



सत्यमेव जयते  
Ministry of Electronics  
and Information Technology  
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## E-Waste Awareness for Refurbishers



# Manual for Training of Trainers

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# Imprint

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# 1. About the Project

The Ministry of Electronics and Information Technology (MeitY) has initiated the project “Awareness Programme on Environmental Hazards of Electronic waste” on March 31, 2015. This project is under the ‘Digital India’ initiative of the Government of India. The project is expected to have far reaching and significant impact on the growth of the country as it focuses on reuse and recycling of e-waste, which has the potential to conserve natural resources. The project has three components viz., Content Development, Inventory Assessment and Awareness Generation amongst different stakeholders. The project will help in effective implementation of E-waste Management Rules, 2016.

The primary focus of the project is to create awareness among different stakeholders in order to reduce the adverse impact on environment and health due to improper disposal of e-waste. MeitY has played a key role in dissemination of knowledge on e-waste rules in the past and wishes to engage all key stakeholders during this exercise. During the project duration of 5 years, a city in each of the 10 identified states viz. Madhya Pradesh, Uttar Pradesh, Jharkhand, Orissa, Goa, Bihar, Pondicherry, West Bengal, Assam and Manipur will be covered. The activities will include organising awareness workshops for RWAs/Localities, Schools, Colleges, Bulk Consumers (including corporate & Govt. sectors), Informal Sector, Dealers, Refurbishers, Manufacturers, etc. so as to build capacities of the target groups to channelize e-waste in a manner that the rules are effectively implemented. Suitable course curriculum would also be framed for schools/colleges. Effort would be made to prepare the content in local language.

This project will also stress on adopting best practices for e-waste recycling available globally, so that the unorganised sector can generate jobs as well as viable business prospects thereby mitigating the impact of improper recycling on the environment. Recycling of e-waste will help in creating jobs and recovery of valuable components and materials through dismantling. The valuable metals recycled from old electronic items that can also be used in manufacturing of new products. As a result, this will save energy, reduce pollution, mitigate greenhouse gas emissions, and reduce extraction of finite natural resources through mining. The project will also emphasize on the responsibilities of the producers and convey the message that they must inculcate the principle of Extended Producer Responsibility (EPR) and follow the mechanism for channelisation of e-waste from ‘end of life’ products to registered dismantlers or recyclers.

The tools and dissemination material for creating awareness are developed by MAIT to create awareness among various stakeholders in the value chain. The awareness workshops will help to present the current situation on e-waste disposal and practices thereby creating awareness on the issue; it’s recycling as well as the legal provisions and the responsibilities of the stakeholders.

The program also aims to enhance its reach to more cities across each state during the course of 5 years of its implementation. This will help to inculcate better disposal practices amongst all stakeholders thereby reducing the environmental impacts of improper handling and recycling of e-waste.

## 2. Framework of the Manual

The objectives of the manual are the following:

**To act** as a tool for enhancing the understanding of the trainers who would be involved in conducting the training for refurbishers on the subject of e-waste.

**To serve** as a ready reference for trainers to design and organize trainings on the subject of e-waste for refurbishers.

**To serve** as a compilation of information on the following issues related to the subject of e-waste:

- What is e-waste?
- What are the categories of e-waste?
- What is the generation of E-waste globally and in India?
- What are hazardous substances?
- What are the hazardous substances in E-waste?
- What are health impacts of unscientific processing of E-waste?
- What are the methods used at present by the informal sector for treating E-waste?
- What is the National Environment Policy of India?
- The E-waste (Management) Rules, 2016 and the challenges of implementing the Rules.
- Defining sustainable consumption and Lifestyles of Health and Sustainability (LOHAS)
- Guidelines for setting up of collection centres of e-waste.
- What is carbon footprint?
- How to measure carbon footprint?
- What are the strategies to reduce carbon footprint?

**To serve** as a guide for implementing initiatives by refurbishers that contribute to safe e-waste management in India.

### Objectives of the training of trainers:

The training of trainers has been designed with the objective to enhance the understanding on the subject of e-waste amongst refurbishers. This will be achieved by a training of trainers on the subject of e-waste and providing them with adequate tools to organize trainings for refurbishers.

The training of trainers will be followed by trainings for refurbishers so that they can contribute to effective handling and management of e-waste.

The training provided will increase knowledge amongst refurbishers about the generation of e-waste, hazardous substances in e-waste, present status of generation and disposal in India, regulation on management and handling of e-waste in India, role of refurbishers as handlers and generators of e-waste and efforts like setting up of e-waste collection centres that can be undertaken by them. In addition they will be introduced to concepts of secondary resources and rules governing e-waste in the country.

The manual uses different methods to achieve the change objective including the Donna E. Walker's 'Learning Cycle' that has five steps including Mind Jog, Personal Connection, Information Exchange, Information Application and Real World Connection. This method

takes into account that different learners have different learning abilities and at least one of the steps of the cycle would be able to transfer the learning effectively.

In addition it uses Harvard case method that involves presenting a case to refurbishers where they associate themselves with a role as they read through the situation and identify the problem. The next step is to perform the necessary analysis to determine the cause and possible solutions to the problem. The manual provides essential information and situations that form cases that can be discussed with the refurbishers by the trainer.

## How to use the manual:

This manual has 3 major components to it with of the objective of providing experiential learning to its users.

Component 1 is the Harvard case study which tries to rake the issue with the specific stakeholders as the key protagonist. This is done to help identify the present scenario with respect to the problem of e-waste and how it impacts the protagonist's daily life and future. The case study can be enacted in markets to ensure that refurbishers are able to learn through this experience and enable them to question on the subject to enhance understanding. Enhancement of understanding will lead to imbibing the learning into practice.

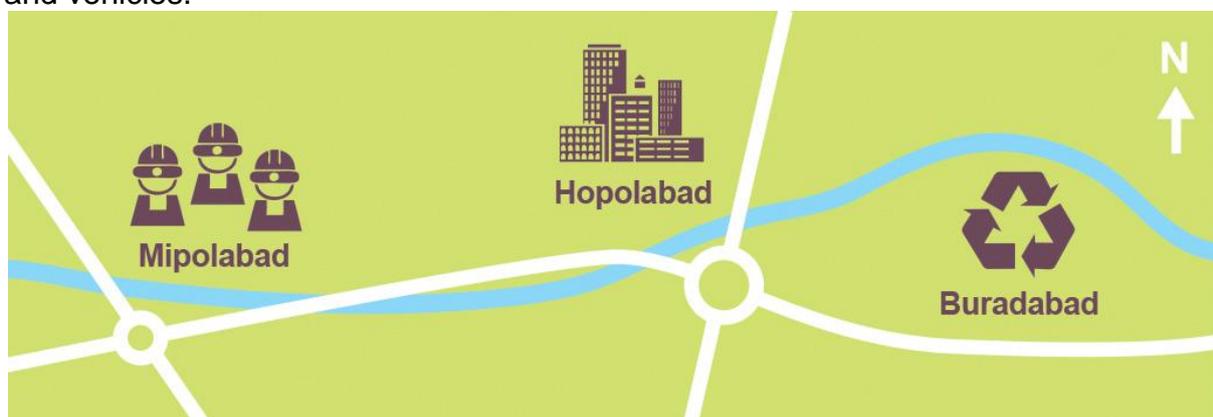
Component 2 is on the learning cycle which has been adopted from the finest techniques available for experiential learning today. The sessions help to unpack the subject at hand and enable to gain a better understanding of solutions in order to solve the problem. It also ensures that engagement is built with participants so that the training sessions are not just monologues from the trainer to the participants but allows the space for dialogue in order to enhance understanding of the subject of e-waste.

Component 3 includes references which have been extensively researched from material available through secondary sources. This includes work which has been done in India as well as around the world and has been published in renowned journals and publications. The links to the material have also been provided so that interested readers can enhance their understanding of the subject of e-waste.

In order to use the manual, the trainer has to go through the case study in order to relate to the problem and read in detail about the different issues that are discussed. For each session as elaborated, the trainers will discuss the subject at length in the time provided in order to ensure that their understanding is enhanced and they can pass the message to the relevant stakeholders during training workshops and activities that they are a part of during the course of the project.

### 3. Screenplay for a conversation between refurbishers in an electronics market, a NGO worker and a formal recycler regarding proper disposal of electronic waste. The conversation results in the setting up of a collection mechanism in the market and proper disposal of e-waste.

This fictitious conversation is based in the city of Hopolabad. The city of Hopolabad is a business hub of the country and has thriving businesses in the manufacturing and service sectors. Mipolabad is a mining hub situated to the west of Hopolabad and Buradabad is a recycling hub which is located to its east. The city is surrounded on the northern and southern sides by agricultural farmland. Hopolabad has a domestic product of INR 72,000 crores annually and has a PPP of INR 7,20,000 (high income population). It has a population of 1 million people (big metropolis). The city is dotted with apartment complexes, malls and office buildings in the eastern and central areas. The western part of the city is a manufacturing hub for electronic items and vehicles.



Buradabad, which is located to the east of Hopolabad, is a recycling hub and is

dotted with formal recycling industries as well as informal (kabadis in local parlance) shops which extract material from waste. The Blue river flows from Buradabad through the city of Hopolabad and then into Mipolabad. Over the last 15 years, the river flow has almost stagnated which has caused floods in these 3 cities in the rainy season.

#### **Introducing the actors:**

**Ramesh:** An owner of an electronics repair outlet in Hopolabad which repairs products of major manufacturing companies. His shop is in a market which also has many other outlets repairing electronics products.

**Sabir:** An informal sector recycler who has now converted to being formal by registering his business with the Pollution Control Board. He has experience of more than 30 years in the recycling sector.

**Shahid:** A school student from Hopolabad who has interests in environment and is involved with a NGO as a volunteer. He is interested in the subject of e-waste and the informal sector.

**Neetu:** A social worker who has been associated with environmental issues and the informal sector for the last 10 years. She has helped many informal sector business people to formalise and be on the right side of the law. She also leads capacity building efforts in Buradabad and her NGO has an office in Hopolabad.

#### **About the conversation:**

**This conversation** has 3 parts to it. Part 1 is a street play which is performed by Shahid and his school mates with support from Neetu and Sabir. In the play, they try to send the message that e-waste contains hazardous material and needs to be handled and disposed off properly. The play also shows that there is a law which mandates all stakeholders who produce e-waste responsible for its proper disposal.

**The second part** of the conversation, Ramesh speak to Neetu and Sabir on what the market association should be doing in order to ensure that they are on the right side of the law and the steps that they should be taking in order to ensure that they are able to manage their e-waste in a proper manner.

**The third part** of the conversation, Sabir gives a presentation to the members of the market association telling them about the importance of setting up a collection center and complying with the new e-waste rules.

## ACT I

*Neetu Sabir and Shahid along with his school mates gather in the center of the community market at Hopolabad. The community market has many electronic repair shops. They have gathered to enact a one act play.*

It has 4.00 pm and there is an announcement on the microphone.

**Neetu:** *Listen! Listen! Listen! There is a major problem on the anvil. Our dear planet is on the verge of destruction and we all need to gather and save. This is our last chance to do something for our mother earth. Come one, come all and join hands for a better tomorrow.*

(There is a small crowd which gather close to where Neetu is standing and making the announcement)

**Ramesh:** *What is it lady and why is our planet going to be destroyed? I don't think any such announcement was heard coming from the Government.*

**Neetu:** *Hello sir! The announcement made can be true if we keep on going about our lives the way we are right now. Look around you and see the amount of waste that is being generated. Do you think you will be able to live in this pile of waste 10 years later.*

**Ramesh:** *Certainly, we cannot. But the government should do something about it. Shouldn't it?*

**Neetu:** *The government is doing its bit my friend. We are here to tell you what the government is doing. Now it is for you to do your bit as well.*

(The crowd has now swelled and people are listening with intent to the conversation between Neetu and Ramesh)

**Raju:** *What happened Ramesh? What is the lady saying?*

**Ramesh:** *She is saying that we need to do something to save our planet from destruction.*

**Neetu:** *Thank you all for gathering here. I come from a NGO and we work with the informal sector to improve their lives and livelihoods. We are here with Sabir, Shahid and his friends from school. They have prepared a small drama which they would like all of you to see. Once the drama is over, we can answer any questions that you may have.*

**Sabir:** *Dear friends, I am Sabir and I have been working in the area of electronic waste since the last 30 years. Earlier I was an informal kabadi, who used to collect and then break open the materials to extract copper and other metals. That was my livelihood. 4 years ago, I came to know about the impact of my work on our planet and I decided that I had to change my ways so that I can give my children a better future. These children today have come to your market with a small drama that they have prepared. They would like to show you how poor handling of the waste that is being produced from the work that you do can lead to severe health hazards and pollution of the environment not only affecting you but also your near and dear ones.*

**Ramesh:** *This will be interesting I think. Why don't you ask the children to start with their drama?*

**Shahid:** *Dear friends, we are all students of the community school of Hopolabad. We have prepared this drama whose name is 'A new beginning'. I am accompanied by my friends from school.*

(Dilip walks in with a broken mobile phone)

**Dilip:** *Oh! My phone has broken. Now I will have to buy a new one.*

**Sarita:** *Why don't you have it repaired. You can go to the community market in Hopolabad. There are many shops there which repair broken and old mobile phone.*

**Dilip:** *That's not a bad idea. I can have this repaired and ask dad to give it away to the maid. That way I can have a new phone as well and put this one to use.*

**Sarita:** *Yeah, that sounds like a good idea.*

**Dilip:** *Will you be able to accompany me to the market Sarita.*

**Sarita:** *I would love to. I am always fascinated by the work that happens in these repair shops. They are magicians and can repair almost anything that doesn't work.*

**Dilip:** *Ok, lets go.*

(In the next scene, Dilip and Sarita are standing in front of a counter with some electronic items in the background. They are then speaking to Sabir who acts as the owner of the shop. )

**Sabir:** *Yes sir, what can I do for you?*

**Dilip:** *This phone has broken. We want to get it repaired.*

**Sabir:** *Let me have a look at the same please.*

(Dilip hands over the broken phone to Sabir)

**Sabir:** *The circuits are corrupted. They need to be changed. Did the phone fall in water or get wet?*

**Dilip:** *Yes it did. I dropped a glass of water on it while having dinner.*

**Sabir:** *Ok. Let me try drying the circuits to see if anything can be done, else will have to replace with a new circuit board.*

(In the meantime, Shahid has come at the store to show his mobile phone to Sabir. His phone has also not been working since the day before)

**Shahid:** *Hi, I also have a phone which is not working since yesterday. Can you please have a look at the same as well.*

**Sabir:** *I will surely. Please give me a couple of minutes to attend to these guys who have come before you.*

**Shahid:** *I am just being inquisitive but I have been listening to your conversation with him for the last couple of minutes. I just wanted to ask, what will you do with the board that you take out of his phone when you replace it with a new one.*

**Sabir:** *Why is that of interest to you?*

**Shahid:** *Actually I am interested in environmental issues and have been to Buradabad on quite a few occasions where many people try and extract metals from these boards.*

**Sabir:** *Ok. We sell it to these kabadiwalas who I think then sell it to these guys who work in Buradabad.*

**Dilip:** *So this board that you take out from my phone will fetch you some money from the kabadiwala? You better give me some discount on the new one in that case.*

**Sabir:** *What will the board have sir. Its plastic, and plastic doesn't sell for much.*

**Shahid:** *On the contrary, a board has many precious metals like gold, silver, platinum, molybdenum, etc. which can be extracted and one can make it a good business proposition. However, one must know that there are hazardous substances which are embedded in these boards and if they are not extracted properly, they lead to the emission of many toxic substances in the environment and cause pollution.*

**Dilip:** *Wow, how do you know that much my friend. If this is the case, then the government should do something about it.*

**Shahid:** *The government is doing its bit already. We have a law and we have rules within the law for different stakeholders so that the menace of electronic waste as it is called can be reduced to the minimum and the recovery of metals can happen in a proper manner.*

**Sabir:** *Sir, if there are rules for different stakeholders, are we as repair people also covered in these rules?*

**Shahid:** *Yes you are. There are rules for refurbishers because when you repair any electronic item, there is e-waste that is generated. This e-waste has to be handled properly so that resources that are embedded in this waste can be recovered, but in an environmentally sound manner. The government through the pollution control authorities has certified authorised recyclers who are supposed to extract these resources which are embedded in e-waste.*

**Sabir:** *Thank you for the information sir. What should we do to ensure that we are following the rules?*

**Shahid:** *You should set up a collection center in the market and ensure that all of you are able to tie up with an authorised recycler who will take all the waste away. Furthermore, all the work that you do should be done in a manner that is not an*

*occupational hazard and you are aware of the health risks that are posed by different materials which are embedded in e-waste and are toxic in nature.*

**Sabir:** *Thank you so much sir for this information. I will certainly speak to all my friends in the market and we shall try and set up a collection center at the earliest.*

*(The audience claps and Ramesh comes forward to speak to Neetu and Sabir. He seeks an appointment with them when he can meet them so that they are able to guide him and the other refurbishers about better management of e-waste)*

(ACT I completed)

## ACT II

*Neetu and Sabir meet up with Ramesh and other shopkeepers from the community electronics market in Hopolabad. They discuss the rules which govern better management of electronic waste and the means to set up a collection center for e-waste.*

**Neetu:** *Hello Ramesh. How is it going with you?*

**Ramesh:** *I am doing fine madam. Thank you for dropping by. After that drama which you guys played in the market, there have been many queries which I have faced from my fellow shopkeepers about what the market association is doing about setting up a collection center. That is the reason I called Sabir and asked for help. He said he would bring you along since you have helped many like us to come within the ambit of the rules which would also mean unhindered progress.*

**Neetu:** *I am happy to know that members of the market association have come together to ensure that they can solve this issue which is so pressing in terms of the environment.*

**Sabir:** *Yes, and Neetu ji can help to ensure that all you can comply with the rules as well so that there are no legal problems that you face while doing your business.*

**Ramesh:** *What are the key problems with managing e-waste the way we do it, Neetu ji?*

**Neetu:** *e-waste contains many harmful and toxic substances which is not handled properly will lead to serious consequences for human health. There are plastics which when burnt to extract metals lead to pollution. It is hence important that the material be sent out to a proper recycler so that the resources that are embedded are extracted properly without leading to any pollution or environmental hazard.*

**Ramesh:** *There are so many different materials that are there is e-waste. Do we mix all of them and keep them or do we have to segregate as well.*

**Neetu:** *You need to segregate a lot of the material in order to ensure that you separate the ones which are toxic from the ones which are not. Furthermore, metals need to be segregated from plastics and other materials so that the same can be disposed off to proper collectors of such waste.*

**Ramesh:** *Our shops are really small and we have to use the space to work while we are repairing stuff. How can we find space to be able to store everything in this manner?*

**Neetu:** *You should have a proper collection center for the same so that you can store the materials there. All shop owners should come together and either purchase or rent a place where you can store all e-waste.*

**Ramesh:** *Won't it get mixed with everyone's waste there? How will we know who owns what so that they may be paid accordingly?*

**Neetu:** *You can maintain a proper inventorisation system such that each and everyone is able to stock their e-waste in an appropriate manner. This will help all of you to determine its value when you dispose it off to a recycler.*

**Ramesh:** *Thank you Neetu ji for this help. Would it be possible for you to spare some time and come and talk to other shop owners as well. I will organise for a workshop where they can be educated as well on this very important topic that has the potential to affect our business.*

**Neetu:** *I would be happy to do that Ramesh and I think it is the need of the hour that such things are done so that all of you can make progress while keeping the environmental interests firmly entrenched in your business.*

(ACT II completed)

## ACT III

*Ramesh has invited Neetu and Sabir to come over and speak to the other refurbishers in the market. Neetu and Sabir tell them how they can set up a collection center and maintain e-waste and how refurbishers can comply with the e-waste rules.*

**Ramesh:** *Dear Friends, I am pleased to invite Ms Neetu and Mr Sabir who is an e-waste recycler here today to share with us the key issues around e-waste and what we can do to comply with the rules.*

**Neetu:** *Thank you Ramesh. Let me introduce myself as a NGO worker and Sabir who is an e-waste recycler who some years ago was a kabadiwala but changed his ways and means to ensure that he was complying with the rules and helping the environment by working in a proper manner. Sabir, please tell our friends the key issues around e-waste.*

**Sabir:** *e-waste contains many different substances of which some are precious metals as well. Apart from iron, copper, plastics, e-waste in some materials also contains precious metals like gold, silver and platinum. There are quite a few materials in an electronic item which can be extracted by just dismantling the same. However, there are some which are extracted either through burning or other ways and means which are not environmentally conducive. That is how recycling of e-waste becomes a hazard when not done properly not only for those who are doing it but also for those who live in and around areas where this work happens.*

**Ramesh:** *How can we manage e-waste?*

**Sabir:** *First, you should remember that you are not creating e-waste. What you are doing is collecting e-waste and that too for a certain time period. During this period it is important that you do basic segregation of materials in a manner that will help to identify different types of products.*

**Ramesh:** *But there are hazardous items as well as Neetu ji said before.*

**Sabir:** *Yes. The segregation has to happen in a manner where hazardous and non hazardous items are placed separately. You can inventorise the same as per*

categories and store them till the quantity is enough that a recycler like me can come and take a truck full away.

**Ramesh:** How do we choose who is the best recycler who will follow environmental norms?

**Sabir:** There are 2 ways of doing the same. Either you can ask the brands to name the recyclers who they have appointed or you can visit the pollution control board and ask them for authorised recyclers who you can give away the material to.

**Ramesh:** Can we have one collection center which can save us some cost as well or does each one of us need a separate collection center.

**Sabir:** You can have one collection center and use shelves to maintain your e-waste. Labelling of e-waste is very important so that you can recognise which product has toxic substances and which has not.

**Sabir:** All the material that you break or dismantle and replace, please store that in a proper place. Please ensure that you follow proper dismantling practices so that there is no pollution in and around your work place. There are guidelines to dismantling of products which are available with manufacturers. You should try and follow the same so that you work in a healthy environment. The material that is left over should be labelled and stored properly and when that is of a sizeable quantity you can send it off to an authorised recycler.

**Ramesh:** Thank you Sabir for this information. I am sure we will meet once again amongst ourselves and decide on things. We can then seek your help to become our chosen recycler so that we can comply with the rules as well.

**Sabir:** Thank you for inviting me and Neetu ji. We will be willing to extend all support to you as much as I can.

(ACT III completed)

*Ramesh and his dealer friends have set up a collection center and have collected more than a ton a e-waste. They have appointed Sabir as their preferred recycler for recycling the same in an environment friendly manner.*

## 4. References:

### a) Who collects what kind of e-waste?

Informal sector collects all kinds of e-waste and due to lack of awareness and economic incentive channelizes e-waste to unsafe informal sector recyclers. However, legally as per e-waste management rules 2016 only authorized collection centres are allowed to collect e-waste. Responsibilities of collection centres include –

(1) collect e-waste on behalf of producer or dismantler or recycler or refurbisher including those arising from orphaned products; Provided the collection centres established by producer can also collect e-waste on behalf of dismantler, refurbisher and recycler including those arising from orphaned products

(2) ensure that the facilities are in accordance with the standards or guidelines issued by Central Pollution Control Board from time to time;

(3) ensure that the e-waste collected by them is stored in a secured manner till it is sent to authorised dismantler or recycler as the case may be;

(4) ensure that no damage is caused to the environment during storage and transportation of e-waste;

(5) Maintain records in Form-2 of the e-waste handled as per the guidelines of Central Pollution Control Board and make such records available for scrutiny by the Central Pollution Control Board or the concerned State Pollution Control Board as and when asked for.

### b) How do you identify toxic substances in e-waste?

Different components of electrical and electronic equipment have different hazardous substances, it is easier to identify the components and then determine how to handle the component considering the hazardous substance present in it.

<b>Hazardous Substance</b>	<b>Danger</b>
<b>Lead</b>	A neurotoxin that affects the kidneys and the reproductive system, high quantities can be fatal. It affects mental development in children. Mechanical breaking of CRTs (cathode ray tubes) and removing solder from microchips release lead as powder and fumes.
<b>Plastic</b>	Found in circuit boards, cabinets and cables, they contain carcinogens. BFRs or Brominated flame retardants give out carcinogenic Brominated dioxins and furans Dioxins can harm reproductive and immune systems. Burning PVC, a component of plastics, also produces dioxins BFR can leach into landfills Even the dust on computer cabinets contains BFR.
<b>Chromium</b>	Used to protect metal housings and plates in a computer from corrosion, inhaling Hexavalent chromium or chromium 6 can damage liver and kidney and cause bronchial maladies including asthmatic bronchitis and lung cancer.
<b>Mercury</b>	Affect the central nervous system, kidneys and immune system. It impairs

	foetus growth and harms infants through mother's milk. It is released while breaking and burning of circuit boards and switches mercury in water bodies can form methylated mercury through microbial activity. Methylated mercury is toxic and can enter the human food chain through aquatic.
<b>Beryllium</b>	Found in switch boards and printed circuit boards. It is carcinogenic and causes lung diseases.
<b>Cadmium</b>	A carcinogen. Long-term exposure causes Itai-Itai disease, which causes severe pain in the joints and spine. It affects the kidneys and softens bones. Cadmium is released into the environment as powder while crushing and milling of plastics, CRTs and circuit boards. Cadmium may be released with dust, entering surface water and groundwater.
<b>Acid</b>	Sulphuric and hydrochloric acids are used to separate metals from circuit board's furnes contain chlorine and sulphur dioxide, which cause respiratory problems. They are corrosive to the eye and skin.
<b>PBB</b>	Polyhalogenated derivatives which can cause pre and post natal complications and can lead girls to menarche at an early age. They can also cause acne.
<b>PBDE</b>	Leads to restriction in development of kids between the age of 1 and 6 years.

**Table 1: Hazardous Substances in E-waste.**  
**Source: E-waste guide.info, (2016)**

### c) What are the pragmatic methods of determination of toxic substances in e-waste?

- Different components of electrical and electronic equipment have different hazardous substances, it is easier to identify the components and then determine how to handle the component considering the hazardous substance present in it.

**Table 2: Possible Hazardous substances in e-waste components (CPCB)**

<b>E-Waste Source</b>	<b>E-Waste Component</b>	<b>Environmental Hazard</b>	<b>Effects on Human</b>
<b>CRTs (used in TVs, Monitors, ATM, Video Camera, etc), Batteries, PVC cables, Paints</b>	Lead, barium & other heavy metals	These metals leaching into the ground water and release of toxic phosphor	Anemia, Renal Toxicity, Insomnia
<b>Batteries, Housing &amp; Medical equipment</b>	Mercury	Air emissions as well as discharge into rivers of glass dust	Renal Toxicity, Muscle Tumors, Mental retardation cerebral palsy
<b>Plastics from printers, keyboards, monitors etc</b>	Plasticizer bisphenol-A(or BPA) as well DEHP and DBP Plastic compound known as phthalates	Chlorinated plastic release harmful chemicals into the surrounding soil, which seep into ground water or other surrounding water sources which cause serious harm to the species that drink	Risk in developing heart problems, obesity reproductive disease

		this water.	
<b>PVC &amp; Polymer, Paints, Printing inks, electrical transformers &amp; Capacitors</b>	Polychlorinated Biphenyls (PCBs)	Include extreme pollution from production, toxic chemical exposure during use, hazards form fires	Suppression of immune system damage to the liver nervous and reproductive systems

**Table 3: Possible Hazardous substances in e-waste components (CPCB, 2008)**

<b>Component</b>	<b>Possible Hazardous Content</b>
<b>Metal</b>	
<b>Motor/compressor</b>	
<b>Cooling</b>	Ozone Depleting Substances (ODS)
<b>Plastic</b>	Phthalate plasticize, BFR
<b>Insulation</b>	Insulation ODS in foam, Asbestos, refractory ceramic fiber
<b>Glass</b>	
<b>CRT</b>	Lead, antimony, mercury, phosphors
<b>LCD</b>	Mercury
<b>Rubber</b>	Phthalate plasticizer, BFR
<b>Wiring/electrical</b>	Phthalate plasticizer, lead , BFR
<b>Concrete</b>	
<b>Transformer</b>	
<b>Circuit Board</b>	Lead Beryllium , antimony, BFR
<b>Fluorescent Lamp</b>	Mercury, Phosphorus, Flame retardants
<b>Incandescent Lamp</b>	
<b>Heating element</b>	
<b>Thermostat</b>	Mercury
<b>BFR – containing plastic</b>	BFRs
<b>Batteries</b>	Lead, lithium, Cadmium, Mercury
<b>CFC, HCFC , HFC , HC</b>	Ozone depleting substances
<b>External electric cables</b>	BFRs, plasticizers
<b>Electrolyte capacitors (over L/D 25mm)</b>	Glycol, other unknown substances

**Table 4: Composition of e-waste**

<b>Pollutant/ Element</b>	<b>Occurrence</b>
<b>Arsenic</b>	Semiconductors, diodes, microwaves, LEDs (light emitting diodes), solar cells
<b>Barium</b>	Electron tubes, filler for plastic and rubber, lubricant additives
<b>Brominated flame –proofing agent</b>	Casing, circuit boards (plastic), cables and PVC cables
<b>Cadmium</b>	Batteries, pigments solder, alloys, circuit boards, computer batteries, monitor cathode ray tubes (CRTs)
<b>Chrome</b>	Dyes/pigments, switches, solar
<b>Cobalt</b>	Insulators
<b>Copper</b>	Conducted in cables, copper ribbons, coils, circuitry, pigment
<b>Lead</b>	Lead rechargeable batteries, solar, transistors, lithium batteries PVC(polyvinyl chloride ) Stabilizers, lasers, LEDs, thermoelectric elements, circuit boards

<b>Liquid crystal</b>	Displays
<b>Lithium</b>	Mobile telephones, photographic equipment, video equipment (batteries)
<b>Mercury</b>	Components in copper machines and steam irons; batteries in clocks and pocket calculators, switches, LCDs
<b>Nickel</b>	Alloys, batteries, relays, semiconductors, pigments
<b>PCBs (Polychlorinated biphenyls)</b>	Transformers, capacitors, softening agent for paint, glue plastic
<b>Selenium</b>	Photoelectric cells, pigments, photocopiers, fax machine
<b>Silver</b>	Capacitors, switches (contacts), batteries, resistors
<b>Zinc</b>	Steel, brass, alloys, disposable and rechargeable batteries, luminous substances.

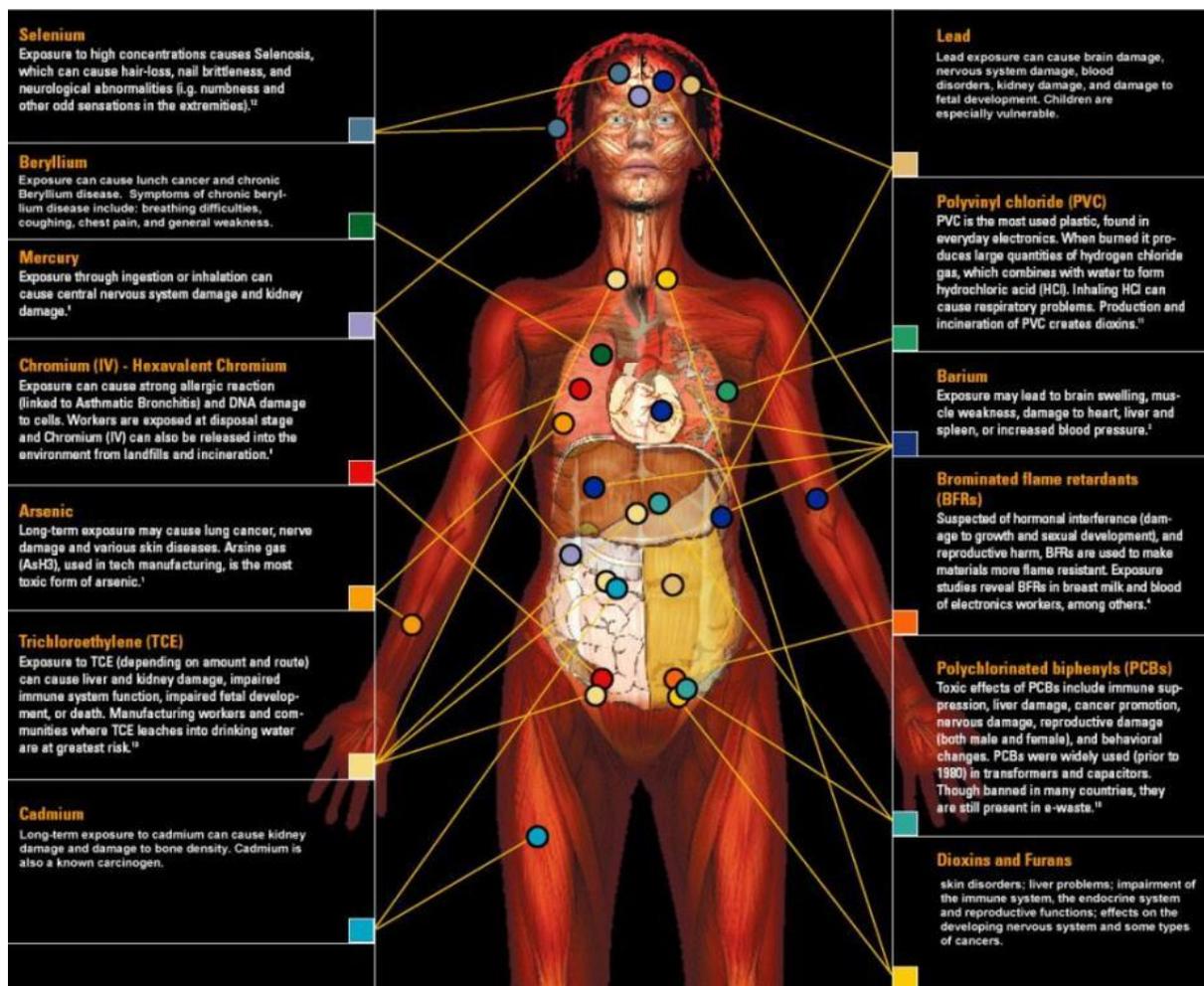


Figure 1: Adverse Impact of e-waste

Source:

[http://www.capeewaste.co.za/why\\_recycle\\_ewaste.html](http://www.capeewaste.co.za/why_recycle_ewaste.html)

**Table 5: Recoverable quantities of elements in TV (CPCB)**

Elements	Percentage	ppm	Recoverable Weight of element (Kg)
Aluminum	1.2		0.4344
Copper	3.4		1.2308
Lead	0.2		0.0724
Zinc	0.3		0.1086
Nickel	0.038		0.013756
Iron	12		4.344
Plastic	26		9.412
Glass	53		19.186
Silver		20	0.000724
Gold		10	0.000362

#### d) What is the end of life of a product?

End of life product or e-waste products cannot be used in any manner and should be managed, recycled and disposed following standard safe methods to prevent harmful substances present in e-waste from contaminating the environment and causing adverse impact on health.

As per e-waste management rules 2016, 'Extended Producer Responsibility' concept has been implemented and each producer is responsible for recycling 30% of the end of life electrical or electronic equipment that it has sold several years ago. There is no restriction that only same brand products should be recycled so it is possible for any producer to recycle any of the e-waste provided by consumer so dealers need not worry about brands while submitting e-waste for recycling.

Extended Producer Responsibility will lead to implementation of take back system or setting up of collection centres or both and having agreed arrangements with authorised dismantler or recycler either individually or collectively through a Producer Responsibility Organisation recognised by producer or producers in their Extended Producer Responsibility – Authorisation.

#### e) How can one disseminate information about e-waste to consumers and create awareness regarding e-waste disposal and take back?

Implementing the Extended Producers Responsibility as per the E-waste Management Rules 2016 include labelling, inventorisation and maintenance. The mechanism used for channelisation of e-waste from 'end-of-life' products including those from their service centres to authorised dismantler or recycler needs awareness creation amongst consumers as informal sector is likely to pay higher sum for the e-waste generated and has better collection network for door to door collection. Therefore, creating awareness through media, publications, advertisements, posters, or by any other means of communication is crucial. Dealers should display e-waste related information at shops and must inform the consumer regarding deposit refund scheme or EPR mechanism in place. Information on hazardous constituents as specified in sub-rule 1 of rule 16 in electrical and electronic equipment should be provided.

## f) What are the precautions one should take while setting up an in-house collection center before transporting to formal collector/dismantler/recycler?

Manufacturers, dealers of electronic and electrical equipment, government department involved in environmental issues can support setting up of collection points for e-waste. As precaution for setting up and managing collection points it is crucial to have Personal Protective Equipment (PPE) and Standard Operating Procedures (SOPs) for people handling e-waste. Record of the type of waste collected and time of collection should be maintained as per the E-waste management rules. Contract with recyclers and manufacturers should be in place to ensure that e-waste is managed safely after reaching the collection point.

Electronics recycling can pose following risks to people handling the waste:

- Illness from toxic metal dusts
- Injuries from lifting and moving heavy objects
- Cuts or eye injuries from sharp objects
- Hearing loss from noise exposure

Use of standard personal protection equipment (PPE) items when handling e-waste is necessary, the PPE include the following: closed shoes, overalls, gloves, security glasses and masks (the latter two are required for any dismantling activities).

Type of PPE
Filtering facepiece*
Half- or full face elastomeric*
Gloves
Eye protection
Hearing protection
Steel-toed boots
*NIOSH-approved respirato

**Figure 2: Precautions while handling e-waste**

**Source:**

GIZ, (2013), Best Practice Guidebook for SMALL South African E-Waste Businesses, [https://www.mtn.com/Sustainability/Documents/Best\\_Practice\\_Guidebook\\_for\\_Small\\_E-Waste\\_Businesses\\_\(SA\)\\_2014.pdf](https://www.mtn.com/Sustainability/Documents/Best_Practice_Guidebook_for_Small_E-Waste_Businesses_(SA)_2014.pdf)

California Department of Public Health, Electronic Waste Recycling Working Safety, <https://www.cdph.ca.gov/programs/hesis/Documents/eWaste.pdf>

## Knowledge of the sanitary regulations at the workplace

Sanitation guidelines at the workplace include:

- Keep your work area clean.
- Do not use brooms to sweep. Wet mop or use a HEPA-filtered vacuum to keep dust levels down.
- Don't eat or drink while handling e-waste. Wash your hands well with soap and water before eating, drinking, or using the restroom. Keep drinking water in a closed bottle.
- Shower at the end of your shift to remove dust from your hair and body. (It's better to shower at work if you can.)
- Change into clean clothes and shoes at work before you go home to avoid getting dust in your car or home.
- Keep dirty work clothes and shoes separate from clean street clothes. If you don't have a storage locker, keep your dirty clothes and shoes in a plastic bag.
- If CRT glass breaks, mist the broken glass with water to keep dust down and wet mop or HEPA-vacuum the area.



Wet mop or HEPA vac and wear a respirator

**Figure 3: Sanitary regulations while handling e-waste**

**g)** What are the specific things that the consumers need to be aware of regarding take back and collection of e-waste?

Manufacturers have to set up 'deposit refund scheme' whereby 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. Under the Extended Producer Responsibility (EPR) it is the responsibility of the producer to set up collection centres and take back e-waste for recycling through authorized recyclers. Consumers should be made aware through different campaigns using print and electronic media. Dealer must inform the consumer regarding the harmful impacts of

e-waste and need for safe recycling. Also, details of the deposit refund scheme should be provided to consumer at the time of sale.

## h) What is e-waste?

### Electronic waste or e-waste:

'e-waste' means waste electrical and electronic equipment whole or in part or rejects from their manufacturing, refurbishment and repair process which are intended to be discarded as waste.

### Source:

Indian Ministry of Environment and Forests & Climate Change 2015. E-waste (Management) Rules, 2015.

<http://www.indiaenvironmentportal.org.in/files/file/notified%20ewaste%20rule%202015.pdf>

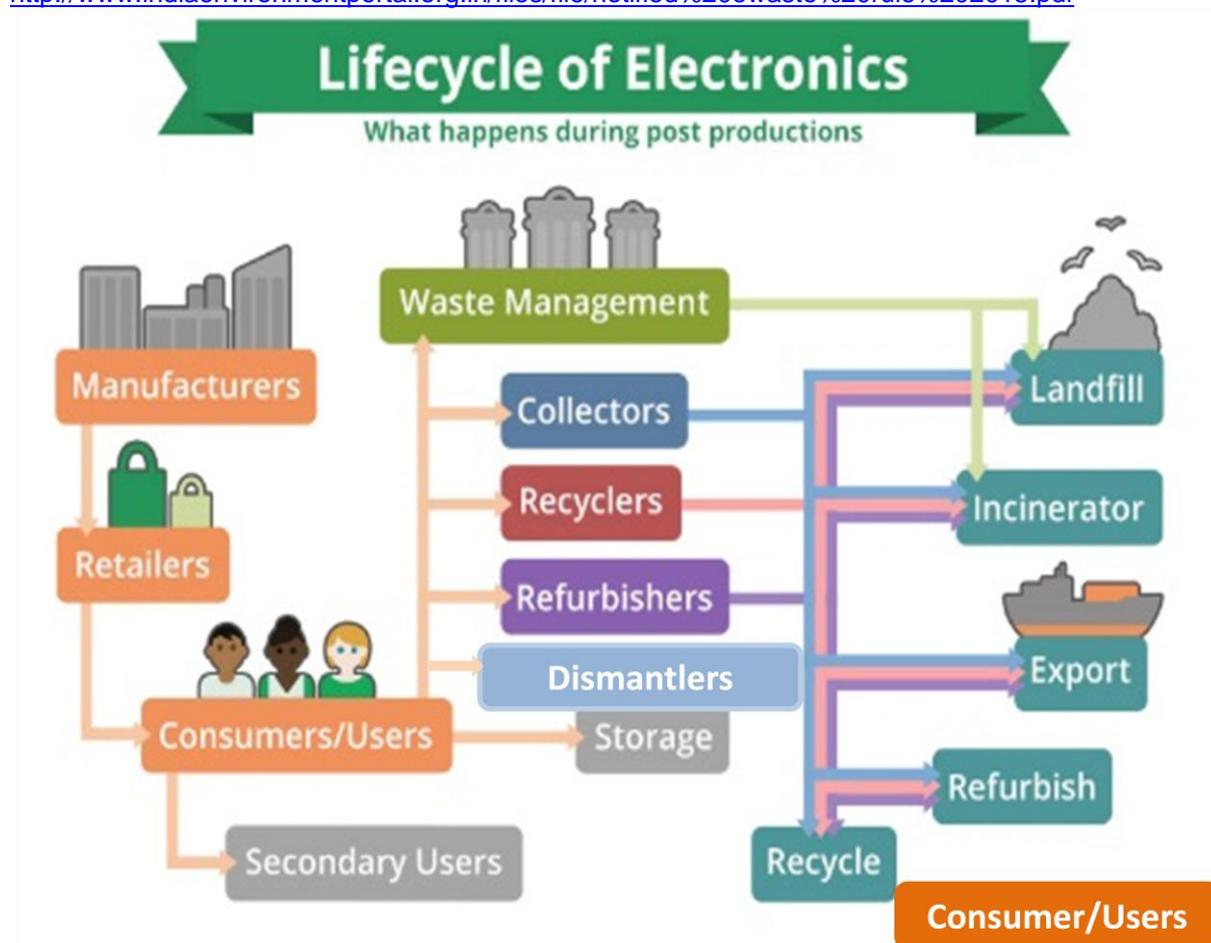


Figure 4: Lifecycle of electronics

### Source:

<http://greatforest.com/sustainability101/uncategorized/e-waste-recycled-video/>

Around 1.7 million tonnes of e-waste is generated in India per year (Baldé, (2015)). The main sources of electronic waste in India are the government, public and private (industrial) sectors, which account for almost 70 per cent of total waste generation. The contribution of individual households is relatively small at about 15 per cent; the rest being contributed by manufacturers. Though individual households are not large contributors to waste generated by computers, they consume large quantities of consumer durables and are, therefore, potential creators of waste. An Indian market Research Bureau (IMRB) survey of 'E-waste

generation at Source' in 2009 found that out of the total e-waste volume in India, televisions and desktops including servers comprised 68 per cent and 27 per cent respectively. Imports and mobile phones comprised of 2 per cent and 1 per cent respectively (Rajya Sabha Secretariat 2011). In countries like China and India, though annual generation per capita is less than 1 kg, it is growing at an exponential pace. The increasing "market penetration" in developing countries, "replacement market" in developed countries and "high obsolescence rate" make WEEE/E-waste one of the fastest waste streams. Main contributors of e-waste includes It includes computer and its accessories, monitors, printers, keyboards, central processing units; typewriters, mobile phones and chargers, remotes, compact discs, headphones, batteries, LCD/Plasma TVs, air conditioners, refrigerators and other household appliances (Rajya Sabha Secretariat 2011).

**Source:**

Baldé, C.P., Wang, F., Kuehr, R., Huisman, J. (2015), The global e-waste monitor – 2014, United Nations University, IAS – SCYCLE, Bonn, Germany, <http://i.unu.edu/media/ias.unu.edu-en/news/7916/Global-E-waste-Monitor-2014-small.pdf>

WEEE Recycle & CSE. E-Waste Training Course for Policymakers and Regulators – Facilitator's Manual, <http://www.igep.in/live/hrdpmp/hrdpmaster/igep/content/e54413/e54441/e62968/WEEERecycleCSEmanual.pdf>

Rajya Sabha Secretariat 2011: E-waste in India. New Delhi. [http://rajyasabha.nic.in/rsnew/publication\\_electronic/E-Waste\\_in\\_india.pdf](http://rajyasabha.nic.in/rsnew/publication_electronic/E-Waste_in_india.pdf)

## i) What is the composition of e-waste?

The composition of e-waste is very diverse and contains products across different categories. A typical electronic and electrical item consists of more than 1000 different substances which can fall under hazardous and non-hazardous categories. The major constituents are ferrous and non-ferrous metals, plastics, glass 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 like silver, gold, platinum, palladium etc.

## j) What are the inventorisation methods and techniques for managing e-waste?

Implementing the Extended Producers Responsibility as per the E-waste Management Rules 2016 involves the following steps which include labelling, inventorisation and maintenance:

(a) collection and channelisation of e-waste generated from the 'end-of-life' of their products or 'end-of-life' products with same electrical and electronic equipment code and historical waste available on the date from which these rules come into force as per Schedule I in line with the targets prescribed in Schedule III in Extended Producer Responsibility -

Authorisation;

(b) the mechanism used for channelisation of e-waste from 'end-of-life' products including those from their service centres to authorised dismantler or recycler shall be in accordance with the Extended Producer Responsibility - Authorisation. In cases of fluorescent and other

mercury containing lamps, where recyclers are not available, channelisation may be from collection centre to Treatment, Storage and Disposal Facility;

(c) for disposal in Treatment, Storage and Disposal Facility, a pre-treatment is necessary to immobilise the mercury and reduce the volume of waste to be disposed off;

(d) Extended Producer Responsibility - Authorisation should comprise of general scheme for collection of waste Electrical and Electronic Equipment from the Electrical and Electronic Equipment placed on the market earlier, such as through dealer, collection centres, Producer Responsibility Organisation, through buy-back arrangement, exchange scheme, Deposit Refund System, etc. whether directly or through any authorised agency and channelising the items so collected to authorised recyclers;

(e) providing contact details such as address, e-mail address, toll-free telephone numbers or helpline numbers to consumer(s) or bulk consumer(s) through their website and product user documentation so as to facilitate return of end-of-life electrical and electronic equipment;

(f) creating awareness through media, publications, advertisements, posters, or by any other means of communication and product user documentation accompanying the equipment, with regard to –

(i) information on address, e-mail address, toll-free telephone numbers or helpline numbers and web site;

(ii) information on hazardous constituents as specified in sub-rule 1 of rule 16 in electrical and electronic equipment;

(iii) information on hazards of improper handling, disposal, accidental breakage, damage or improper recycling of e-waste;

(iv) instructions for handling and disposal of the equipment after its use, along with the Do's and Don'ts;

(v) affixing a visible, legible and indelible symbol given below on the products or product user documentation to prevent e-waste from being dropped in garbage bins containing waste destined for disposal;



(vi) means and mechanism available for their consumers to return e-waste for recycling including the details of Deposit Refund Scheme, if applicable;

(g) the producer shall opt to implement Extended Producer Responsibility individually or collectively. In individual producer responsibility, producer may set up his own collection centre or implement take back system or both to meet Extended Producer Responsibility. In collective system, producers may tie-up as a member with a Producer Responsibility Organisation or with e-waste exchange or both. It shall be mandatory upon on the individual producer in every case to seek Extended Producer Responsibility - Authorisation from Central Pollution Control Board in accordance with the Form-1 and the procedure laid down in sub-rule (1) of rule 13;

(2) to provide information on the implementation of Deposit Refund Scheme to ensure collection of end-of-life products and their channelisation to authorised dismantlers or recyclers, if such scheme is included in the Extended Producer Responsibility Plan. Provided that the producer shall refund the deposit amount that has been taken from the consumer or bulk consumer at the time of sale, along with interest at the prevalent rate for the period of the deposit at the time of take back of the end-of life product;

(3) the import of electrical and electronic equipment shall be allowed only to producers having Extended Producer Responsibility authorisation;

(4) maintaining records in Form-2 of the e-waste handled and make such records available for scrutiny by the Central Pollution Control Board or the concerned State Pollution Control Board;

(5) filing annual returns in Form-3, to the Central Pollution Control Board on or before the 30th day of June following the financial year to which that return relates. In case of the Producer with multiple offices in a State, one annual return combining information from all the offices shall be filed;

The collection centres also need to maintain records in Form-2 of the e-waste handled as per the guidelines of Central Pollution Control Board and make such records available for scrutiny by the Central Pollution Control Board or the concerned State Pollution Control Board as and when asked for.

# 5. Session Plans:

## E-Waste Curriculum: Training of Trainers

*This curriculum has used Donna E. Walker's 'Learning Cycle' to design each of the sessions. Each step of the Walker's cycle serves a specific purpose thus ensuring that the learning effectiveness is maximized. The details of the five steps of the Walker's Cycle are explained below:*



**1. Mind Jog:** This step helps to start the session on a positive note and arouse curiosity about the issue the session relates to. Mind jogs need to be short and crisp, and lead into the topic.



**2. Personal Connection:** This step helps to bring out the 'what's in it for me' connection and prepares the participants for absorbing new knowledge. The exercises used at this stage try to make the session relevant to learner's real world 'as is'.



**3. Information Exchange:** The focus of this stage is to build new knowledge, facilitate exchange of information between and among the participants and deduce some key concepts through discussion and presentation to supplement participants' information. In this stage, the facilitators allow the participants to come up with concepts instead of downloading it for them and allow extensive peer discussion and learning.

The facilitators here need to concentrate on refining and building on participants' inputs.



**4. Information Application:** The purpose of this stage is to build confidence in the participants about new knowledge, support them to apply the key concepts learnt to realistic scenarios (thereby reconfirming the learning of the previous stages), and to facilitate a multi-perspective view. This stage also seeks to add fresh insights into the concepts and apply the skills to real life situations without taking real risks. For this curriculum, we have tried to ensure that the activities are drawn from the participants' background and experiences and enough complexity has been built into it in order to get a variety of responses.



**5. Real World Connection:** The activities in this stage seek to elicit personal learning and satisfy the participants that new knowledge will lead to a better performance. The design of this stage enables participants to connect personal learning to learning from the session, as the facilitator helps them set up clear performance oriented goals, which are also specific, measurable and realistic. This way both the facilitators and the participants get a chance to informally assess how effective the participants' learning has been.

# Session 1: What is E-Waste?

## Purpose

The primary function of this session is to introduce the participants to the methodology that would be used in transacting the curriculum. The session also aims to build an understanding of participants around the concept of E-waste and problems associated with E-waste.

## Session Objectives

At the end of the session participants will be able to:

- Explain what E-waste is composed of, where e-waste is produced and in what quantities
- Identify the problems associated with E-waste Management

Flow Step	Key Idea/Description	Methodology/ Tools	Duration
<b>Mind Jog</b> 	<b>Familiarizing with the concept of E-waste</b> How many of you have heard of the word e-waste; show of hands; get responses from few participants.	Group activity	15 minutes
<b>Personal Connect</b> 	<b>Connecting personal experiences with E-Waste</b> One thing which I am doing, through which I am augmenting e-waste in the environment (think individually and then share in small groups). <ul style="list-style-type: none"> <li>• Individually reflect and write (10 minutes)</li> <li>• In small groups, share. (20 minutes)</li> </ul>	Individual reflection and Group Work	30 minutes
<b>Information Exchange</b> 	<b>Defining the concept of E-waste</b> Case study: Read aloud the case study with participants reading the part of different characters + individual recording after each section. If the group is a mixed Hindi/English group, run in one Hindi group and one English group. It is a good idea to give the case study as a pre-work so that the participants have at least read it before they come and this is only a refresher.	Group study and Discussion Case study	1 hour
<b>Information Application</b>	<b>Learning about the themes of the E-waste curriculum</b> Group processing of the case study to identify the major themes of curriculum <ul style="list-style-type: none"> <li>• Make 4 small groups</li> <li>• Participants share individual written</li> </ul>	Discussion	1 hour

	<p>thoughts in small groups</p> <ul style="list-style-type: none"> <li>• As a group discuss the case study and bring out the core themes which the case study is focusing on</li> <li>• Each group presents to the larger group the themes which they have been able to identify from the case study .</li> <li>• The facilitator sums up the discussion by introducing the curriculum themes and how each theme will be treated as a session which the participants will undergo over the course of next 4 days .</li> <li>• Theme 1 – Introduction to E-waste</li> <li>• Theme 2 –Harmful effects of E-waste on human health and environment</li> <li>• Theme 3 – Policy for E—waste management in India</li> <li>• Theme 4 Sustainable consumption and Lifestyles of health and sustainability ( LOHAS)</li> <li>• Theme 5 Disposal and Recycling of e-waste</li> <li>• Theme 6 Carbon footprint and its reduction</li> </ul>		
<p><b>Real World Connect</b></p> 	<p><b>Reflecting on one’s understanding wrt E-waste themes</b> Self-assessment on E-waste themes</p>	<p>Individual reflection</p>	<p>15 minutes</p>

<p><b>MIND JOG</b> Slide – What is E-Waste?</p> 	<p><b>INSTRUCT</b> Make a circle How many of you have heard of the word e-waste? Please raise your hands if you have heard and if you have not please don't ; get responses from few participants.</p> <p><b>EXPLAIN:</b> All of us have some idea about E-Waste. In the course of next 3 hours , we will be engaging more deeply with the subject and get to build a more informed understanding on the issue.</p>
<p><b>PERSONAL CONNECT</b></p> 	<p><b>SAY:</b> Take a minute to reflect on “One thing which you are doing, through which you are augmenting e-waste in the environment” and write down for yourself on a card. <i>(Give participants 5 minutes for this)</i></p> <p><b>SAY:</b> Now, let’s get into three groups. Within your groups, take a look at your reflections and as a group capture the actions which are adding to e-waste in the environment.</p> <p><b>INSTRUCT</b> Will one person from each group share their groups’ chart with the larger group?</p>

	<p>As the groups are sharing, capture what they are saying on a chart or white board</p> <p><b>EXPLAIN</b> Each one of us is responsible for creating e-waste some more some less. Its important that first we accept that we are contributing to e-waste and take necessary actions to mitigate e-waste within our schools, family and community</p>
<p><b>INFORMATION EXCHANGE</b></p> <p>Handout1.1 What is E-waste? Handout1.2 What are the 10 categories of e-waste? Handout 1.3 Generation of E-waste globally Handout 1.4 Generation of E-waste in India</p> 	<p><b>INSTRUCT</b> Read the case study in small groups with participants reading the part of different characters</p> <p><b>Neetu:</b> <i>Thank you Ramesh. Let me introduce myself as a NGO worker and Sabir who is an e-waste recycler who some years ago was a kabadiwala but changed his ways and means to ensure that he was complying with the rules and helping the environment by working in a proper manner. Sabir, please tell our friends the key issues around e-waste.</i></p> <p><b>Sabir:</b> <i>e-waste contains many different substances of which some are precious metals as well. Apart from iron, copper, plastics, e-waste in some materials also contains precious metals like gold, silver and platinum. There are quite a few materials in an electronic item which can be extracted by just dismantling the same. However, there are some which are extracted either through burning or other ways and means which are not environmentally conducive. That is how recycling of e-waste becomes a hazard when not done properly not only for those who are doing it but also for those who live in and around areas where this work happens.</i></p> <p><b>ASK</b> How was it? What have you learnt?</p>
<p><b>INFORMATION APPLICATION</b></p> 	<p><b>INSTRUCT:</b> Get into your groups again . Now discuss the case study in your small groups and respond to the following questions -What is the case study about ? -Why do you think we are studying this case study? -Who are the different characters and what roles are they playing ? - Which character has fascinated you the most and why? - What is your learning from the case study ? -How would you like to use this learning in your life ? - What are the different themes which the case study brings out?</p> <p><b>EXPLAIN</b></p> <ul style="list-style-type: none"> <li>• The case study brings out the different themes which an E-Waste facilitator needs to understand to facilitate sessions with adolescent groups . During the course of the next 4 days of this TOT we will be referring to the case study to highlight different themes:</li> <li>• Theme 1 – Introduction to E-waste</li> <li>• Theme 2 –Harmful effects of E-waste on human health and</li> </ul>

	<p>environment</p> <ul style="list-style-type: none"> <li>• Theme 3 – Policy for E—waste management in India</li> <li>• Theme 4 Sustainable consumption and Lifestyles of health and sustainability ( LOHAS)</li> <li>• Theme 5 Disposal and Recycling of e-waste</li> <li>• Theme 6 Carbon footprint and its reduction</li> </ul>
<p><b>REAL WORLD CONNECT</b></p> 	<p><b>ASK:</b> Each one of you need to fill –up this questionnaire. You have ½ hour to fill this and your time starts now .....</p> <p><b>ASK:</b></p> <ul style="list-style-type: none"> <li>• How was your experience?</li> <li>• Why did it work /not work well?</li> </ul> <p><b>EXPLAIN:</b> Our understanding of E-waste is at different levels . For us to be a credible E-waste facilitator its important for us to have the right information . The questionnaire clearly indicates your current understanding of the subject and also brings out the learning gap.</p>

## Session 1 and Session 2

### Transition Note:

*In the last session, we discussed about the concept of E-waste through a case study. In this session we will dive deeper into the issue and understand the harmful effects of E-waste on environment and human health and also learn about actions which can help us prevent the hazards resulting from these substances.*

# Session 2: Harmful effects of e-waste on the environment and human health

## Purpose

This session explains the harmful effects of E-waste. The focus will be on understanding the harmful effects of e-waste on human health and environment.

## Session Objectives

Upon completion of this topic, participants will be able to...

- Explain the hazardous substances found in e-waste
- Describe the risks associated with hazardous substances
- Explain the actions on how to prevent the hazards resulting from these substances

## Summary session plan:

Flow Step	Description Key Idea	Methodology/Tools	Duration
<b>Mind Jog</b> 	<b>Linking personal associations of E-waste with the session</b> Photo language (photos depicting the harmful effects of e-waste on health and environment).	Photo language Set of 30 photographs depicting impact of e-waste ( To be sourced) The activity can be done either ways - with photo prints or soft copies if all participants have laptops.	10 minutes
<b>Personal Connect</b> 	<b>Reflecting on personal experiences wrt E-waste</b> Why have you selected this particular photograph? What story does this photograph tell you?	Individual Reflections + Group work	30 minutes
<b>Information Exchange</b> 	<b>Defining E-waste impact</b> Case study: read aloud the RELEVANT SECTION of case study with participants reading the part of different characters + individual recording after each section. If the group is a mixed Hindi/English group, run in one Hindi group and one English group. It is a good idea to give the case	Case study	1 hour

	study as a pre-work so they have at least read it before they come and this is only a refresher.		
<b>Information Application</b> 	<b>Understanding types of E-waste impact</b> Group processing of the case study to identify the impacts of E-waste <ul style="list-style-type: none"> <li>• Make 4 small groups</li> <li>• Participants share individual written thoughts in small groups</li> <li>• As a group discuss the case study and bring out the harmful effects of E-waste</li> <li>• Each group presents to the larger group the harmful effects of E-waste based on the case study .</li> <li>• The facilitator sums up the discussion by sharing the effects with the participants</li> </ul> Post the discussions, participants are asked to prepare a poster/other IEC material in their small groups on E-waste and its harmful effects .	Group work	1 hour
<b>Real World Connect</b> 	<b>Identifying personal learning gap</b> Participants are asked to create a personal learning plan for themselves to address the learning gaps from the last session on E-waste and this session on Impact of E-waste . This will help the participants to keep a track of their learning throughout the training workshop. The plan will be reviewed again on the last day of the training workshop.	Creating a personal action plan	20 minutes

<b>MIND JOG</b> Slide with instructions and questions 	Spread 25-30 photographs depicting the harmful effects of e-waste on health and environment <i>INSTRUCT</i> <b>This activity has to be done individually .Please pick up one photograph keeping 2 questions in mind</b> Why have you selected this photo? What story does this photo tell you?
<b>PERSONAL CONNECT</b>	<b>ASK -Keep the photo with you and get into 3 small groups for a group activity .Each member has to share his /her response to</b>

	<p><b>the above 2 questions in the group</b>  <b>EXPLAIN:</b>  Each one of us is an E-Waste facilitator and all of us have stories to share from the field and from our personal experiences about the harmful effects of e-waste on humans and environment. <b>In this session we'll look at the harmful effects of e-waste on humans and environment more deeply.....</b></p>
<p><b>INFORMATION EXCHANGE</b></p> <p>Handout 2.1  Hazardous substance in E-waste  Handout 2.2 Health impacts of E-waste  Handout 2.3 Methods of treating E-waste</p> 	<p><b>INSTRUCT</b>  Case study: read aloud the RELEVANT SECTION from the case study with participants reading the part of different characters + individual recording after each section. If the group is a mixed Hindi/English group, run in one Hindi group and one English group. It is a good idea to give the case study as a pre-work so they have at least read it before they come and this is only a refresher.</p> <p><b>Ramesh:</b> <i>What are the key problems with managing e-waste the way we do it, Neetu ji?</i>  <b>Neetu:</b> <i>e-waste contains many harmful and toxic substances which is not handled properly will lead to serious consequences for human health. There are plastics which when burnt to extract metals lead to pollution. It is hence important that the material be sent out to a proper recycler so that the resources that are embedded are extracted properly without leading to any pollution or environmental hazard.</i></p>
<p><b>INFORMATION APPLICATION</b></p> 	<p><b>INSTRUCT</b></p> <ul style="list-style-type: none"> <li>• Make 4 small groups</li> <li>• Participants share individual written thoughts in small groups</li> <li>• As a group discuss the case study and bring out the harmful effects of E-waste</li> <li>• Each group presents to the larger group the harmful effects of E-waste based on the case study .</li> <li>• The facilitator sums up the discussion by sharing the effects with the participants</li> </ul> <p>Post the discussions, participants are asked to prepare a poster/other IEC material in their small groups in order to generate a discussion with adolescents on E-waste and its harmful effects .</p> <p><b>EXPLAIN</b>  As E-waste facilitators it is important for you to not just have the right information but also the right resources and the methodology to make the target group understand the concepts in a fun way so that maximum learning can happen.</p>
<p><b>REAL WORLD CONNECT</b></p>	<p><b>INSTRUCT</b>  Create a learning plan for self to address the learning gaps which has been identified through the self-assessment tool. Request you to keep a track of your learning throughout the training workshop. We will review it again on the last day of the training workshop.</p> <p><b>EXPLAIN</b></p>



Its important as a facilitator to keep an eye on your own learning and unlearning because it will help you not only transfer the concepts better but also help you to respond to the questions of the participants

## Session 2 and Session 3

### Transition Note:

*In the previous session, we discussed the harmful effects of E-waste on health and environment. In this session, we will talk about the state of the art dismantling and identification material.*

# Session 3: What are the state of the art dismantling and identification material?

## Purpose

This session seeks to build an understanding of the participants about state of the state of the art dismantling and identification of recyclable material.

## Session Objectives

Upon completion of this topic, participants will be able to...

- Explain the basics of dismantling ,specific dismantling techniques , professional dismantling and dismantling of recyclable material
- Knowledge and appliance of tools and equipment wrt to dismantling

## Summary session plan:

Flow Step	Description	Methodology/Tools	Duration
<b>Mind Jog</b> 	<b>Connecting with the session objective</b> (Word- association game ) – One word that you associate with dismantling	Word- association	10 minutes
<b>Personal Connect</b> 	<b>Reflecting on personal experience as an E-waste facilitator</b> One material which you have dismantled in the past 6 months and what has been your experience with that process?	Individual reflection	30 minutes
<b>Information Exchange</b> 	<b>Explaining the basics of dismantling techniques</b> Case study: read aloud the RELEVANT SECTION of the case study with participants reading the part of different characters + individual recording after each section. If the group is a mixed Hindi/English group, run in one Hindi group and one English group. It is a good idea to give the case study as a pre-work so they have at least read it before they come and	Film	1 hour

	this is only a refresher Sharing about E-waste policy by experts ( 1 speaker from the formal and another from the informal sector )		
<b>Information Application</b> 	<b>Identifying different stakeholders</b> Group processing of the case study to identify the dismantling techniques <ul style="list-style-type: none"> <li>• Make 4 small groups</li> <li>• Participants share individual written thoughts in small groups</li> <li>• As a group discuss the film and bring out the dismantling techniques in India</li> <li>• Each group presents to the larger group the dismantling techniques based on the film .</li> <li>• The facilitator sums up the discussion by sharing the dismantling techniques with the participants</li> </ul> Based on your understanding. , prepare a toolkit for dismantling in small groups and share with other groups This is followed by group presentations of questions and also responses from the participants	Group work	1 hour
<b>Real World Connect</b> 	<b>Building awareness of fellow informal sector about dismantling techniques</b> Share the toolkit with 5 other colleagues in the informal sector and take their feedback		10 mins

<b>MIND JOG</b> 	<b>STATE:</b> Before we begin our session let's do an activity <b>EXPLAIN:</b> <ul style="list-style-type: none"> <li>• You have to share the first word which comes to you , when you hear dismantling</li> </ul> <b>ASK:</b> <ul style="list-style-type: none"> <li>• 'Are you ready?'</li> </ul>
<b>PERSONAL CONNECT</b> 	<b>ASK :</b> What is your experience as an E-Waste Facilitator?  <b>EXPLAIN</b> As E-waste facilitator what is your experience wrt to dismantling. Please reflect for 5 min s and write on paper . Share in small groups.
<b>INFORMATION EXCHANGE</b>	<b>INSTRUCT</b> Film : Now we are going to watch a film :

	<p><b>Ramesh:</b> <i>There are so many different materials that are there is e-waste. Do we mix all of them and keep them or do we have to segregate as well.</i></p> <p><b>Neetu:</b> <i>You need to segregate a lot of the material in order to ensure that you separate the ones which are toxic from the ones which are not. Furthermore, metals need to be segregated from plastics and other materials so that the same can be disposed off to proper collectors of such waste.</i></p> <p><b>Ramesh:</b> <i>Our shops are really small and we have to use the space to work while we are repairing stuff. How can we find space to be able to store everything in this manner?</i></p> <p><b>Neetu:</b> <i>You should have a proper collection center for the same so that you can store the materials there. All shop owners should come together and either purchase or rent a place where you can store all e-waste.</i></p> <p><b>Ramesh:</b> <i>Won't it get mixed with everyone's waste there? How will we know who owns what so that they may be paid accordingly?</i></p> <p><b>Neetu:</b> <i>You can maintain a proper inventerisation system such that each and everyone is able to stock their e-waste in an appropriate manner. This will help all of you to determine its value when you dispose it off to a recycler.</i></p>
<p><b>INFORMATION APPLICATION</b></p> 	<p><b>INSTRUCT</b></p> <p>Group processing of the case study to explain dismantling</p> <p>Group processing of the case study to identify dismantling techniques</p> <ul style="list-style-type: none"> <li>• Make 4 small groups</li> <li>• Participants share individual written thoughts in small groups</li> <li>• As a group discuss the case study and bring out dismantling techniques</li> <li>• Each group presents to the larger group the dismantling techniques based on the case study .</li> <li>• The facilitator sums up the discussion by sharing the dismantling techniques with the participants</li> </ul> <p>Based on your understanding, prepare a toolkit for dismantling in small groups and share with other groups</p> <p>This is followed by group presentations of questions and also responses from the participants</p>
<p><b>REAL WORLD CONNECT</b></p> 	<p>Read about the policies from other countries to do a comparative analysis</p>

# Session 3 and Session 4

## Transition Note:

*In the last three sessions we have learnt about the identification and hazards of toxic substances including environment and occupational health & safety, and dismantling techniques. In this session, we will discuss about recycling and disposal of toxic substances.*

# Session 4: Recycling and Disposal of toxic substances

## Purpose

This session seeks to give an introduction into Recycling and disposal of toxic substances .

## Session Objectives

Upon completion of this topic, participants will be able to...

- Explain different product recycling technologies
- Differentiate the recycling technologies and options for diverse materials including glass, plastic and metal
- Understand the disposal routes of waste material

## Summary session plan:

Flow Step	Description	Methodology/ Tools	Duration
<b>Mind Jog</b> 	<b>Connecting with session</b> Inform the participants that they are going to play a game. Share that as you clap your hands , they will have to start walking in the circle and when you point at someone that person will have to share the name of a recyclable material . . Begin the game	Game	10 minutes
<b>Personal Connect</b> 	<b>Reflecting on personal experiences of recycling</b> Ask each participant to write down a material that they have recycled recently and what technology did they use to recycle the same	Reflection and Group work	30 mins
<b>Information Exchange</b> 	<b>Explaining about domestically available recycling technologies and options</b> Group Exposure to a recycling unit	Group Work	1 hour
<b>Information Application</b>	<b>Learning about the technologies to recycle and dispose-off toxic substances</b> processing of the case study to identify sustainable consumption and LOHAS <ul style="list-style-type: none"> <li>• Make 4 small groups</li> </ul>	Individual work on project and self	1 hour

	<ul style="list-style-type: none"> <li>• Participants share individual written thoughts in small groups</li> <li>• As a group discuss the case study and bring out sustainable consumption and LOHAS</li> <li>• Each group presents to the larger group the sustainable consumption based and LOHAS on the case study .</li> <li>• The facilitator sums up the discussion by sharing the sustainable consumption and LOHAS with the participants</li> </ul> <p>Group processing Design a sustainable campaign objectives of the campaign , expected outcomes , stakeholders, plan to make it happen</p>		
<p><b>Real World Connect</b></p> 	<p><b>Linking self learnings with experiences of others</b> Collect stories of sustainable consumption from your community</p>	<p>Template for collecting stories</p>	<p>20 mins</p>

<p><b>MIND JOG</b></p> 	<p><b>ASK:</b> Participants to place their watches/ phones/calcs in the centre) – <b>INSTRUCT</b> Now there are so many gadgets lying in front of you , you are requested to pick up your favorite gadget and share the reason for choosing the same. Explain We choose things because of appearance, brand, popularity, price OR alternate activity Inform the participants that they are going to play a game called gadget . Share that as you clap your hands , they will have to start walking in the circle and when you specify a pose and call out gadget , they will have to strike the pose of that gadget Begin the game by clapping out the following: Phone Computer/laptop Watch Television</p>
<p><b>PERSONAL CONNECT</b></p> 	<p>Ask each participant to write down the purpose of their favourite gadget and how it eases their life</p>
<p><b>INFORMATION</b></p>	<p>Case study: read aloud the RELEVANT SECTION of the case study with</p>

<p><b>EXCHANGE</b></p> 	<p>participants reading the part of different characters + individual recording after each section. If the group is a mixed Hindi/English group, run in one Hindi group and one English group. It is a good idea to give the case study as a pre-work so they have at least read it before they come and this is only a refresher.</p> <p><b>Sabir:</b> <i>Thank you for the information sir. What should we do to ensure that we are following the rules?</i></p> <p><b>Shahid:</b> <i>You should set up a collection center in the market and ensure that all of you are able to tie up with an authorised recycler who will take all the waste away. Furthermore, all the work that you do should be done in a manner that is not an occupational hazard and you are aware of the health risks that are posed by different materials which are embedded in e-waste and are toxic in nature.</i></p> <p><b>Sabir:</b> <i>Thank you so much sir for this information. I will certainly speak to all my friends in the market and we shall try and set up a collection center at the earliest.</i></p>
<p><b>INFORMATION APPLICATION</b></p> 	<p><b>SAY:</b> Group processing of the case study to identify sustainable consumption and LOHAS</p> <ul style="list-style-type: none"> <li>• Make 4 small groups</li> <li>• Participants share individual written thoughts in small groups</li> <li>• As a group discuss the case study and bring out sustainable consumption and LOHAS</li> <li>• Each group presents to the larger group their understanding on sustainable consumption and LOHAS based on the case study .</li> <li>• The facilitator sums up the discussion by sharing the sustainable consumption and LOHAS with the participants</li> </ul> <p>Group processing Design a sustainable campaign objectives of the campaign , expected outcomes , stakeholders, plan to make it happen</p> <p>Design and run a sustainable campaign – ( IEC material – posters , mugs , batches) objectives of the campaign , expected outcomes , stakeholders, plan to make it happen</p>
<p><b>REAL WORLD APPLICATION</b></p> 	<p>Collect stories of sustainable consumption from your community</p>

## Session 4 and Session 5 Transition Note:

*Thus far the curriculum has focused on building the understanding the participants on the concept of E-waste, impact of E-waste on health and environment, sustainable consumption and lifestyles of health and sustainability. Going forward, this session will delve deep into policies for e-waste management in our country.*

# Session 5: What are the policies for e-waste management in our country?

## Purpose

This session seeks to build an understanding of the participants about the policies and rules associated with E-waste in India . The session also helps participants identify the responsibilities of different stakeholders in the effective implementation of the rules.

## Session Objectives

**Upon completion of this topic, participants will be able to...**

- Explain the policy, rules and important terms used in the Rules and their definition
- Explain their responsibility as an E-waste facilitator and also the responsibility of other stakeholder groups for the implementation of the Rules
- Identify the challenges in implementing the Rules

## Summary session plan:

Flow Step	Description	Methodology/Tools	Duration
<b>Mind Jog</b> 	<b>Connecting with the session objective</b> Quiz about the rules and policies ( <b>Prepare a quiz with 6 questions</b> )	Quiz	20 minutes
<b>Personal Connect</b> 	<b>Reflecting on personal responsibility as an E-waste facilitator</b> My responsibility as an E-Waste facilitator.....	Individual reflection	30 minutes
<b>Information Exchange</b> 	<b>Defining different policies and rules wrt E-waste</b> Case study: read aloud the RELEVANT SECTION of the case study with participants reading the part of different characters + individual recording after each section. If the group is a mixed Hindi/English group, run in one Hindi group	Case study Speakers	1 hour

	and one English group. It is a good idea to give the case study as a pre-work so they have at least read it before they come and this is only a refresher. Sharing about E-waste policy by experts ( 1 speaker from the formal and another from the informal sector )		
<b>Information Application</b> 	<b>Identifying different stakeholders</b> Group processing of the case study to identify the policy /rules for E-Waste <ul style="list-style-type: none"> <li>• Make 4 small groups</li> <li>• Participants share individual written thoughts in small groups</li> <li>• As a group discuss the case study and bring out Policies/rules wrt E-waste in India</li> <li>• Each group presents to the larger group the Policy/rules based on the case study .</li> <li>• The facilitator sums up the discussion by sharing the policy /rules with the participants</li> </ul> Based on your understanding of E-waste thus far create a list of 5 Questions as a group . This is followed by group presentations of questions and also responses from the participants	Group work	1 hour
<b>Real World Connect</b> 	<b>Exploring the importance of policy and rules in regulating E-waste</b> Read about the state and national policies		10 mins

<b>MIND JOG</b> 	<b>STATE:</b> Before we begin our session let's take a quick quiz <b>EXPLAIN:</b> <ul style="list-style-type: none"> <li>• Please be ready with a paper and pencil</li> <li>• There will be total five questions</li> <li>• I will not repeat any of the questions</li> <li>• Maintain complete silence till the quiz gets over. You will write the responses to the questions and not speak about it</li> </ul> <b>ASK:</b> <ul style="list-style-type: none"> <li>• 'Are you ready?'</li> </ul> If they are ready you begin administering the quiz Just wait for about half a minute between each question After asking all the questions then you can discuss the answers Clarify all the answers using the quiz paper
	<b>ASK:</b> How many of you have got more than five?

	<p>Appreciate them quickly and...</p> <p><b>ASK:</b> What do you think the quiz was about?</p> <p><b>EXPLAIN:</b></p> <ul style="list-style-type: none"> <li>• This quiz was about E-Waste</li> <li>•</li> </ul>
<p><b>PERSONAL CONNECT</b></p> 	<p><b>ASK :</b> What is your responsibility as an E-Waste Facilitator?</p> <p><b>EXPLAIN</b> As E-waste facilitator what is your responsibility to uphold the rules and policy of the state</p>
<p><b>INFORMATION EXCHANGE</b></p> <p>Handout 3.1 National environment Policy Handout 3.2 E-waste ( Management) Rules 2016 Handout 3.3 Challenges of implementing the Rules</p> 	<p><b>INSTRUCT</b> Case study: read aloud the RELEVANT SECTION of the case study with participants reading the part of different characters + individual recording after each section. If the group is a mixed Hindi/English group, run in one Hindi group and one English group. It is a good idea to give the case study as a pre-work so they have at least read it before they come and this is only a refresher. We will have practitioners one from formal and the other from the informal sector to talk about the policies and rules ; responsibility of different stakeholders and the challenges in the implementation of the policy</p> <p><b>Neetu:</b> <i>I am happy to know that members of the market association have come together to ensure that they can solve this issue which is so pressing in terms of the environment.</i></p> <p><b>Sabir:</b> <i>Yes, and Neetu ji can help to ensure that all you can comply with the rules as well so that there are no legal problems that you face while doing your business.</i></p> <p><b>Ramesh:</b> <i>What are the key problems with managing e-waste the way we do it, Neetu ji?</i></p> <p><b>Neetu:</b> <i>e-waste contains many harmful and toxic substances which is not handled properly will lead to serious consequences for human health. There are plastics which when burnt to extract metals lead to pollution. It is hence important that the material be sent out to a proper recycler so that the resources that are embedded are extracted properly without leading to any pollution or environmental hazard.</i></p>
<p><b>INFORMATION APPLICATION</b></p>	<p><b>INSTRUCT</b> Group processing of the case study plus the talks with the practitioners to identify the policy /rules available in the country Group processing of the case study to identify the policy /rules for E-Waste</p> <ul style="list-style-type: none"> <li>• Make 4 small groups</li> </ul>

	<ul style="list-style-type: none"> <li>• Participants share individual written thoughts in small groups</li> <li>• As a group discuss the case study and bring out Policies/rules wrt E-waste in India</li> <li>• Each group presents to the larger group the Policy/rules based on the case study .</li> <li>• The facilitator sums up the discussion by sharing the policy /rules with the participants</li> </ul> <p>Based on your understanding of E-waste thus far create a list of 5 Questions as a group which adolescents may ask when you facilitate the session with them. This is followed by group presentations of questions and also responses from the participants</p>
<p><b>REAL WORLD CONNECT</b></p> 	<p>Discussion with informal sector friends to find out about policies in the country</p>

## Session 5 and Session 6 Transition Note:

*In the last three sessions we have learnt about the identification and hazards of toxic substances including environment and occupational health & safety, and dismantling techniques. In this session, we will discuss about carbon footprint and how one can measure it.*

# Session 6: What is Carbon footprint? How to measure carbon footprint?

## Purpose

This session seeks to give an introduction into carbon footprint and how to measure carbon footprint.

## Session Objectives

Upon completion of this topic, participants will be able to...

- Explain carbon footprint
- Explain the interconnections between production , consumption and recycling
- To apply strategies to mitigate carbon footprint in personal life

## Summary session plan:

Flow Step	Description	Methodology/ Tools	Duration
<b>Mind Jog</b> 	<b>Introduction to carbon footprint</b> Make 25 labels of different electronic products - toaster , mobile , car , laptop , refrigerator, fan , Ac, iron, microwave, electric kettle, washing machine , music system, dvd player..... paste it on the back of each participant . Each participant has to guess what label is pasted on his/her back. They can ask only 2 questions to ( function of the product and how it eases life) . The person who finds out first will be declared the winner.	Game	20 minutes
<b>Personal Connect</b> 	<b>Linking personal lifestyle with carbon footprint</b> Now make a daily timetable for yourself and list down the products which you use in your daily life in home, school with friends and for entertainment. Sharing in small groups.	Reflection and Group work	30 mins
<b>Information Exchange</b> 	<b>Understanding the dimensions of carbon footprint</b> Case study: read aloud the RELEVANT SECTION of the case study with participants reading the part of different characters + individual recording after each section. If the group is a mixed Hindi/English group, run in one Hindi group and one English group. It is a good idea to give the case study as a pre-work so they have at least read it before they come and this is only a refresher.	Group Work	1 hour

	Explain the process of calculating the carbon footprint..... Encourage the participants to calculate the same.		
<b>Information Application</b> 	<b>Understanding the importance of reducing carbon footprint</b> Group processing of the case study to understand what is carbon footprint and how to measure the same <ul style="list-style-type: none"> <li>• Make 4 small groups</li> <li>• Participants share individual written thoughts in small groups</li> <li>• As a group discuss the case study and build understanding about carbon footprint</li> <li>• Each group presents to the larger group their understanding of carbon footprint based on the case study .</li> </ul> The facilitator sums up the discussion by sharing what is carbon footprint and how does one measure carbon footprint with the participants  Ask the participants to refer back to your timetables and measure the carbon footprint which you create on a daily basis.	Individual work on project and self	1 hour
<b>Real World Connect</b> 	<b>Reflecting on ways to mitigate carbon footprint</b> One action that you will take in personal life which will help mitigate carbon footprint in the environment.		20 mins

<b>MIND JOG</b> 	<b>ASK:</b> Participants to stand in a circle <b>INSTRUCT</b> Each one of you will have sticker on your back . The task is that you have to find out what is written on your back by asking relevant questions. You can ask only 2 questions per person. Now please keep moving in the room.....
<b>PERSONAL CONNECT</b>	Ask each participant to write down the purpose of their favourite gadget and how it eases their life

	
<p><b>INFORMATION EXCHANGE</b></p> <p>Handout 6.1 What is carbon footprint</p> <p>Handout 6.2 How to measure carbon print?</p> <p>Handout 6.3 What are the strategies to reduce carbon footprint?</p> 	<p>Case study: read aloud the case study with participants reading the part of different characters + individual recording after each section. If the group is a mixed Hindi/English group, run in one Hindi group and one English group. It is a good idea to give the case study as a pre-work so they have at least read it before they come and this is only a refresher. Explain the process of calculating the carbon footprint..... Encourage the participants to calculate the same.</p> <p><b>Sabir:</b> <i>e-waste contains many different substances of which some are precious metals as well. Apart from iron, copper, plastics, e-waste in some materials also contains precious metals like gold, silver and platinum. There are quite a few materials in an electronic item which can be extracted by just dismantling the same. However, there are some which are extracted either through burning or other ways and means which are not environmentally conducive. That is how recycling of e-waste becomes a hazard when not done properly not only for those who are doing it but also for those who live in and around areas where this work happens.</i></p> <p><b>Ramesh:</b> <i>How can we manage e-waste?</i></p> <p><b>Sabir:</b> <i>First, you should remember that you are not creating e-waste. What you are doing is collecting e-waste and that too for a certain time period. During this period it is important that you do basic segregation of materials in a manner that will help to identify different types of products.</i></p>
<p><b>INFORMATION APPLICATION</b></p> 	<p><b>SAY:</b></p> <p>Group processing of the case study to identify the major themes of curriculum</p> <p>Group processing of the case study to understand what is carbon footprint and how to measure the same</p> <ul style="list-style-type: none"> <li>• Make 4 small groups</li> <li>• Participants share individual written thoughts in small groups</li> <li>• As a group discuss the case study and build understanding about carbon footprint</li> <li>• Each group presents to the larger group their understanding of carbon footprint based on the case study .</li> </ul> <p>The facilitator sums up the discussion by sharing what is carbon footprint and how does one measure the same with the participants</p> <p>Refer back to your timetables and think of ways to reduce, reuse and recycle.</p> <p>Design and run a sustainable campaign – ( IEC material – posters , mugs , batches) objectives of the campaign , expected outcomes , stakeholders, plan to make it happen</p> <p>.</p>
<p><b>REAL WORLD</b></p>	<p>- One action that you will take in personal life which will help mitigate</p>

**APPLICATION**



carbon footprint in the environment

# 6. Additional Awareness Materials and Sources of Information / References:

For Informal sector:

## What is E-waste

WEEE Recycle & CSE. E-Waste Training Course for Policymakers and Regulators – Facilitator's Manual

<http://www.igep.in/live/hrdpmp/hrdpmaster/igep/content/e54413/e54441/e62968/WEEERecycleCSEmanual.pdf>

Chatterjee, Dr. S. 2011: *Electronic Waste and India*. New Delhi: Department of Information Technology.

[http://deity.gov.in/sites/upload\\_files/dit/files/EWaste\\_Sep11\\_892011.pdf](http://deity.gov.in/sites/upload_files/dit/files/EWaste_Sep11_892011.pdf)

Indian Ministry of Environment and Forests & Climate Change 2015. *E-waste (Management) Rules, 2015*.

<http://www.indiaenvironmentportal.org.in/files/file/notified%20ewaste%20rule%202015.pdf>

Indian Ministry of Environment and Forests & Climate Change 2011. *E-waste (Management and Handling) Rules, 2011*. New Delhi, 12 May 2011

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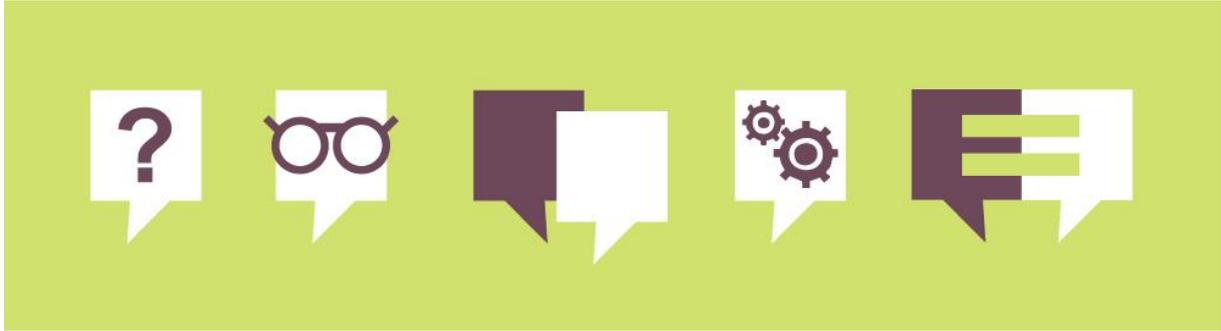
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## List of Abbreviations

MeitY: Ministry of Electronics and Information Technology  
MAIT: Manufacturers Association for Information Technology  
LOHAS: Lifestyles for Health and Sustainability  
e-waste: Electronic Waste  
RWAs: Resident Welfare Associations  
EPR: Extended Producer Responsibility  
PPP: Purchasing Power Parity  
TV: Television  
CRT: Cathode Ray Tube  
LCD: Liquid Crystal Display  
LED: Light Emitting Diode  
CPCB: Central Pollution Control Board  
PVC: Polyvinyl Chloride  
PCBs: Polychlorinated Biphenyls  
TSDF: Treatment, Storage and Disposal Facility  
BFR: Brominated Flame Retardants  
PBB: Polybrominated Biphenyls  
PBDE: Polybrominated Diphenyl Ethers  
ATM: Automated Teller Machine  
WEEE: Waste Electrical and Electronic Equipment  
CFC: Chlorofluorocarbon  
HCFC: Hydrochlorofluorocarbons  
HFC: Hydroflourocarbon  
HC: Hydrocarbon  
UNEP: United Nations Environment Programme  
DRS: Deposit Refund Scheme  
PRO: Producer Responsibility Organisation  
OHS: Occupational Health and Safety  
PCDD/Fs: Polychlorinated dibenzo-p-dioxins  
PBDD/Fs: Polybrominated dibenzo-p-dioxins  
CO<sub>2</sub>: Carbon Dioxide  
IEC: Information, Education and Communication



## About this Manual

Under the Digital India Mission, the Ministry of Electronics and Information Technology (MeitY) has initiated a project “Awareness Programme on Environmental Hazards of Electronic waste”. The programme aims to enhance awareness on the growing challenges and opportunities provided by e-waste.

This manual, for the refurbishers, is a part of a series of training materials prepared for all the relevant stakeholders involved in e-waste management in India. Through this programme and by publication of awareness materials, MeitY aims to develop standardized content for reaching out to the relevant stakeholders.

The focus group of this particular manual are refurbishers, a critical and vibrant community of e-waste managers in society. This manual intends to present the subject of e-waste management and its multiple facets in a manner that engages the refurbishers in experiential learning about the proper methods of managing e-waste. The manual uses state of the art methodological approaches such as Harvard Case Methodology and Walker Learning Cycle to enable this group of stakeholders not only learn but also act – in a responsible manner such that their work does not lead to health hazards and environmental damage.



The manual uses different methods to achieve the change objective including the Donna E. Walker's 'Learning Cycle' that has five steps including Mind Jog, Personal Connection, Information Exchange, Information Application and Real World Connection. This method takes into account that different learners have different learning abilities and at least one of the steps of the cycle would be able to transfer the learning effectively.

In addition it uses Harvard case method that involves presenting a case to refurbishers where they associate themselves with a role as they read through the situation and identify the problem. The next step is to perform the necessary analysis to determine the cause and possible solutions to the problem. The manual provides essential information and situations that form cases that can be discussed with the refurbishers by the trainer.

