Infrastructure Finance
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Lecture - 31
Risk Management – Market Risks

Welcome back to this course on Infrastructure Finance, this is lecture 22, in this lecture we will again continue our discussion on Risk Management and towards the end of this lecture, we will try to focus to on the next set of risk, we talked about, which is basically the market risk. But before we actually do that let us try and discuss the questions that, we had at the end of the previous lecture.

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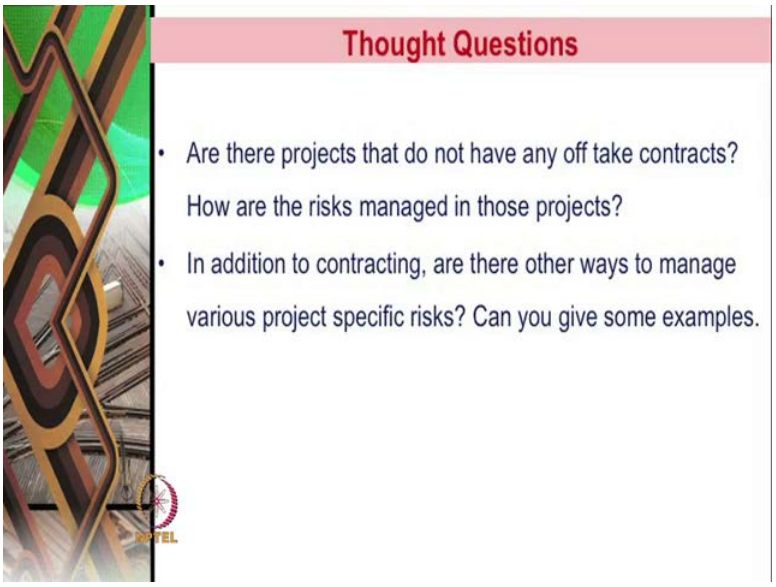

In fact, we had one question at the end of the previous lecture, but what I realized is we did not discussed that we actually had, at the end of lecture 20; lecture 20 we actually had 2 questions, but we ended up discussing only one of them. So, I thought we will spend some time discussing, the second question that we had at the end of lecture 31, before discussing the question that, we had at the end of lecture 31.

So, the question that, I wanted to first discuss is are there projects that do not have any off take contracts and how are the risks managed in those projects, see ultimately, you will have to realize that, so many of the contracts that, we talked about is essentially a way of managing risk. And so if we actually have to run a project in a very you know

satisfactory manner, the risk have to be allocated to the people, who are best able to manage it.

And unfortunately not all of the risk can be mitigated and in some cases, as we will see, we not even actually have an off take contract, as we have seen earlier an off take contract is one of the important mitigating mechanisms of revenue risks. So, how do we actually manage projects that, do not have any off take contracts, but to answer the first question that are there projects that, do not have any off take contracts, yes there are projects that do not have any off take contract. Specifically, I can give you an example in power sector that to in the generation segment, if you really look at you can classify private power generation plants into broadly 3 categories.

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So, the first category, you have what is called as your TPPS, which is your tolling power plants and then you have your, IPPS, which is your independent power plants and then you have your MPPS, which is your merchant power plants alright. So, TPPS are those power plants, where it is actually operated, it is operated in a way where, there is very limited risk on the project company, essentially the operations of the plants is disread by let us say fuel supplier.

And whenever the plant is being operated the project company gets all the operating expenses plus a return on the investment. So, essentially, if you really look at it, the fuel supplier decides when to actually operate the plant and it is a facility that is available, for

the fuel supplier, because the fuel supplier decides to either sell fuel at the open market or it decides to generate power using the surplus fuel that he might have produced.

So, when to actually operate the plant and when not to operate it depends on, so many factors depends on fuel production depends on market prices of the fuel and so on and s, forth. But, essentially the tolling power plants are operated, based on the needs and the demand of let us say the fuel supplier. So, if the plant is not being operated the they will still actually be compensated by means, of some kind of a charge and if the plant is being operated, it will also include the energy charge.

So, remember the previous lecture, we talked about the availability charge and the energy charge, so in the case of a tolling power plant, even if the plant is not being operated, the availability charge will continued to be paid to the project company. And whenever the plant is being operated, you know depending on, how do we actually see the fuel cost or sometimes, if the fuel cost is actually borne by the fuel supplier then in the case we are actually trying to give a facility of power generation to the fuel supplier.

So, therefore, it becomes like you know paying a toll for using the facility, like a toll road, when we try and use a toll road, we pay a toll to use a facility, similarly in this case for trying to use the power plant, we actually pay a charge. So, the kind of risk that exists in a tolling power plant is going to be very minimal, because there is virtually no demand risk, because the power plant will be operated based on the needs of the fuel supplier.

And the tariff and the charges will be calculated in such a way that, it will meet the debt interest on debt, as well as your return on equity and if you really look at independent power producers. Independent power producers, actually have an off take agreement in this case the off take agreement is with the power consumer. So, it could be distribution, electricity distribution company or it could be any large industrial house and so on and so forth.

So, we really have a power purchase agreement and power purchase agreement mitigates the revenue risk, in the case of IPPS. So, the power purchase agreement will specify, what will be the tariff and how much power will be you know consumed by the purchaser and so on.

And then we have the merchant power plants, so merchant power plants are those power plants, where there is no off take contract and it is completely dependent on the demand and supply of electricity in the market place. So, the merchant power plants might not be operated at all times, it might be operated only when the demand is very high and they are actually called as your peak load plant. So, to an extent they do not really have an off take contract, when the demand is more than the supply merchant power plant will start generating power and supply in the market.

But, when the supply is able to meet the demand, when the capacity is able to meet the demand, then the merchant power plant will not operate. So, there is no off take contract, it is entirely exposed to the market risk. So, as we actually see these broad categories of power plants, we find that, as we move from T P P S to M P P S the level of risk increases right. So, the level of risk increases and the level of risk is high, in the case of M P P S and the level of risk is low, in the case of P P PS.

Now, what risk, we are talking about, we are talking about the business risk that exists in the project company, in as we move from T P P S to I P P S, now when the business risk is higher, can we actually compensate, it by reducing the risk in some other fashion. So, this is one aspect of risk management, let us say for example.

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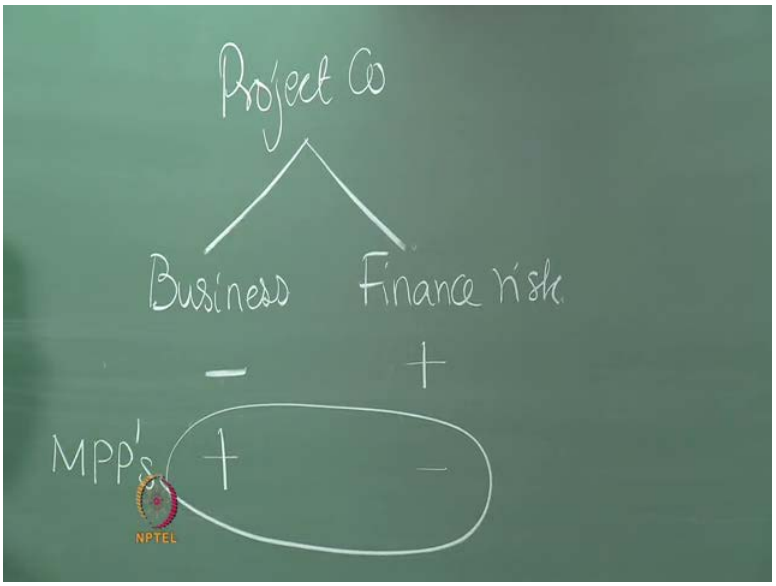

A project company can be broadly classified to having 2 types of risks, one is your business risk, the other is your finance risk. So, when we actually have a low business

risk, that means we have very, very well established risk management mechanism, we actually have off take contracts, we have supply contract, we have all of the other contracts in place. So, that means, the business risk is being well mitigated, when the business risk is slow, then we try and fund the project, which will actually have a higher degree of financial risk.

Now, what will have a higher degree of financial risk, when you actually try and have a capital structure that, have higher degree of dead then the financial structure is supposed to be little bit more riskier. Why simply because if the project company is not able to meet the dead applications, then it will actually approach bankruptcy. So, therefore, the risk is higher when, we have a higher level of debt, so to compensate for example, if you are able to if you are actually having a low business risk.

Then we can actually have financial risk structure, we can actually have a capital structure, which is having a higher degree of financial risk. So, that we are able to produce power in a competitive basis alright. Remember, if we are talking about higher degree of financial risks, so that means, we are talking about higher level of debt and when you have higher level of debt. So, we are able to actually produce power at competitive rates, higher degree of debt results, in a very, very positive in a positive impact on tariffs. So, therefore, a positive finance risk will be able to compensate, for the I would not say compensate, but it will probably contract against, the low business risks that prevails in the project.

Remember, when you are talking about, low business risks, we are actually going to have a lot of contracts and whenever we are trying to you know have all this contracts and agreements, it is essentially going to you know result in increase in cost. And this increase in cost to certain extent will be compensated by lower cost of capital, if you have a higher degree of debt ok.

Now, look at the other situation is the business risk is very high and so therefore, in this case, if you want to really make, the project company having an acceptable level of risk then we should not really have a capital structure, which has a higher degree of financial risk. But, we should have a structure, which has a lower degree of financial risk, so a higher risk on the business front is to certain extent compensated with a lower degree of risk in the financial structure.

So, how do we actually have a lower degree of financial risk, we will have a lower degree of financial risk by having, a lesser leverage in the capital structure that is fund the project with a lower level of dead. So, this is the example that, I am talking about, so when we actually have projects, which has a higher level of business risk, such as your merchant power plants then the capital structure of these projects will have a higher level of equity as compared to projects, such as IPPS, which will have a higher level of debt. So, we manage the risk in these projects, by using a capital structure that, carries a lower level of financial risk. Now, we will get to the next question, the second question that we had at the end, I mean the question that, we had at the end of lecture 31 is…

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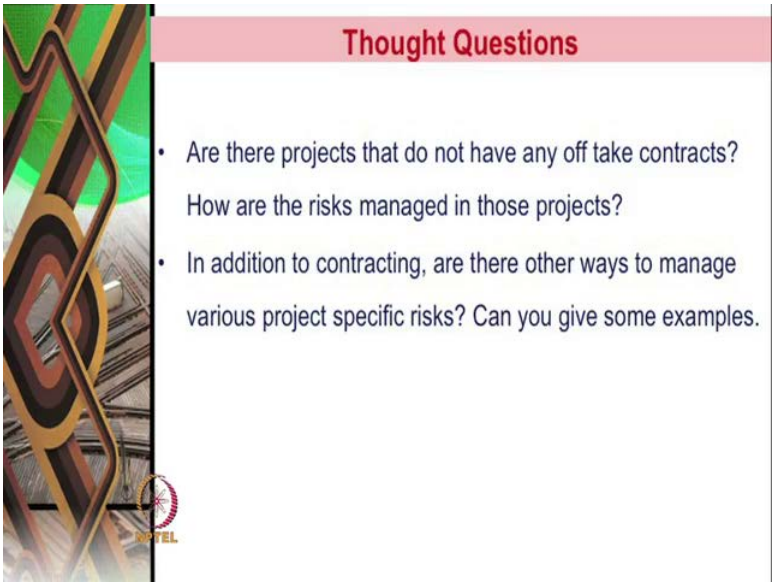

We talked about various methods of contracting, so the question is are there any other ways, in which we can manage a project specific risk, can you give some examples ok. So, apart from using contracts and agreements, how do we actually manage project specific risks, so is there any examples.

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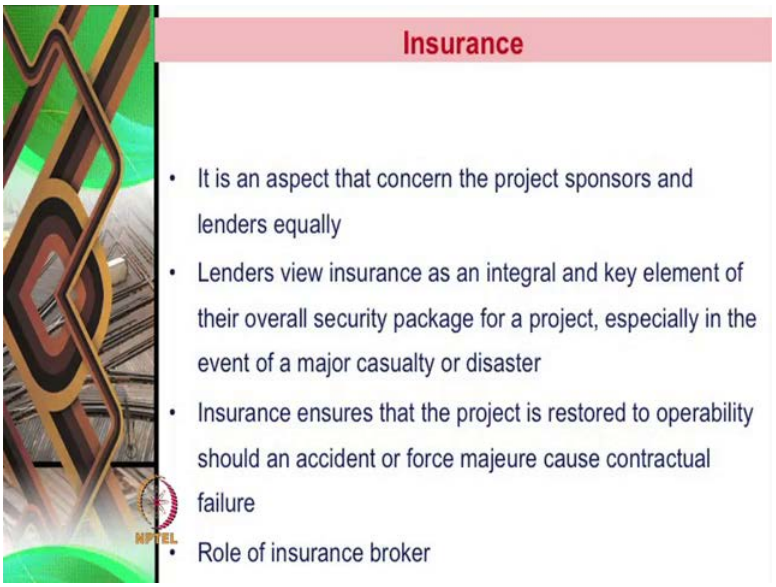

So, the one word answer that, I can give you is insurance, so where we actually have a contract, the contract is essentially trying to manage certain level of risk to different parties. But, there are several risks that cannot be managed, you know, which probably we cannot find a counter party, for which we can write a contract. So, those risk will have to be essentially, mitigated by using insurance ok.

So, insurance very, very important aspect in the case of project finance or infrastructure finance, this is an aspect that concerns both, the projects sponsors and the lenders equally, it is not, it is concerned only lenders. But, project sponsors also are equally concerned and ensure that, there is well you know, there is a well thought through insurance, you know package, for the entire project. Lenders view insurance as an integral and a key element of the overall security package.

So, remember it talked about a financial closer and at the time of financial closer lenders will ensure that, there is adequate risk management mechanism in place and more importantly, they will also look at what is the security that, they have for their investment. Now, a very important component of the security package, for the project is the kind of insurance that, the project will have to take.

Because, the insurance package will ensure that in the event of any major causality or disaster the lenders are paid their investment the lenders get their investment back ok. Now, insurance also ensures that, the project is restored to operability should an accident

or force measure, cause contractual failure. So, for example, there is an accident, it could be a fire, it could be an earthquake, it could be any other natural disaster. So, because of that the plant, let us say undergoes damages and because the plant has undergone damages, it is not in a position to let us say generate power.

And if the project company has actually signed a contract with the power producer and this damage will a kind of you know, this damage will result in a fact that, they will not be able to honor the commitment that, they have indicated in the power purchase agreement. So, this can lead to what is called as a contractual failure, so therefore, the project company might have to compensate the power purchase agreement and so on. But, if you actually have an insurance, then such events of contractual failure will be compensated by the insurance claims and not by the project company.

Because the project company might itself not have the bear with all, to actually compensate the contractual failures. But, insurance company, because of being a larger entity, because of the fact that, it is able to manage risk a lot more effectively will be able to pay the compensation or other damages that needs to be paid, in the case of a such contractual failures.

So, how do you actually create an effective insurance package, so I think most of us know about insurance in general, you know for example, you know about life insurance, there are several life insurance companies that are operating in India. So, if you want to actually take a life insurance, we actually approach any of these companies, directly in most cases and then take an insurance depending on what we need from the insurance.

In addition, we are also familiar with other types of insurance for example, we are familiar with health insurance and we are familiar with general insurance, which we use insure our vehicles our houses, you know property and so on and so forth. So, in all these cases the risks are commonly known and it is a direct interaction between the insured and the insurance company.

So, there is no intermediary involved and the products are also commonly understood and there is not, so much of complexity, in the in insuring some of those things that I just talked about. But, if you are talking about a project finance entity, the insurance is not. so simple it is a lot more complex and it is actually highly customized you know, for

example, with the normal poly insurance policies that we are aware of it is not customized to a single individual.

There are. So, many products, that are available in the market, so we go and buy the product that is suitable for our need, but in the case of this kinds of complex insurance packages, it is highly customized. And it is possible that the project company might not be able understand, the entire insurance requirements that may actually satisfy the lenders. So, in most circumstance, an insurance broker is engaged, who will help the project company in putting together, a very effective insurance package.

So, the insurance broker will have familiarity with the sector of the project company, for example, the insurance broker might actually have a lot of experience, in terms of developing insurance package in developing, in identifying a insurance needs, for let us say the power plants or it could be for ports and so on. So, because of his experience he will be able to put together, a very effective insurance package or second the insurance broker would have familiarity in the region, in which the project company is located.

For example, insurance broker insurance broker would be familiar with the Indian market and therefore, he will be in the position to identify, what are the different forms of insurance that is needed, in the Indian context. Now, the project company or the promoters might not have the kind of insight that, an insurance broker would have. So, therefore, it is always preferable to actually engage the services of an insurance broker, in the case of a project finance structures that, we have been dealing in this course.

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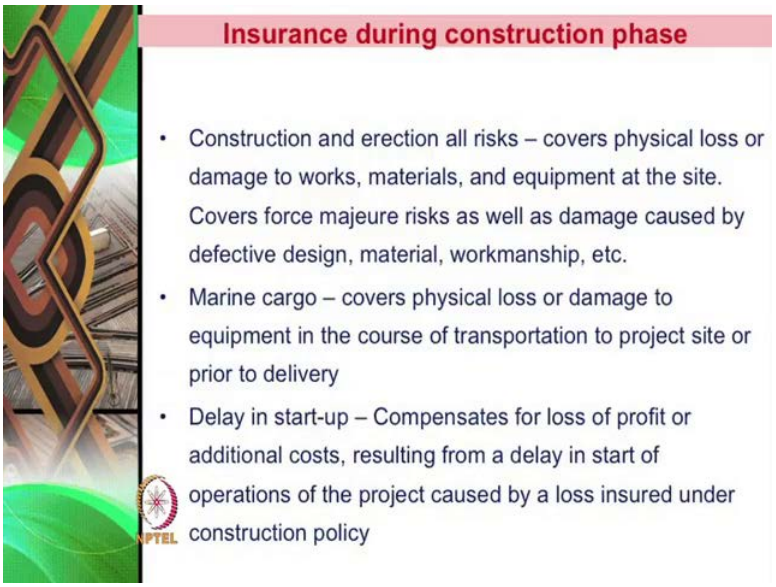

So, the next thing, that I want to talk about is, so the next thing that, I want to talk about is what are the different types of insurance that, we normally will have to, have in place of. So, for example, we talked about life cycle of the project consisting of 2 broad phases, the construction phase and the operation phase. So, we will try and look at, what is the kind of insurance that may need in the construction phase, what is the kind of insurance we need in the operation phase, let us first talk about the construction phase.

The main the most prominent insurance that is needed in the construction phase, it is basically construction all risk or it is also called as construction and erection all risk. So, this is an insurance policy, which actually would cover, the physical loss of damage works, see for example, it could be it could be heavy rains, it could be earthquake, it could be fire or it could be because of any of these or it could be an accident, that can result in damage to the work during the construction phase.

So, the insurance policy will cover, this kind of risk and then that could be material and equipment at the site. So, materials could get stolen, materials could get damaged for example, there is cement and if the cement is actually exposed to water and rain, it can actually get damaged. So, whenever there is such damages, then this insurance policy will cover all the risk. It also covers the risks and damage caused by defective design, for example, if there is a design, which is defective and that leads to further damage to the construction and the insurance policy also covers it will also covers workmanship.

For example, the employee does not do a proper job and not because of the fault of the design, but it is the fault of workmanship involved, then the damages involved is also covered under the construction and erection all risks. So, everything pertaining to the construction and erection of the site is covered by this policy the second policy that it should there should it should be in place is what is called as your marine cargo, this actually covers the physical loss or damage to equipment in the course of transportation.

So, for example, we are installing a power plant and it needs transportation of turbines, to the to the power generation site. So, during the transportation, if there is any physical loss or damage you know it actually covers this insurance policy covers the loss that occurs during the transportation, to the project site or prior to delivery, then we have what is called as a delay in startup.

So, a project company signs a contract let us say it could be a power purchase agreement or it could be any other contract, which ensures that the project will be up and running at a particular date and if there is a delay, so there will have to be some penalties that will have to be paid. Now, if there is a delay or damage, because of construction or because of equipment not arriving in not time and so on, then the start up will be delayed alright.

So, in which case the project company will have to pay some damages and penalties to the power purchaser, so this delay in startup insurance will help to compensate for the additional cost or it could compensate for the loss of profit that can, result from delay in operations, either because of you know problems in construction or either because of equipment not coming and so on and so forth.

So, in essence it compensates the construction and erection all risk policy, the construction and erection all risk policy does not really compensate for in generally, does not compensate for the delay, it compensates for the loss of material, so if there is a material that has been loss that policy will ensure that it is compensated. If there is damage to the structure then the additional cost that is that will be incurred to bring the structure back in place will be provided.

But, it does not compensate for the delay in startup, the delay that can result in loss of revenues and profits result in additional costs, such as penalties and damages does not compensate for interest payment on debt and so on and so forth right. So, we need to really have an insurance, you know insurance framework that is actually complimentary

and manages all the risks and these are the 3 main insurance policies that we normally see during the construction phase. When this is not an exhaustive list the exhaustive list is may be very, very long and it may be too technical and some therefore, I am just giving you an indication of the main policies that, we actually see in the construction phase.

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The next we look at the insurance policies in the operation phase, the main policy that we commonly see during the operation is called as the all risk policy. So, this covers a project against physical damage, so the project is in operations and any physical damage can actually, you know impact the functioning of the plant. So, therefore, we actually have a policy, which actually covers for all this risks, normally this policy provides the replacement costs of the project or the equipment.

So, the insurance under the all risk policy can be again having many categories, it could be machinery insurance, it could be property insurance and so on and so forth. The second most common insurance policy that is seen, in the operations phase and in fact, it is also seen in the construction phase is your third party liability. So, third party liability insurance covers all those involved with the project company, against third party claim.

So, for example, if the claim arises because of an act of an employee, then you know, if the claim has to be met then the third party liability is the insurance policy will provide, you know will provide will address, these kinds of claims that arises. So, this is the third

party liability, then you have the business interruption. So, business interruption is equivalent to that of the delay and start up insurance that, we talked about in the construction phase, you know it should cover, you know losses.

For example, it could actually cover in you know interest on loans it should actually cover penalties that, might have to paid for contractual failures, it will actually have to cover for fixed operating costs etcetera, during the period of interruption. Remember, whenever there is a physical damage, there is an interruption in a business operations, there is an interruption in the operations of the project company.

And the all risk that, we talked about will not compensate for this interruption the all risk will actually provide replacement cost of the equipment or the cost that is actually incurred to develop the project and bring it back to operating conditions. But, at the same time because of these interruptions, project company will incur some kind of damages and the business interruption insurance is the insurance policy that will help to meet, the claims that arises due to such interruptions ok.

Then we also have a force majeure insurance which actually covers dead service, if the project cannot operate. So, force majeure as we have seen earlier an act of god, it could be war, it could be strikes, it could be rains, it could be natural disasters like earthquake and so on. So, whenever the project cannot operate because of such force majeure reasons, the insurance policy will provide for dead service.

So, I think in addition to contract, you should also be very familiar with insurance as a way of risk management and you know whatever we have discussed as insurance in construction operation, to just give you a highlight to just give you indication of the different forms of insurance that we have commonly seen. The ultimately you may also come back and tell me that no insurance is also a type of contract yes, but then insurance is a contract that we actually write with a specific you know financial institution with an insurance service provider.

They do not supply or they do not consume, any of the outcomes from the project, so if you have a fuel supply agreement, we are writing a contract to the fuel supplier. So, if you are having a power purchase agreement, we are writing the contract to the power purchaser, but in the case of insurance insurance provider do not supply or do not consume, any of the outcomes from the project alright.

So, therefore, in essence though, it is a contract, it is different from some of the other contractual agreements that, we talked about. So, when we talked about project specific risk the final risk that we are yet to discuss is operating risk.

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We have discussed all the other major forms of project specific risks in the previous lectures, so we will spend some time in this lecture to understand the operating risk. So, operating risk can be broadly you know under the following categories, you know it could be technology risk, it could be general operation of the project, it could be operating cost overruns, it could be availability, it could be maintenance, it could be performance degradation and so on and so forth.

So, essentially if you look at operating risk after the construction is complete and after the date of commercial operations, the risks that the project faces is called as your operating risk, let us look at some of the forms of operating risks that, they have listed 1 by 1. So, technology risk arises, whenever there is a new technology that is being put in place, so for example, if there is not prior strong history of operations of a particular equipment and it leads to certain level of technology risk.

Because, we do not know how the technology is going to perform is it going to perform as per expectation and so on, let us say in the case of a power plant, if the turbine is entirely new design and we are not very sure, how the turbine is going to be performing,

you know in the future alright. So, the initial test results might be acceptable, but is it really going to perform as per expectation, so that is a technology risk ok.

So, the lenders sometimes might not be very comfortable, in investing in an entirely new technology and whenever, we are talking about a new technology. They will talk about you know having a lower degree of dead funding or they will request for additional risk mitigation mechanisms, such as guarantee from the equipment supplier and so on and so forth.

The next is your general operations of the project, you know the project will have to be operated, with a certain degree of efficiency, the maintenance will have to be done properly and so on. So, if there are if there are any problems in regular maintenance or if the operations is not being done properly as per instructions then it can actually affect you know the operations of the project for example, the plant might not be functioning at proper efficiency.

And this can actually result in you know, higher degree of fuel consumption or it can actually result in a higher amount of wear and tear this can actually result, in increase in maintenance expenses and so on and so forth. So, you know the operations of the project should be done appropriately and this is the risk, if it is not done appropriately, it is actually going to affect the revenues, it might also affect the cost.

The third risk factor is operating cost overruns, so we have actually estimated for, certain levels of operating cost, there is a possibility that we have overruns. So, whenever there is an overrun, because of the fact that, we have actually signed up, for a particular level of tariff and any increase in operating cost overruns, might actually affect your profits. Now, operating costs overruns can also, reduce the coverage ratios and whenever such coverage ratios are reduced, it can actually be of concern to the lenders. So, that is another type of operating risk.

And then the fourth is your availability, so we talked about you know, even though, there is an off take contract, let us say we have a take or pay contract unless until the plant or the facility is available, it will not be eligible for any you know tariffs any charges. So, therefore, the plant has to be available and non availability of the facility is one of the big operating risk, then we talk about maintenance, the plant will have to be functioning for certain duration of time throughout the year.

So, if the maintenance is about, let us say 5 to 10 days of the year, for the remaining part of the time plant will have to be functioning. So, the maintenance is again important factor alright are we able to stick to the planned maintenance or is the maintenance shut downs is going to actually be higher, so that is the level of risk that we are talking about. Then the performance degradation initially, we estimated a certain level of performance, the plant will actually have a hit rate of, so on and so forth, the plant will have an efficiency of 70 percent 80 percent and so on.

Now, if this performance degrades over a period of time, it actually is also going to affect the project, so if the efficiency reduces then it might actually result in higher level of fuel consumption and higher level of fuel consumption means higher operating costs. And it will also lead to, lower profits and it will also lead to lower coverage levels, so on, so essentially, if you really look at it, operating risk can actually have you know, 2 impact, 1 is the top line impact where, it can actually result in reduction, in revenues or it can actually, result in an increase in cost.

And there are some of the risk, which can actually lead to both reduction in revenues as well as increase in cost, some can actually result only in increase in cost, but nevertheless it can actually put together lead to a reduction of profits. And also lead to reduction in coverage ratios for debtors, so how do, we actually minimize the operating risk.

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So, the common way of mitigating the operating risk is by signing an operations and maintenance contracts, so like we actually signed several types of contract to mitigate other forms of risk, to mitigate the operating and maintenance risk, we also have an O and M contract. So, the O and M contract helps to insure that, the O and M costs stay with the budget and projects operates as projected.

So, if the budgeted expenses was let us say 2 percent of revenues and O and M contract will ensure that the risk, there is a contractor, who will ensure that, it stays within the budgeted, you know budgeted limit and the project will operate as projected. Now, sometimes both of them can be done by single contractor, sometimes it could be split, let us say for example, when both operation and maintenance are 2 different activities then 1 may tend to split and have it as 2 separate contract, so for example, in the case of a toll road, toll collections are very specific activity.

So, therefore, toll collection can be a separate, kind of a operation contract and maintenance of the roads such that, it is of a adequate quality and so on, it can be another specialist activity. So, therefore, there can be a separate maintenance contract for that, so there are instances, where the operations and maintenance contracts may be split. In many instances operations maintenance responsibility is with the project company, so let us say for example, we have BAAL is actually responsible, for you know operations and maintenance of the Bangalore international airport.

And one of the project sponsors can actually take the responsibility of operating and maintaining the airport. So, today you have you know the airport company is a project company and then one of the O and M partner is also a project's sponsor is an actually shareholder of the project company. So, we have you know instances, where the O and M, contractors are important part of the project company. The contractors are paid a fixed or a cost plus basis. So, it is again depends on what kind of project that, we are talking about and if the if the project operates below agreed levels.

So, the project is not functions at a particular level of efficiency or if the project is not able to offer certain level of quality then under the O and M contract, there are penalties ok. But O and M contractors normally do not responsibility for all of it sometimes, you have major equipments, you might have boilers, you might have turbines and so on. So,

whenever we have these kinds of major equipment, the maintenance contracts are usually done by the equipment suppliers themselves.

Because you know it is very important that, these large equipments are maintained appropriately and if it is not maintained appropriately then the efficiency can actually be reduced. Now, if the equipment does not perform as per expectation, then the equipment supplier can always put the blame on the O and M contractor saying that, these machines have not been operated properly, these machines have not been maintained properly and so on right.

So, therefore, to avoid those kinds of controversies, the responsibility for maintaining all these equipments is actually the responsibility of the equipment supplier ok. So, this will kind of ensure that, the O and M contractors do not have the responsibility, for any reduction in performance of these equipments, with this we have actually completed our discussion on project specific risks. So, the next category of risk that we will discuss is called as your market risk.

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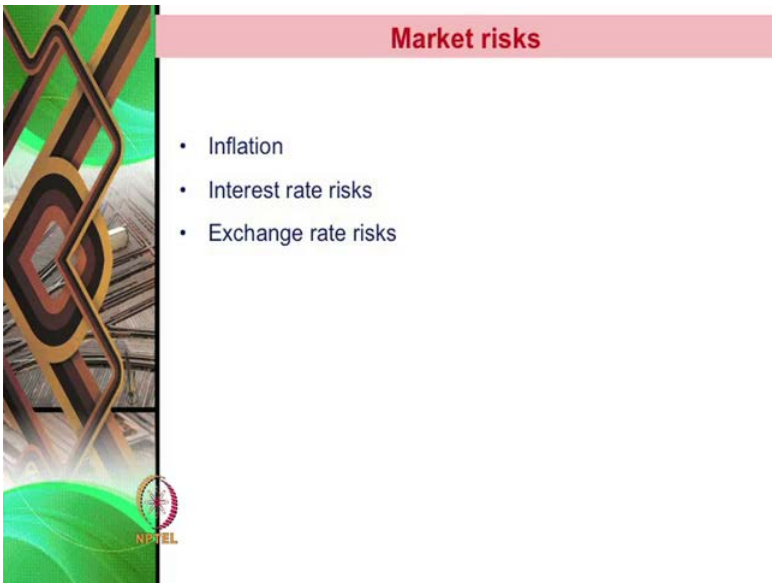

So, remember when we talked about classifying risks into 3 categories, we classified them as per project specific risk, market risk and country or political risk, so we are now in the second component of the overall 3 levels of risk categorization alright. So, if you look at market risk, how are they different from project specific risk, so market risk are

those that is going to be affecting, the entire economy as a whole and not to any specific project, so it could be economy level indicator.

So, for example, the 3 kinds of a market risks are we have inflation, we have interest rate risk and we have exchange rate risks. So, whenever there are any change in any of these, it is actually going to impact the entire country as a whole, it is going to impact the entire sector as a whole and it is not specific to any particular project or any particular sponsor alright. So, therefore, these are called as market risks, so how do we actually handle these market risks, so let us look at each of these 3 common forms of market risks 1 by 1.

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First is inflation, so what is inflation, a general increase in price trends is called by inflation. So, for example, today if we buy a kilogram of rice for 25 and tomorrow it becomes 30 then part of it is increase is attributed to inflation. So, the general price increase in goods and services is basically, due to inflation ok. Now, inflation cannot always be considered to be a harmful factor, it can either be risk or it can be a benefit, to the project company depending on, it is timing or occurrence.

So, therefore, you know it is not right, to look at inflation as major risks and it is always going to affect the project in a very wrongful way, you know sometimes, it can actually be beneficial as well depending on, how the contracts are being structured alright. So, for example, if the revenues continue to increase with the inflation, but at the same time, if

the costs are fixed, because we have actually have agreements that will ensure a fixed cost then it can actually lead to a benefit for the project alright.

But, normally how is inflation handled in infrastructure projects, there is a separate you know there is appropriated indexation against inflation and project agreements. So, for example, we have several agreements that supply, goods to the products and then we have several agreements that, actually are off take agreements alright. In both these cases, they are appropriately indexed against inflation, so if the inflation increases, so much, the tariffs will also increase. So, much and if the inflation increases, so much, the cost of fuel also will increase, so much.

So, having appropriate indexation, for both outputs as well as inputs, helps to reduce the mismatch between costs and revenues, so if the revenues increase, the costs also increase or vice versa. So, the inflation is kind of the impact of inflation is not really very large, if we actually have cost of dead, which is fixed then inflation can even lead to the project company being better off, see for example, the revenues are increasing as per inflation.

Then in the cost there are some cost, which are indexed to inflation and they continue to increase, but then dead service particularly the interest cost, if it is not linked to inflation or if it is not linked to any other parameters and it continues to remain constant. Then a portion of the cost factor remains constant, so therefore, an increase in inflation is not going to lead to an all round increase in all the costs. And therefore, the profits are going to be, you know going to be higher with increase in inflation.

Another way to manage inflation is also use specific financing schemes that are linked to inflation, you know we do not really have, these kinds of schemes in India, but for in countries, such as the U K, there is something called as a inflation linked bonds. So, the rate of interest is linked to the inflation level in the economy and we can use financing of these kinds to actually mitigate the risk of inflation.

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The next form of risk is your interest rate risk, so we have seen earlier, the project finance loans are usually for long term and whenever, we actually have a long term loan, it is not possible to actually have a fixed interest rate. Because, if you really look at it as the economy changes, the interest rate might also vary and therefore, in many cases, the interest rates are benchmark to a particular rate and whenever, there is a change in the benchmark rates, the interest rates of the loans also change.

The most common benchmark is you London interbank offer rate Libor, there are other benchmark offer rates as well, so when there is a fluctuation in interest rates, what happens, if the interest rates become higher, then it leads to lower project cash flow. And it also leads to a reduction in cover ratios, so for example, a lender, who actually expects certain level of cover ratios, because of you know an increase in interest rate, the cover ratios will reduce.

Because the you know, the EBIT levels will be remain as, it was before, but the interest components will increase, so therefore, the ratio the interest cover ratio might actually reduce. So, this is something that might not be acceptable for the lenders, because the lenders would not want, the projects to actually get exposed to interest rate risks and therefore, the lenders will expect the project company to provide some kind of a coverage to mitigate these interest rate risks.

So, what do we actually do, what do the project companies do, to actually mitigate the interest rate risks, so the 2 common strategies, used to use an interest rate swap. So today, there are banks that are willing to actually swap, floating rate loan with a fixed rate loan, so the bank will exchange a floating rate interest rate with a fixed rate, interest rate. So, this actually results in technically a synthetic fixed rate, for the project company, so interest rate swaps are 1 mechanism, by which we try to manage the interest rate risk. The other instrument that is used to manage interest rate risks are called your interest rate caps or collar arrangements, so how does an interest rate cap work.

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Let us say for example, a cap is fixed, let us say for example, 10 percent right, so if the rate of interest is below 10 percent then the project company pays, the floating rate of interest. And the moment the interest rate increases, more than 10 percent, the interest rate is capped at 10 percent, the difference is actually paid by the bank, which has actually returned this interest rate interest rate cap contract. The collar arrangement is different from cap arrangement in the sense that, there is also a floor.

So, for example, we have a floor, which could be 7 percent alright, as long as the floating interest rate is between 7 and 10 percent, then the project company will pay the actual rate of interest. But, if the interest rate falls down to less than 7 percent, then the project company will actually pay the difference in the actual interest rate and 7 percent as a compensation to the bank that has actually provided, the collar arrangement.

By the same token, if the floating rate interest exceeds 10 percent, then the project company will actually pay an interest rate of only 10 percent and the difference will actually be paid by the bank that has actually provided the collar arrangement. So, these are all actually risk mitigation schemes, to manage the interest rate risk. So, when we actually have a band then we know clearly that the interest rate, for the project company is not going to go, beyond a certain level. But having a floor also ensures that the project company, does not actually make profit much from a fall in the interest rates.

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The next risk is your exchange rate risk, what is an exchange rate risk, this risk occurs when there is a mismatch in the currency. So, currency mismatch can be in both, the construction phase and the operation phase, let us say for example, in the construction phase, the source of funds is at a different currency and the expenses are at a different currency then there is a currency mismatch. For example, if the lenders are providing a loans in dollars, but if the expenses in rupees then there is a currency mismatch alright.

And in the operations phase as well there could be a currency mismatch, in the inflows are in a different currency and the outflows to investors are in different currency, there is a currency mismatch. So, if you actually have a dollar loan and if it is a power generation facility, the tariffs and the revenues are going to be in rupees, but the loan will have to be repaid in dollars, so there is a currency risk.

So, whenever we have this kind of an exchange rate risk, like in the case of interest rate risk, lenders may not be willing to accept, the project where the exchange rate risk, because if the project is unable to bear the exchange rate risk then the lenders are the people who are going to be affected. So, the lenders would certain extend would expect the project company to mitigate all this exchange rate risks, so how do we actually mitigate the exchange rate risk.

The most common way is to use some kind of a hedging instrument, let us say for example, you can actually have currency swaps like, we actually have interest rate swaps, you can actually have currency swaps, another common form of mitigating is you are using forward contracts. So, what happens in a forward contract, in a forward contract, we fix in advance the exchange rate between the different currency, so even though, there is a change in the currency rates, it is actually mitigated.

So, the currency rates changes would not actually affect the project company, the third is actually try and ensure that, there is a currency matching between the inflows and the outflows. So, if you are talking about a project, which is actually earning revenues in rupees, but the outflows are in dollars, can we actually ensure that, the revenues are either in dollars or the outflows in terms of debt servicing is in terms of rupees. So, by trying ensuring currency matching, we can also mitigate your exchange rate risk

So, whatever kind of hedging can be some that, we can think of whenever, there is what is called as a catastrophic devaluation, see normal currency movements, normal market currency movements, these kinds of contracts will be able to manage. But, if there is a very rapid devaluation, because of some government actions then it is really difficult to it is going to be really difficult by any of the hedging mechanisms, so that has to be understood.

So, sometimes the currency can be devaluated by 10 percent by 20 percent overnight, so under those circumstances any of the hedging mechanisms might actually fail, before we end this lecture, we will come to the questions for this sessions, we have 2 questions.

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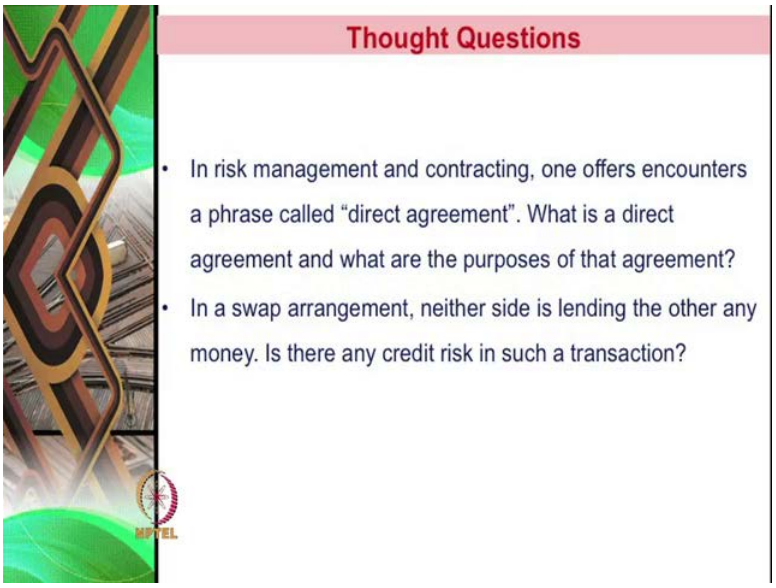

The first question is in risk management and contracting, you will often encounter a phase called a direct agreement, so what is this direct agreement and what are the purpose of having this direct agreement, so that is first question. The second question is we talked about the swap arrangement, where we actually swap floating rate interest, floating interest rate with a fixed interest rate. So, in a swap arrangement neither side is lending the other any money, there is no money transaction, so is there any credit risk associated in such a transaction, so we will discuss this in the next lecture.