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Global Supply Chain Management
Lecture-27
Green supply chain design-part2

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We have two popular green methodologies one is the cradle to cradle protocol which we have discussed earlier and the second one is the emissions trading the emissions trading is the one that we are going to look at now.

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In the emissions trading what you are doing is you this is you which is producing the gases and you want to claim this convert this into this that is you know as though then what you do is you offset credits so let us see how this is done.

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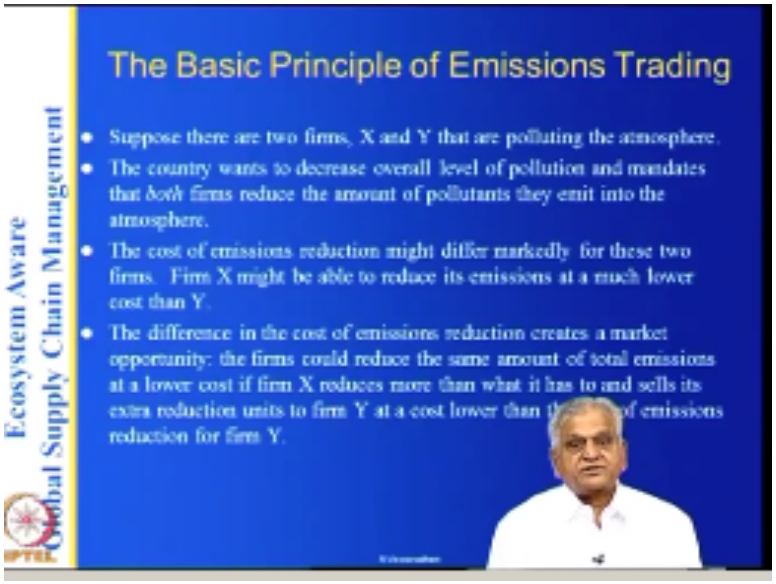

So the basic principle of emission trading is suppose there are two forms x and y that are polluting the atmosphere and the country wants to decrease the overall level of pollution and mandates both forms reduce the amount of pollutants they mate into the atmosphere so there is a regulation that says you should reduce they both both for x and y and the cost of emission reduction my different markedly for these two forms so firm X might be able to reduce its

emissions at a much lower cost then why because they it could be x and y are in different industries and it is possible that it is to reduce.

The percentage of emissions for X it might cost much less than for Y so the difference in the cost of emissions reduction creates a market opportunity now there are two both of them are regulated to reduce their this one but to reduce the carbon emissions of one it costs much less than the other so what you could do is the forms that could not use the same amount of total emissions at a lower cost to form X reduces more than what it has to and sells the extra reduction to farm why at a cost lower than the cost of emissions enough reduction in other words you know it is has been mean if you can if you can sell supposing X it.

Since it is cheaper it in separate if it is asked to reduce by 30% it reduces by 40% because it a cheaper to reduce it and it is feeling it is beating it is its own goal by the government regulations and it has 10% extra credits so that it can sell to why and why instead of reducing it took them by 30% it can reduce by 20% so the it should be the cost x charges to Y should be less than what Y has to pay to the to the regulator so basically it is a simple principle of trading where you know one company where it is cheaper to reduce the emissions there is more than what it is required or none sells the saved credits to this Fornix will gain because of the difference between the cost of emissions reduction of firm fermiums and form Y and from Y will gain for the same reason so well I mean it is obvious that for X whatever it gets from Y should be more than what it spends.

In reducing the emissions and of course for why they should buy cheaper from X then it has to pay the regulator.

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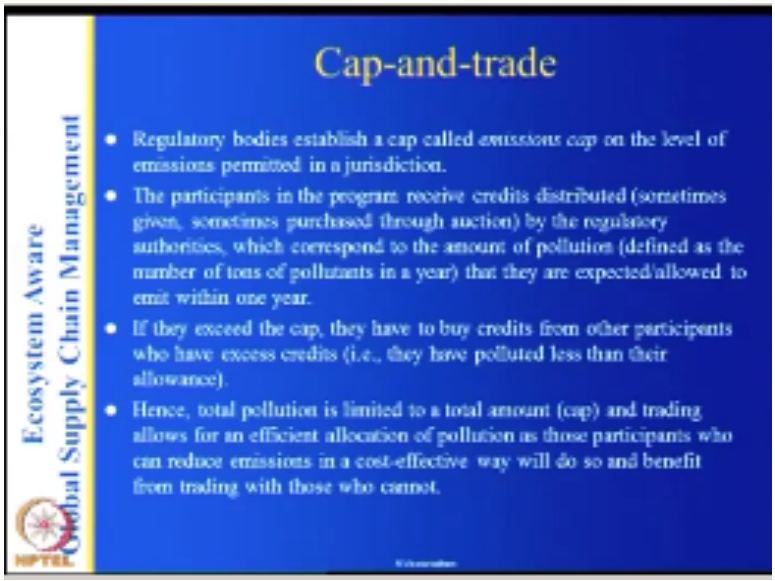

So it has to be a win-win situation for both so that is what is called cap and trade that is regulatory bodies establish a cap called emission cap on the level of emissions permitted in a jurisdiction the part Spencer the program receive credits distributed sometimes given sometimes purchased through a option by regulatory authorities which correspond to the amount of pollution you find that the number of tons of pollutants in here and they are expected allowed to emit within any year so I mean this is basically a regulation this one if they accept a cap they had to pay a tax they have to buy credits from other participants.

So hence torture pollution is limited to the total amount of cap and trading allows for an efficient allocation of pollution as those participants who can reduce emissions in a cost-effective way will do so and benefit from trading with those who cannot so basically it is this cap and trade is the same thing as we're discussed between x and y here there is a government limit and you have to follow that limit and you can buy the credits from mothers who could do it cheaper.

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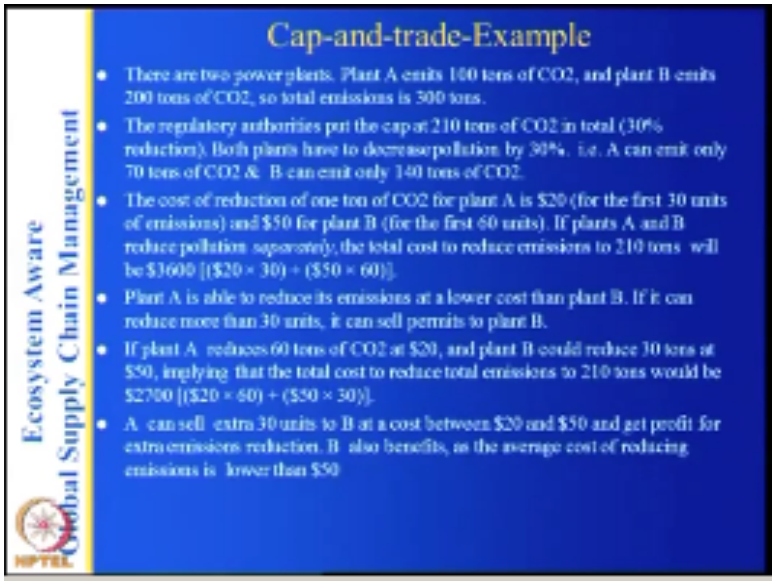

So looking at an example there are two power plants power platy it is a hundred tons of co2 and plant B emits two hundred tons of co2 so the total emissions are 300 tons so they see what we emission is 300 tons now the government steps in and says it puts a cap of two hundred and ten tons of co2 total 30 percent reduction that plants have to decrease the pollutant de pollution by 30 percent they can emit only 70 tons of co2 and be around 40 tons of co2 and a cost of action of one-ton mostly were to for a plan A these $20 for the first 30 units and $50 for plant B for the first 60 60 units.

So if the plants A and B reduce pollution separately the total cost of emissions for 210 tons will be because he has to reduce by 30 and it cost $20 per ton that is 20 into 30 whereas for B it has

to reduce by 60 and it costs $50 for the Platt B so this is $3,600 so if they do it independently now you can always find that here that the A it is it has to reduce by 30 units and it costs only $20 whereas for B it has to reduce by 60 units and it costs $50 for the plant so you can see it costs it costs more for B to reduce the this one so there is an opportunity here for EA to reduce more and sell it to be that is what it does so plant here is able to reduce emissions at a lower cost than plat V and if it can reduce more than 30 units.

It can sell permits to the plant T well then this is allowed and people have made a lot of money with the in the cap-and-trade scheme there are companies who basically advise you unless it is like stock market trading and A plant here reduces 60 tons of co2 at 20 the plant B could reduce 30 tons at 50 implying that a total cotton production of 210 will be 20 into 60, 60 plus 30 into 50 that is 2700 which is less than 3600 , I think this it this is a simple mathematics which shows that instead of 3,600 each pay independently if the both of them combined and then to create 2700 then he a can sell the extra 30 at a cost between 20 and 50.

Because they will not buy if it is 50 because he could reduce it himself but on the other hand he cannot sell below 20 so it has to be between 20 and 50 and it got a profit for the extra missions do also benefits at the average cost of reducing emissions is lower than 50 so a and B could be in different continents so basically the about the cap-and-trade the idea is they the global universe is the same so you can produce emissions in one part of the world and to reduce the emissions and to do the cap rate in another part of the world so this is a kind of a cap-and-trade that is being done.

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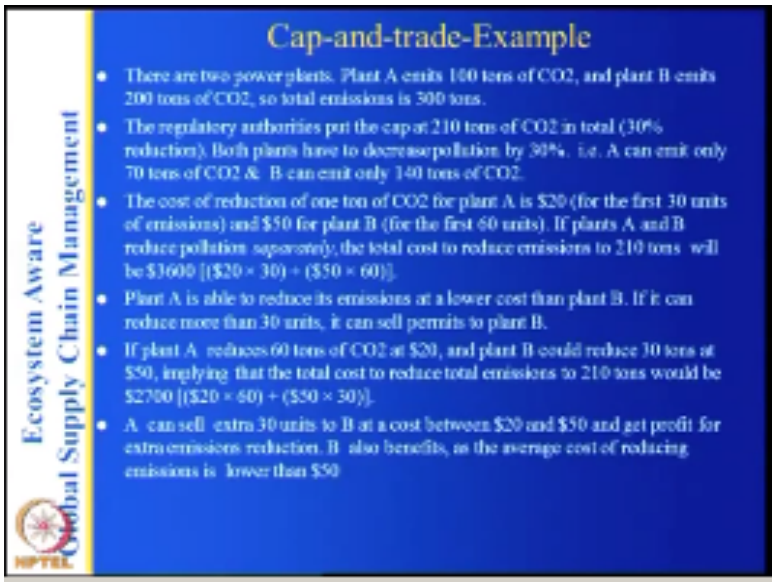

And it is it is very popular trading scheme and so whatever what have called offsets a carbon offset is another type of commodity that represents the reduction of one metric ton of carbon

dioxide equivalent by qualifying Carbon Reduction project so the carbon offset may or may not represent the actual direction of co2 emissions examples of offset include renewable power generation energy efficiency projects and forestry and industry waste the meditation so see you cannot reduce one with the earlier cap-and-trade is if you have generating emissions then you have to reduce the emissions someplace that is one way of doing it.

But the other us that is you can do some other energy efficient project like solar some somewhere else in the world or windmill and get the credit for that in terms of the renewable power generation so in other words you can have a cement plant you pollute the atmosphere in one part of the world and have a solar plant in somewhere else and you can offset the credits so there are no there are governing bodies that attempt to ensure offsets are real and accounted properly because you know you are trying to try to match Ethel's and tomatoes here in other words you are uh your carbon if I am a cement plant you want to offset to a solar power in the other.

So somebody in between that regulatory body has to decide what it means in terms of offset so Avenue goal energy certificate can be converted into carbon offsets by proving the renewable energy generated actually offsetting an equivalent amount of carbon based electricity production so if you were doing say renewable energy like solar or a windmill and if you are generating so many megawatts of electricity you have to see same to generate the same amount of electricity either through call or some other fuel then you have to see how much of carbon you will spend and that is going to be your offsets so there has to be some standardization and conversion of these offsets.

And so on this seems to be the one that is that is going on now so basically the emission trading it is a trading you know this then the basically it is half side effect and half marketing I am trading into the market so basically you can go to a stock exchange and trade your carbon offsets and that that business cause goes out.

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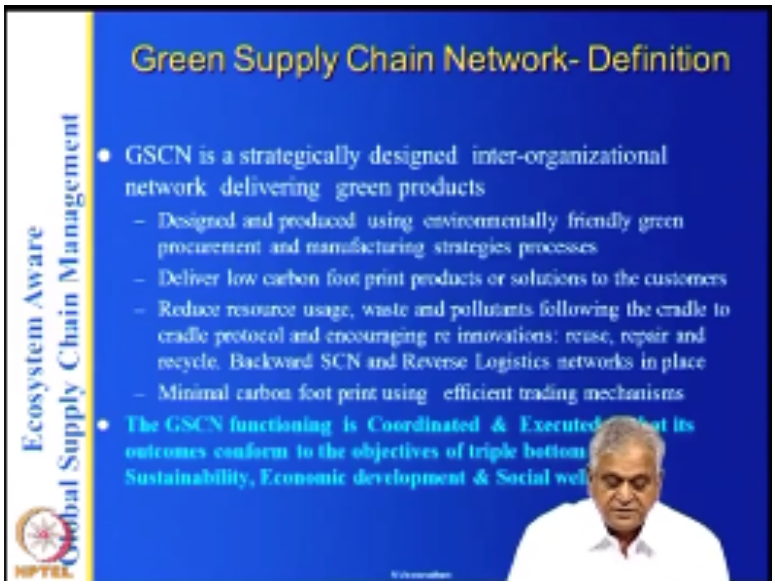

So what we have seen so far is that there are two ways of in which you can design your green supply chains one way is to look at the cradle-to-cradle protocol you are doing all the hard work with your suppliers with your manufacturing plants redesign your products. So that you know they are recycled recyclable and you are reducing your carbon generation in your manufacturing processes you are using your distribution or your transportation which is with minimum carbon footprint and your distribution centers are all either solar or minimal carbon footprint but so you take several of these steps and that is the first step of cradle to cradle for the whole which is basically a very scientific way of reducing the real carbon emitted into the atmosphere the other one which is a marketing jargon which came in the Kyoto Protocol is that you can trade your carbon.

Now when you are trading your carbon is at real carbon if you are generating carbon and you trade off with the same buddy in the same vertical industry then probably you are saving the atmosphere that is one way of doing it another way of doing it instead of there are offsets instead of the carbon you generate you produce some other factory which actually saves the carbons and you try to offset it so there are various types of schemes that are possible and when you are designing your supply chain it is important that you consider both schemes since carbon treble trading is legal order it is allowed.

You need not have to spend all your time on cradle to cradle protocol redesigning your products redesigning your processes and so on you can see a part of the time part of your effort into where you can trade maybe if you have factories aware and then you want to start a s all our factory there with if it is in a hot climate and if it has 12 hours of Sun every day then maybe it may make sense for you to start a factory there and then use those credits there so then the supply chain design is basically if your design in network design you have to take both these into account that is what our definition of between supply chain is so it is a strategically designed inter organizational network.

GSCN and is global green supply chain network is a strategically designed intern organization network delivering green products design and produced and learn mentally friendly green procurement manufacturing strategic processes so you have designed a green product you are producing that product your procurement your manufacturing your distribution and other thing is you have taken care that you are minimizing your carbon credits no carbon footprint products are solutions to your customers so in other words you produce this and you deliver it to your customers and reduce resource usage and pollutants following the credit protocol and encouraging re- innovations what are the re-innovations repay recycle and there are the forward the supply chain network and the backward SCN Network reverse logistics are all in place.

The backward supply chain Network is the one from the consumer once you dumps the product as disposes the product the auto recycle reuse on all that that is the backward supply chain and there is the reverse logistics like me to be b2c logistics which takes the products in the forward direction you have the reverse logistics which basically takes the products in the reverse direction once it is disposed of and reverse logistics is basically very difficult thing because you be of the uncertainty of the disposal and so on and minimal carbon footprint using efficient trading mechanisms.

So I think when once you have to supply chain all your operations you should look at not only the design of the green supply chain which is with the minimum co2 generation you should also look at the carbon footprint using efficient trading mechanisms in other words can you use efficient trading mechanisms where you can save money in other words if you are having very efficient processes so can you throw it some of the carbon that you have saved or will it makes economic sense for you to trade by the carbon credits from somewhere else instead of going through your processes.

Which are basically the not carbon efficient so you there is always the balance of reducing the carbon as we seen in the numerical examples you are reducing the carbon emissions may be very expensive and you can buy trade them very easily , so it all depends so basically the design of your network you have to consider all the factors what the cradle the cradle to cradle protocol as well as the efficient trading mechanisms see the green supply chain functioning is coordinated and executed so that it outcomes conforms to the objectives of the triple bottom line sustainability economic development and social well-being.

So basically your objectives of the global supply chain or the same it is a triple bottom-line sustainability you want to produce products and you want to save the future for future generations and all that but the important thing is you follow two points first one is the cradle to cradle protocol in your design manufacturing distribution etc and also in the reverse logistics the second one is the trading.

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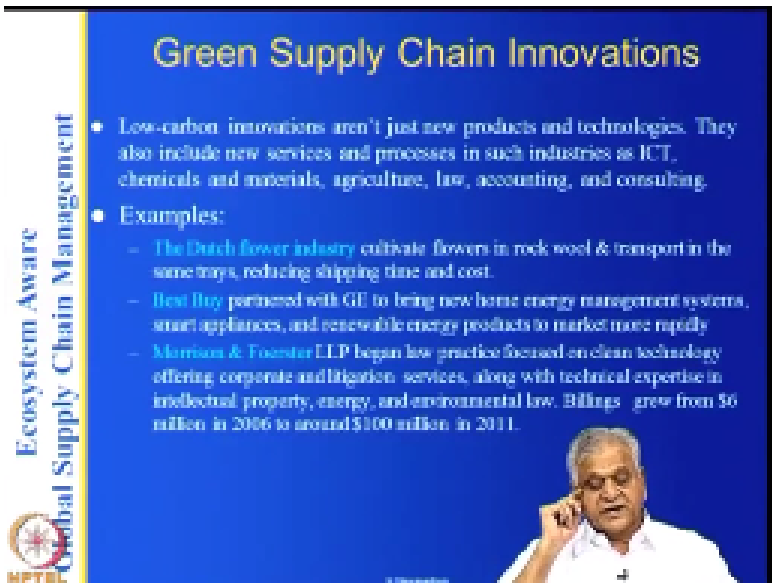

So before we get into the design of the green supply chains this one I thought it has better we look at what is the industrial practice that that is happening in the industry today in other words what is the state of the industry we are talking of the of the green practices this one so basically let us look at what are the initiatives in practice what is happening in the industry so more carbon innovations are not just new products and technologies they also include new services and processes such as the information and communication technologies chemicals and materials agriculture law accounting and consulting in other words if you want to use this in other words supposing you are somebody you want to use the green supply chain innovations.

What are the kinds of things that that you could do this the debt flower industry for example has cultivates flowers in rock wool and transports them in trains reducing shipping time and cost so what they do is they are basically in the flowers in rock pool in a stuff and they send in stuff in the soil and it is all in parts and parts are exported by it by themselves so you need to have to take the take the part out the flower out and then see that it does not get caught in spoils and so on but what do you do is to basically put it in raw fuel and transport by escape arts themselves.

So that you save a lot of time and shipping cost that is basically one of the innovations that they do and they are saving they are saving a lot of carbon in this because you know they do not use pesticides that over to use fertilizers and so on and their use in the rock well and Best Buy partnered with GE to bring new home energy management systems smart appliances and renewable energy products to market them more rapidly see that is why GE has brought out this and the home energy management systems and so on so they are bringing out the products were from the high electrical products Ennis and Morrison and Forrester LLP began law practice focused on clean technology offering corporate and litigation services along.

The technical expertise and intellectual property energy environmental laws buildings grew from 6 million in 2006 to 100 million in 2011 and then you can see there are a lot of people who want to make an opportunity in this one thing is you like and trading we are seeing that you can you can trade you can basically convert the offsets and so on so what if there is a legal issue who is going to defend you in a court so somebody has started this legal practice it is the focused on clean technology offering corporate litigation services so somebody can say it is a green product and it is not a green product supposing.

Your supplier says that you will supply you a green product he does not supply what do you do you have to go to the law so is there a law firm which is an expert on this it is no so this is happening like in the IT industry today you know for example you have lot of social media that are coming up like Facebook, like LinkedIn and so on so I mean when you are in LinkedIn when you are talking with your friends you think it is you think it is confidential or you think it is not public so but it is public.

So basically there are litigations that that come in and people have to be careful about this so particularly it is green is not so very well-defined right now and it is a new thing it is possible somebody says it is green your definition of green is different from my definition of green we are going to look at this is an important thing because supposing my definition of green is less carbon and your definition of green is less use of less energy.

So there could be some differences so there is a law practice that was focused on this and how to make us adopting new start-stop battery mechanisms from Johnson Controls that turn off vehicles engines off rather than idle when the vehicle stopped so there are several of these things which are coming up which saying that if the vehicle stops instead of this one and it immediately starts once you once you release the brakes so there are several plain supply chain innovations which are coming up.

So it need not be the reason why I am showing this is the reason it need not have to be always a manufacturing production process a supply chain and so on but there is a supply chain behind each of these products to create green supply chains or a service like a law and so on but this these products are created so that ultimately they save the carbon credits.

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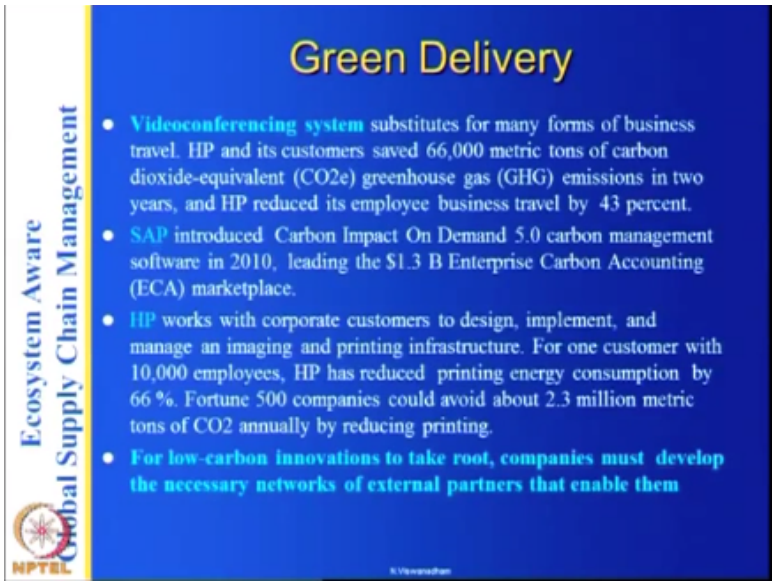

So green delivery is videoconferencing system for example it avoids substitutes for many forms of business travel, HP and its customers saved 66,000 metric tons of carbon dioxide equivalent greenhouse gas emissions in two years and HP reduced its employee business travel by 43 percent so each employee has a carbon credit count that depends on his he is basically the office the energy he consumes in the office the mode of transportation that he uses from house to office and return and also his office travel.

So basically by using a video conferencing system companies are saving SAP introduced carbon impact on demand 5.0 carbon management software leading to 1.3 billion enterprise carbon accounting marketplace so if you are a company how do you find out what is your carbon this one so SAP has introduced a software and this can be used and it is basically a very good move .

HP works with corporate customers to design implement and manage and imaging when printing infrastructure for one customer with 10,000 employees HP reduced printing energy consumption by 66% fortune 500 companies could avoid 2.3 million metric tons of carbon dioxide annually where it used in printing so if you are using a printer and if you want to reduce the printer printing then you know you could do that by avoiding printing use email and other methods for low carbon innovations to take route companies must develop the necessary network for external partners that enable them.

See there is a co evolution that goes on for any of these kind of innovations you know we have seen earlier that innovation in global supply chains is by outsourcing and their low-cost outsourcing to basically regulatory restrictions removal to delivery mechanisms and all that similarly if you want the green delivery to take green products to take root companies must develop the necessary networks of external partners to enable them. It is not enough if you just generate the product and you should find out how to coil a wall from this.

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So basically the next this one is we have seen what are they some of the innovations and so on let us look at a company where like a cement company which is CEMEX and its sustainability innovations this so the reason for looking at CEMEX is that it is a cement company which is a highly carbon intensive company and it basically emits a lot of gases into the atmosphere and what are the kinds of initiatives that they are doing one thing is to look at the innovations like SAPs software for carbon footprint and the innovations of the other companies .

But then another thing is how is the actual reduction taking place by these companies like CEMEX so let us look at that so CEMEX what are the sustainability innovations.

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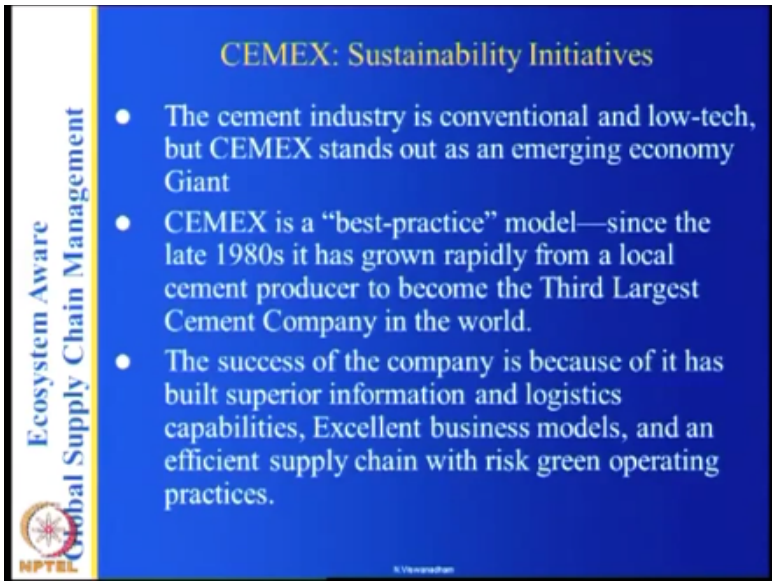

In this you know CEMEX is a cement company and cement industry is unconventional and low-tech well it is used in building construction it has no high technology and stands out as an emerging economy chain in other words it is from Mexico and it is the third largest it has become in no time and it is the best practice model since late 1980s which has grown rapidly from a local cement producer in Mexico to the third largest cement company in the world so basically it has made tremendous amount of progress.

The success of the company is because it has built superior information and logistics capabilities excellent business models and an efficient supply chain with risk green risk green operating practices so basically if you look at the supply chain here in this what is there you know to start with clicker and then try to heat it up and then make cement you know this is the model and it is high temperature and it was emanates lot of gases under this how are you going to reduce this or how do you make up what are the sustainability practices.

Because there are two issues here one is the price of cement is low it is a commodity product and this if you say a cement company it is not a you know high profile company that this one and the second thing is the government regulates the price at a low level because the infrastructure the house building and everything made cement and it cannot increase the prices as they like which the prices are regulated .

And second thing is the communities are basically as state if the cement plant is in their neighborhood because they know it emanates a sulfur dioxide learnt all poisonous gases and also it is spoils the atmosphere and it ultimately affects the health of the residents so because of all these reasons that CEMEX has what are the types of initiatives that such a company should do so that it satisfies the government be it satisfies the communities and see it actually produces at the price that is in the market .Because cement is such a commodity product you cannot increase the price because it is green simple so what else CEMEX offerings .

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CEMEX basically has grown into global building solutions what CEMEX does instead of cement it says it will offer building solutions that provide products that is consistently high quality and reliable service to customers and communities in Americas Europe Africa and Middle Eastern Asia. So first thing I did was insert just cement it offers all the building solutions with all the building materials like steel and others it may not manufacture the steel it manufactures cement but it procures with the other materials like gravel and the steel and others and lowest rates.

So that it basically supplies to various distributors and the operation network operations network produces distributes and markets cement ready mix concrete aggregates and related building materials to customers in over 50 countries so basically it is a that is that company that is doing very well at the market cement ready mix concrete aggregates and other building materials globally .

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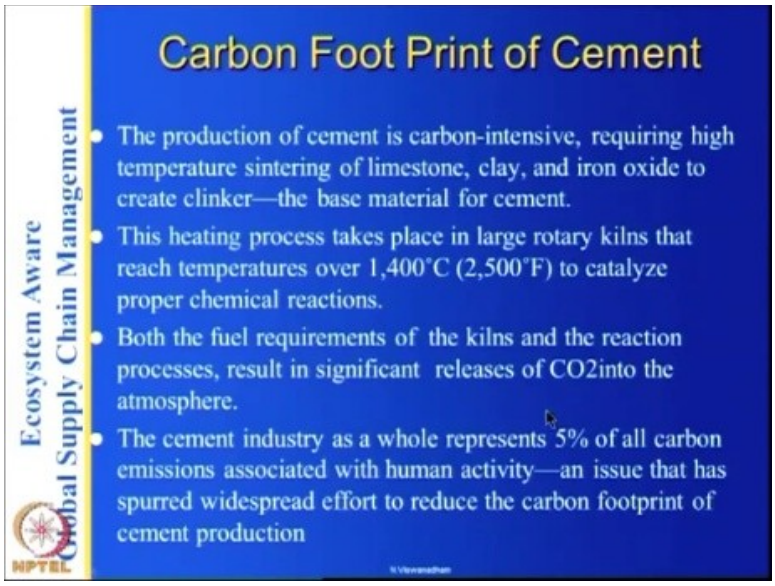

So what is the carbon footprint of cement the production of cement is carbon-intensive requiring high temperature sintering of limestone, clay and iron oxide to create clinker the base material for cement so it takes limestone clay and iron oxide to create clinker and from clinker we will get the cement and basically it is a high-temperature sintering process and the heating process takes place in large rotary kilns that reach temperatures of 1,400 degrees centigrade to catalyze proper chemical reactions.

So you can see the complexity here you have you to generate these temperatures so you need fuel to get up to these temperatures so whatever the fuel is basically if you are using whatever fuel you are using and to get it to for 1400 you generate lot of gases and also during the chemical reactions of making this particular product from limestone to cement or clay or clinker you are going to produce a lot of poisonous gases and of course there are remnants which pollute .

So both the fuel requirements are the kilns and the reaction processes result in significant releases of CO2 into the atmosphere so you require fuel for the kiln as well as the reaction processes both of them will generate lot of co2 into the atmosphere and so it is a complicated thing how to reduce the cement industry as a whole represents 5% of all carbon emissions associated with human activity an issue that has spurred widespread effort to reduce the carbon footprint of cement production.

So 5 % of the total carbon emissions are from cement so that is where it becomes very important to talk about this and although the point here is a commodity industry and in the commodity industry you cannot you do not spend lot of money because you cannot increase the price you cannot say it is green cement and charge more so that is where the importance of doing things well in this particular this one .

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So what are the sustainability initiatives and I mean have given you the background of the industry and what are the initiatives that CEMEX has taken .

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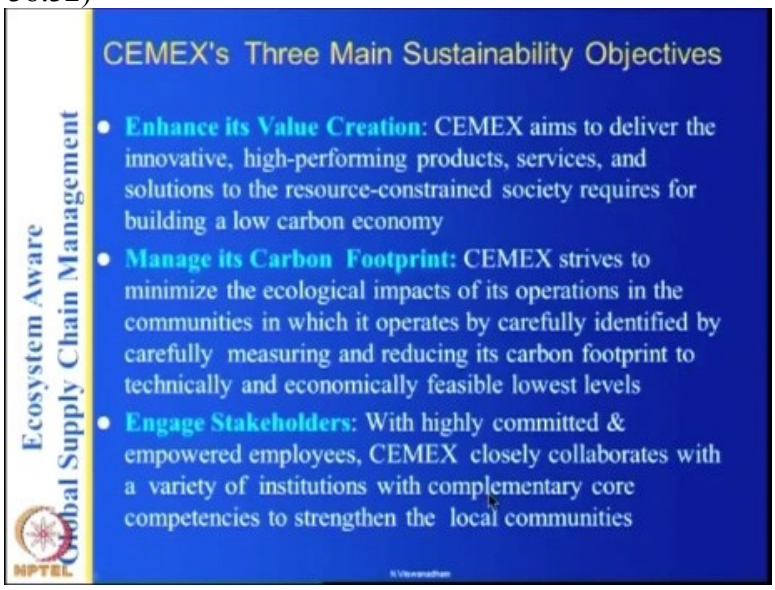

CEMEX has three main sustainability objectives it is enhanced its value creation CEMEX aims to deliver the innovative, high performance products, services and solutions to the resource constrained society requires building or it requires for building a low-carbon economy that is the value creation manage its carbon footprint it strives to minimize the ecological impacts of the operations of the communities and engage stakeholders as I said before it is not enough if you are green your stakeholders your society your people should be green .

You know for example if you can make your clinker which is green but then what about the transportation to the customers then it has to be green so basically if you it is highly committed and empowered employees CEMEX closely collaborates with a variety of institutions with complementary core competencies to strengthen the local communities.

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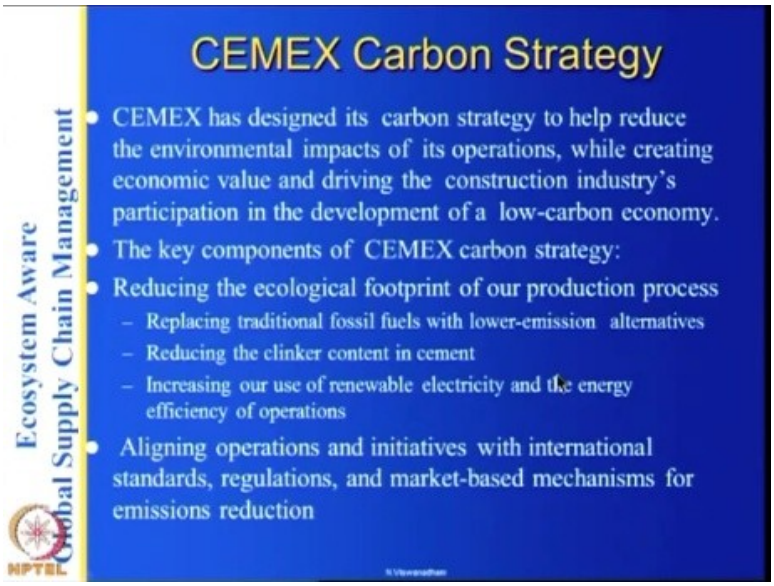

So what is the carbon strategy of CEMEX the carbon strategy is designed a carbon strategy to help reduce the environmental impacts of its operations while creating economic value and driving the construction industry's participation in the development of low-carbon economy so there are two things it is doing one is it is trying to reduce the value of its operations the problems with its operations and also it is trying to help our construction industry as a whole where CEMEX belongs it is trying to create value and it is driving a construction industry's participation in the development of low-carbon economy.

The key components of strategy are reduce the ecological footprint of our production process replacing traditional fossil soils with low emission alternative ,reducing the clinker content in cement because evidently that gives you a lot of less carbon this one increasing our use of renewable electricity and other energy efficiency of operations because it requires a lot of electric power and energy that use renewable energy in this.

Aligning operations and initiatives with international standards regulations on market-based mechanisms for emissions reductions so whatever people are doing whatever they standards ISO 14000 whatever they are following the this kind of standards so let us look at what they are trying to do here.

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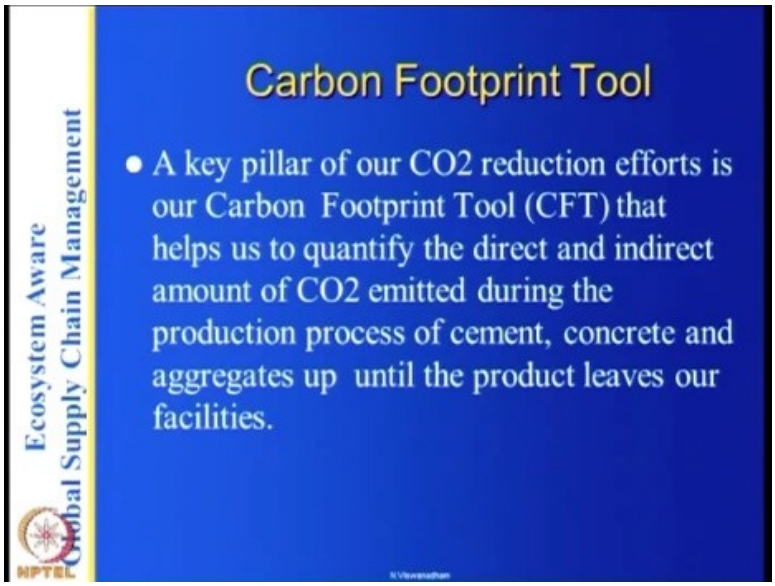

So the carbon footprint tool they had developed a carbon footprint tool a key pillar of our co2 reduction efforts is our carbon footprint tool that helps us quantify the direct and indirect account of co2 emitted during the production process of cement ,concrete and aggregates up until the product leaves our facilities. So well the popular belief is unless you can measure you cannot control what you cannot measure you cannot control so here you have to have a carbon footprint tool for your kiln and all the operations till from end to end in other words .

You get the various raw materials you fire them up in your rotary kiln and finally get the clinker and make them into cement and then concrete and aggregates and slabs and all that so then it leaves your factory up to that what is a carbon footprint and now then look at how to reduce the same.

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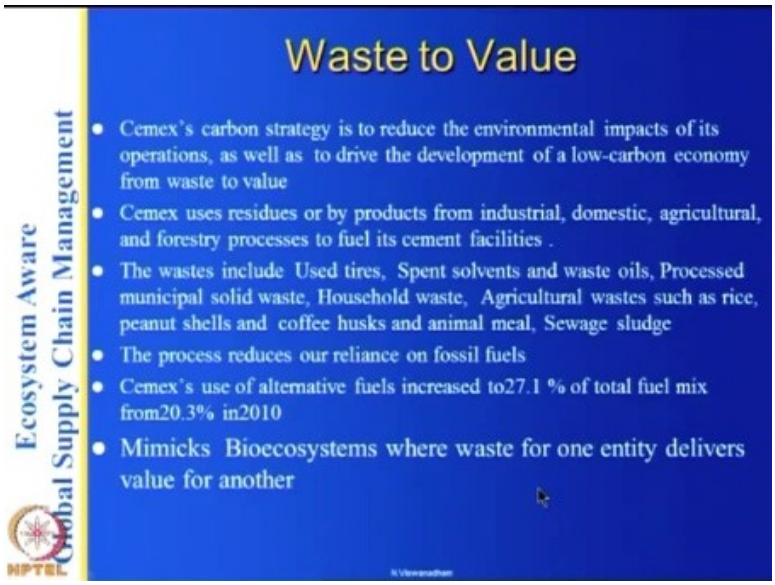

So there is this one that CEMEX follows is waste to value CEMEX carbon strategy is used to reduce the environmental impacts of its operations as well as to drive the development of low-carbon economy from waste to value how does it do CEMEX uses residues or by products from industrial, domestic, agriculture and forestry processes to fuel its cement facilities so it uses this whatever garbage the municipal garbage as well as the agriculture and domestic and forestry processes everything to fire up its plants.

For example the some of the materials that are the waste include used tires, spent solvents waste oils, processed municipal solid waste, household waste ,agriculture wastages such as rice ,peanut shells and coffee husks and animal meal, sewage sludge and so on so basically all these things are being used these are the outputs of various processes in the households, in the cities and so on it is using it as a fuel .

So this is following the biological principle of the waste of one animal is the food for another animal it is the same thing that the waste of municipal waste is used as a fuel for cements so the process reduces reliance on fossil fuels and CEMEX uses alternative fuels increased the alternate use 27.1% of the total fuel makes it has increased by 7% it was 20% in 2010 and 2012 it is 27% so basically this helping big communities to reduce the waste instead of in land it goes into the fuel and basically that converts and it is saving energy there. So Mimics bio ecosystems where waste of one entity delivers value for another .

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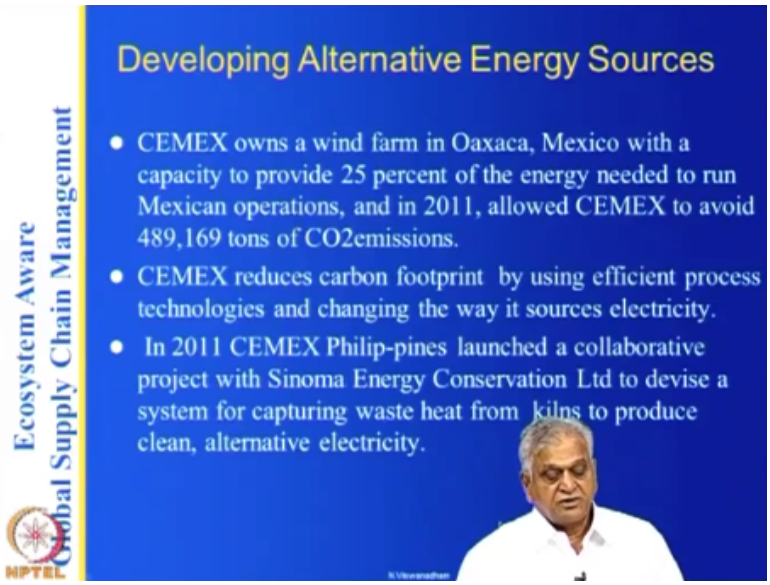

So developing alternate energy sources and I mean CEMEX because I have taken this example because if you have talking of green supply chairs they are varieties of ways in which you can reduce your carbon footprint there are various alternatives you can create and I think some CEMEX has done wonderfully well by using a biological waste into their kilns and also developing alternate energy sources.

For example say CEMEX owns a wind farm in Mexico with a capacity to provide 25% of energy needed to run Mexican operations and in 2011 allowed CEMEX to avoid 489 , 169 tons of co2 emissions so this is basically the kind of carbon trading but instead of trading and then setting up the plant somewhere in some other country in some other continent what CEMEX does is whatever power it is needed it generates through green alternatives like windmills.

CEMEX reduces carbon footprint by using efficient process technologies are changing the way it sources electricity .In 2011 CEMEX Philippines launched a collaborative project with Sinoma Energy Conservation limited to devise a system for capturing waste heat from the kiln to produce clean alternative electricity so now CEMEX not only uses this one it has what 1400 degree centigrade it operates so there is a lot of waste heat that is coming out from the rotary kiln can you use that heat to fire up your boilers to heat the boilers and generate electricity and that is what they have been trying .So the other means they are trying to generate the generate electricity or use the waste as a fuel and so on .

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So if you look at the drivers of the green initiatives so that is where we have looked at several examples so far what are the initiatives that people are taking to drive off the green this one before we go into the design and the next class we I have presented to you various innovations that people are following if you want to call them innovations or practices so that they can save the energy one is physical change in the environment is the basis for policy discussions.

In other words for any green environment there is a lot of climate change there is a lot of pollution and so on and health of people getting spoiled and that is the physical change in the environment and that creates regulation so regulation in turn can affect development and availability of technology in other words once there is a regulation to reduce this you devise new technologies regulation and availability of technology affect national and global markets .

Because once there is a regulation for green market green products you try to regulate this and consumer habits and thus the demand for cleaner products can affect the way companies do business and encourage them to adopt new technologies that allow them to meet new consumer needs so basically this whatever your examples you have seen they are basically coming from either social pressures are the government regulatory pressures or increases in the technology like solar energy.

So you are using the increases in the technology and you are basically trying to counter gas this one by coal-filed electricity generation and so on so you can see this is a co evolution that happens whatever happens through the green this one so green versus customer value.

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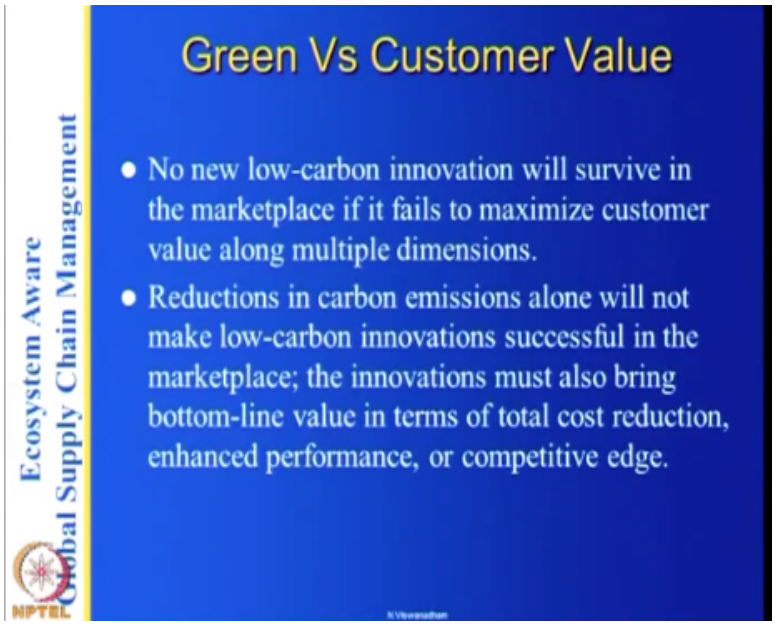

No new carbon innovation will survive the marketplace if it fails to maximize the customer value along multiple dimensions I think this is one thing that all the green people should remember that you can produce a product and unless it delivers value to the customer whether it is green or not nobody is going to buy in other words in addition to being green if it reduces less electricity, produces less water some other benefit the customers won't buy so reduction in carbon emission alone will not make low-carbon innovation successful in the marketplace innovations must also bring bottom-line value in terms of total cost reduction and hence the performance or competitive edge .

So the customer will ask all right you have following your regulations and you are producing green products now what is in it for me the same thing am i using less electricity less water or am i getting the product at a cheaper cost what is it just because it is a green and you are meeting the environmental regulations of the government I cannot pay more price that is what the customer will say .

So what we are doing what we have done so far is in this two lectures is to look at the ecosystem of the green this one what is happening in the world and what is it carbon trading and protocols and so on.

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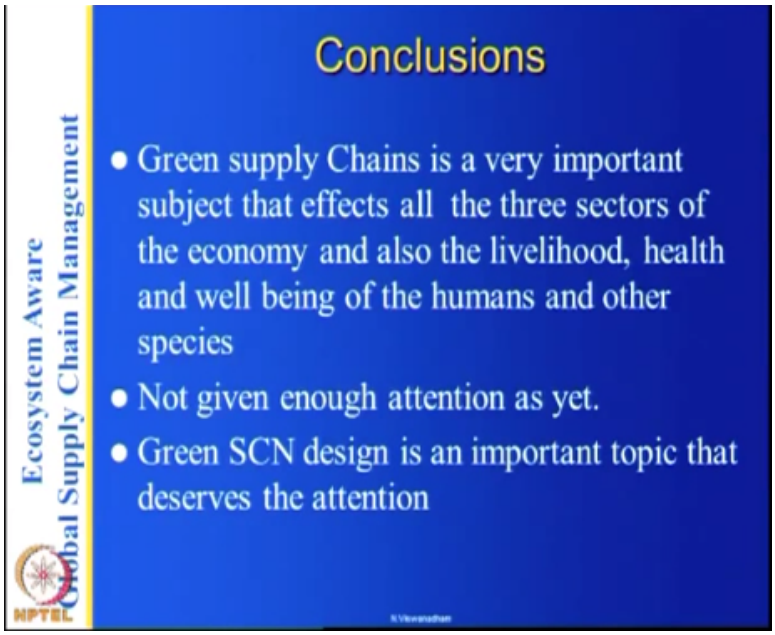

So before we go into this one the green supply chains is a very important subject that affects all the three sectors of the economy and also the livelihood health and well-being of the humans and other species ,not given attention as yet .I mean the green supply chains are not given as much attention as the design so green supply chain design is an important topic that deserves attention this across the board .

Not only if you are an industry vertical it get food, agriculture world services and so on the mapping the entire green supply chain and see what are the alternatives that are available for its operation for its use generating the products and so on it is an important this one what we will do in the next class is how to design a green supply chain and that would do.

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