Infrastructure Finance
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Lecture - 33
Risk Management - Country / Political Risks II

Welcome back to Infrastructure Finance, this is a lecture 31 we will continue our discussion on Risk Management, like what we have done in the couple of lectures in the recent past. And by large we will looking at various risks related to various risks, what we call as project specific risk, and we will continue some of the other aspect of risk, which we will classify as project specific risk in this lecture as well. And before, we actually do that let us spend some time to discuss the thought question, that we had in the previous lecture.

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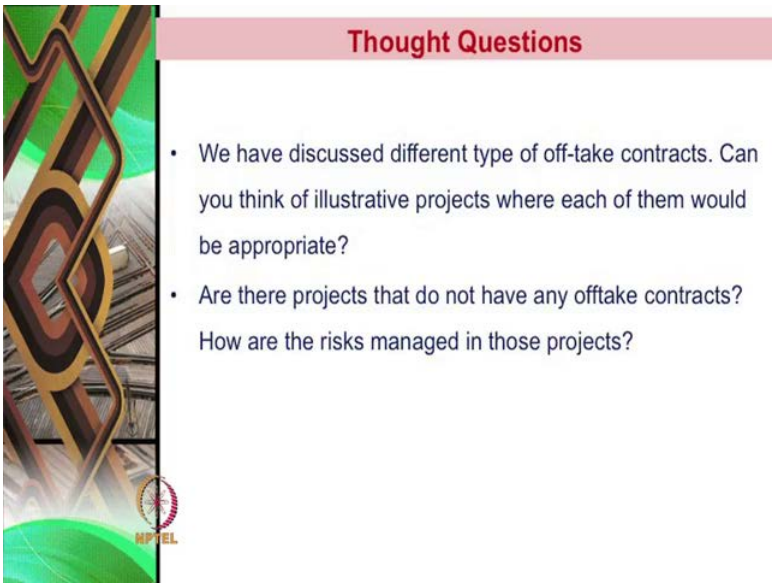

And if you look at it we had two questions in the end of the previous lecture, question number one was have you discuss, we have discussed different types of off take contracts, can you think of illustrative projects where each of them would be appropriate. So, essentially we consider the off take contracts as a way of medicating revenue risk, that is be trying to reduce a uncertainty in the project revenues, and there are different type of off take contracts that we have seen.

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In fact, to recap we looked at the following types of off take contract. So, we talked about take or pay contract, we talked about a take and pay contract, there is a long term sales contract, then we have a hedging contract, then there was a contract for differences and then there was a throughput contract. In fact, if you look at we probably did not spend as much time as possible in each of these contracts, in the previous lecture.

So, today we will also use the opportunity to spend some of time discussing the silent features of each of these contracts, so the first type of off take is a take or pay contract. So, what is the take or pay contract take or pay contract is a one where the purchaser will have to pay the project company, whether he actually off takes the a product or not. So, let us for consider for example, there is a power generating company, the power generating company signs a contract, signs take or pay contract with let say power purchaser.

And a power purchaser will have to compensate will have to pay the project company, irrespective the fact that whether the power plant is generating power or not. So, the logic behind this take or pay contract is that, the project company makes a investment on the basis of the demand, on the basis of an agreement that the power purchaser are executed. And if the power purchaser is not able to purchase a power, then the investment that the project company has made on is also going to be affected.

So, therefore, the project company has to be compensated, for the power that is not being purchased, so this is your take or pay contract. So, where do you normally find this take or pay contracts, in projects such that BOT, BOOT and BOO, any of this project types we mightily have a take or pay contract, but on the cross is that we see take or pay contract only when the result is a product that is being produced. So, sometimes infrastructure involves delivering a service, but you find a take or pay contract only when we have product being produced.

So, a classic case is a power generation, in a power generation we have what is called as a power purchase agreement, and a power purchase agreement is a is very classical case of a take or pay contract. In a power purchase agreement it is clearly mention that if the power purchaser is not able to purchase a certain amount of power, for which the plant has been constructed, then he will have to pay at least for certain base level of plant capacity.

So, a take or pay contract should not seen as what is called as a hell or high water clues, that is in the project company is compensated whatever the case may be, a take or pay contract the project company is paid only if the plant is available. So, the plant that has been setup for generating power should be available to generate power, only then will the power purchasers will start making payment to the project company.

Another important distinction a take or pay contract as compare to the long term sales contract that you will see later, is a fact that in a take or pay contract the tariff is fixed before had. If you really look at it, tariff let say for example, in the case of power generation, tariff broadly consists of three board components.

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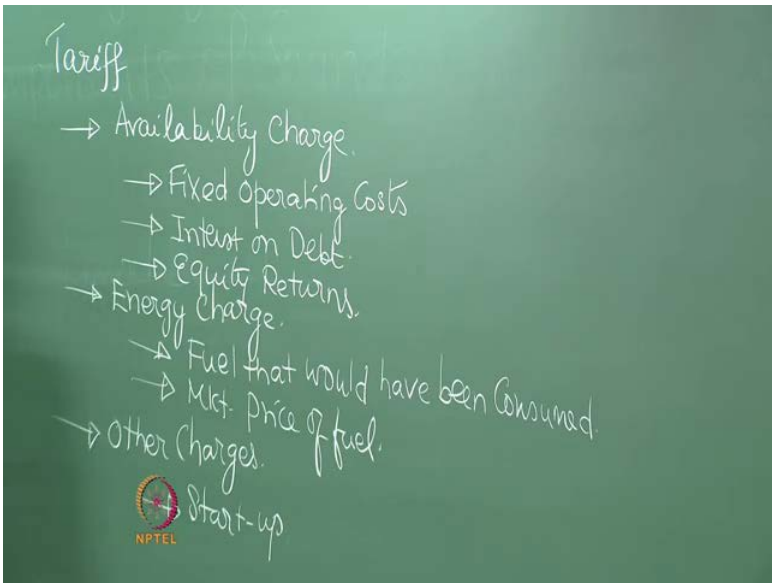

So, the tariff consists of 3 components, a first is what is called as your availability charge, this is your availability charge, and then it consists of energy charge, and then it consists of other charges. So, in a take or pay contract the tariff is decided in the agreement itself, it is not the exact tariff that is decided, but what is decided is how the tariff will be calculated.

Some of the tariff is agreed upon, but some of it based on the market prices depending on the date at which the tariff is calculated, so for example what is the availability charge, so availability charge is in the nature of fixed charge. So, there is been a investment made by the project company, and even there is been no power generated by the project, then the investment needs to be compensated for.

So, the availability charge compensate for the investment made by the project company, and broadly consist of 3 different components, so it talks about a fixed operating costs. So, irrespective of whether plant is in operation or not the project company will have to pay salary, will have to undertake maintenance, so that the project is in running condition and so on and so forth. So, there are some fixed operating costs that need to be incur, so that will have to be pay as a part of your availability charge.

Next, you have interest payments on debt, it should be expected that debt will be serviced by revenue, but as a part of the revenue contract, we will have to ensure that debt is serviced even if the project is not generating power. So, therefore, the availability

charge will account for the interest payment on debt, and then the next is your return on equity right that is equity returns.

The investment made by the project company, the sponsors investment in the project company has to be compensated for, so the equity returns have to be provided. So, the availability charge is calculated based on these three factors, so even though the plant not going to generate power, the availability charge will have to be pay to the project company. So, price that is a basic you know compensation that the project company gets for make a investment in the power plant.

The next is your energy charge, so energy charge is largely at least for the power plant block of the energy charge is incurred in terms of fuel. So, the energy charge is calculated based on the fuel that would have been consumed, for generating a certain amount of power. See normally, what happens there is a power purchaser and depending in the demand for the power, the power purchaser dispatches load to the power project company, which is the power generate. So, the power purchaser tells, how much of power to generate to the project company.

So, based on the load that has been dispatched, that is based on the power that the project company is expected to generate, the total fuel that would be consumed for generating that kind of power is calculated. So, remember it is not the actually fuel that has been consumed, because when we actually install the power project. So, at time you know the efficiency of the project power project is calculated, and this efficiency this is basically called as a heat rate.

So, much of fuel needs to be burned to generate the certain amount of power, so this actually is defined by what is called as heat rate. So, this heat rate, you see that heat rate you know it is calculated how much of fuel would be consumed, and then the fuel charge is calculated by the fuel, that would have been consumed multiplied by the market price of fuel.

So, this energy charge generally calculated only if the project company starts generating power, if there is no power that has been generating by the project company, then the power purchaser will only pay the availability charge. But, there are exceptions of courses, for example if the project company has signed a fuel supply agreement with a fuel supplier, that necessitates a minimum purchase of certain quantity of fuel.

Then there would be incidents, where even though the power is not being generated part of the energy charges will have to pay by the power purchaser. Because, of the fact that the project company has a fuel supply agreement, which states that there is a specific amount of fuel which will be purchase by the project company. And there are other charges as well for example, there is something called as startup charge in a power plant, let us say the plant like in most other processing.

And manufacturing plants will have to be shut down for periodic maintenance, and whenever the plant is shut down and then when is started again there is a certain amount of cost that incurred. For example, you need additional fuel during the startup, you need a certain amount of electricity to actually you know fuel the start the process. And the kind of expenditure that needed for starting up its substantially higher as compare to the regular operations.

So, whenever we are incurring more than certain amount of startup, then what been estimated for that has to be a compensated to the a project company. So, the tariff is calculated based on various parameters, some of these tariffs are determined while the project is being construction. See for example, the fixed operating costs is determined, while the project you know even before the project is being constructed, and if you also know how much is going to be a capital structure.

So, based on that we can determine the interest and the equity returns, so therefore all of this is fixed even of the time of construction, so when we have this kind of tariff base take or pay contract, most of the revenue risk is mitigated simply, because of the fact that the project company is compensated, even though the plant is not making ant generation; however, there are some risks. What are the risks that are there in take or pay contract, see for example is the plant cost more than, which it has been estimated for.

See for example, the tariff is calculated based on certain amount of the equity, and certain amount of debt that is being used in the project, but if the plant cost more that it takes more amount of equity, and takes more amount of debt, then it may not be possible to increase the tariff. So, therefore, whenever there are cost overruns, the returns for the project would be affected, because we are employing more capital, but we are probably not getting corresponding increase in tariffs, so there is a cost overruns which gets affect.

Second, which actually also is a risk is a fact that would be changes in the efficiency in which the plant is being operated, see for example, you estimate how much of fuel is going to take based on the initial efficiency or the heat rate of the plant. But, later on if the plant is not being maintained properly, and if the plant becomes less efficient then more fuel would get consumed.

So, the amount of expenditure that will be paid for fuel is dependent on the initial heat rate, so therefore when we have changes in the heat rate it can also impose an additional risk on the plant. So, the bottom line is a take or pay contract is not really a full proof way to mitigating all the revenue risks, there is another factor that your should remember for example, there is availability.

You would actually get availability charge only of the plant is available, that is the plant is in a position to generate power. If the plant is having problems for various reasons, then the availability charge will not be given to you by the power purchaser. So therefore, though there is take or pay contract there is lot of owners in the project company to ensure that the project is in good condition. So, that all the risks that are otherwise, you know that we have talked about are mitigated.

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So, the next type of off take contract that we talked about is your take and pay contract, in a take and pay contract what happens, the purchaser off takes the product that been produced by the project company and then compensate for it accordingly. So, there is no

guarantee that so much of product will be demand for, so much of units of power or there will be demand for so much of quantity and so on and so forth, but whatever is been consumed by the purchaser will be compensated for.

So, there is no guarantee of any kinds, so normally what you find is in a project finance dean, there are very, very few instances of a take and pay contract. So, take and pay contract stumbles are typical supply in the competitive market, there is no guarantee for how much one needs to supply, and there is no guarantee for what is revenue that is going to come and so on.

So, for this reason you very rarely find the take and pay contract systems in a project finance situation, because a take and pay contract is something that might not be very comfortable for the lenders, but you will actually find take and pay contract not the in the off take, but you actually in this supply site, so most of the fuel supply agreements are in the project companies have actually entered into, they are all take and pay contract.

You know there are some floor level for example, a project company would say that for would guarantee that it will actually purchase certain amount of minimum quantity of fuel, but otherwise the fuel price actually paid on how much fuel have been actually consumed, so in necessitates of take and then pay contract. Then you have what is called as your long term sales contract, so long term sales contract is very similar to the take and pay contract except for the fact that in you long term sales contract.

The tariff is not pre decided, and the tariff is based on some suitable marketing index, so in a take and pay contract the tariff is decided off rent and it is been indicated in the agreement. But, in a long term sales agreement it does not mention anything about the tariff, because the price at which the purchaser is going to you know purchase from the project company will be based on some a market index.

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Let say for example, if you look at a revenues is a function of two things, revenues is a function of quantity, and then it is also question of price, so price multiplied by quantity will actually give you the revenues. So, in a long term sales contract what actually happens is the contract talks about, you know specific quantity that will be purchased by the purchaser, but then at what price it will be purchased.

It will be purchase at a price that is linked to some kind of market index, see for example, you know there are several cases, let say for example, the case of petrochemical or in the case of some minerals and so on. There is a market price that can be easily determine, but what is a objective of having a long term sales contract. The objective of long term sales contract is not really hedge the price, but the objective is to provide a market access, so if there is a purchaser who is willing to actually purchase the outputs from the product, outputs from the project company.

Then a project company essentially has access to markets, but at the same time the purchaser is not willing to take purchase risk, because there is a market that is available. And then therefore, if you debates from the market price, then it is going to be very difficult in the case of volatile price movements on both and of this segment. So, it its most important the advantage of the long term sales contract is it actually provide market access, and given the fact that there is a readymade market that is available, the price risk is not really major concern. So, where do you actually series being used, they actually

series being used in project that involves mining, that are involves minerals such as petrochemicals and so on.

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The next type of contract that we talk about is a hedging contract, so when a hedging contract the project company as well as the purchaser is compensated for very, very wide price movements.

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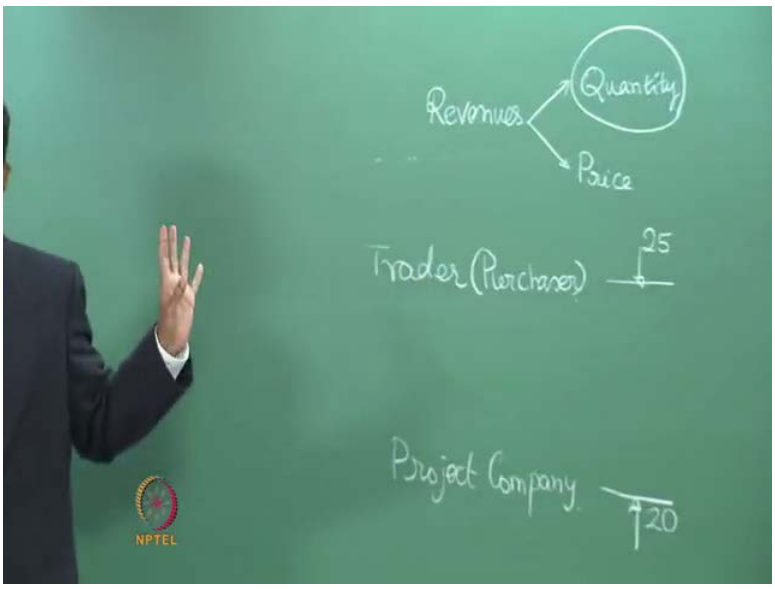

Let say for example, there is let say a trader, who actually is a purchaser, and there is a project company, so in a hedging contract what happen normally, we define what is

called as a floor price, and we define what is called as your ceiling price. Let say for example, you are talking about a project that involves extraction of oil, and then a project company signs the hedging contract to the purchaser, which says that if the market price of the oil falls below 20 dollar per barrel. Then the purchaser will purchase at the floor rate of 20 dollar per barrel.

So, for example, the market price of oil falls down to let us say 18 dollar per barrel the hedging contract will ensure that the purchaser purchase. a oil at rate of 20 dollar per barrel from the project company, so that one in of the hedging contract. Let us say for example, if the oil price increases to 30 dollar per barrel, then the hedging contract will indicate that the purchaser will have the right to purchase form the project company, oil at the rate of 25 dollar per barrel. So, what you have is you actually have a ceiling of a 25 and you actually have a floor of a 20.

So, as far as the project company is concerned, it will not get anything less than 20, but at the same time it will not get anything more than 25 as well. So, if the price between 20 and 25 the purchaser will purchase it at the market index or the market price. Market price is between 20 and 25 let say for example, market price 23, then the purchaser will purchase a oil at the rate of 23 dollar per barrel from the a project company.

So, this hedging contract gives some kind of production to both, the project company as well as a purchaser in terms of very volatile price movements. So, where do you actually see this kind of hedging contract, we actually see this hedging contract largely in the commodity markets. So, for example, you have metals, you have oil in some of those instances, you actually see this kind of hedging contract being quietly used.

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The next contract that we talked about is a contract for differences, a contract for differences is very similar to a hedging contract except that, there is no direct contract between the purchaser.

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So, in a contract for differences is different from hedging contract in the sense that in the project company does not sale the product to the purchaser, but project company sales it to the market, and then the purchaser again purchase it from the market. It is a typically seen in let say the electricity sector, so in a electricity sector there is something called let

say there is a power pool, so the project company supplies the power that is generated to the power pool, and intern gets a price for the power from the power pool.

On the other hand you also have the purchaser, so the purchaser purchases power from the power pool, and then for the power that he has consume the purchased, he pays the a power pool. So, the power pool adds some kind of intermediary between the project company and the purchaser, so in both the instances the project company and the purchaser the price that they pay or the price that they get depends on the pool price.

So, if the pool price fluctuate widely, if the pool price let say for example, falls below certain level. Then it might not be economical for the project companies to start generating power, because you need power, that he actually purchases its he sales it at the lower price when actually you know incur a loss. Similarly, if the pool price goes beyond the certain level then the purchaser will find that very difficult, because it might actually affect the profitability of his operations. So, to hedge the price fluctuation, there is actually sing between the project company and the purchaser. So, this is called as your contract for differences, it is called as your CFT.

This is a contract between the purchaser and the project company, which indicates that if the pool price of the power falls below certain level, then the purchaser will compensate the project company at on agreed upon level. And similarly, if the pool price goes above certain level, then the project company will compensate for the increase price to the purchaser.

So, it essentially is a contract for a differences, that is different between the agreed upon price and the pool price, if the pool price is more beyond the certain level, then the project company compensates to the purchaser. If the pool company, if the pool price is lower than the upon price, then the purchaser compensates the project company. The differences between compensated by either the purchaser or the project company, so this is your contract for differences.

Now, where did you actually series being use, you actually series begin used in largely in the electricity sector, we have not seen that kind of contractual innovations in India, but in most of the developed economies, we are seeing this kind of contractual innovations. May be in a few years time we may also see this innovations coming to India as well.

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The final contract that we talk about is your throughput contract, a throughput contract is essentially like a service, the project company has constructed a facility. And the user of the facility will if in case you know the purchaser is user of the facility and he pays the project company to the extend the facility being used. And where do you actually series being use a throughput contract is largely used in project such pipeline companies, so there is a pipeline company.

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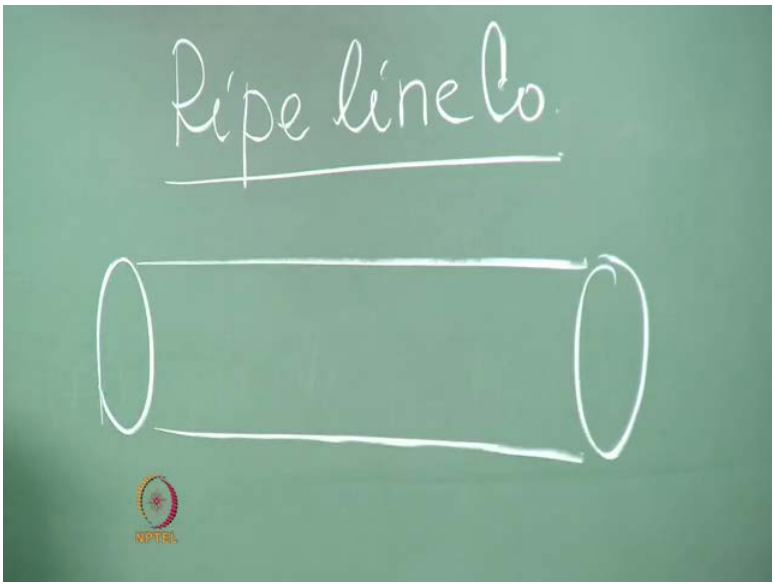

So, there is let say oil pipeline or gas pipeline, there is a pipeline company, so the pipeline company has install facility which will help to transport oil or gas or any such. And a project company which owns the pipeline, has actually made the investment to install the pipeline, so therefore it needs to be compensated. So, how can it be compensated it needs to be compensated, depending on the volume of material volume of the produced that goes through the pipeline, so this is your throughput contract.

So, a throughput contract will also mention that there will be certain amount of minimum volume of you know goods or products that will be transported, that will be used, that will be send through the pipeline. Because, if there is no guarantee on what will be the minimum amount that will be send through the pipeline, then the project company might not get return on his investment. So, the throughput contract will also ensure that there is certain minimum that is actually send through the pipeline, and if there is shortfall in the minimum, at least there is compensation provided to the a project company.

So, the throughput company, throughput contract is largely used to in the case of pipeline companies in the case of oil, gas and so on and so forth. So, what you know actually see is you actually see variations and different types of off take contracts, and the applicability of using of this contracts to different project situations. So, whenever we are trying to analyze the particular infrastructure project, we will have to analyze a project characteristics and then check whether they are using the appropriate off take contract for the given context.

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So far we are talking about off take contracts, in many cases off take contracts are actually signed only when there is product, but then we also have several situations, where infrastructure involves provision of the a service. For example, there is a road service, there is you know transportation service, there is so many other services that we actually get from the infrastructure projects.

So, when we have a service kind of situation, then we do not really have which is called as off take contract, but which we actually see is constitutional agreement. What is the concession agreement, constitutional agreement is a contract between a public sector entity and the project company under which the project is constructed to provide a service.

So, there are several types of a projects there are have been constructed to provide service, for example, you have toll roads which provide access service, then you have transportation system, where railway or metro which provides transportation service. Then you have service for sewage systems, and there is water supply and so on we also have a big project such as ports and airports, which provide transportation service.

So, these are all essentially service base projects, and you do not really have any off take agreements, but you have concession agreement what is the concession agreement in this case. Broadly, if you look at concession agreement they can be classified into two

categories, either they are called as a service contract or they are called as a toll contract, so let us look at silent features of each of these types of agreements.

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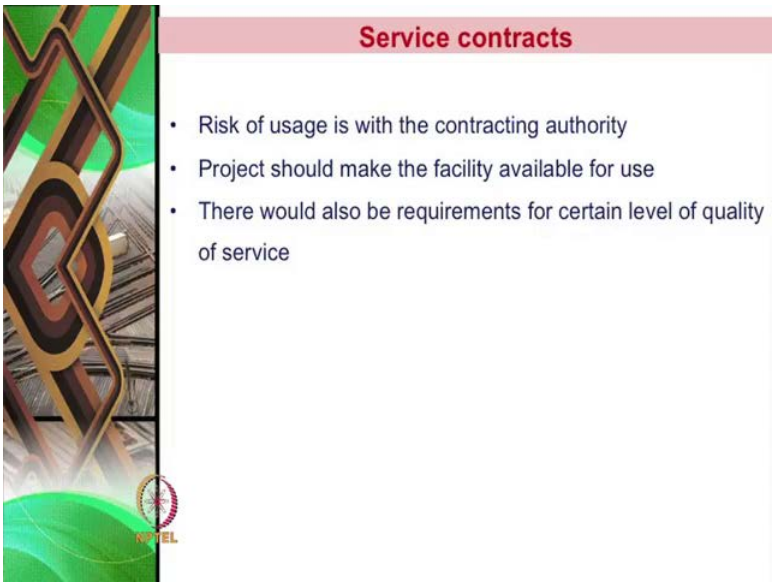

First let us talk about service contracts, what is the service contract, service contract is one where the risk is transferred to the contracting authority, or the risk of usage with the contracting authority. That is the contracting authority in this case the public sector entity asks the private sector, to actually construct the project and then the compensates of private sector in some way.

Even if the project is been used or not the contracting authority will have to compensate the a project company. So, if there are less usage of the facility that has been created, then the risk has to be borne by the contracting authority. There are fixed payments that the contracting authority will have will pay the project company, and irrespective of the kind of usage.

As far as the project company is concern the project company should make the facility available for use, it has to ensure that the facility is available and it is also available at on certain level of quality. So, that is most important, you know making the facility available is not the only thing it should available at the certain level of quality. For example, if look at the Bangalore international airport, a every year you know there is a mandate to check, whether the airport is operating at on certain quality benchmark.

So, you know there has to be certain level of quality of service as a part of your service contract, where can we see this kind of service contracts. Let say for example, in the roadway sector broadly today we have two kind of projects, one is your called as invitee road. So, in a invitee road what happens, the road users are not told by the government pays the project company a fixed sum for certain period, during the construction period it pays the fixed sum.

So, that is really your service contract, because the risk of usage is now with the contracting authority, and there is no risk at least in terms of usage on the project company. But, then from the lenders prospective, it is very important that the contracting authority seen as sufficiently creditworthy, even though the usage risk is not the project company. Unless, the contracting authority is financially strong and is able to honor the terms of the contract, the lenders might not find at a very attractive for position.

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So, the concession agreement is called as your toll contract, so in this kind of concession agreement, the project company has a right to collect fares from the general public. See for a example in a toll road, what happens if I actually travel in the road, I have to pay a toll. And I have to pay toll to the a project company, so the project company has a right to collect tolls from the people who are a using the project.

So, such kind of concession agreement is called as your toll contract, so a major difference between the service contract and toll contract is that, the risk of usage is on the

project company. So, if there are less number of people, who are using the road then the revenues that are going to be collect is also going to be lesser, so it is up to the project company to manage the a usage risk.

To encourage investment by project companies, so that they can assume the risk of usage there are several features that we actually, see in a toll contract. For example, the contracting authority you know makes available, you know land and right of where required for the construction. See for example, if the road has to constructed, land has to made available for the project company, the project company might find it very difficult to go and acquire land on soon, because of various litigations and so on.

But, a public sector authority can acquire land for the project, lot more easily as compare to a private company. So, the contracting authority will have to ensure that the land is available, and then for example, let say the road will have to be constructed, and there is a crossing over the railway line. So, the right of way to build let say an over bridge and underpass under the railway line, again we will have to obtained by the contracting authority.

So, the contracting authority ensures that there is enough, what is it called as you know a feature in contracting agreements, so that the project company can construct the facility without much of a problem. You will also find generally in this kind of concession agreement, that there is provision of creation of no competing facility for a fixed period of time, because the investment made by the project company is in good faith. And if there is a competing facility, that comes up then the traffic will actually split between the two facilities and that made actually affect the returns for the project company.

So, the project company would wants certain kind of safeguards and provisions to ensure that his risk is minimize, so once such provision is fact there will be no competing facility for a fixed period of time. Let say for a example in the case of the Bangalore international airport, the concession agreement clearly specifies, that there will be no competing airport constructed a around certain amount of distance from the Bangalore international airport for a certain period of time. So, this ensures that the Bangalore international airport remains only facility, and there is no diversion of users of the airport let say during the construction period.

Whenever, there are also some other features in a toll contract let say for example, you know the toll, when you actually construct the road you have a certain estimate of traffic. But, you know because of variations are development, let us say after the road has been constructed, there has been sudden increase in traffic. And the project company has been able to recover the returns on his investment much quicker, as what was initially estimated.

So, whenever the project company has been able to get his returns much faster, than the concession agreement can be terminated, because on the initially period the expected returns on the duration of the concession agreement factors in the expected returns on the equity made by the sponsors. If the equity returns has been reached, then the concession agreement will being terminated, so that you know the public need not continue to pay tolls for using the facility.

By the same token, if there is a reduction, if there is a shortfall in traffic if there is shortfall in usage of the road project, there is also something called as a firebox guarantee. That is in the case of inadequate harm usage, of the project then the public authority ensures that there is certain level of minimum tolls that will be actually provided to the a project company, so this is called as you're a fare box a guarantee.

So, the fare box guarantee would be in terms of a actual composition or would be in terms of you know what is called a variability gap funding, which providing some kind of assistances or subsidies or grand's to project company. So, that the investment by the project company is lesser, so that the returns then can be made from the lower traffic flow of the project.

So, when we talk amount the tolling contract, broadly there would be a two types of one is real tolls, a real tolls is a one where user actually pays a toll and then you have something called as the a shadow tolls. In a shadow toll the tolls are not paid by the user, then the tolls are paid by the contracting authority depending on the usage. Let say for example, there are several cases where it may not be feasible to collect tolls, let say it is a very, very busy highway, if you actually stop the traffic to collect tolls, then it can actually lead to lot of traffic buildup, so it may not be feasible.

Second is if the road is actually is in kind of network, and it may be very, very difficult to actually, you know find out how much tolls be used for using a part of the network, so

that would be second problem. The third would be you know to kind of reluctant on the part of the usage to actually pay the tolls, if you actually living toll in the particular kind of stretch then that would be diversion of traffic and the diversion might not be very desirable. For example, they may actually adopt certain rules, which may not be equipped to take that kind of heavy traffics.

And forth is a the government in case did not want to impose burden of toll on the road users for various of the reasons, so in all those cases that what it called as a shadow tolls. That is the toll usage is being monitored, and base on the usage instead of users paying the tolls the contracting authority pays the tolls to the project company, so this is your shadow tolls consult. So, these are the board contracts that we actually see in case of mitigating your revenues or off take.

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There are couple of other risks also that we have seen under the category of project specific risk a major risk factor is environmental risk. So, we again try and discuss this another three board questions, how does it affect the project, and when does it affect the project and how is it mitigated. If you really look at it environmental of risk affect a project in several ways for example, if environmental risk is not addressed properly, then it can lead to delays in getting clearances and approvals for operating a project. And second if you are not able to comply with a environmental norms on a continue basis, then the government can even shut down the operation of the plant.

So, it affects the project in several ways and mainly it affects a project in terms impacting the project revenue, because of closer. It affects the project in different way for example, because of changes in the environmental law, regulations or various other resource. There is a need for additional investment, let say for the project for example, if the emission norms requires certain amount of minimum, certain amount of specifies the maximum amount of pollutants in their emissions. Then if the emission level become lot more stricter, then the project company will have to make additional investment to comply with the newer emission norms.

So, in that case there is need for additional investment, and it increases the a project cost, so it affects both the top line and it affects the a bottom line as well, it affects the revenues and it also affects the cost. When does it affect the project, does it affects the project during the construction phase or does it affect the project during the operation phase.

So, it affects the project in both the construction as well as the operation phase, in the construction phase the project has to be seen that it addresses all the environmental risk in a very, very sound way. And in the operation under the operation phase the project will have to ensure that, it needs on complies with the all the environmental rules regulations and emission control norms.

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How is it mitigated, so let us try and look at some other ways in which the risk is mitigated. See for example, environmental effects of a project might cause a delay in a project development or necessitate a very costly redesign, so this fundamentally the you know impact of environmental risk. While, the project company might have obtained all the necessary permits to construct and operate the project, so that might have be a power purchase agreement, that might have be a project agreement.

And all of that, even if all these agreements are in place, if the clearance with respect to environmental is not obtained, then the project is at the risk, the project will not be in position to operate. And then when we look at environmental standards, there are different levels of environmental standards, so today in India environmental list a subject of both the state government and central government.

And the project will have to necessarily meet the complains requirement of the both states as well as is a central government. Sometimes a state government norms might be lot more stricter than the central government, in which case the project will have to meet the conditions of the state government. There are instances, where you have a you know international agencies which are actually providing funding for the project.

For example, you have the world bank, you have a European investment bank and so on, and these intuitions might have a lot more stricter environmental norms as compare to the host country as well. So, when projects actually obtained funding from some of these agencies, they will have to ensure that they meet the complains requirement of these funding agencies. Sometimes if the host country norms are lot more flexible and liberal as compare to the norms of these funding agencies.

If the norms of funding agencies not met then it can actually lead to problem in terms of continue functioning of the a project. An environmental risk sometimes can also be manufacturing in terms of public oppose into the project. So, today if the public feel that there is a going to be their livelihoods are going to be affected, the environment is going to be affected, because of you know the project is being developed and so on, that would be tremendous amount of public oppositions. So, we have seen numerous cases, where there is public opposition to such large development on infrastructure projects.

The most the reason case that many of you might have heard of the Kudankualam nuclear power project that is coming up the sudden part of Tamil Nadu. So, there is so

much of public oppositions to project in terms of it can affect the project livelihoods, it can affect the people there in terms of increase the radiation levels and so on, and so forth. So, this again you know environmental risk, because of the fact that some of the environmental impacts have not been you know properly up you know address as perceived by the public, so how do you manage the environmental risk.

A first is first and for most is to really understand the relevant legal framework, because you know environmental risk is actually kind of a very, very tightly goes when with the law and existing regulations. So, we have to really understand the relevant legal framework, and do exhaustive analysis of the environmental risk of the project. What are the different types of you know environmental impacts, that the project can have, and then the legal framework with respect each of this for example, does it actually affect the forest land does it actually have some kind of emissions.

Is it actually going to cantonment the project site, you know that can be several levels for example, it affects the mining project, the mining project can actually lead to tremendous amount of let say environmental digression, because of digging and so on. So, how is it going to be address, so these are different types of environmental risk that needs to fist assessed, and then found out what kind of legal framework that governs the various aspects of environmental risk.

The third project should be in a position to meet future tightening of environmental controls, remember environmental risk and emission is a continuous process as time goes by the emission norms, become tighter and tighter. So, a project should always be in a position to meet the relevant norms at any time in the future, even if the emission norms become lot more tighter, the project should be in a potion to meet. If there is any additional investment that is needed, in project should be flexible enough to meet this additional investment.

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And fourth since it is not a onetime exercise, it is a continuous exercise the operation of the project needs to be monitored on an ongoing basis. Even, of the projects enter a operation phase is it continuously compiling with the various environmental norms and regulations, so that is need to be monitored very, very carefully. And finally, you know all the licensing and permit issues, you know should be met at the outset of the project, is the design appropriate to meet the environmental rules and regulations, will it comply with any changes in the future.

So, in many cases there the project decide itself will have to address some of this environmental risk factors, and unless a like we have other types of projects like constructions and so on. You gone and actually sign a contract to mitigate the environmental risk, you cannot sign a single contract to mitigate the environmental risk.

It actually is a process and at the addressing environmental risk is interwoven into several other aspects of the project, it is interwoven with the rehabilitation and resettlement. It is interwoven with the project design, it is interwoven with the construction, it is interwoven with the kind of equipment that is going to be used, because sometime emission level can be dependent on the equipment that is been used and so on. So, there is various ways in which we have to we have to see how the environmental risk can be address.

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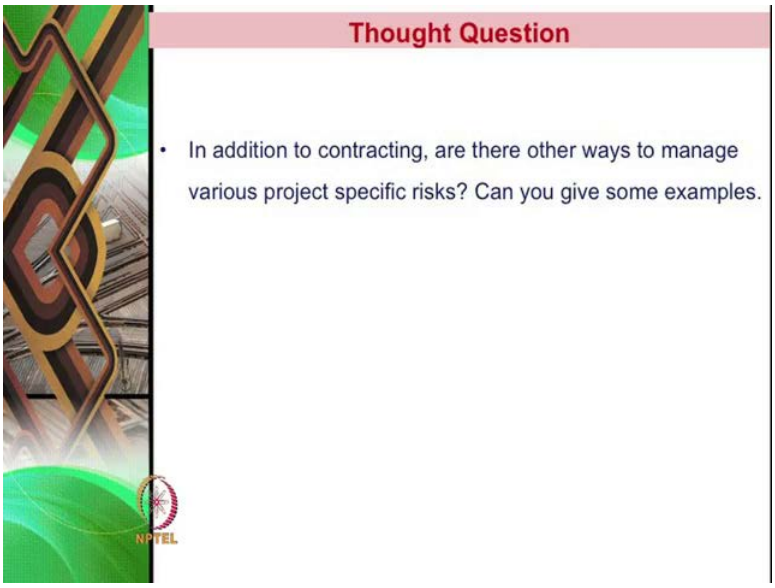

So, before we end this lecture let us look at the thought questions, for this lecture the question is we all been looking at contracting, to mitigate the several of this project specific risks. So, the question is in addition to contracting are there other ways to manage various specific risks, and can you think of a some examples that we can used to address some of these project specific risks. So, think about it and then we will discuss it in the next lecture.