Course on Integrated Solid Waste for a Smart City
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Module 12
Lecture No 57
E-Waste Management (Contd.)

Okay welcome back, so will continue our discussion on the waste e-waste management rules, if you remember towards the end of the last video that you had looked at, we covered we were talking about the e-waste management rules and I did go over different aspects of the rules and different stakeholders which are identified as per e-waste management rules and we also talked about some of the duties, roles and responsibilities of different stakeholders.

So what I have done now is the same thing that we have already talked about, I have tried to summarise in a kind of small kind of boxes, make it little bit like a summary as a more in terms of what we called nowadays info graphic, it is not a very fancy info graphics it is just a very simple illustration with several boxes of what are the different stakeholders, what are their rules, some of the like a it is kind of summary. So it is a quick review of the rule and we will do that and then we will move on to the last aspect of this e-waste management that we want to cover in this particular course.

As you know this is a this course is focused on waste management major focus was on municipal solid waste, e-waste I just wanted to introduce the topic so that you get some idea. Maybe in future if time permits and if needed we will try to have a at least a four-week course of slight something like that in on a just on electronic waste management where we talk about more in detail.

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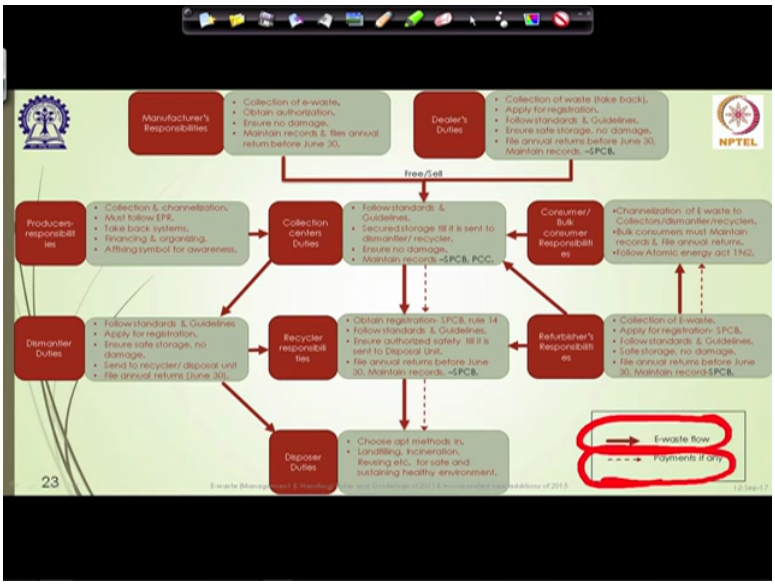

So, let us continue our discussion where we left the early day. So in terms of the rules here as I said I have tried to summarise, do not worry too much about that you cannot see much of the things of the slides do not worry about that. This was just to show everything is here we have we will go in each of those boxes in detail, so that is the plan. So here we have from manufacturers responsibility, dealers duties, producers responsibility, collection Centre duties, consumer, bulk consumer, refurbishers, recyclers, dismantlers, disposals for each one of them we have tried to I have tried to put together small-small boxes here.

And we also this is the manufacture here and then we have the dealer we will go into each in a detail. Then we have producer responsibilities, dismantler duties and the duties for each one of them are listed in these boxes which you will see. Collection centres, recyclers, disposers,

consumer and bulk consumers, refurbishers and the important point also is how they are connected, as you can see here they have a connection like manufacture, dealers that is connected to collection centres, from the collection consumer bulk consumer is also sending their waste to the collection Centre.

Producer responsibility has on collection Centre, collection Centre is linked with the dismantlers, they again to the recyclers as well as the disposers. Then here your refurbishers linked with the collection Centre as well as to the recycler. Then finally you have things coming down from collection centre to recyclers to disposers and that is what you see here. And the dark line which shows that how the e-waste is flowing into the system and that thing that dotted line shows how the payments will move if any, like how the payments move around in into the system.

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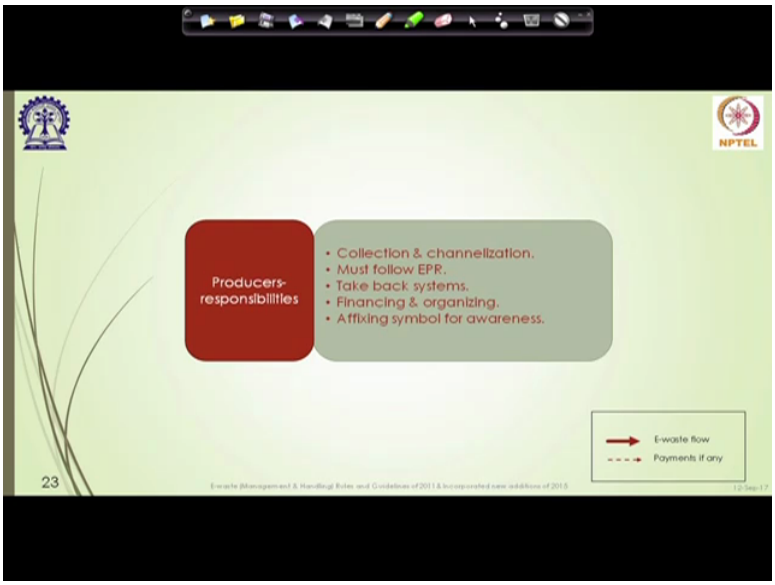

So being said that if you can look at each one of them now in detail. So in terms of the producer's responsibility, what is the producers responsibility are? Producers responsibility is to make sure the collection is done properly when I am talking about producers it is the e-waste producers and the collection and channelization they have to do this, collection and channelization part and .

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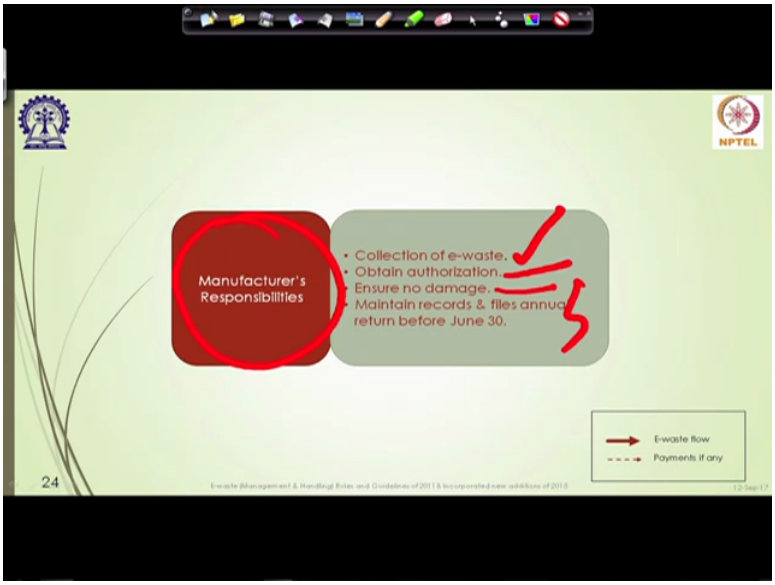

So in terms of the manufacturer's responsibility, manufacturer's responsibility is to do the collection of e-waste. So as per the e-waste management rules as per the extended producer responsibility, the manufacturers have been made obligated that they need to take part in the collection of the e-waste, they have to obtain authorisation, they have to ensure that no damage is there, maintain records and files return before June thirtieth. So this is manufacture have been as part of the extended producer responsibility they have been given this role to do that. Whether it is good or bad? What are the shortcomings we have already talked about that.

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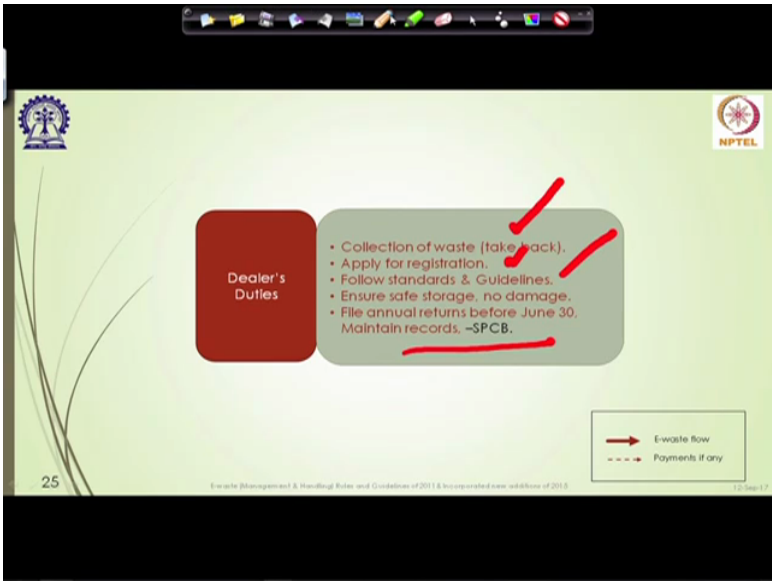

Then you go to dealers. Now what is the dealers rule? They have to collect the waste back. So if they are selling the product, they should be able to collect the waste back, they have to

apply for registration, follow standard guidelines, ensure that safe storage, no damage, file annual returns by June thirtieth, maintain the record, so those things are there in terms of responsibility of the dealers. So it is we already covered this part earlier just kind of quick summary.

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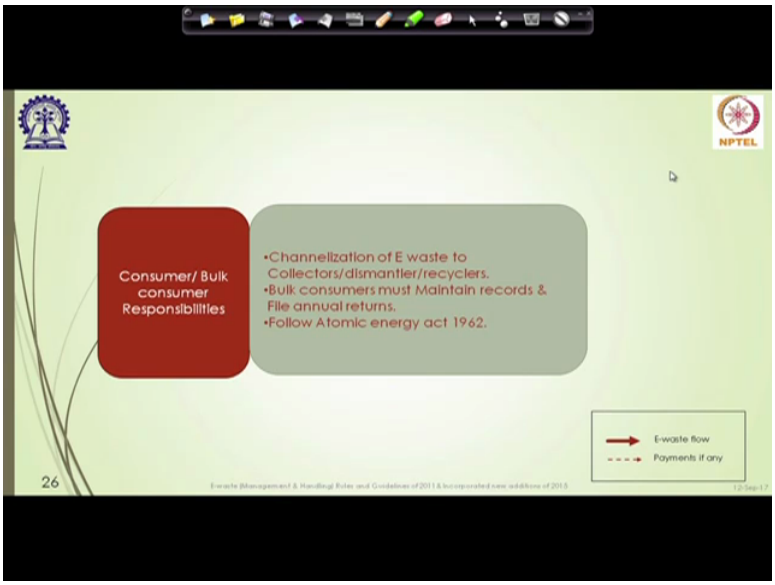

Then next we will have the consumer and the bulk consumer responsibilities, they have to make sure that the e-waste is goes to the registered collectors, registered dismantlers, registered recyclers. Bulk consumers they also have to maintain record, they have to maintain file annual returns, follow the atomic energy act, so those things are there in terms of consumer and bulk consumer responsibility for electronic waste. So this is as per the e-waste management rules that we have.

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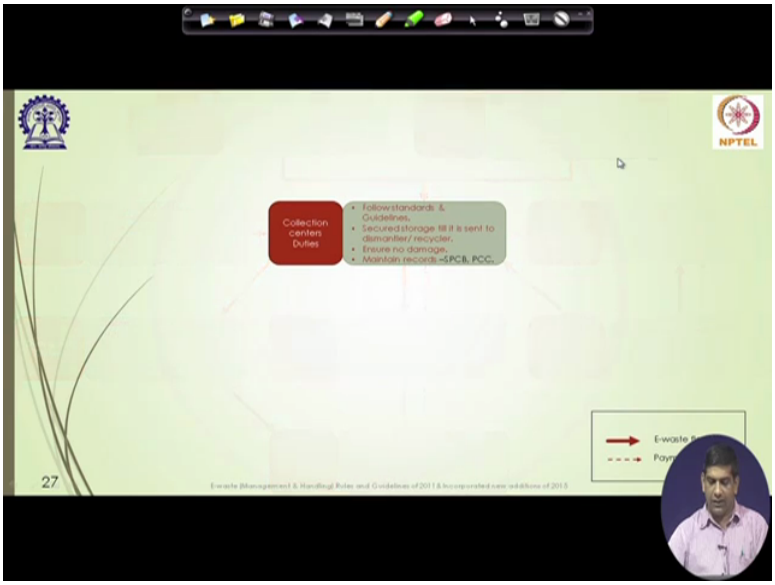

And then we have collection centres, what they have to do? Again have to follow the standard guidelines, they have to secure storage till it is sent to dismantlers, recycler. Ensure there is no damage, no impact to the environment, maintain the record, submit that record to SPCB which in turn will submitted to CPCB, so those things are there in terms of the collection Centre.

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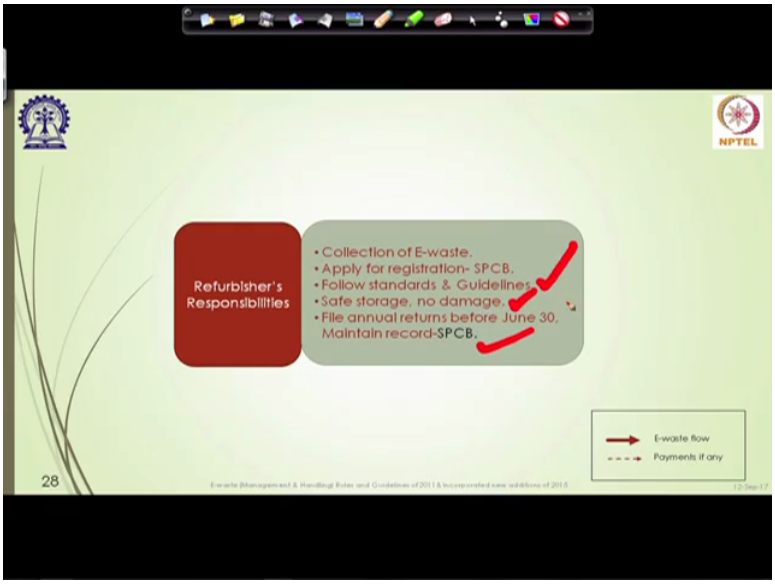

So then the refurbishers, what they have to do? They have to collect the e-waste, they apply for registration you cannot just become a refurbishers. Say if you are there these days that is what is happening is not it? Say you there are people in the society they will take the old electronics and then they will say out of 3 electronic items, 3 computers, whatever the parts is

not working, they will get that part from the other computer, say for one particular computer they will look at other two, they will try to salvage some of the part from the other two which maybe in the working condition and then they make at least computer working, if they are lucky they may be able to make 2 computers working.

So that in that case and then they put it back in OLX or some other websites where they can sell it as a refurbished computers and that is all and there is a market for that as well. So to right now there was before the rule there was like there was no need for them to of course they should be registered as a business, but many people do not really do that.

So but as the e-waste refurbishers we have to apply for registration, they have to get with state pollution control board just to make sure that they are not contaminating the environment, they are not doing things which is going to impact on human health and environment. And then they have to follow the standards and the guideline, that is what they talk about here, safe storage, no damage and also they have to do the annual return between June thirtieth.

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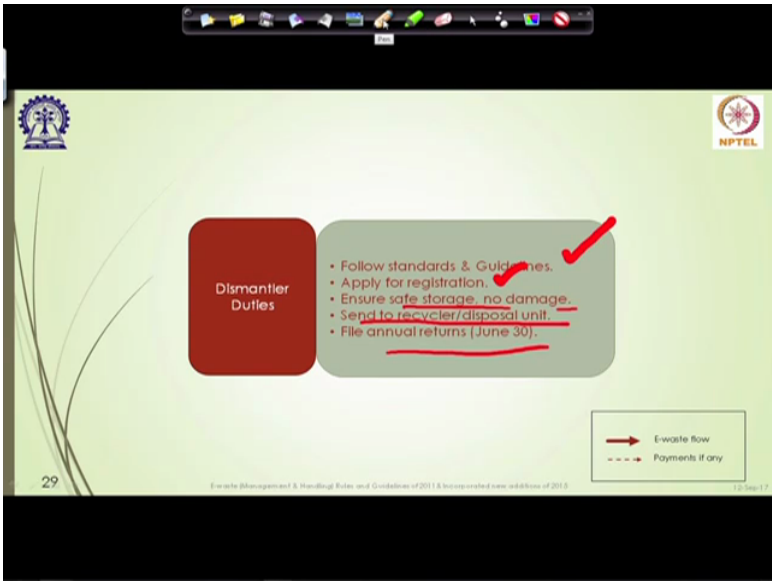

So then dismantler's rules again follow standards and guidelines, apply for registration. So follow the standards and guidelines, apply for registration, ensure safe damage, safe storage, no damage, send to recycler disposal unit and then also file the annual written by June thirtieth. So those is again dismantlers duty, very similar stuff that you kind of see over here.

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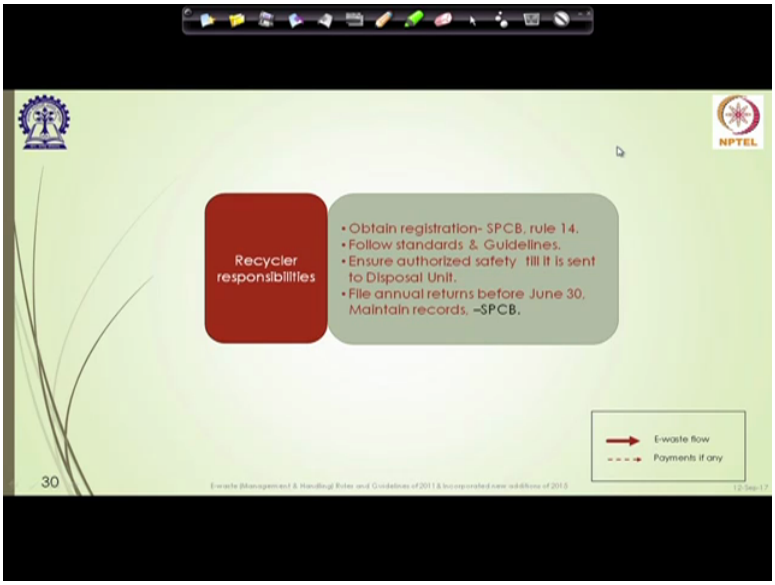

And then recyclers they have to again get the registration from state pollution control board, follow standard guidelines, ensure authorised safety, file annual return. So if you look at each one of those possibilities essentially it is kind of 4 sets of things they have to have some sort of authorisation, so they have to so that state pollution control board knows that there is a recycler, there is a dismantlers, there is one refurbishers in that particular town or in that particular area.

Then once they are registered they get certain guidelines and standards which they need to follow in terms of like environmental impact, human health impact. Then they make sure that they are not contaminating the environment there is a some safety is there. And then after they are whatever they could recycle, they can recycle and they send the remaining to the disposal unit.

And in terms of how much they recycle, they keep a track of how these electronic waste is flowing, all they have to do a annual return where to be know that how things are being managed. So this is kind of common thread along all the different stakeholders in terms of what the rules and responsibilities they need to follow.

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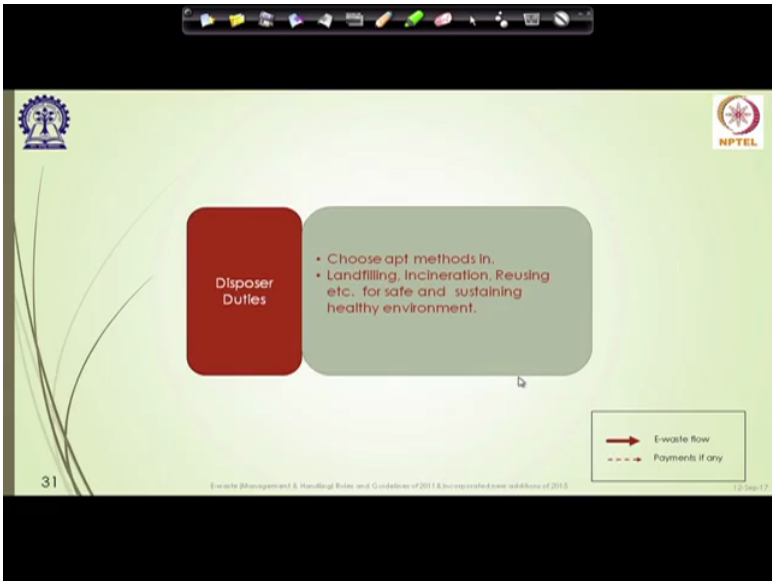

And the disposal, then they have to choose apt method in terms of disposing, landfilling, incineration, reusing. Make sure it is safe, make sure it is under the kind of big concept of sustainable sustainability, so sustainable and healthy in the healthy environment.

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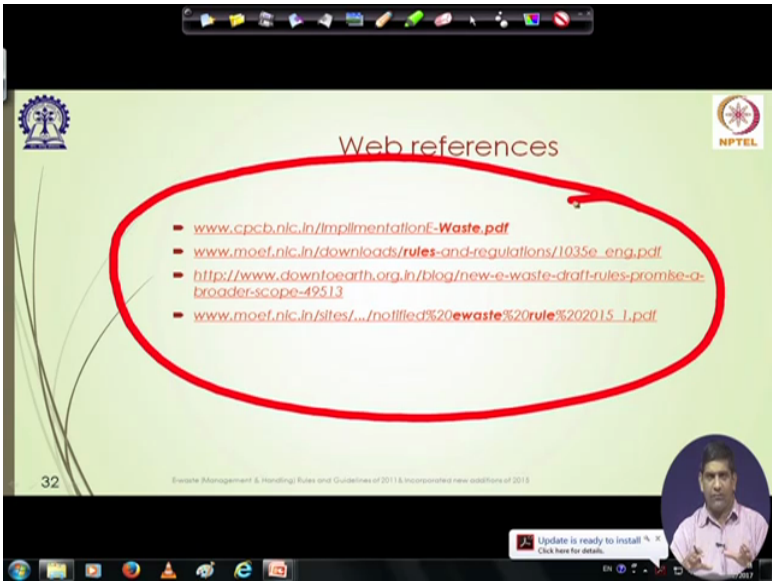

So those were kind of what we had in terms of the rule and so this is the stuff came out there are some web reference which you will get PDF file of this for every week we have been putting PDF file, so you can look at these websites where this information's are available and even the e-waste management rule is available, you can download the rule.

So what we have tried to do in this particular this part of this module and also the previous module the goal was to introduce you to the e-waste management rule and so that you know what are the different components? What the e-waste management rules talk about? Of course, if you end up working in this area or if you are more interested to know about this area, I would strongly encourage you to look at the rule and then and rule does keep on changing as well from Time to Time, there might be some amendments and other things coming up.

So this is just a quick overview of the e-waste management rules and what are the different components, what are the different who are the different stakeholders, what is the each of this stakeholders role and what we are supposed to do as e-waste producer as well. So from now if you have e-waste at home and then you have certain e-waste, now Diwali is coming in you are trying to dispose that e-waste, you should send it to the you should call to the registered e-waste recycler, you should call the collection Centre and go and drop of do not give it to the kabadiwalas who will give you few rupees for that.

Ultimately it is as a responsible citizen of the country, it is our responsibility as well to follow these rules. So if we give do not follow the rule just for sake of few hundred rupees getting for my old cell phone or for my old laptop and then it ends up in a very crude manner where it is being recycled and then it goes and impacts the environment, it is our we are also responsible. So it is not only the we always like to put the blame on others, but very certain rules and responsibilities that we as a citizen have to follow and each one of us in the country actually starts following it, most of the problems will be gone.

We do not have to have a it is kind of a few thing about that the Prime Minister of the country he has to give speech after speech after speech to tell us that keep your house clean, keep your community clean that we should do it, nobody should tell us that, we should be able to do it by ourselves, but since we do not do it that is why people at this position have to remind us from time to time.

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So with that we will like to close the this part, but it is the video is still continuing will talk about the other aspect so I will go to my next set up slides in a minute let us so this is a part of we had finished this part in terms of the rules but we will go to the next stuff which will talk about today in this video and the next video as well is on looking at what are what are the issues? What others say we have been again coming back to my first like those of you watching this video and if you have taken my earlier class as well I always try to say that, always thinks about why, why this electronic waste management?

We talked about the little bit now I will try to highlight when we are doing the overview in the waste management in the e-waste management I did talk about that, now I will show you some facts and figures that why this e-waste management is it is being studied, what is the use of studying this e-waste? What why it is important?

So will talk about global issues and then when we talk about the importance, it is a global problem, it is not only India problem, India off course it is a in India it is a big problem now it is a problem keep on increasing because we producing more and more electronic but it is an global issue and there is a there is some things are moving from developed countries to developing countries as well in the name of recycling, in the name of charity and all that, so will talk about those.

So we will look at the global issues including export to poor countries, we also talk about how the how this e-waste is characterised, what are the drawbacks of the characterisation

method. So over next few videos that is all we do and that kind of wrap-up this particular course.

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So if you look at why this e-waste is becoming a problem? As you can see from this picture and few pictures down the line, as a consumer society we always strive for buying new stuff, we always liked to have new stuff and that is now because of the salary people things are becoming affordable as well. Earlier it may not be affordable but in terms of electronics cost has come down and people salary have gone up, so affordability of buying these electronic products is there.

And there is some pressure among I would say the way we call it peer pressure, there is also society pressure and unfortunately even some of these advertisement and other things that comes that is also forcing us to buy things. Say last Time I was watching I think it was during IPL time I do not remember when it was one particular cricket series going on there was an Amazon add for Amazon where they were talking about (Sharma ji ke waha bada TV hai) so that is Sharmaji has big TV, so we also need a big TV.

So that does not make sense, like basically you are your TV might be fine, you do not really need a big TV in fact they have told you earlier as well I as a child with a black-and-white TV with so many people coming to my house to watch that Ramayan and Mahabharata serial, I used to enjoy that more that what I am enjoying right now with a big TV of around 36 inch or something like that I do not even remember what is the size of the TV.

But anyway, so it is but there is a there is a like a society pressure and these days if you go to a middle-class family's house, it is not only one TV there be there will be multiple TVs, in every bedroom has a TV. So it is becoming and it is because of affordable like cost of this stuff the ratio of the salary is much more affordable now, so we are buying lots and lots of stuff.

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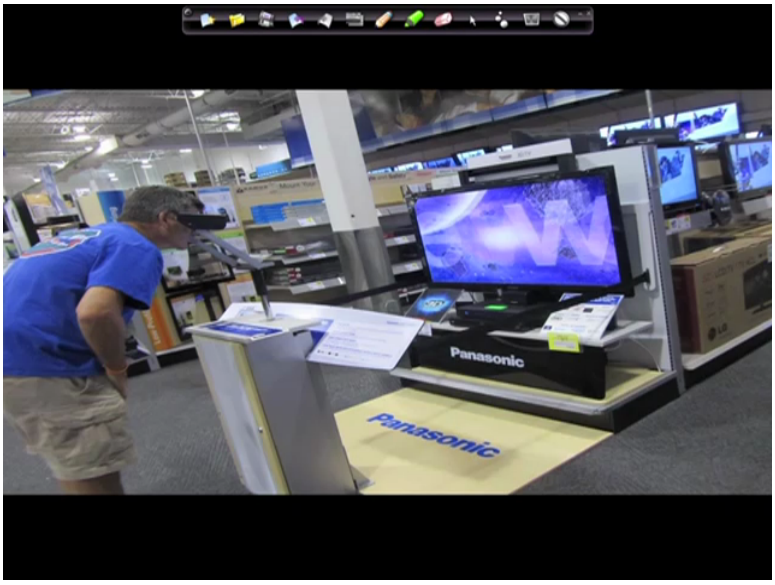

And every Time there will be new stuff coming in, even say now the Apple something new iPhone is coming they have call it with a new name just recently it was in the news, so apple like iPhone 7, 8, now there is something new is coming. So every season there would be something new coming out and that kind of forces you to buy new because your friends have bought something.

So in like we have been produced, we have been buying those stuffs, off course the old stuff what will happen to it? It will not used, some places it is get passed down to maybe some other family members if they do not have it or even to your servants and then like a security guards and then it may but ultimately those all of us wants smart phones these days, so everybody has to do their Whatsapp and Facebook.

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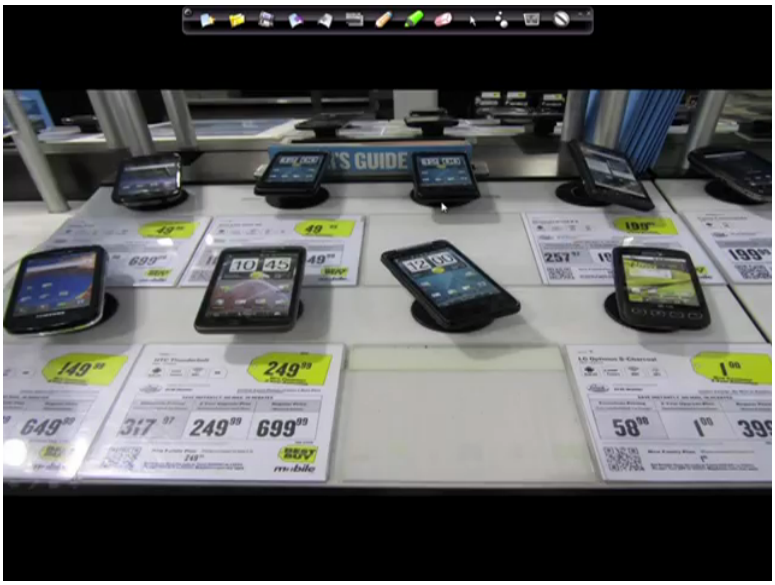

So things has going down the chain and finally it will end up in the disposal stream and as you producing more and more electronics, we are selling more and more electronics, more and more of these is coming into the disposal stream. So that is the reason why people are worried about electronic waste, because it is a lot of material and there are variety of things every like you we have saw the pictures, you just saw pictures of TV and like a computers, you have cell phones.

Cell phone is one of the growing market in terms of electronics and these days if you watch most of this like a sale, now just recently we have like Durga Pooja, Diwali and all those stuffs, every time there will be sale, online sale these days and the great Indian sale of this

great Indian sale of that and most of the times it is the electronic product which gets lots of discount and other stuff, because people are buying lots of electronics.

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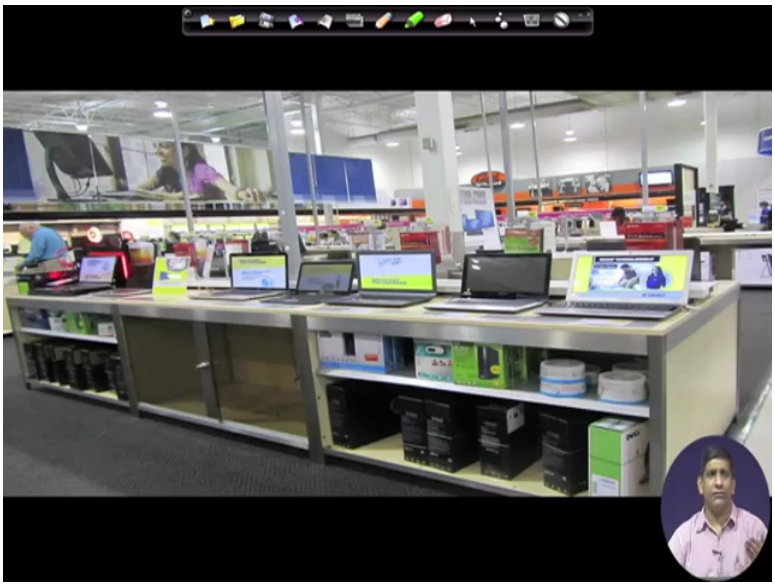

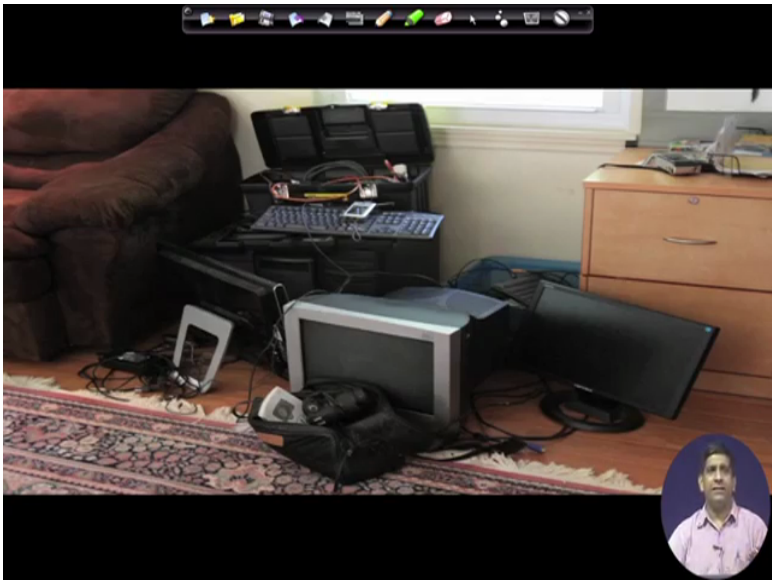

And then we have like a refrigerators, those kind of stuff lots of kitchen appliances, different types of refrigerators, laptop, other stuffs in there, so ultimately at the some point of Time it becomes and then it will it becomes a waste, it stays in a house for a little while and after staying in the house for a little while, one day when you kind of do not have much space left our apartment sizes are also getting smaller, if you live in a metro metropolitan city, the apartment houses is getting smaller.

In Mumbai we even have there is a concept of one and half bedroom and which is for many of us who has never been to Mumbai as part of my career I have spent slightly more than a year in Mumbai working there, so it is a I know and we have like a property there as well. So it is a in terms of one and half bedroom, which is kind of if you talk about to some people they will kind of make fun, what is that one and half bedroom.

But that is because the houses getting so small and our electronic gadgets are becoming more, so at some point of time even if you do not want it you have to get rid of some of the old desktop and some of these old electronic item which is sitting in your house and then then it becomes a waste. Unless you do not discarded it is not a waste, once you discarded it becomes a waste.

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So as you can see in this picture at some point of time it will you will think you will start thinking about discarding it and then it becomes a waste stream and then it comes under what is known as the e-waste and that he e-scrap and that is how we are getting lots and lots of e-waste and e-scrap coming in.

As you can see from this picture and all the different varieties of stuff, you will have some of these accessories showing up, like keyboard and other stuff, there is a old laptop, motherboards, different types of equipment these days comes with the motherboard. Mice and other stuff you have a printer, scanners, you have like a display unit, old cell phones, walkie-talkies, old TV's these are showing up as well. Then again computers, TVs, other

thing showing up, so there is a variety of stuff that comes in terms of in this electronic waste electronics and electrical product. So these are called e-waste and e-scrap, which we already talked about.

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So going back you have seen this slide very-very early in this course, where we have this solid waste can come from variety of sources, municipal, agricultural, mining, construction, demolition and all that and part of that is the hazardous waste and are part of this most of these WEEE waste electrical electronic equipment will actually come under this hazardous waste category.

If you do the hazardous waste characterisation as I was as I explain to you in the very I think it could be in the week 3 or week 2, I do not remember right now. So but when we talked about the waste characterisation, that is where we were talking about how to characterise a waste as a hazardous waste or not. So if you do the waste characterisation for electronic waste most of it falls under hazardous waste.

Although it is exempted from the definition of hazardous waste just because of it is severe volume, it is too much and we want to promote recycling of electronic waste. So that is why it is exempted from the definition, from the regulatory definition of e-waste in many countries around the world, but as per the true, if you go by the books, it will come under electronic it is comes under hazardous waste and mostly for heavy metals and that we do.

If you remember from the previous video that we do under TCLP test that was toxicity characteristic leaching procedure. So we do the test to find out whether a particular solid

waste is the hazardous waste or not and this electronics helps us to kind of do that particular sorry that electronic waste hazardous waste characterisation is done using the TCLP test as a testing protocol.

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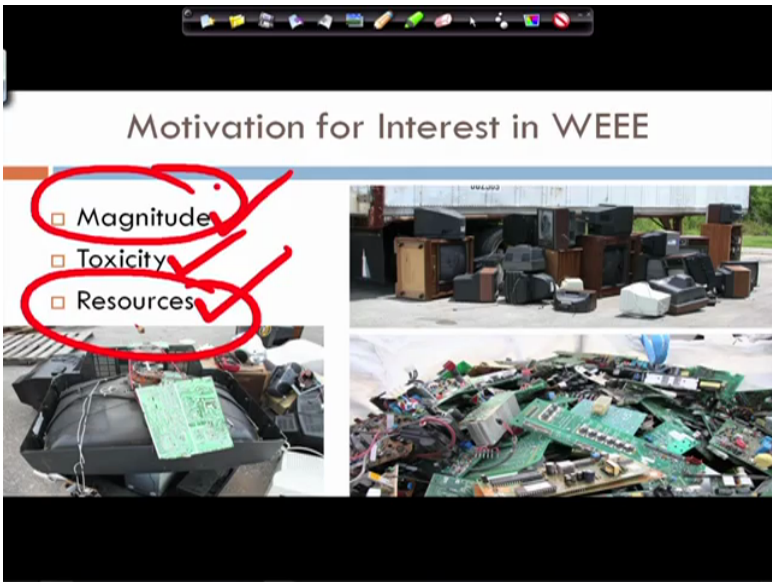

So motivation why and then why it is interest, what is the motivation for interest in these waste electrical electronic equipment? Of course severe volume, I think I have said enough, that there is more and more of e-waste being produced across the globe. It is not only in India, India and China 2 major population but even if you go to other countries lots of electronic waste is being produced.

Other thing is the interest off course there is too much, we have to manage them properly otherwise it will lead to environmental health or human health problem. Why it will lead to environmental health and human health problem? Because of certain toxicity, which is the second bullet as you see over here, off course the magnitude the too much of it is being produced, that is important and the same time it is the toxicity. Now toxicity of what? Toxicity of the different component present in these electronics.

So there are lot of heavy metals present there, there are lot of organic chemicals present there, so for those chemicals they have certain toxicity. When we say toxicity, if you remember the previous discussion or from your other classes, toxicity means basically has an adverse health impact, it is toxic to either to human or to environment. When we say environment the biological systems in the environment, so it is a toxic to them, so there is toxicity associated

with that for the different elements different compounds which is present in this electronic items.

Then there is lot of valuable resource, so third bullet as you can see over here is resource. Now what is this resource we are talking about? We are talking about resource, because if you remember we talked that there are lot of heavy present there, lot of rare earth metals, rare earth in the periodic table they are called rare earth because they are rare.

So rare means it is not easy to find them and there are lot of so these we have rare earth metals which were mining. China is one of the leading producers of rare earth metal right now, so we are mining them, we are using them in this electronics and at the then you are putting them in the landfill or even we are if it goes to the recycling system, we are not able to recover it very properly.

So that is it is so there is a resource there, there are some gold, copper and aluminium could be there as well and there are certain heavy metals which it is present. So as we are producing more and more as the magnitude is getting higher, even this individuality these elements may be in a tiny quantity when you if you have huge magnitude even if you multiply by the tiny quantity here the total value will be much higher.

So that gives you a like huge resource which is just being lost as because things are not being managed properly. When I say being lost, it is not truely lost but say because some of you might be thinking that you cannot really destroy the mass that is true, its conservation of mass is already there, but when we say lost it means lost from the economy, where it is not coming back to the economic cycle, it is just being dumped into the environment in some fashion where it is actually creating an adverse impact.

If somehow if we can recover this this element or this compounds and we can bring it back to the economy and that would be really helpful for the economy as well as for the environment, so that is where that is interest in terms of why we are talking about this electronic waste management.

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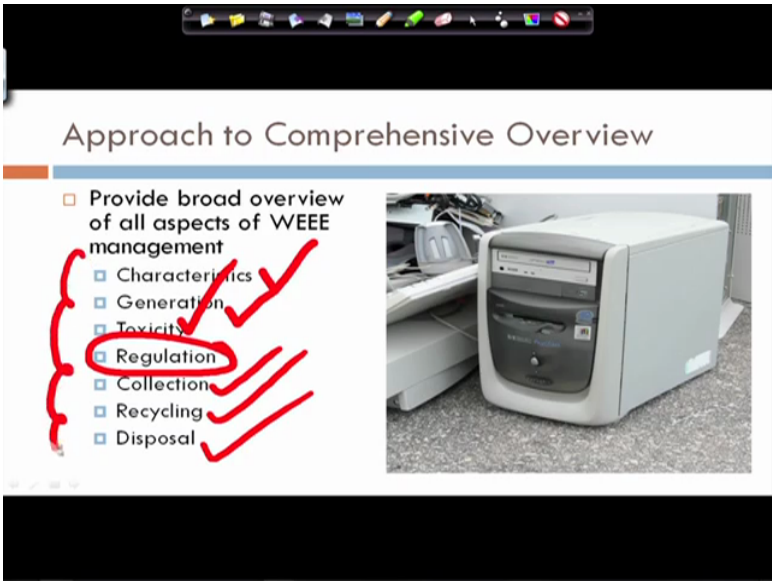

So in this video we are coming like we will kind of close this video in a few minutes and then this video and then the subsequent videos that we have we will be trying to look at some of these aspects related to global issues, related to e-waste management. So we will again since it is a quick like just a two weeks kind of material and we ended up having little bit less than two weeks. So you will have a brief broad overview in this video and the subsequent videos.

We will look at the characteristics of the e-waste, what are the different characteristics. How is the generation is changing, what are the toxicity issues, some of the regulations part we already talked about Indian regulation, so we will talk little bit about the global regulation and try to compare. We talked about how things are collected, how things are recycled, how things are disposed. So if you remember from your MSW classes, we did the same thing for MSW as well. From your MSW municipal solid waste we started with the same kind of stuff, looking at the characteristics, looking at the generation, is it a hazardous waste, non-hazardous waste.

So for any waste management this is kind of the basic, first you need to know how much is being produced, how bad it is, what are the like harmful components, how to manage those harmful components, what regulation says about that. Then once you have collected it, how to collect once you have it is generated, how it is to be collected from the different sources, then after collection it should be go for recycling, how what is the process for recycling, how

the recycling system will work, then we will talk about the disposal stream, ultimately if you cannot recycle how things can go into the disposal site.

Here if you remember (())(27:27) supposed to the municipal solid waste, so here we have not talked about composting anaerobic digestion, because we are talking about all these stuffs which is inorganic, like it is they are not biodegradable stuff, they are mostly non-biodegradable. So we are not going to talk about those aspects it is of no use of talking about those aspects, so will talk about recycling then we will talk about disposal.

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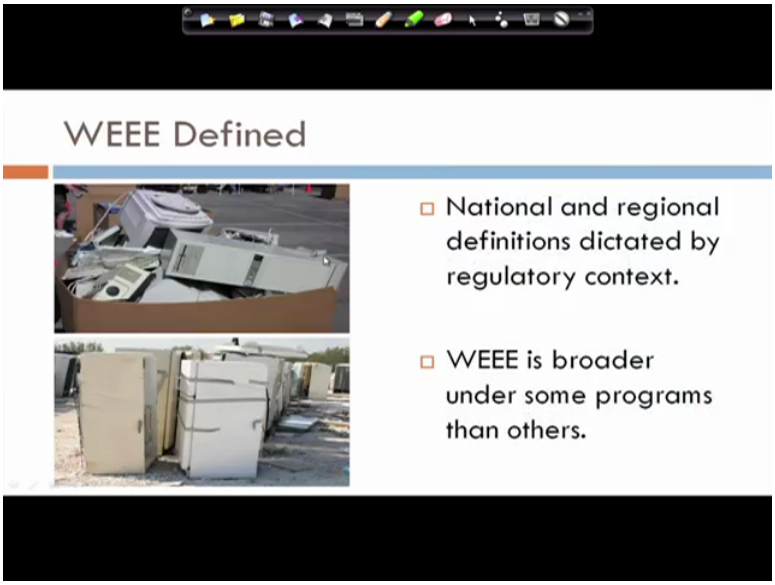

So in terms of the definition, let us look at the definition there is a National and regional definition dictated by regulatory context, you saw the definition from the Indian side in the e-waste management rules that we talked about in the previous two this previous part of this video and the previous video. And it is a broader as you will see that waste electrical and electrical equipment is broader under some programs than the others, some programs is much broader than the other programs.

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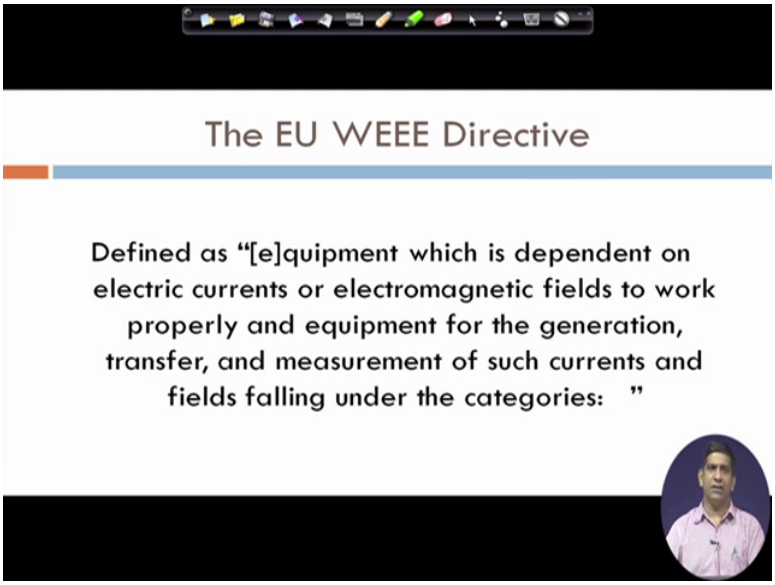

So here in the EU directive it has defined as equipment which is dependent on electrical current or electromagnetic field to work properly and equipment for the generation, transfer, and measurement of such currents and fields falling under such falling under the categories. So there is a definition again this came from the EU document, so it is equipment which is dependent on electric current or electromagnetic field to work properly or equipment for the generation, transfer and measurement of such currents and field falling under the categories. So that is how the EU has defined it, so it is much broader definition.

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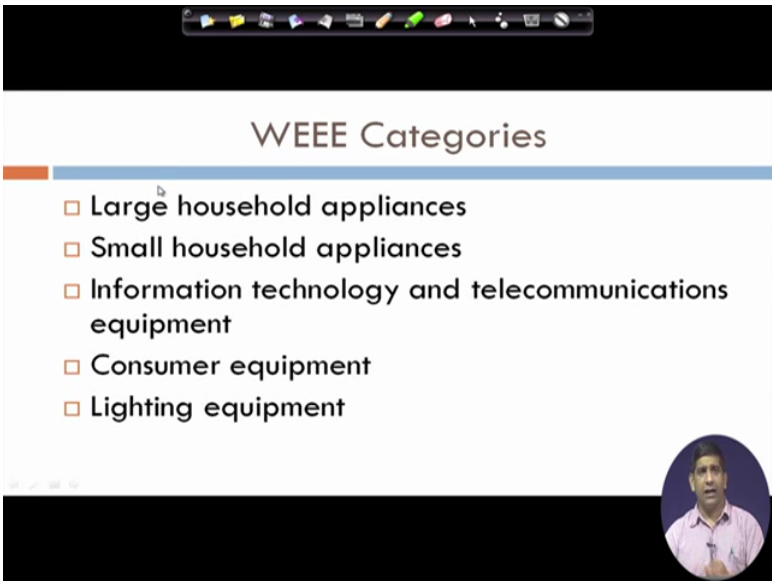

So under that category you have the large household appliances, you have small household appliances, information technology and techno technical equipment, many times you hear that ICT equivalent ICT is a short form used for that for those kind of stuff. Consumer equipment, lighting equipment, all electrical and electrical tools with exception of large sale stationary industrial tool, toys and leisure and sports, medical devices except all implanted one and infected products, monitoring and control instruments, so all these things comes under electronic stuff.

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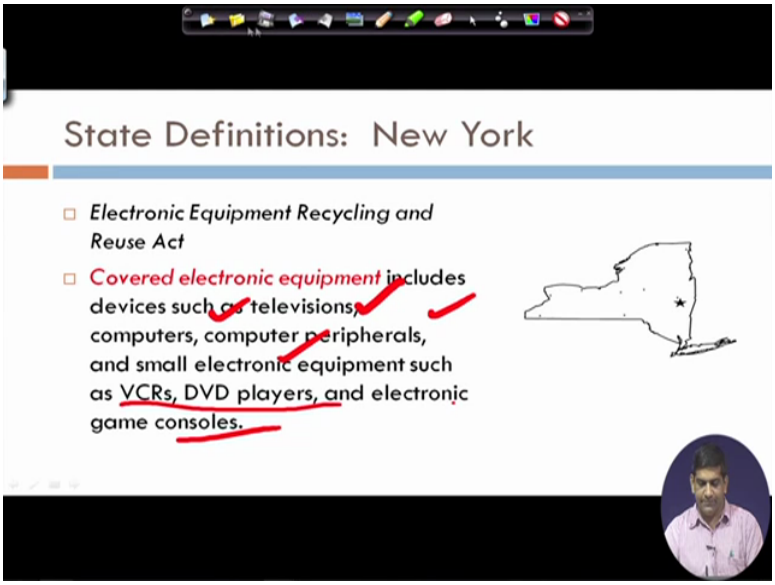

So but if you go to the individual level, state of New York for example they cover device such as television, computers, so it is not as broad. They has television, computers, computer peripherals, small electronic equipment's that is VCR, DVD player and electronic game consoles, so they just call that much as electronic waste, others like white good and other things they do not call them as electronic waste in the New York state.

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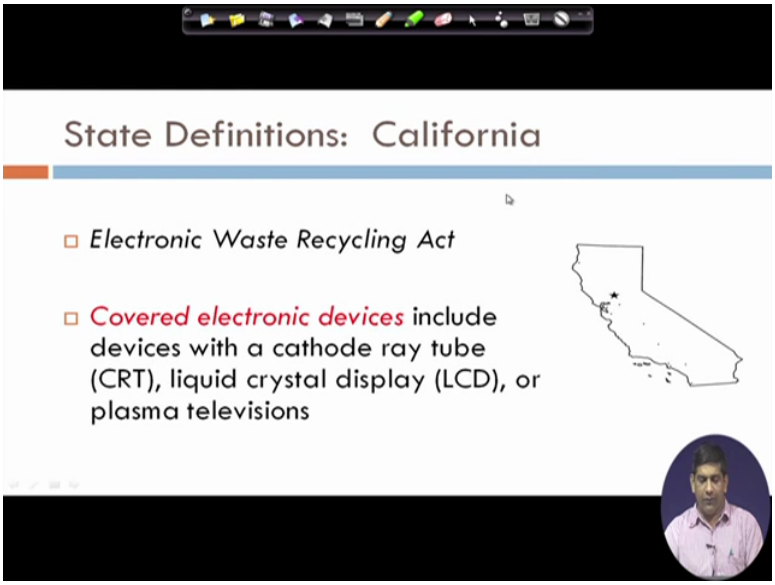

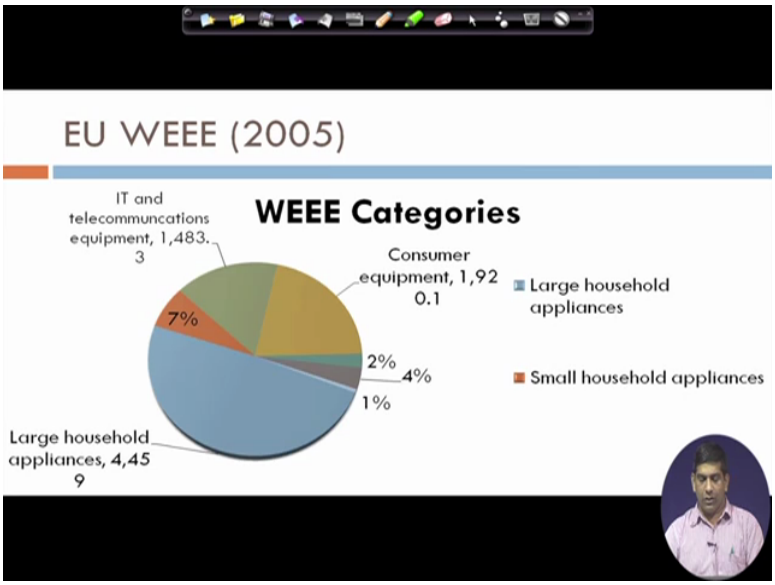

When you go to California they are little bit they also include those in the also include cathode-ray tube, LCD and plasma television, so that is covered electronic devices is there in terms of California. So in terms of EU in WEEE as per the definition of EU you have the consumer equipment and then you have large household appliances, small household appliances, you have large household appliances it is the blue part it is and then we have the small household appliances, there is a IT and telecommunication equipment, consumer equipment and then some other categories there as well.

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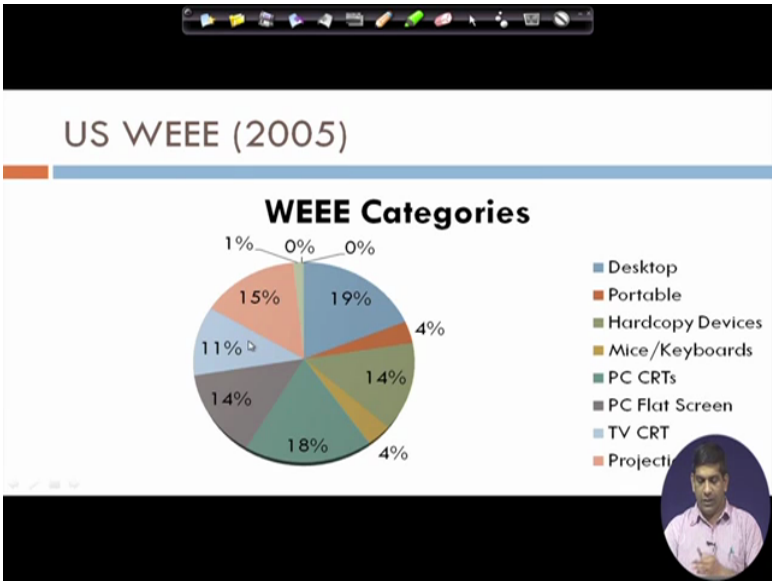

So in US if you look at you do not see those like a large household appliances, small household appliances that much, here you have the desktop, portable, hardcopy machine, mice keyboard, PCs, PC flat screen, TV CRT's and the project and all that, so that comes under WEEE categories as per the US definition of 2005.

So based on as you can see based on where you are the what you called the e-waste and this problem was there, this similar scenario was there in is municipal solid waste as well. In some places in municipal solid waste, C and D waste is included and in some places it is not included, so those kinds of issues are there. So that is how in the US if you look at the US versus European Union the definition changes, that is why the composition if you look at the e-waste composition, e-waste pie chart that will change again it will varies from place to place.

So let us close this video at this particular point and then will continue our discussion in the in the next video and so with that it is again continue enjoying. I hope that you are enjoying the course do send your response on that e-waste survey, the municipal solid waste survey you have already done, I thank you very much, it is was really helpful and we will share the information with you in a after in a like towards the end of the course.

And for e-waste survey again please do it, it is again it will not take you more than 5-6 minutes to do it, just do it and some responses are already again, so please do those and it will really help us, so in trying to put a big picture of how e-waste is managed in India. So with

that let us close this video and then I will see you again in the next video, we will continue our discussion on e-waste, thank you.