, concrete, transformer, magnetron, textile, circuit board, fluorescent lamp, incandescent lamp, heating element, thermostat, brominated flamed retardant (BFR)-containing plastic, batteries, CFC/HCFC/HFC/HC, external electric cables, refractory ceramic fibers, radioactive substances and electrolyte capacitors (over L/D 25 mm).

The composition of WEEE/e-waste is very diverse and differs in products across different categories. It contains more than 1000 different substances, which fall under ‘hazardous’ and ‘non-hazardous’ categories. Broadly, it consists of ferrous and non-ferrous metals, plastics, glass, wood and plywood, printed circuit boards, concrete and ceramics, rubber and other items. Iron and steel constitutes about 50% of the WEEE followed by plastics (21%), non-ferrous metals (13%) and other constituents. Non-ferrous metals consist of metals like copper, aluminium and precious metals, e.g. silver, gold, platinum, palladium, etc. The presence of elements like lead, mercury, arsenic, cadmium, selenium and hexavalent chromium and flame retardants beyond threshold quantities in WEEE/e-waste classifies them as hazardous waste.

The electronic and electrical goods are largely classified under three major heads, as: ‘white goods,’ comprising of household appliances like air conditioners, dishwashers, refrigerators and washing machines; ‘brown goods,’ comprising of TVs, camcorders, cameras, etc.; ‘grey goods,’ like computers, printers, fax machines, scanners, etc. The grey goods are comparatively more complex to recycle due to their toxic composition.

Health and environmental impact of e-waste

EEEs are made of a multitude of components, some containing toxic substances that have an adverse impact on human health and the environment if not handled properly. Often, these hazards arise due to the improper recycling and disposal processes used. It can have serious repercussions for those in proximity to places where e-waste is recycled or burnt. Waste from the white and brown goods is less toxic as compared with grey goods. A computer contains highly toxic chemicals like lead, cadmium, mercury, beryllium, BFR, polyvinyl chloride and phosphor compounds.

Environment and health hazards.

**Lead**

exerts toxic effects on various systems in the body such as the central (organic affective syndrome) and peripheral nervous systems (motor neuropathy), the hemopoietic system (anaemia), the genitourinary system (capable of causing damage to all parts of nephron) and the reproductive systems (male and female).

**Mercury**

causes damage to the genitourinary system (tubular dysfunction), the central and peripheral nervous systems as well as the foetus. When inorganic mercury spreads out in the water, it is transformed into methylated mercury, which bio-accumulates in living organisms and concentrates through the food chain, particularly by fish.

**Cadmium**

is a potentially long-term cumulative poison. Toxic cadmium compounds accumulate in the human body, especially in the kidneys. There is evidence of the role of cadmium and beryllium in carcinogenicity.

**Polycyclic aromatic hydrocarbons (PAH)**

Affects lung, skin and bladder. Epidemiological studies in the past on occupational exposure to PAH provide sufficient evidence of the role of PAH in the induction of skin and lung cancers.

Existing legislations and policy related to e-waste

The E-waste (Management & Handling) Rules, 2016 have been notified on March 23 2016. The new rules include Compact Fluorescent Lamp (CFL) and other mercury containing lamps, as well as other such equipment.  
The Rules also brings the producers under Extended Producer Responsibility (EPR), along with targets.

To get the E-Waste Rules 2016, [click here](http://www.moef.nic.in/sites/default/files/notified%20ewaste%20rule%202015_1.pdf).

Organizations/networks working on e-waste issues in India

**Knowledge bank for e-waste management in India**

The Asia Pro Ecoprogramme supported by the European Commission is dedicated to the environmental performance in Asian Economic sectors through the exchange of environmental policies, technologies and practices and to promote sustainable investment and trade between the European Union Member States and South Asia, South-East Asia and China.

**The E-waste Guide, India**

An Initiative of the Indo–German–Swiss Partnership [Ministry of Environment and Forests, German Federal Ministry for Economic Cooperation and Development and Swiss State Secretariat for Economic Affairs] It is designed to serve as an information resource on e-waste as well as a common collaborative work platform for stakeholders.

For more information, visit [ewaste.in](http://www.ewaste.in/simsmm/home/?type=.render" \o "External website that opesn in new window" \t "_blank)

**National Solid Waste Association of India (NSWAI)**

A leading professional non-profit organization in the field of solid-waste management, including toxic and hazardous waste and also biomedical waste in India. It was formed in 1996. Its objectives include development of solid-waste management as a profession, research and development, development of expertise, standards and goods practices with regards to solid-waste management. Some of the others include improvement in legislation and creating awareness and community involvement.

For more information, visit [NSWAI](http://nswai.com/)

**Toxics Link**

A Delhi-based environment activist group with a mission of working for environmental justice and freedom from toxics. It is also actively involved in creating public awareness on environmental issues through publications, reports, articles and environment news bulletins besides organizing various events.

For more information, visit [toxicslink](http://toxicslink.org/" \o "External website that opens in new window" \t "_blank)

Others are STEP Workweb, WEEE Forum, Clean India, Indian Environmental Society, INDIA HABITAT CENTRE and Microbial Biotechnology Area of Tata Energy Research Institute.

### E-Waste Management Rules, 2016

The Ministry of Environment, Forest and Climate Change notified the E-Waste Management Rules, 2016 on 23 March 2016 in supersession of the e-waste (Management & Handling) Rules, 2011.

E-Waste (Management) Rules, 2016 - What’s New?

1. Manufacturer, dealer, refurbisher and Producer Responsibility Organization (PRO) have been introduced as additional stakeholders in the rules.
2. The applicability of the rules has been extended to components, consumables, spares and parts of EEE in addition to equipment as listed in Schedule I.
3. Compact Fluorescent Lamp (CFL) and other mercury containing lamp brought under the purview of rules.
4. Collection mechanism based approach has been adopted to include collection centre, collection point, take back system etc for collection of e - waste by Producers under Extended Producer Responsibility (EPR).
5. Option has been given for setting up of PRO , e - waste exchange , e - retailer, Deposit Refund Scheme as additional channel for implementation of EPR by Producers to ensure efficient channelization of e - waste.
6. Provision for Pan India EPR Authorization by CPCB has been introduced replacing the state wise EPR authorization.
7. Collection and channelisation of e - waste in Extended Producer Responsibility - Authorisation shall be i n line with the targets prescribed in Schedule III of the Rules. The phase wise Collection Target for e - waste, which can be either in number or Weight shall be 30% of the quantity of waste generation as indicated in EPR Plan during first two year of implementation of rules followed by 40% during third and fourth years, 50% during fifth and sixth years and 70% during seventh year onwards.
8. Deposit Refund Scheme has been introduced as an additional economic instrument wherein the producer charges an additional amount as a deposit at the time of sale of the electrical and electronic equipment and returns it to the consumer along with interest when the end - of - life electrical and electronic equipment is returned.
9. The e - waste exchange as an option has been provided in the rules as an independent market instrument offering assistance or independent electronic systems offering services for sale and purchase of e - waste generated from end - of - life electrical and electronic equipment between agencies or organizations authorised under these rules.
10. The manufacturer is also now responsible to collect e - waste generated during the manufacture of any electrical and electronic equipment and channelise it for recycling or disposal and seek authorization from SPCB.
11. The dealer, if has been given the responsibility of collection on behalf of the producer, need to collect the e - waste by providing the consumer a box and channelize it to Producer.
12. Dealer or retailer or e - retailer shall refund the amount as per take back system or De posit Refund Scheme of the producer to the depositor of e - waste.
13. Refurbisher need collect e - waste generated during the process of refurbishing and channelise the waste to authorised dismantler or recycler through its collection centre and seek one time authorization from SPCB.
14. The roles of the State Government has been also introduced in the Rules in order to ensure safety, health and skill development of the workers involved in the dismantling and recycling operations.
15. Department of Industry in State o r any other government agency authorised in this regard by the State Government is to ensure earmarking or allocation of industrial space or shed for e - waste dismantling and recycling in the existing and upcoming industrial park, estate and industrial clusters.
16. Department of Labour in the State or any other government agency authorised in this regard by the State Government need to ensure recognition and registration of workers involved in dismantling and recycling; assist formation of groups of such workers to facilitate setting up dismantling facilities; undertake industrial skill development activities for the workers involved in dismantling and recycling; and undertake annual monitoring and to ensure safety & health of workers involved in dismantling and recycling.
17. State Government to prepare integrated plan for effective implementation of these provisions, and to submit annual report to Ministry of Environment, Forest and Climate Change.
18. The transportation of e - waste shall be carried out as per the manifest system whereby the transporter shall be required to carry a document (three copies) prepared by the sender, giving the details.
19. Liability for damages caused to the environment or third party due to improper management of e - waste including provision for levying financial penalty for violation of provisions of the Rules has also been introduced.
20. Urban Local Bodies (Municipal Committee/Council/Corporation) has been assign the duty to collect and channelized the orphan products to authorized dismantler or recycler.

Salient Features of the E-Waste (Management) Rules, 2016 and its likely implication

To access the salient features of the E-Waste (Management) Rules, 2016 in comparison to the e-waste (Management & Handling) Rules, 2011 with the reasons /and likely implications, [click here](http://pibphoto.nic.in/documents/rlink/2016/mar/p201632302.pdf).

To access the complete E-Waste (Management) Rules, 2016, [click here](http://www.moef.nic.in/sites/default/files/notified%20ewaste%20rule%202015_1.pdf).

Amendments in E-Waste Management Rules 2016

The E-Waste Management Rules 2016 have been amended vide notification G.S.R. 261(E), dated March 22, 2018.

The amendment in rules has been done with the objective of channelizing the E-waste generated in the country towards authorized dismantlers and recyclers in order to formalize the e-waste recycling sector.  The collection targets under the provision of Extended Producer Responsibility (EPR) in the Rules have been revised and targets have been introduced for new producers who have started their sales operations recently.

Some of the salient features of the E-waste (Management) Amendment Rules, 2018 are as follows:

1. The e-waste collection targets under EPR have been revised and will be applicable from 1 October 2017. The phase-wise collection targets for e-waste in weight shall be 10% of the quantity of waste generation as indicated in the EPR Plan during 2017-18, with a 10% increase every year until 2023. After 2023 onwards, the target has been made 70% of the quantity of waste generation as indicated in the EPR Plan.
2. The quantity of e-waste collected by producers from the 1 October 2016 to 30 September 2017 shall be accounted for in the revised EPR targets until March 2018.
3. Separate e-waste collection targets have been drafted for new producers, i.e. those producers whose number of years of sales operation is less than the average lives of their products. The average lives of the products will be as per the guidelines issued by CPCB from time to time.
4. Producer Responsibility Organizations (PROs) shall apply to the Central Pollution Control board (CPCB) for registration to undertake activities prescribed in the Rules.
5. Under the Reduction of Hazardous Substances (RoHS) provisions, cost for sampling and testing shall be borne by the government for conducting the RoHS test. If the product does not comply with RoHS provisions, then the cost of the test will be borne by the Producers.