Electronic Waste Management - Issues and Challenges

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Lecture - 02
E - Waste Overview (Contd.)

So, hello and welcome back. So, will continue our discussion where we left in the previous module. We were looking at different types of electronic waste, different classification. And as I told you that you need to be careful when you look at the E waste report from different places, different countries, different cities. You need to pay attention to how the E waste was defined.

So, as I mentioned in the previous module that many times E waste definition is not the same, when you go from one country to another country within a bigger pig country. Sometimes E waste definition also changes, especially in US or in provinces of Canada. The E waste definition may change from one province to another province. Where, like a. when in US. It would be states in Canada, it will be province, but since where the waste management is kind of left at the state level or the provincial level in those countries, not the Central Government only provides some guidelines

So, that is the reason why you may see some of the differences in terms of nomenclature and all that. So, being said that, let us focus in this module. We will start our focus from the Indian context. We are sitting in India. So, we will talk about Indian context. What are the sources of E waste in India, how, which states that producing more, which state is producing less, just have some discussion on that and then will start getting into why it is important to talk about E waste management, which we did in the previous module, but we will continue that discussion with more, some more details in this video.

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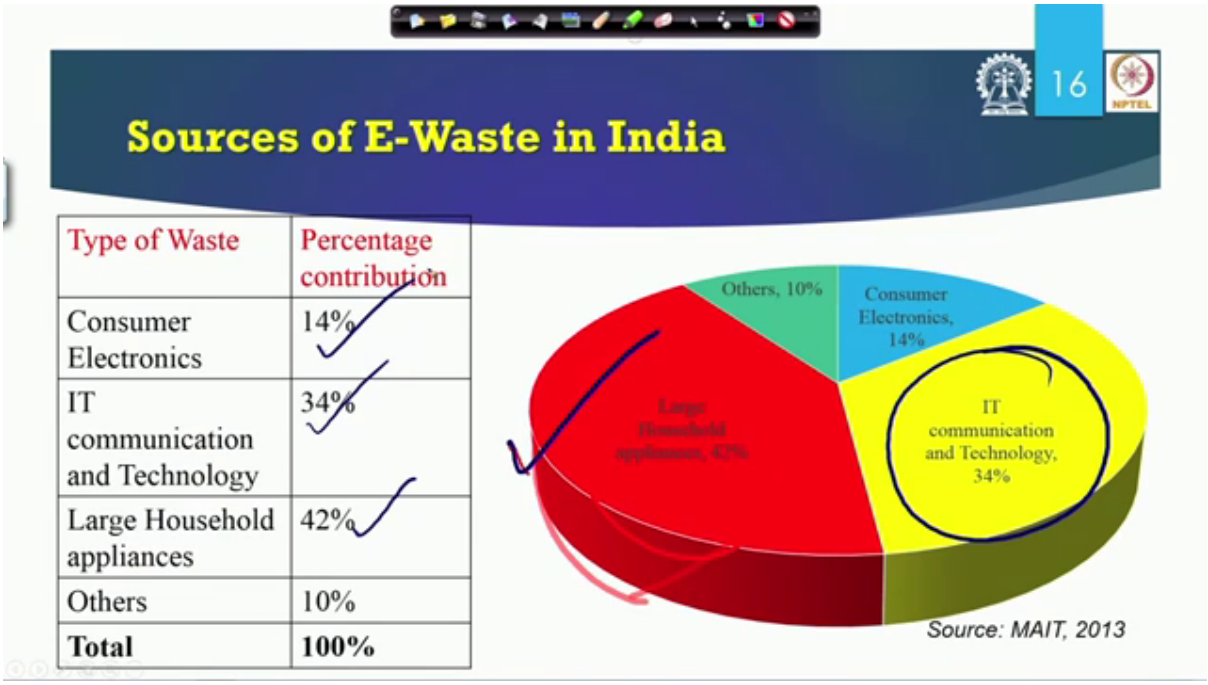

So, if you look at the source of E waste in India, where this E waste is coming from in terms of the product, as well as in terms of the industry. So, as you can see we are, we have a table as well as the pie chart here. Both table and the pie chart has the same data. It is just represented in to a waste, just to make you visualize it little better. We could have just put the table or the pie chart, but just we will thought out like, let us put both right. Now some people like the table, some people like the pie chart. So, it if we look at the biggest contribution is coming from large household appliances. So, you see the biggest contribution is actually coming from the large household appliances which is its. So, we see the biggest house, biggest is coming from the large household appliance

So, this is our biggest contributed of a electronic waste, and in terms of others, then the next one is the I Tand communication technology I Tin communication is around thirty four percent. So, biggest is forty two percent is the large household appliances I T in communication is 34 percent and then you have consumer electronics. Consumer electronics will include your laptop, mobile phones, Ipad, desktops on all those, any consumer electronics that you buy. So, that is your 14 percent

So, still the large household appliances which is your refrigerators t v's or washing machine, dishwasher and all those big items that you see in the house that constitutes 42 percent, again these are by weight. So, if since those are bulky items, those are heavier item, that is why you see a high percentage coming out, that does not mean that people

are disposing more refrigerator as compared to disposing their cell phone. Cell phone has a less self life or less useful life right. Now as supposed to many other electronics. So, if you go by the numbers of electron, numbers of products, your cell phones very much, higher laptops will be much higher and, but if you go by the weight of the product we see the large household appliances contributing more. So, that is you need to be careful with that

So, then I T communication and technology that I C T is stuff, which is like bases, big desktop computers and other stuff related to that printers, scanners, xerox machine. So, all those things are your height. Again those are mostly bulky item. Again if you think about computers, the computers that we are mostly see in the disposal stream, is most with the ones with a C R T tube, that monitor with the C R T tube, and the C P U, the bulky ones. Remember as when you were probably a little child, those of you are a little older. You will see that in mid nineties or when is to be started, seeing these desktop computers making way into the homes of people, we saw that the curser, the monitor will be very heavy, C P U will be heavy. One person cannot carry both, you need at least 2 maybe 3, depending on all the peripherals with that speakers and keyboards, and mice and all those, but and they. So, they were bulky items, they were heavier item and they are coming up, because although they were not used, many of those might be not being used since 2005 2006, but people have, since that was their first computer

So, they know, want to get rid of that very soon there is a emotional attachment, and that we see more in countries like us, where we see we have, we get mostly, we get emotionally attached to even many products, and then we keep it at home. Although we are not using it for some, and that is at the end of the day, when you buy these new monitors, new computers. Now you think that I need to get rid of it, I do not have any room left in the house to keep it. So, that those are the ones which you see more, its showing up in the E waste disposal stream; although the flat panel ones. The ones that we start using now, is also showing up

So, that say in terms of the different composition that we see in terms of sources of E waste. So, continuing this discussion if you look at on the next slide.

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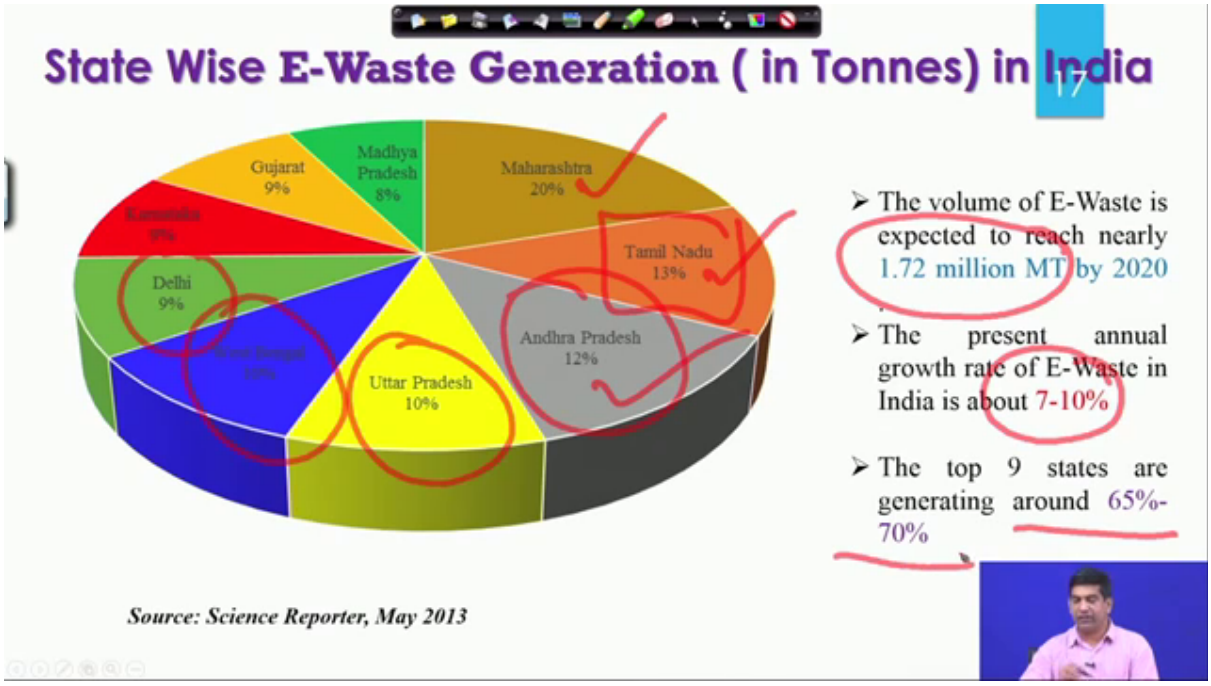

If you see that stage wise generation, how the way E waste is being produced for in different states of the country. So, if you and as you will see, its not surprising, we say that the maximum amount of E waste is coming from Maharashtra

So, Maharashtra is contributing 20 percent. So, 20 percent of the E waste in the country among the big city, big states which is producing E waste is essentially, coming from Maharashtra, and we can think about Mumbai. Is there Mumbai in the greater Mumbai area. So, new Mumbai, Thane, Kalyan, Mumbai. So, it is a big area right there which produces a, which has a business capital of India. So, lot of electronics usage over there. People, if you look at the purchasing power per capita is also higher in that part of India. So, that is. So, you see a bit pretty high, like a E waste being produced, then Pune is there as well

So, Mumbai, Pune, those two; Pune is kind of an I T hub, second or third I T hub. We can call it after Bangalore, Chennai and Hyderabad maybe and. So, that we see a good amount of electronic waste, coming up from there. In general Maharashtra a lot of industries, a lot of activities going on. So, we see, and Maharashtra is a biggest state relatively compared to other states, Maharashtra is a bigger state. Of course, Uttar Pradesh would be bigger than that, but in terms, if we have more purchasing power Uttar Pradesh is not that wealthy as Maharashtra is. So, those are those kind of leads to that kind of data

Now, the second one that you see is, coming down to Andhra Pradesh. Now this is Andhra, Andhra is here. In terms of the Andhra Pradesh what we are looking at, is a combination of both Andhra as well as Telangana. This data is not separate. So, events the data is separated, probably we will see hub, I do not know, maybe we will see more in Andhra less in Telangana, just because of Hyderabad. Hyderabad being at the I T hub, and again in the country, we may see over there more. So, Maharashtra was number one, then followed by Andhra Pradesh. Sorry followed by Tamil Nadu, and on Tamil Nadu. Sorry Tamil Nadu is number two, which is just slightly more than like Andhra Pradesh, 13 percent which is again Chennai, and other places in Tamil Nadu; that is the reason. And then Andhra followed by utter Pradesh and west Bengal. Utter Pradesh, lots, it is a populous area, population is more, and then we have Ghaziabad, Noida and other places, which has a lot of I T industries, and other things going on there. So, you see utter Pradesh showing up, and then west Bengal, Kolkata, its kind of driving that force, we have west Bengal, all around 10 percent. Then Delhi, Karnataka and Gujarat, and these three are at 9 percent multiple, this is 8 percent

So, it says you can Delhi again N C R i. I do not think N C R is included here it is only the Delhi area that is why you see less. If you include N C R probably it will be, it will be much higher if you get the Ghaziabad, Noida, Goregaon. All those things included there probably the numbers would be higher. Then Karnataka, Bengaluru, Mangalore as well, both are I t places. Bangalore of course, is our I T capital of India. Then Gujarat, again Ahmedabad, Surat, Baroda lot of activities there, and people are wealthy the per capita income is pretty high there. So, you see it over there Madhya Pradesh pretty big state. So, as you see the E waste is coming from different states, and some states are leading, some states are not that much depends on population, depends on affluence and all that. So, but it is been expected that volume of E waste the amount of E waste is produced in India, will reach around 1.72 million tons

So, if you think about if you compare this, it is compared this with the municipal solid waste or the solid waste that is produced in India is around 60 to 65 million tons per year. So, out of that, nearly 2 million ton. So, 2 out of 60. So, that is a lot of number, its almost, if you think about its 3 to 4 percent, its although you know it is in the 3 4 percent is well how big of a deal, but E waste, it is it is a very specialized area and that contribute in 3 to 4 percent of material going into our municipal solid compared to municipal solid,

which comes from solid waste in general, that comes from variety of sources. So, like a municipality and then industrial activities and all that, but there on 2 million tons, 2 million metric ton by 2020; that is a lot of E waste that will be coming up. That also source there is a lot of business opportunity there, which material can be recovered and green jobs, job which can pay pretty well, because we can recover rare earth metals and precious metals from there which will talk about that in the economics. And present annual growth rate of E waste is India's arounds 7 to 10 percent

So, every year or more than 7 to 10 percent it keeps on increasing. We are increasing the electronic waste. Top 9 states which is presented over here, generates nearly 75 65 to 70 percent. So, mostly from the top 9. Out of 29 30 states we have, it is top 9 is states produced around 65 to 70. The data is a little bit older, because we do not have the newer data, that is another thing in the Indian context. We need to produce this data more frequently, and the government should, there should be an agency which actually does at every 2 years. There like it is done most of the developed world. They do these kind of data collection every 2 years. So, in every 2 years we have the new data

So, in 2017 they will do all their exercise. So, the report will be available in 2018. Then again in 2019 they will do all the exercise, the report will be available in 2020. So, you have the current data, because see if you design a. If you have to design a E waste management system, if we do not have that current data, we are designing on something outdared. So, you go to a doctor, and you show them if your blood report and urine report which was done 4 years ago, and based on that blood report and urine report doctor gives you a medicine. How confident you will be. You will be feeling like oh wow it is. So, there is, this is of no use, because things may have changed

Similarly, here also things do change, and types of electronics things are changing much more rapidly. So, we need to have a very frequent data collection. So, somehow, if any of you who are working in government agencies, who are taking this course, or working for C P C B S P C B. Please highlight this in your organization that, we need it very, we need this data collection more frequently. Ideally every 2 years that would be really great, and if we can spend money on that. And I think now in Indian context money is not that much of a problem it. So, it is more where the money should be spent. If we can spend a lot of money on these I P L games and all those stuff, why not spend money where which really needed, where we need to improve the waste management infrastructure of the

country; that is a need of the our, that is a very it. If you do not, do it now, it will be a big problem, it is a monster waiting for more disasters to happen in future

So, we need to have more frequent data collection; that is if you can highlight that wherever you talk, to whom over you talk, who can you think, that can make some impact. Tell them your ministers secretaries, whoever you kind of see, we need more frequent data collection, for E were waste management in general, E waste in particular

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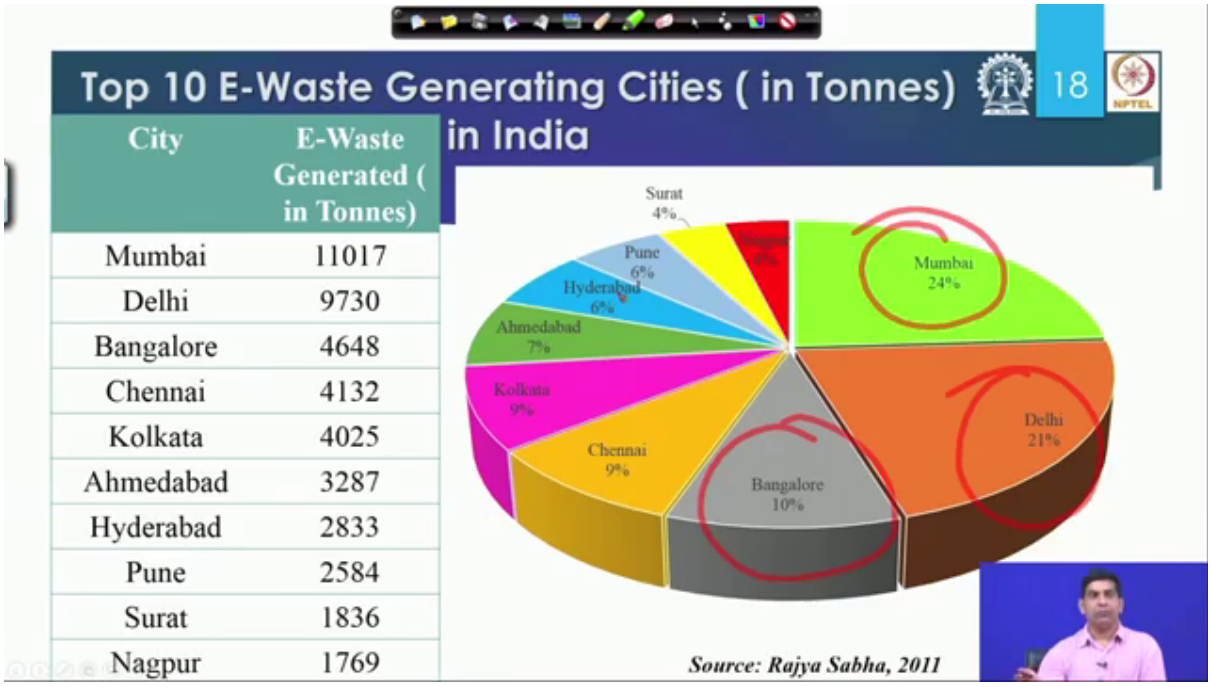

So, looking at the next, from the states if we go to the city level, and is that the US generated in terms. Again this is a older data, unfortunately we do not have new data out there and. So, but for more or less if you look at in terms of, like how much the ratio wise things may not have changed, more or less it will it stay the same. So, in terms of US generated Mumbai leads the pack, followed by Delhi, then Bangaluru, and I think here Delhi does include N C R, because that is what my thinking is. Otherwise I would expect Bangalore to top Delhi, if you are just talking about the Delhi city, but here then again you see. This is again we have to go and look that report did not cover very clearly that when we say about Delhi does is, it is Goregaon then Ghaziabad Noida. those are included or not included

So, where we have to kind of look at that part more closely. In this I think it is included. In the previous one when we are looking at the states this was not. So, Mumbai it is a pack followed by Delhi, Bangalore, Chennai, Kolkata, Ahmedabad, Hyderabad, Pune, Surat and Nagpur, and then you can see in terms of. So, Mumbai has around 24 percent that is highest one, Delhi is 21 percent, and you have others then Bengaluru is there, then we have Chennai, Kolkata, Ahmedabad, Hyderabad, Pune, Surat, Nagpur. Surat again has a lot of industry there as well. So, this is in terms of the cities. So, these cities definitely need good E waste. So, if we when we look at E waste management system in the country, some of this it is needs priority. Actually we need to set up some facilities there, in a more, I would say. If you have to prioritize we will go for these, we should go for these cities first. And then if you look at Delhi, Bombay, Chennai and other places, and we did a lot of E waste is also coming from abroad; that is again the problem we have, where the E waste is being imported from abroad, which is all again creating problem in terms of E waste disposal and management in the country

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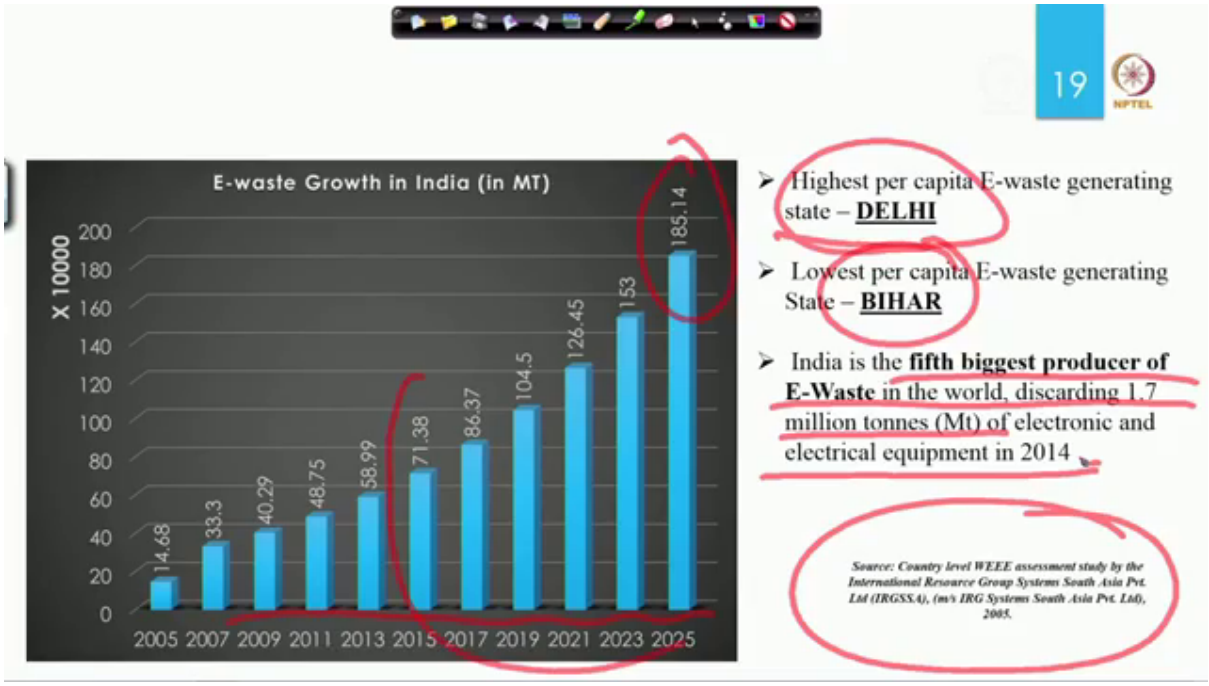

So, look at, and then how there is some projection. This is a. This was a country level work done, as you can see on the side here, there were some projections done, like how much E waste will have from different countries, done by international agency. So, taking data from there, we have tried in this slide. We have tried to present to you that

how much E waste will be produced in future in the country. So, highest per capita sorry will go at there a day. So, as you can see from 2005 until 2025. So, this, the data for actually for this part, because this was done in 2005. So, is basically it is a, it is more like a projection. So, mostly projected data, based on the growth rate so, but around 185 metric ton

So, 185 metric ton of E waste, that looks like a lot of you is being produced. Even if this projection is say 60 percent, even if we do not get to entire 100 percent, even to 60 70 percent that itself is a lot of E waste, 100 metric ton of E waste, that is a lot of E waste to manage in the country. So, if you look at. In terms of the per capita generation, Delhi is supposed to lead highest per capita E waste generation state is Delhi, which that is based on the projections. Lowest per capita will continue to be Bihar. And India will become the fifth biggest producers of E waste, is the produces the E waste right now, discarding 1.7 million ton of electronic equipment in 2014. So, we are the fifth biggest producers of electronic waste, and then we also import a lot of electronic waste from other countries. So, that is another problem we have which will talk about later in this course. So, I take again in. So, why these slides are. Again like a keep on telling this question why and why.

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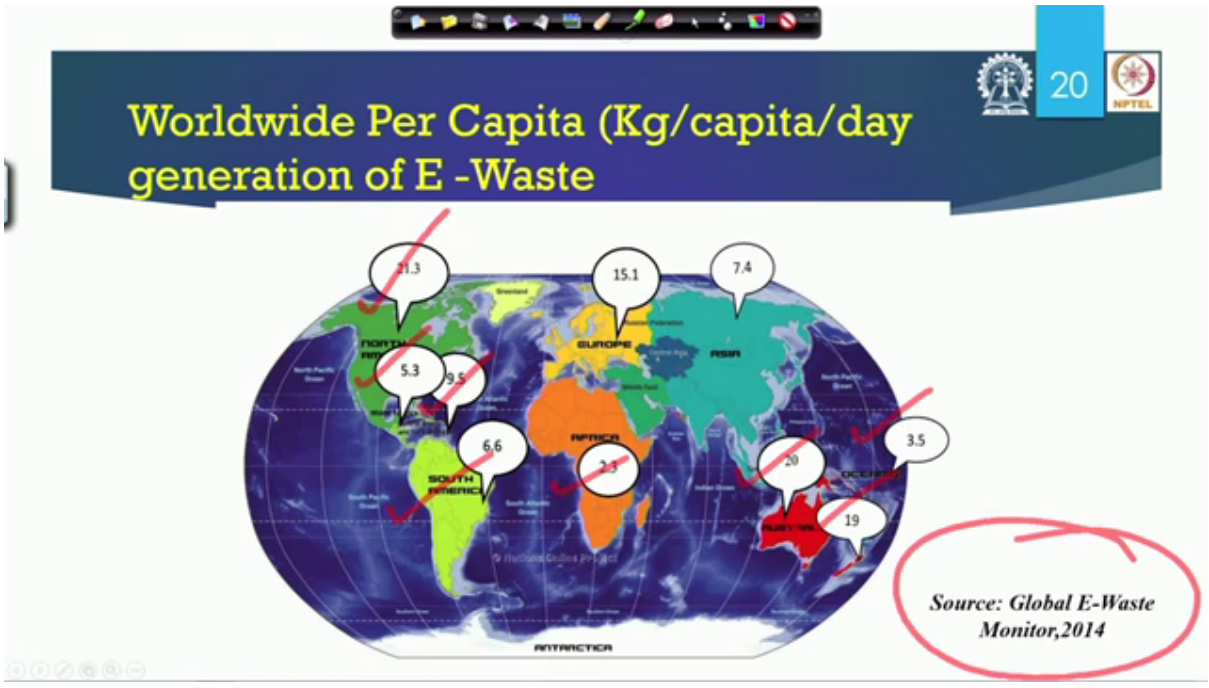

So, why these slides are important, because see we are trying to find out I am taking this course is on E waste management. Why we need to study E waste management. So, you need to really have a very good understanding of what is the problem out there, what is the problem out there, and where is the problem. In Indian context how much E waste is being produced right now. Where they are produced, how much we are anticipating more in future. Of course, these are all model values forecasted values, may not be 100 percent current, but in the ballpark, based on we have in terms of forecasting something we have we have been doing it for so many years now. We have some puffs or like a perfect the method a little bit now. So, we may not be that much off

So, even a little bit off here and there does not really matter, because it is a big deal which kind of we see already. And it is not only in India, worldwide also it is becoming a problem in terms of electronic waste. So, if you do not look at the world worldwide information. So, in this slide, we are trying to produce try to present to you the worldwide, in terms of different continents. So, as you can see here, on this particular slide, we have some countries is like a Asia and Africa and some of the Island in Oceania. They are kind of the low producers. So, if you can now see on this slide. So, the lowest one is Africa which we see 2.3 kg per capita per day; that is in terms of generation of E waste 2.3 kg per capita per day of E waste generation, and that is again here you need to be careful. It does not mean that one African person is disposing 2.3 kg of electronic waste every day. What does it mean is, if you take the entire E waste produced in Africa divided by the African population, this is the value is 2.3

So, there is a difference there. So, and that E waste can come from industry sources, come from institutional, comes from individual homes. So, it is a lot of, like a like a E waste which is being produced, and then you divided by the population. So, 2.3 is for Africa, 7.4 is for Asia. For Asia we see 7.4. This is the again coming from globally E waste monitor from 2014, and 15.1 in Europe. Europe is pretty high. So, if 15.1. Australia New Zealand around 20. This is Australia is 20, New Zealand is 19, or some of the islands here is 3.5. North America is 21.3, which includes US and Canada. Latin Mexico is 5.3. Latin American countries, some of the Latin American is 9.5. South America 6.6. Africa we already looked at 2.3. So, as you can see, even if what is the take a home message from this particular global map with it. Is it is saying that some of the

major producing E waste countries are in US Canada, most of European union, Australia, New Zealand

So, they are the countries which are producing a lot of E waste, and many of these E waste from these countries also travel to countries in a, like, countries like India, China, Africa and other places. Lots of countries in Africa and other places. So, we need to have kind of just and a like a global overview of where the waste is being produced, and where though, and then will talk about how this E waste is being managed in a little while.

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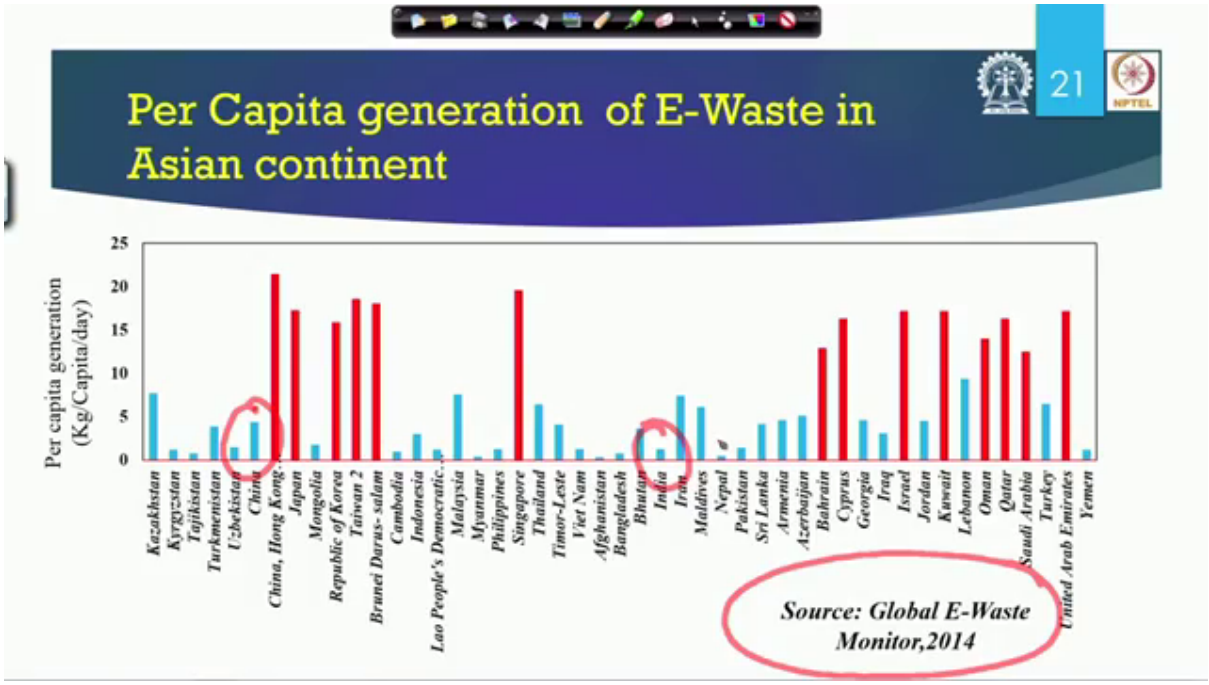

If you go in the for previous map if you can start looking at in Asia a little bit more in detail. So, as you can see per capita generation like k g per person per day. If you think about the different countries in Asia. India is not that high, India, in Indian context although if you go by the total, we produce a lot of electronic waste, but since our per capita is much less per, capita is much less, because we have a our population is too high it is still we have nearly 30 to 35 percent of the people are in below poverty line, who are really poor. So, they cannot afford any of these electronics, which we are talking about

So, because of those people out there, and because of like a huge population. Although the amount of E waste produced in India is quite large, but when you start looking at per

capita, because when you divided by the population of the country, the number goes down, because you have a bigger denominator. Numerator is high, but the denominator is much higher, and which is not if you look at in Hong Kong or in Japan or in Korea, which is a south Korea. We have Taiwan and other countries, like say is Israel, Kuwait, Qatar Oman, Saudi Arabia. So, these are some of many of these countries are wealthy countries they have a lot of oil money, and then also for example, Hong Kong lots of activities there. China again if you look at China. The amount of E waste of produced in china will be very high, but since the population is high the per capita generation is pretty low. So, but other countries where the population is comparatively less, we see very high per capita showing up. So, this is just a you. When you look at the per capita information you need to be careful, you need to take into account how much what is the population of the country, because ultimately the total amount depends on per capita multiplied by the population of the of that particular city or country or the state that you are looking at.

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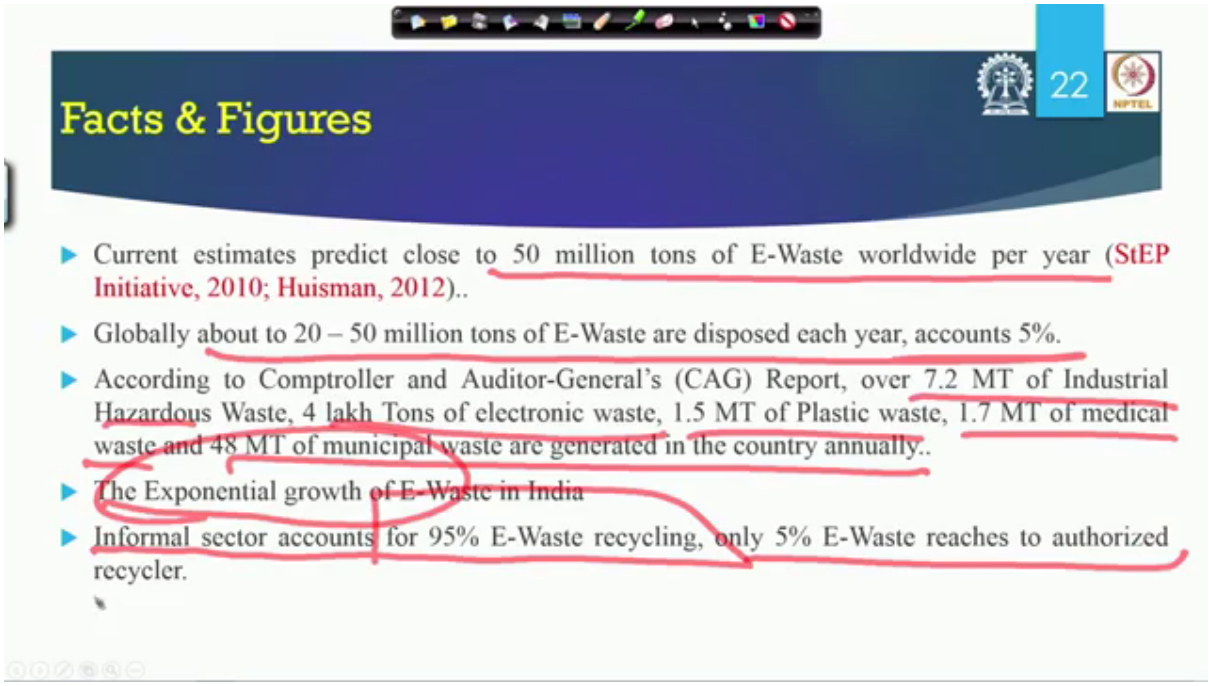

So, in terms of like a facts and figures, if we just summarize what we have been talking about so far in this, since in this particular module, current per estimated predict estimates. They predict close to 50 million tons of E waste. So, we have nearly we will have it on 50 million tons of E waste worldwide per year. So, that is a lot of E waste that

is going to be produced; that is the current estimate. Globally about 20 to 50 million of tons of E waste are disposed easier, which is a confer on 5 percent of the total waste produced

According to the C A G report in India. C A G comptroller and auditor general which many of you are familiar, 7.2 metric tons of industrial waste hazardous waste 4 lakh tons of E waste. So, we have will have 4 lakh tons of E waste, 1.5 tons of plastic, 1.7 metric tons of medical waste, and 48 metric tons of municipal solid waste is generated in their country annually. This is the one of the, new one of the recent reports; that is there which kind of have this data we do not have the breakup of each city in each state that much in detail, but it is there. So, if you add them up its almost like 60 some stuff, out of that 4 lakh tons of electronic waste. And it said growing exponentially in India. There is exponential growth of E waste in India. And the biggest concern that we have right now, that the informal sector accounts for 95 percent of E waste recycling

So, 95 percent of E waste management is being done by the informal sector, which will look at some pictures, and some of the alt on the discussion output, some videos out there, which you can link for the YouTube videos, which I would like you to see, because they are how do you want to get more. There is a lot of information out there in terms of how E waste is managed in Indian context, and also will have something from china and other countries there too, but 95 percent of E waste is managed in the informal sector, which does not have much environmental control. And only 5 percent of the waste goes to authorized recyclers. We have several authorized recyclers which is there on the, if you look at I think we have towards the end of this set of slides we do have the list, which will strictly show you, but if you go on the website of C P C B website, Ministry of Environment and forests website, you will see the list of authorized E waste recyclers, for each state. And that, but they are struggling to get electronic waste, what is happening is mostly electronic waste is going to the informal sector.

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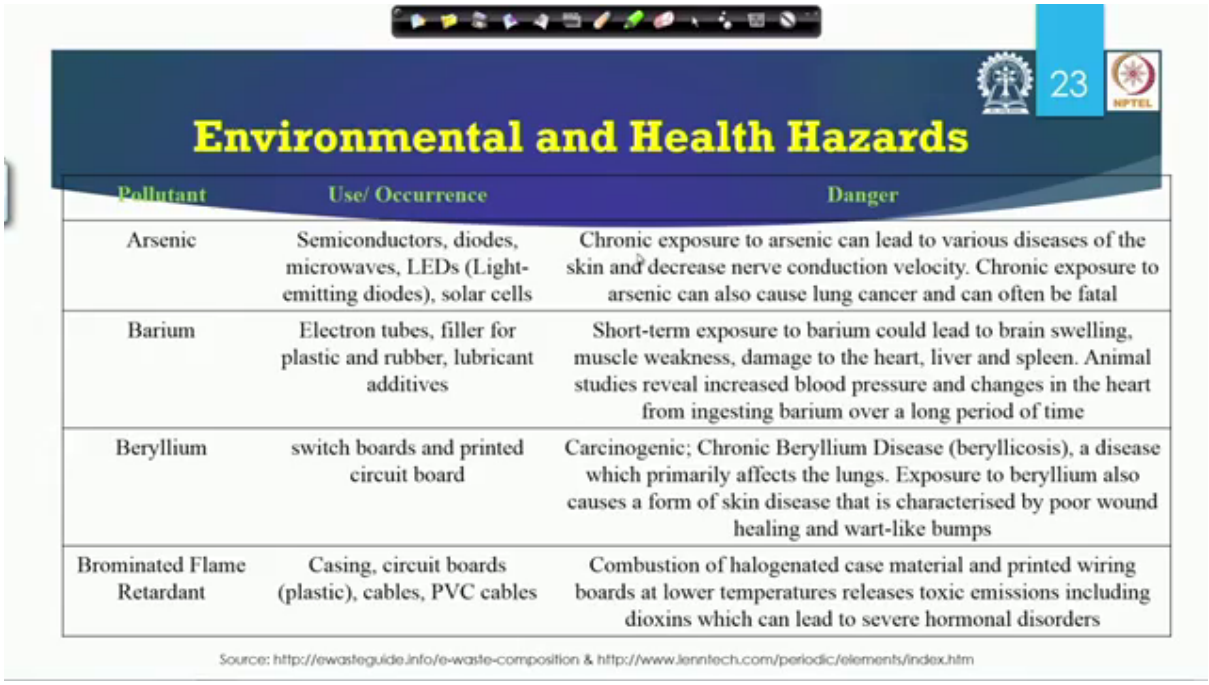

So, that is in terms of how this electronic waste is being, in terms in terms of how much E waste is there in India, and how much is being managed like in how what way it is managed, as you can see mostly going to the informal sector

So, that kind of brings to the closer to this particular module as. So, if you what we covered in this module, the one we looked at if. We focus mostly on India that how much E waste is produced in India, where in India with the E waste are produced, what are the major producing states, then we also looked at major producers cities. Then we also looked at in terms of the global scenario, how E waste how much E waste is produced from different countries, which countries more which countries less. Then we talked about some of this summarized, summarizing the facts and figures, but more majorly from the Indian context, and then how it compares to other waste stream. And in terms of the management of E waste, as I said it is mostly 95 percent is managed in that formal sector. So, let us wrap this video right now, and then will continue our discussion in the next video, where will talk about some of the health hazard; like what are the elements of concern in this electronic waste, what are the chemicals of concern. So, thank you, keep watching, and keep the discussion board active.