

**Electronic Waste Management - Issues and Challenges**  
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**Lecture - 16**  
**E-waste Management**

Hello and welcome back to the week 4 of this course, if you remember in the previous week we did discuss e-waste management and handling rules very briefly I had a brief description of that. So, I thought I will kind of give you a slightly more detail on the e-waste management rule because that is very, very important in terms of how the e-waste management system has to be installed in any country and we had here we are talking about in India. So, we will talk about the e-waste management rule in India in slightly more detail in this particular video and then some other stuff will try to cover.

So, so far if you remember from the week 1, week 2, week 3, 3 weeks have been done; week 1, we started with big overview what is e-waste? How it is defined? How the definition changes in different places in the world and some places certain things are included other further places it is excluded.

So, those discussions were there, what are the why we are even talking about e-waste? What are the environmental implications? What are the health implications? We talked about that and then we also looked at some of the individual chemicals which is present what why they are bad? What is the risk? Risk assessment we talked about those kind of aspect, we did some calculations in terms of risk; we also did some calculations in terms of what is the future? How to predict? How much e-waste would be produced? How to do?

Those kind of predictions and then we had spent last week especially the week 3 we spend quite heavily on how to extract the precious metals from electronic waste. Before that, we also try to quantify how much e-waste different materials are present in e-waste and we also try to quantify from a monetary point of view like when a e-waste has been disposed say how much money we are also losing because the we are losing material.

So, any product when they are disposed we are losing lot of material with it and that material we have to mine, we have to process, so there is a cost associated with all that

and of course, there is environmental implication. So, we try to quantify as well, how much money can potentially be made if we recycle e-waste properly and then we talked about what are the process required in terms of recovery of this precious metal from electronics to finally make it another to bring it back as a pure metal.

So, from electronics the process in general if you look at we looked at different processes, but in a very summarized form we can say that the whole process the most of the process in fact, the entire different process that we looked at the basic philosophy was to get the get this precious metal from electronics to a liquid solution and then again from that liquid solution concentrate it and make it to a pure form.

So, that is the whole process and there are different aspects of like a biological process, bios option, bio leaching and in thiourea, cyanide and there were several more, which you already have seen it, even the slides are available with you to look at too. So, that is kind of how this, whole things we try to cover the different aspect of it.

Now, in this particular week we will be again going back to some of those concept which we have covered earlier try to emphasize on that and then we also talked about some of the newer stuff in terms of little bit more discussion on e-waste management rules, how the e-waste is managed say in other countries will try to see an example from China, because that is a like a booming economy.

So, it is actually as of as of today they have a, now they have impact a little bit better environmental infrastructure as compared to what we have in India. So, what are how china is doing it they also in a similar position lot of population, so lot of electronic waste is supposed to be produced in future; projected to be in future, they are also getting lot of e-waste coming from abroad until recently.

They, so now, there are some checks and balances are there, so similar situation how they are managing it what we can learn from them and how we can do things over here. So, I said so those, discussion will try to have and then another concept which this week will try to cover is the concept of this lifecycle analysis. There is a separate course running on lifecycle analysis.

So, some of you who are registered for both the courses you may see some overlap maybe a video or a video and a half overlap here and there, but there may be many

students here who have not taking life cycle course, so there will be give you a very quick overview of what is an LCA? And how it relates to environmental e-waste? So, will talk about that aspect all that is, so that is kind of a nutshell, what will be there in this week, just to give you a like a preface of this week.

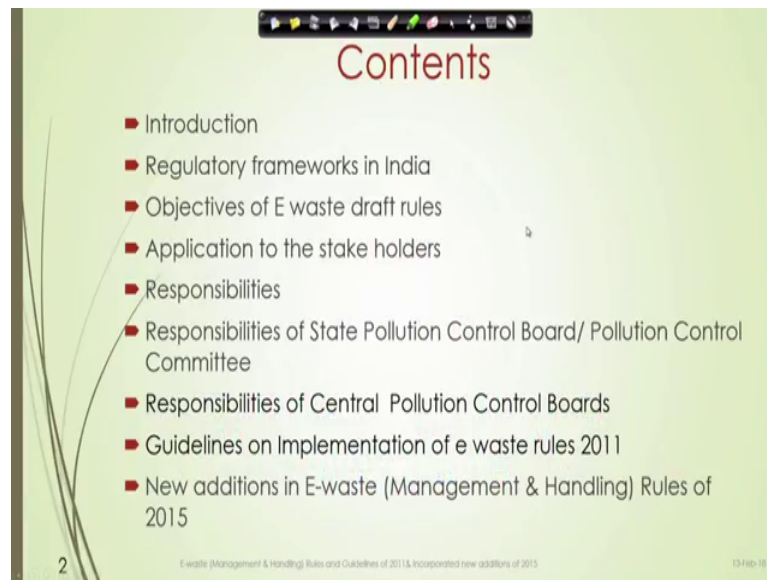
Then, we also have we are planning to have some maybe 1 or 2 extra videos, where will have some of these problems being solved, there was some questions on the discussion forum recently where students were asking for they want to see some solved examples being done. We have done some solved examples on the slides, but it looks like you want some more.

So, we will try to have a video or a video (Refer Time: 05:25) it may be 40, 45 minutes video or 2 videos of 30 minutes each, just dedicated on how to solve some of these problems using the concept that we have covered in this course, that will be helpful especially for helpful for all, but especially for those of you who are planning to register for the exam another staff because in an exam you will have some those kind of problems also showing up.

So, we are planning to do that extra bit just to have like, so those to help you guys to do it better and at the same time there is a possibility of having a live session sometimes, will inform you about that, as we make progress on that aspect you. So, being said all that having a good overview how far like a giving you the big picture for this week, let us look at individually what we are trying to cover here. So, we are looking at e-waste management and handling rules and guidelines first.

So, let us and the goal for that is to better management of e-waste in the country.

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- Guidelines on Implementation of e waste rules 2011
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E-waste (Management & Handling) Rules and Guidelines of 2011 & incorporated new additions of 2015

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So, how will go over that? I will quickly give you an introduction what is the regulatory framework? What is the objective of e-waste draft rule? There was a draft rule and there was a final rule, so we will talk about both, application of a stakeholders, so will talk about the draft rule and which is the newer rule and also how it is differs from 2011 rules.

So, we will have most of the new rule is actually similar to 2011 rule, there are certain new; some new things have been added and then will try to summarize with some slides. So, application of a stakeholder's, responsibilities, responsibility of the SPCB, responsibility of CPCB, guideline of implementation of e-waste, new additions and e-waste management handling rules, what is the newer things we just come up. So, that is we are going to talk about.

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## Introduction

- Obsolete or unusable electronic and electrical products are commonly referred to as 'electronic waste, e-waste or as Waste Electrical and Electronic Equipment (WEEE).
- Over 1,000 of the chemicals identified in the e-waste streams.
- These chemicals have potential to disrupt hormonal systems, can adversely affect reproductive functions and cause certain types of cancer.
- Contamination of soil, surface water and air occur due to these wastes.
- Adverse effects on Human health & Environment

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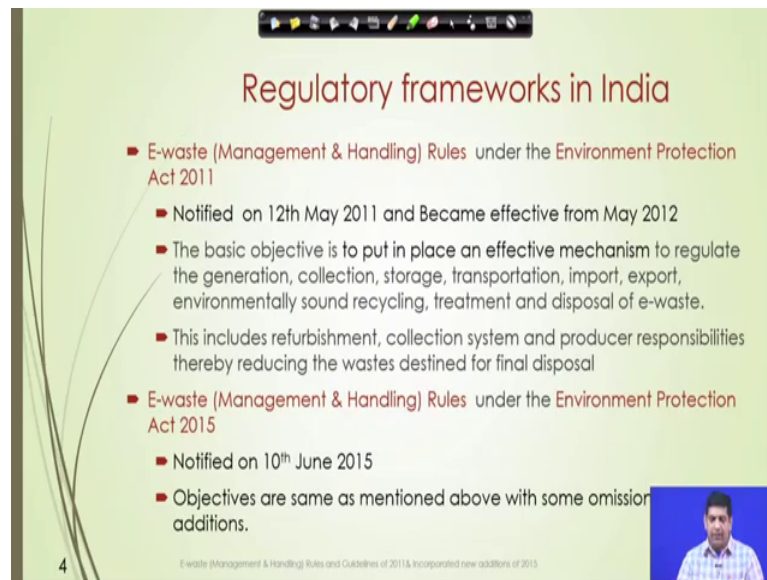
E-waste (Management & Handling) Rules and Guidelines of 2011 & incorporated new additions of 2015

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So, we already know that obsolete or line used, an electronics electrical product they are commonly known as e-waste or electronic waste. So, over off 1000 chemicals have been identified in a e-waste stream. So, more than 1000 chemicals are there in the e-waste stream.

So, these chemicals have the potential to this to how to disrupt the hormonal system, can adverse reproductive function; can cause certain types of cancer, so contamination of soil surface water. So, all these things you have already seen, already you discuss. So, we do not have to spend too much time on that.

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**Regulatory frameworks in India**

- E-waste (Management & Handling) Rules under the Environment Protection Act 2011
  - Notified on 12th May 2011 and Became effective from May 2012
  - The basic objective is to put in place an effective mechanism to regulate the generation, collection, storage, transportation, import, export, environmentally sound recycling, treatment and disposal of e-waste.
  - This includes refurbishment, collection system and producer responsibilities thereby reducing the wastes destined for final disposal
- E-waste (Management & Handling) Rules under the Environment Protection Act 2015
  - Notified on 10<sup>th</sup> June 2015
  - Objectives are same as mentioned above with some omission and additions.

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E-waste (Management & Handling) Rules and Guidelines of 2011 & incorporated new additions of 2015

So, this is kind of why the rules are there? Any rule, whether you look at any particular rule, the rules are there for a particular purpose. So, this e-waste management and handling rules which came out in 2011 and then the division in 2016, it is basic objective again is to put in place effective mechanism to regulate the generation, collection is, storage, transport, import, export and then environmental sound recycling, treatment and disposer of e-waste.

So, basic philosophy for any of these rules is the same, to prevent human health impact or prevent environmental health impact, to make the environment clean, to keep it clean and then to promote recycling, so that we can recover the materials from there and that material can be used back. So, it becomes more like a circular economy concept rather than a linear economy. The entire world is gradually realizing that we have to move from this linear economy concept to the circular economy concept and if the presently most of the stuff that we have is a linear economy.

So, you have kind of things being mind, produced and then they come to the market, you buy it, you dispose it, dumped and then again new material you follow the circle. Now, the circular economy concept is once it is end of life, coming out of the waste stream, you recover the material from there and then you put that material back into the system, so that is your circle, that is why it is called circular economy, right now it is linear. So, it just goes 1 and then you the dump, goes to the dump sides or to the waste to energy

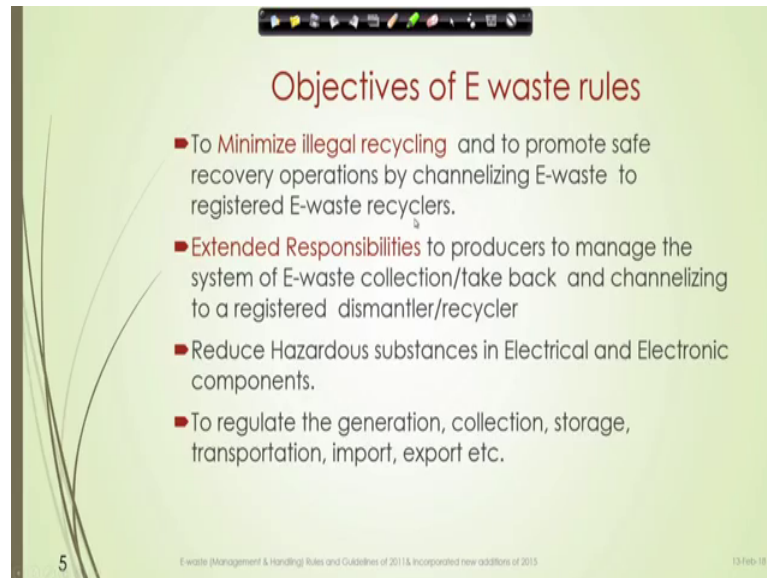
plant. So, that is your linear economy and people are realizing that with the population rise and then the demand from different sectors, cost of living I would say their purchasing power going up around the world, so that is in general.

Of course, there are a lot of inequalities in the world including in India and fortunately we have lot, we ranked pretty high on inequality index, some people are really very rich in India, but most of the people are very, very poor. So, that is and then there is a middle class, but the middle class do you call it low middle class, middle class, high middle class, whatever; but then there is a quite a bit of like we have a substantial poor people in the country and then that is, so that they do not have much purchasing power, but our middle class and my upper middle class also is actually more than the e-waste population now.

So, that is why we have lot of purchasing power and lots of markets that is why it is a Indian market, that is what they are targeting for actually and we want people from the lower strata to come to the middle income. So, over the e-waste it has tended some progress, have been made ideally if we could have done more, we could have it, would be really great for anything this kind of stuff, but we have been, we are trying to make some progress in that area. So, coming back, so this is based on that since there is a lot of demand lot, so a lot of waste will be produced.

So, then we need to have, when we try to collect it, that we can refurbish it, we can there is a lot of recyclable market is also there, collection system, then there is a concept of this producer responsibility which we talked about in the previous video as well, one of the previous video the extended producer responsibility EPR concept and this is all like this is also there, then the newer rule has almost the same as the previous there are some modifications which will be talked about in a plug in this particular video.

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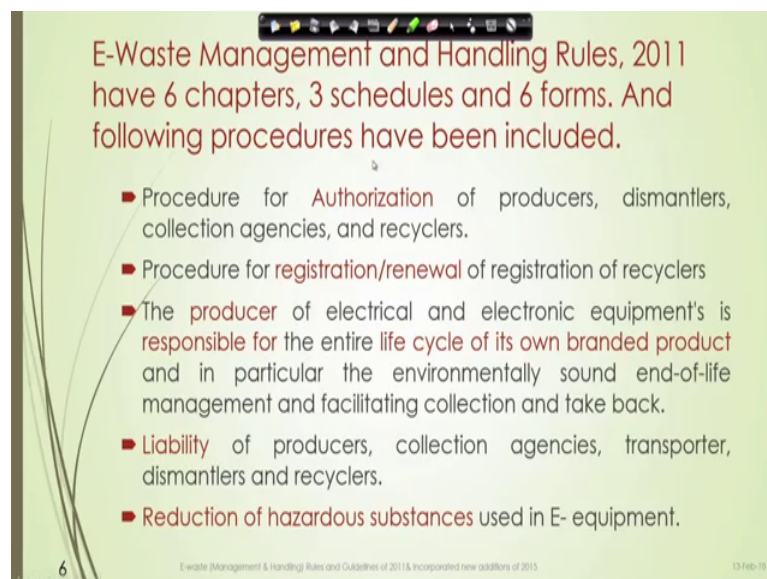
### Objectives of E waste rules

- To Minimize illegal recycling and to promote safe recovery operations by channelizing E-waste to registered E-waste recyclers.
- Extended Responsibilities to producers to manage the system of E-waste collection/take back and channelizing to a registered dismantler/recycler
- Reduce Hazardous substances in Electrical and Electronic components.
- To regulate the generation, collection, storage, transportation, import, export etc.

E-waste (Management & Handling) Rules and Guidelines of 2011 & incorporated new additions of 2015 13 Feb-18

So, in terms of e-waste rule what is the whether it is 2016 or 2011, it is minimize illegal recycling, extended responsibility to produce e-waste, take back program, channelizing to register dismantle recycler, reduce the hazardous substance in electrical and electronic components. So, try to use the material, will talk about that as well in a in that LCA exercise, they try to use a more environmental friendly exterior material, environmental friendly chemicals and then you regulate the generation, collection, storage, transportation, import, export and all that.

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### E-Waste Management and Handling Rules, 2011

have 6 chapters, 3 schedules and 6 forms. And following procedures have been included.

- Procedure for Authorization of producers, dismantlers, collection agencies, and recyclers.
- Procedure for registration/renewal of registration of recyclers
- The producer of electrical and electronic equipment's is responsible for the entire life cycle of its own branded product and in particular the environmentally sound end-of-life management and facilitating collection and take back.
- Liability of producers, collection agencies, transporter, dismantlers and recyclers.
- Reduction of hazardous substances used in E- equipment.

E-waste (Management & Handling) Rules and Guidelines of 2011 & incorporated new additions of 2015 13 Feb-18



So, in terms of this e-waste management rules 2011 there are 6 chapters, 3 schedules and 6 forms, the newer one actually has slightly more number of forms, which you we have already seen in the previous video and following procedures have been included, where you have to have authorization of producers, dismantlers, collection agencies, you have to register and renewal origin of recyclers, producer is responsible for the entire lifecycle for the own branded product.

So, the producer is responsible for the entire life cycles of his own branded product and in particular the environmental sound end of life management, facility collection and take back. So, this is again what we were discussing in the previous video that it is good to make them responsible, but at the same time we need to have a some sort of mechanism to really have this producers behave responsibly. So, we need to set up some sort of mechanism, we need to have dedicated recycling recyclers or the collection centres, so which can collect all these waste. So, liability of producers collection there is have been identified reduction of hazardous substances, that is also called ROHS, that has been looked into.

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The slide is titled "Application of these rules to stakeholders" and features a bulleted list of three points. The first point states that the rules apply to every producer, consumer, or bulk consumer involved in the manufacture, sale, purchase, and processing of electrical and electronic equipment or components, collection centres, dismantlers, and recyclers of e-waste. The second point states that the rules shall not apply to batteries as covered under the Batteries (Management and Handling) Rules. The third point states that the rules shall not apply to micro and small enterprises, radio-active wastes as they have respective development Acts. The slide also includes a navigation bar at the top, a page number '7' at the bottom left, and a footer with the text 'E-waste (Management & Handling) Rules and Guidelines of 2011, Incorporated new additions of 2015' and the date '13 Feb-16'.

- These rules shall apply to **every producer, consumer or bulk consumer** involved in the manufacture, sale, purchase and processing of electrical and electronic equipment or components, collection centre, dismantler and recycler of e-waste.
- Shall not apply to **batteries** as covered under the Batteries (Management and Handling) Rules
- Shall not apply to **Micro and small enterprises, radio-active wastes** as they have respective development Acts.

So, application of these rules applied to every producer, consumer, bulk consumer involved in manufacturing, sale, purchase, the processing of electrical equipment, collection centres, dismantlers, recyclers everybody is under this, they are all the stakeholders, shall not apply to the batteries because battery is a separate rule, then shall

not apply to micro and small enterprises radioactive wastes they have respective development act. So, they have a different act which is out there.

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**Responsibilities**

- **Responsibilities of the producer:** The producer of electrical and electronic equipment shall be responsible for
  - **Collection of e-waste** generated during manufacturing, from the 'end of life' of their products with the principle of 'Extended Producer Responsibility'
  - Should ensure collection and channelization by authorizing collection agencies
  - **Setting up collection centers** or take back systems either individually or collectively
  - **Financing and organizing** a system individually or by joining a scheme
  - **Providing contact details and creating awareness** about hazards through publications, advertisements, posters etc.
  - **Affixing a visible, legible symbol** given, on the products to prevent e-waste from being dropped in garbage.

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E-waste (Management & Handling) Rules and Guidelines of 2011, incorporated new additions of 2015

Image courtesy:



Responsibility, we it is a producer has to collect the e-waste, setting up the collection centre or a take back system. So, it is as part of the extended producer responsibility, they have to do, they have to kind of make sure their e-waste based is collected, setting of the collection centre, financing organizing a system individually or joining a scheme.

So, that is what I was trying to say in the previous video that we you it is better to have a scheme rather than they join me everybody is trying to do individually because it becomes so much of duplication of effort and that does not remains financially viable to do that way, then you have to have financially in an organization of a system individual adjoining a scheme again, providing contact details, creating awareness about hazards through publications, advertisements, posters, affixed a visible, legible symbol on the product of preventing us from dumped in the regular wastes. So, those are some responsibilities of the producer.

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A presentation slide titled "Responsibilities..." with a green background and a navigation bar at the top. The slide lists several responsibilities in a bulleted format. The first three points are: "Obtaining an authorization from the concerned State Pollution Control Board or Pollution Control Committee in accordance with the procedure under rule 9.", "Maintaining records in Form 2 of the e-waste handled and make such records available for scrutiny by the State Pollution Control Board (SPCB) or the Pollution Control Committee concerned.", and "Filing annual returns in Form 3 to the State Pollution Control Board or Pollution Control Committee concerned, on or before the 30<sup>th</sup> day of June." The fourth point is a sub-heading: "Responsibilities of collection centers:". Under this sub-heading, there are two points: "Obtain an authorization in accordance with the procedure under rule 9 from the SPCB or PCC." and "Ensure that the e-waste collected is stored in a secured manner till it is sent to registered dismantler(s) or recycler(s), no damage is caused to the environment during storage and transportation of e-waste." The slide number "10" is in the bottom left corner, and the footer text "E-waste (Management & Handling) Rules and Guidelines of 2011 & incorporated new additions of 2015" and "13 Feb 18" are at the bottom.

They have to obtain an authorization of the state pollution control board, they have to maintain the record, they have to file annual return, then the collection centre is and all the games they have to get an authorization, they have to collect the e-waste in a secured manner and no damage during storage and transportation of e waste.

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A presentation slide titled "Responsibilities..." with a green background and a navigation bar at the top. The slide lists several responsibilities in a bulleted format. The first two points are: "File annual returns in Form 3 to the SPCB or PCC before 30<sup>th</sup> June." and "Maintain records of the e-waste handled in Form 2." The third point is a sub-heading: "Responsibilities of bulk consumer:". Under this sub-heading, there are two points: "Consumers or Bulk consumers of electrical and electronic equipment shall ensure that e-waste generated by them is channelized to authorized collection center(s) or registered dismantler(s) or recycler(s) or is returned to the pick-up or take back services provided by the producers." and "Shall maintain records of e-waste generated by them in Form 2 and disposal through registered recycler in Form 3". The fourth point is a sub-heading: "Responsibilities of dismantler:". Under this sub-heading, there are two points: "Obtain authorization and registration from SPCB with the procedure under the rules 9 & 11;" and "Ensure that no damage is caused to the environment during storage and transportation of e-waste;". The slide number "11" is in the bottom left corner, and the footer text "E-waste (Management & Handling) Rules and Guidelines of 2011 & incorporated new additions of 2015" and "13 Feb 18" are at the bottom.

Then, they have to file an annual return from 3 to SPCB and CPCB, maintained record of e-waste handled in form 2, then there are certain responsibilities of the consumers; consumer of bulk consumer, they have to make sort of a e-waste channelized to authorize

collection centre only or register dismantler or recyclers or is returned to the pick up or take back service, shall maintain record of e-waste generated in form 2, then the responsibility of dismantler is there, obtain authorization or registration, no damage is caused while doing a storage and transportation.

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**Responsibilities...**

- Ensure that Processes **do not have any adverse effect** on the health and the environment **in accordance with guidelines** published by CPCB from time to time.
- Ensure that dismantled e-waste are segregated, non-recyclable/non-recoverable components sent to the registered recycling facilities for recovery of materials;
- File a return in Form 3 to SPCB or the PCC
- Do not process any e-waste for recovery or refining, unless he is registered with SPCB as a recycler.

■ **Responsibilities of recycler:**

- Obtain authorization and registration and ensure that the facility and recycling processes are in accordance with the guidelines.
- make available all records and file annual returns in Form 3 to SPCB or PCC.

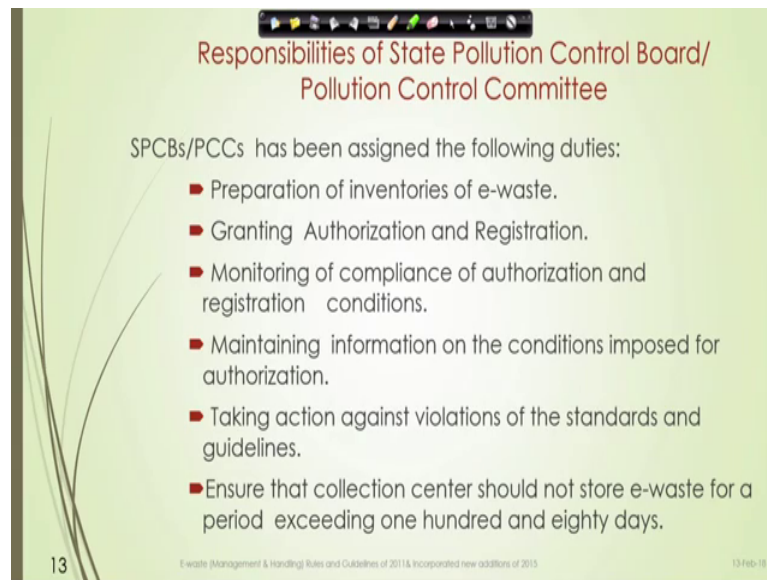
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E-waste (Management & Handling) Rules and Guidelines of 2011, Incorporated new additions of 2015

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They have to do not have any adverse affect process that they use, the condoms were the guideline, ensure that this mentally e-waste are segregated, non recyclable, non recoverable components and to register a recycling facility for recovery of material, file a return of form 3, do not process any e-waste for a recovery refinery unless he is registered with SPCB, then recycler, obtain authorization and I registration make available all records file and well returned in form 3 to pollution and tour poll.

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**Responsibilities of State Pollution Control Board/  
Pollution Control Committee**

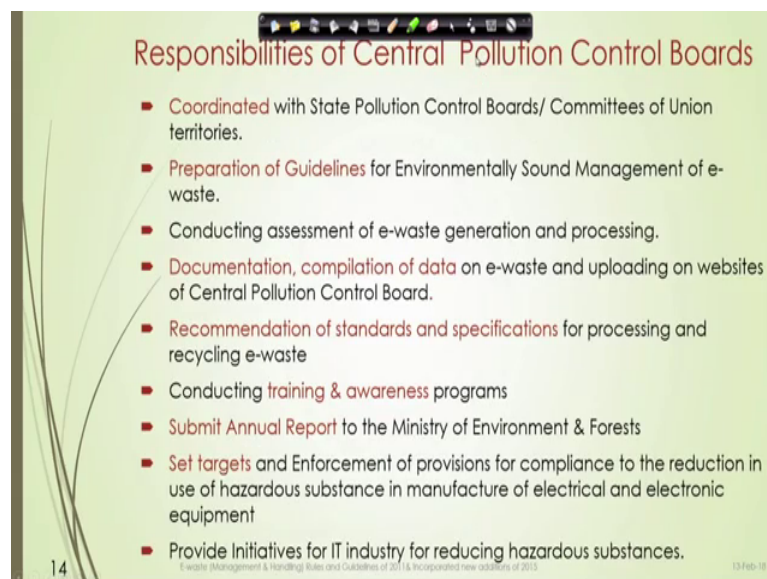
SPCBs/PCCs has been assigned the following duties:

- Preparation of inventories of e-waste.
- Granting Authorization and Registration.
- Monitoring of compliance of authorization and registration conditions.
- Maintaining information on the conditions imposed for authorization.
- Taking action against violations of the standards and guidelines.
- Ensure that collection center should not store e-waste for a period exceeding one hundred and eighty days.

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Then, a state pollution control board or the pollution control committee, it is preparation of inventory, granting authorization, compliance, maintaining information, taking action and all that.

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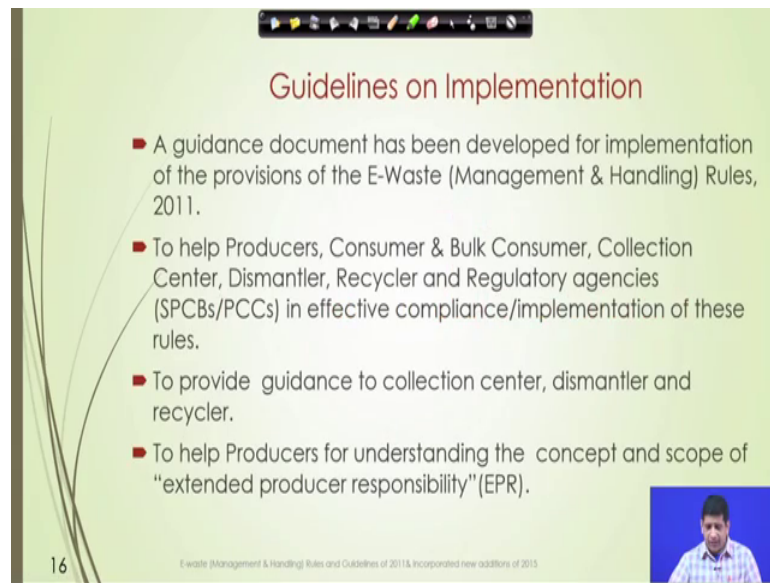
**Responsibilities of Central Pollution Control Boards**

- Coordinated with State Pollution Control Boards/ Committees of Union territories.
- Preparation of Guidelines for Environmentally Sound Management of e-waste.
- Conducting assessment of e-waste generation and processing.
- Documentation, compilation of data on e-waste and uploading on websites of Central Pollution Control Board.
- Recommendation of standards and specifications for processing and recycling e-waste
- Conducting training & awareness programs
- Submit Annual Report to the Ministry of Environment & Forests
- Set targets and Enforcement of provisions for compliance to the reduction in use of hazardous substance in manufacture of electrical and electronic equipment
- Provide Initiatives for IT industry for reducing hazardous substances.

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Then, you have central pollution control board, similar stuff coordinated with the state pollution control board, preparation of guidelines, documentation, compilation of data, recommendation of it is standards, training and awareness program, annual report all that.

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The slide is titled "Guidelines on Implementation" and features a list of four bullet points. A small video inset of a presenter is visible in the bottom right corner. The slide number "16" is in the bottom left, and the footer text "E-waste (Management & Handling) Rules and Guidelines of 2011 & incorporated new additions of 2015" is at the bottom center.

### Guidelines on Implementation

- A guidance document has been developed for implementation of the provisions of the E-Waste (Management & Handling) Rules, 2011.
- To help Producers, Consumer & Bulk Consumer, Collection Center, Dismantler, Recycler and Regulatory agencies (SPCBs/PCCs) in effective compliance/implementation of these rules.
- To provide guidance to collection center, dismantler and recycler.
- To help Producers for understanding the concept and scope of "extended producer responsibility"(EPR).

So, in terms of implementation guidance document has been prepared, which can be used for the implementation, this was for 2011 similar guidance document I think is there for 2016 as well.

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The slide is titled "E-waste (Management & Handling) Rules of 2015" and features a list of three bullet points. A small video inset of a presenter is visible in the bottom right corner. The slide number "17" is in the bottom left, and the footer text "E-waste (Management & Handling) Rules and Guidelines of 2011 & incorporated new additions of 2015" is at the bottom center.

### E-waste (Management & Handling) Rules of 2015

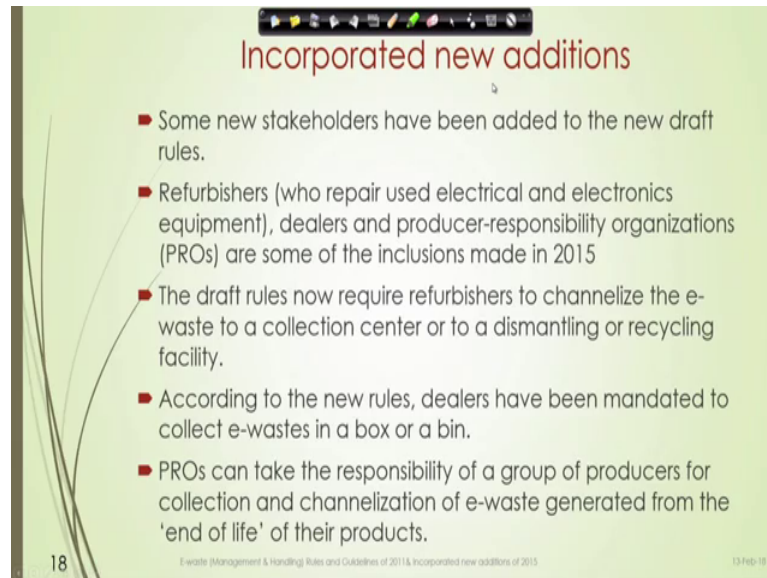
- The draft of E-waste rules, 2015, has broadened the scope of the existing one by including several major provisions.
- Earlier, there were several defects in the rules for stakeholders which prevented their proper implementation.
- The new draft rules are with clarity and lay down the responsibilities of various stakeholders in clear terms.

So, draft has been broadened what is the changes in this hope in 2015 draft or 2016 rule, they have been broadened, the scope of existing 1 by including several major provisions likes a earlier there were some issues in terms of a stakeholders, now the new draft rules



have clarity, they lay down the responsibilities of the various stakeholders in very clear term, so you know who is responsible for what.

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### Incorporated new additions

- Some new stakeholders have been added to the new draft rules.
- Refurbishers (who repair used electrical and electronics equipment), dealers and producer-responsibility organizations (PROs) are some of the inclusions made in 2015
- The draft rules now require refurbishers to channelize the e-waste to a collection center or to a dismantling or recycling facility.
- According to the new rules, dealers have been mandated to collect e-wastes in a box or a bin.
- PROs can take the responsibility of a group of producers for collection and channelization of e-waste generated from the 'end of life' of their products.

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They have incorporated some new I like a refurbishes, who repair use electrical and then dealers and producers responsibility organizations PROs are included, draft or the new rule also have references to channelize e-waste to a collection centre, dealers have been mandated to collect e-waste in a box or a bin, PROs can take the responsibility which is the producer responsibility organizations, can for collection and channelizing of e-waste from the end of life of their products.

Let us see, then they have. So, these are the newer stuff added to that.

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**Incorporated new additions...**

- Another new feature that the draft rules have incorporated is the **Deposit Refund Scheme**.
- Under this, a portion of the **sale price** shall be retained by the producers and **be refundable to consumers** once the end-of-life products are channelized according to the prescribed methods.
- **Authorization and registration simplified:**
  - The new rules have simplified the formalities regarding authorization and registration.
  - It now asks producers to seek authorization for carrying out Extended Producer Responsibility (EPR) from SPCB in case they are implementing it in a particular state or the Central Pollution Control Board (CPCB) in case of a pan-India implementation.

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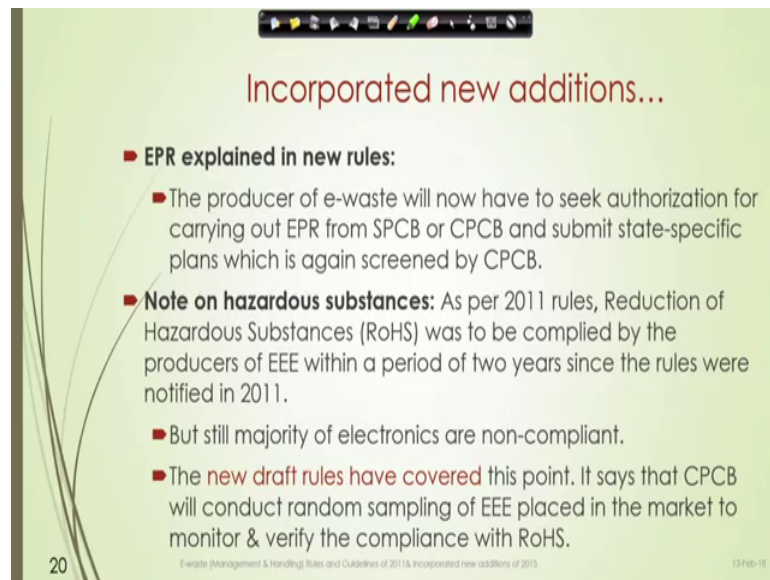
Another new feature is deposit refund scheme, which is a portion of the money, portion of the sale price shall be retained by the producer and to be refunded to consumer once the end of life products are channelized according to the prescribed method. So, basically you pay little bit extra that is what I was telling you that if you are in Canada you pay nearly 36 to 40 dollar extra for e-waste and e-waste disposer fee.

Here, the point is not a e-waste disposer pits more like a deposit refund system. So, you deposit certain money and then you will get the money back, when you are going to dispose this electronic product and you while you are trying to buy a newer product or something like that and the this a portion of the sale price shall be retained by the producers and we refundable to consumer once the end of life product which channelized according to the prescribed method, so that is all.

So, new rules have simplified the formalities regarding authorization and signature and it now as producers to seek authorization for carrying or extended producer responsibility from SPCB, in case they are implementing in a particular state or CPCB if they have a plan in their implementation.



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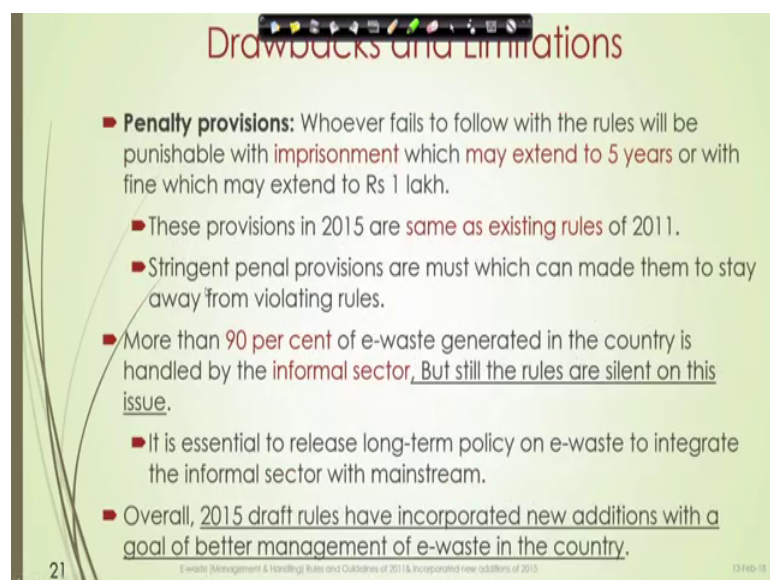
**Incorporated new additions...**

- **EPR explained in new rules:**
  - The producer of e-waste will now have to seek authorization for carrying out EPR from SPCB or CPCB and submit state-specific plans which is again screened by CPCB.
- **Note on hazardous substances:** As per 2011 rules, Reduction of Hazardous Substances (RoHS) was to be complied by the producers of EEE within a period of two years since the rules were notified in 2011.
  - But still majority of electronics are non-compliant.
  - The **new draft rules have covered** this point. It says that CPCB will conduct random sampling of EEE placed in the market to monitor & verify the compliance with RoHS.

20 E-waste (Management & Handling) Rules and Ordinances of 2011 & incorporated new additions of 2015 13 Feb-15

So, there have been some I would say delegation of power delegate to power EPR has been explained and note on hazardous substances also there, a reduction of hydrogen substance was to comply this will maturity of electronics are non compliant actually have covered this point. So, they can do a random sampling of EE, triple e wastes electronic and electrical product and then see whether compliance with ROHS is there or not.

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**Drawbacks and Limitations**

- **Penalty provisions:** Whoever fails to follow with the rules will be punishable with **imprisonment** which **may extend to 5 years** or with fine which may extend to Rs 1 lakh.
  - These provisions in 2015 are **same as existing rules** of 2011.
  - Stringent penal provisions are must which can made them to stay away from violating rules.
- More than **90 per cent** of e-waste generated in the country is handled by the **informal sector**, But still the rules are silent on this issue.
  - It is essential to release long-term policy on e-waste to integrate the informal sector with mainstream.
- Overall, 2015 draft rules have incorporated new additions with a goal of better management of e-waste in the country.

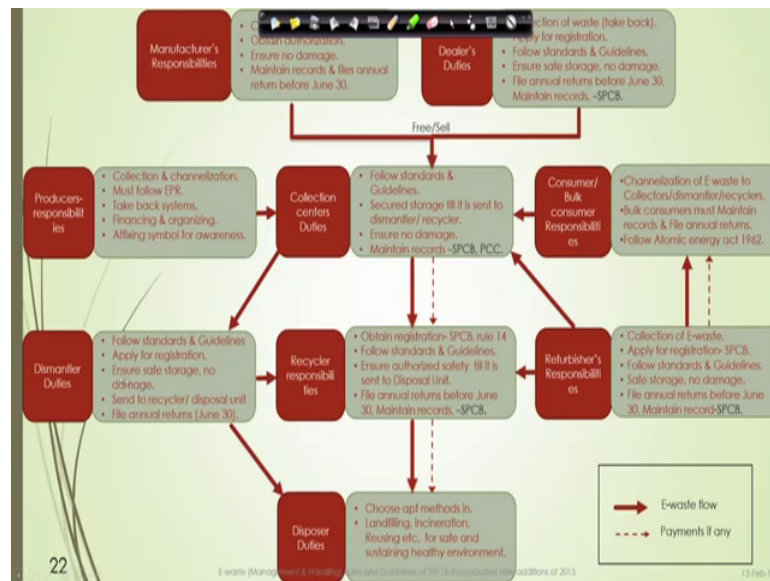
21 E-waste (Management & Handling) Rules and Ordinances of 2011 & incorporated new additions of 2015 13 Feb-15

There is a penalty provision now as well, whoever fails to make the rule like 1 lakh and 25 lakh and then the price will go up, these provisions in 2015 arise for existing rules of

2011, the stringent penal is there, more than 90 percentage of e-waste is handled by the informal sector, but is still the rule does not talk about that at all. So, it does not say anything, it is essential to release long term policy.

So, if there are lot of new stuff, new addition, so they good better management of the e-waste in the country. So, if you can look at quickly these some of the how different e-wasted stuff is being used.

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So, to the very this slide it looks a little bit busy, so what will do, will go 1 by 1. So, here we have tried to explain. So, if you have the manufacturer's responsibility, dealers, producers responsibility, collection centre, recycler, dismantler, disposer, refurbishes, consumer, bulk consumer and the dealers duty. So, everybody's duty has been listed there based on the e-waste management rules and then how the things flows down the chain like in terms of the e-waste flow or the payment if any, how the payment move through that has also been kind of presented over here.

So, let us look at one by one, so in terms of different stakeholders and then different type of responsibilities and then we can summarize it at the end. So, let us say for the first parts, if you took up talk about producer's responsibilities e-waste, which is being produced at the producers place. So, producer has to collection and do the channelization, must follow the EPR, take back system, financing and organizing,

affixing symbol for awareness. So, it is the producer who has to do these tasks as per the MS rules MSW management sorry, e-waste management rules 2016.

So, that is in terms of like for the collector and then the manufacturers response that was a consumer and the manufacturer is collection of e-waste, obtain the authorization, ensure there is no damage, maintained record and file annual return before every on June 30<sup>th</sup>, then we have dealers duty, dealers had to collection of waste, apply for registration, follow standard guideline, ensure safe storage and no damage, file annual returned before June 30<sup>th</sup> maintain the record. So, that is their duty.

Then, you have the consumer bulk consumer like something like IIT will be a bulk consumer. So, channelizing of e-waste to collectors, dispenser, recycler, bulk consumer must maintain records and file and will return follow at atomic energy act, so those things are also there. So, then we have the collection centre, we have to follow the standard guideline, security storage dismantler, no damage maintained record.

So, this is again what this set of slides are there, it is as I said by the beginning as well many times the rules start getting boring. So, we need to kind of put some story there to understand it better. So, as you can see there are a lot of for each and every stakeholders at least from the 2016 municipal solid waste management rules for each and every stakeholder, we have some sort of responsibilities and the responsibilities has been clearly defined.

So, it is also who to people to reduce the level of what should I say like their level of confusion, what this rule does is, said try to get the different stakeholders try to explain them what are their responsibilities. So, manufacturer's responsibilities we looked at the dealers, we look at the producers, collection centres, consumer and bulk consumer, then further you have dismantler duties.

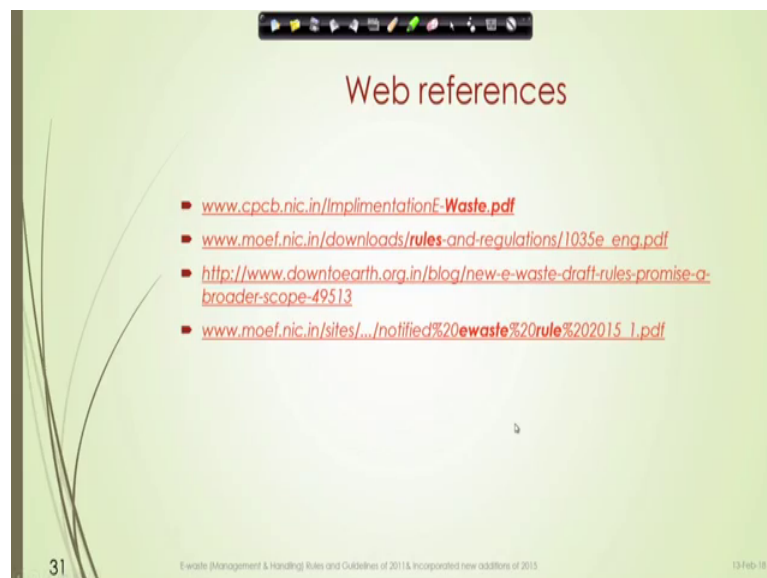
As you can see for the dismantler, it is dismantler or Rrefurbisher's, first the Refurbisher's collection of e-waste, apply for registration, follow a standard, safe storage, no damage file annual returns many of these sounds as if like a repetitive and they are repetitive, but that is how the rules are is not it the rules are many times repetitive only few things will change.

So, dismantler duties follow standard guideline, apply for registration safe storage, no damage sent to recycler or disposing unit and then they also file annual tax return. So, I like annual return not tax return annual return for that particular plant. So, those are, there than recycler they have to get the registration, SPCB, follow a standard, it is your authorized safety, file annual returns, so that is the responsibility of the recycler.

Then, finally I think for the disposer we have choose appropriate method in landfilling, incineration or reusing etcetera for safe and sustaining healthy environment. So, that this disposer is making a very, very strong I would say strong judgment in terms of how the waste is going to be managed. So, this person or the power whoever is working as a disposer needs a very good thorough understanding, thorough training of this electronic waste, it would be really nice if that person is actually is taking a course like this because they will get some idea about what are their rules? What are their responsibilities? What should they do? What are the environmental implications of those electronic waste?

So, they choose the method which is landfilling, incineration, refusing etcetera for sale safe and sustaining healthy environment. So, that is how they get that the information that is the disposer will get the information in that line.

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So, these details for these rules are presented over here. So, if we can look at like I just have a quick little wrap up on these particular rules, I said any rule is the basic philosophy for any rule is to have a protection of environment, have a protection of a

human health and at the same time if you think about e-waste rule or municipal solid waste rule, we are also trying to do some resource recovery, resource conservation, resource recovery. Now, what we are meaning by resource recovery? The rule is trying to promote recycling of e waste.

So, let us promote recycling of e-waste, try to use material; less harmful material, less hazardous material to make it a greener product and at the same time those this is a it is a greener, but whatever the waste is produced that has to be also managed properly. So, for the management point of view we have different stakeholders, which is there, as you can see on this we have several stakeholder if you we saw that particular slide with all the stakeholders nicely listed over there.

So, there are the responsibilities for each of the stakeholders there are certain responsibilities that they have to follow and those I wanted I try to capture on those small, small boxes that you saw and then there is also a flow of material, how this waste material e-waste material is flowing through that is also there and how to bring this e-waste back into the economy as a how to do the resource recovery prim moving from linear to a circular economy.

So, those kind of things kind of goes into while we are trying to develop these kind of rules extended producer responsibility, removal of organic, try to remove that as it is substances in those electronics. So, all these things kind of is goes into making this e-waste management rule and so that is again in 2016, it is a slightly more than a year when this was implemented the newer version.

So, things are still in progress, we have to see how the rule can be further implemented in a nice way, there are some initiatives going on in terms of the capacity building and all and this course is actually another attempt to have some more capacity in terms intellectual capacity, in terms of the e-waste management, people should understand the basics and details of what goes into when we are trying to have a e-waste management system.

So, with that let us wrap up this video, so will close this video now, you have in week 4 you first we are in week 4 like a first module, we have another 4 modules to go, then there will be some example problem once, again you have been asking questions on discussion board please keep on doing that, those of you who are not active, get active on

discussion forum, ask questions that is the there if you ask questions we will try to answer that as soon as possible as well and sometimes the questions are not clear.

But still we try to either will go back to you and tell that can you please clarify or we try to interpret in our way and then say that this is how what we thought you are asking and here is the answer. So, if you have any questions do not feel free, feel free to ask those questions through the discussion forum and we have been giving you reply within 24 hours and will continue to do that.

So, thank you and again see you in the next video.