Infrastructure Planning and Management
Guest Lecture by K Venkatesh

I will talk about our experiences in PPP which is L and T's experiences in PPP, over the past 25 years been in this for almost since 1995 and it has had a very checkered you know interest, it was very hot in terms of lot of interest, lot of commitment between 1995 and 2000, it went through a very difficult phase in 2000 to 2004 but a good part is PPP in the country was equal to L and T plus Ireland FS plus maybe a company or so that is about it, only about three players, three or four players.

2004 to 2012 were very exciting times, very very exciting times, investments worth at least worth 6 - 7 lakh crores were poured into the private format into infrastructure which included of course power, it included roads, it included ports, it included airport, included water supply and all the infrastructure around the IT boom which is IT buildings you know built to suit and the other social infrastructure that went with it apart from commercial, metros, metros came up on private sector format at least Mumbai, Delhi and Hyderabad.

Hyderabad was L and T, Mumbai was Reliance and Delhi was Reliance which went awry and got terminated so if you really see between 2004 to 2012 it was really a boom, 2012 onwards it is been a huge challenge for various reasons which we will see so frankly speaking we will look at investment objectives, project processes, value drivers and experiences, now this is a huge body of discussions which is around it, I will try and keep it as precise and simple as possible for another hour and a quarter, it is 3:15 or 3:30? 3:15 okay, so that is about an hour then and please feel free to just stop me wherever things are not very clear and then I will try and explain it to you okay.

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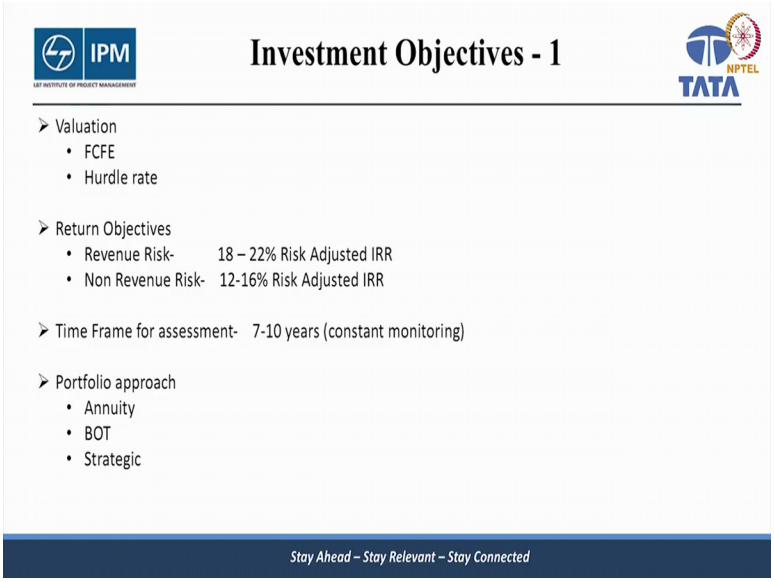

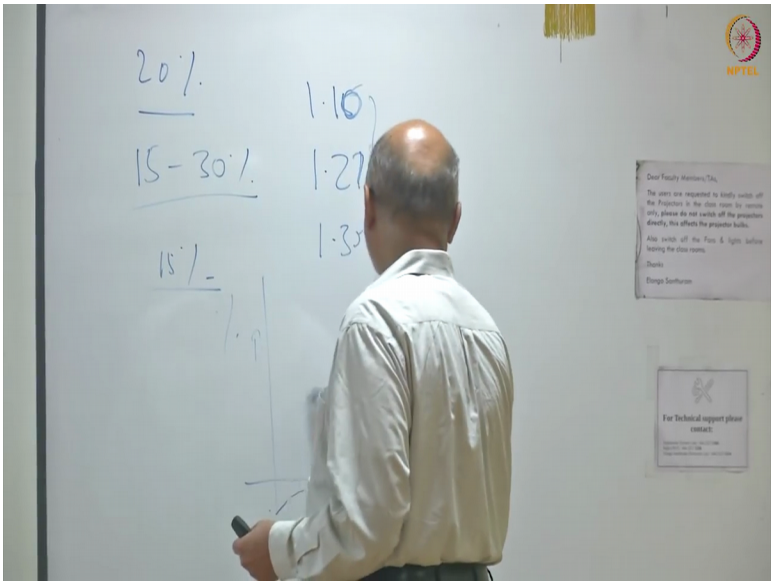

So what are your objectives before you get into any PPP project your objectives have to be very clear right and the objectives which go behind any investment, what should be the objective behind any investment, sorry? To create value, good, three English words, to create value, but can we quantify it, I mean you are all engineer so you believe in quantification right, profit cost, to make an investment what do you expect? Returns right? And how much return do you expect?

Let us do a quick roll call you are a person with a lot of funds at your disposal, what is the return that you expect if you invest in infrastructure? 20, good start okay what next anyone else wants to volunteer? Do not see the presentation please, there is a disadvantage of presentations, yeah,

anyone else? 15 to 30 okay, what returns? Sorry? 15, so someone said create value okay so what is very logical, if you have to create value you need a higher return or a lower return? To create value do you need a higher return or a lower return? Lower return? How do you create value in lower returns? No, so let us just focus on returns, now when you say returns what does it mean, in the first year you get 1.15 or let us say 1.10 to be make it simple, in the second year you get 1.21, in the third year you get 1.35 it is it is cumulative right that is what return is all about.

So if you put 15 it will be much higher if you put 20 it will be much higher so if you put 100 rupees into an infrastructure project it becomes 120 - 140 but tell me one thing do you get returns in that way, in any business it starts off slow right it starts off maybe in the negative territory and then moves on, it starts off somewhere here if returns are here and X is the time and Y is the percentage then it starts off somewhere here and then it moves like.

This is how returns come and then it plateaus off when it reaches given the project reaches capacity correct? When you say return in infrastructure project or for that matter any business it is the cash flows are icing out of this profile where you invest 100 and you get back 500, 600, 800 whatever it is in simple terms I have kept it very very simple right, now we come to the other aspect that some gentleman mentioned that low return, now wear your shoes on the other foot which is you are the public right and you are paying toll or you are paying the user development fee in the airport or you are paying a usage charge in a port, what would you like to pay the lowest or free? Free, then nothing will get built like in this country, there is nothing free you either paid through taxes or you pay through, as you use pay as per you use or a combination of both that is the entire infrastructure story, there is no other story, there is no big story either you pay through taxes or you pay per use or a combination of both depending on the type of infrastructure.

If it is something which socially affects a lot of people it tends to be low or free if you can, you take a car you drive down to Bangalore you can afford a car you want a good road you pay for it every time every 50 kilometers you pay right so the lower the toll the more happy you are correct, now is not it a contradiction of sorts? The guy who has invested wants a higher return, the guy who uses it wants to pay less right so there has to be some process by which an equilibrium of sorts is created, how do you create that equilibrium particularly in public funded

projects or sorry, in private sector investment formats where profit maximization, return maximization is the core of investment whereas the usage is by the general public right.

And consequently what happens is there is competition, you create competition he wants to invest, you want to invest, you want to invest, I am the government, I am responsible to give the utility, all three of you want to invest right so what should be my criteria for choosing one of you and giving a concession for 25 years to build, own, operate and then after 30 years transfer it right so what should be my criteria as the government so you got the third player so you had private sector which wanted the highest return, you had public which wants to pay very little, you have the government which says all right how do I now make sure that all these three objectives are met I make them compete, if I make them compete then the guy who quotes the lowest rate of return should technically get the project.

Because on the other side of the coin of a lower rate of return is a lower fee, so you see you have to create competition, you have to create that market once you create that market a person with the lowest expectations of return will come in hopefully it should also then create a lower charge.

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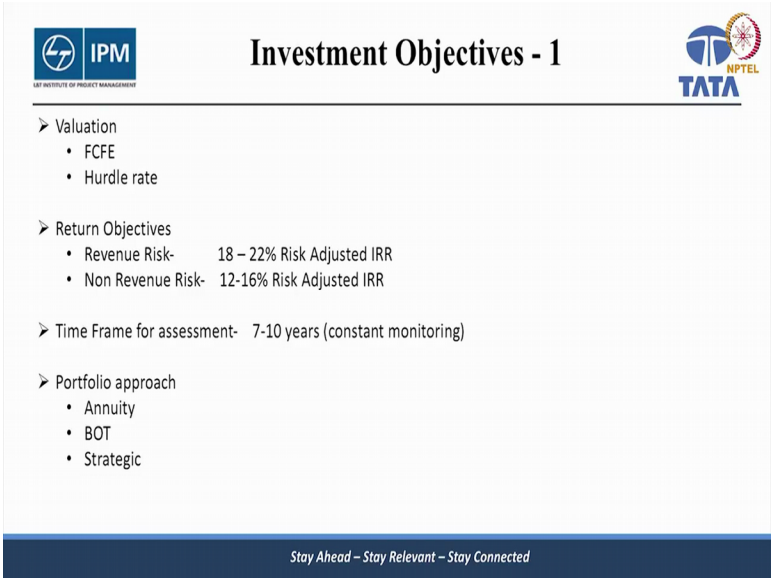

Of course there are various mechanisms to arrive at it but I am just giving a very simple example that whenever there is a private sector participation there has to be competition to make sure that you meet the objectives of a lower return, not the objective sorry, the most optimum level is reached in terms of return and a delivery of service correct so that is what private sector

investment is all about, as we get into the complexities of private sector participation in infrastructure we will try and understand this a little better.

So very clearly there is a valuation issue someone said create value right, what it means is you get a valuation and that valuation is nothing but we studied the profile of the cash flow after paying all the expenses, after paying interest on the loan that you take, after repaying the loan there is some cash available you take that cash and you discount it at any point of time you will get a value.

So that value arising out of the free cash flows to equity FCFE based on the hurdle rate, the hurdle rate is nothing but the rates that all of you said, someone said you want 20 percent, someone said you want 30 percent, someone said 15 percent so they said look okay look if I have to earn 15 percent and I invest a 100 units could it be rupees, dollars, whatever and that hundred has to become X which will deliver me a 15 percent return that X is the value, it is a valuation right and this valuation is after paying off interest, paying off expenses, paying off the loans, whatever little money that is available which expands as the project ages is the valuation.

Returned objectives you have discussed technically returns and risks are they correlated so if you have a higher risk would you expect a higher return, yes, if you have a lower risk you expect a lower return right, if someone were to tell you that look please invest in this project X, it is a water supply project here is a source of water but your job is to create the intake well, install the pump set, bulk transfer the water by drawing it from the intake, store it here, here is the lake or the pond or whatever it is this is yours from there distributed to the municipality or the corporation or create your own reservoir, create your own tanks and I will pay you X number of units every month, your job is to build the intake well, build the storage, create the network and supply water to this city or town or factory or power plant or steel plant or whatever right and I will pay you an X amount of money every month.

Is there any risk over here? Lower as compared to, here is the road, it is a two-lane road expanded to four lanes depending on traffic you collect your money, you do not get any fixed money traffic comes you get money traffic, does not come you do not get anything, so which is a higher risk? The road or the water supply? Road, so consequently your return expectations are going to be higher and here your return expectations are going to be lower so that is what it

means by when I say a revenue risk where there is a revenue risk, the returns are higher, where there is a non-revenue risk the returns are lower.

Now there is another element that we need to discuss and that element is how do you calculate what should be your return, you gave some numbers based on some you know some thought right what should be or how do you calculate what should be your return what are the sources of funding so there is you see when you have to calculate what should be your return, you have to get into what is the cost of capital where does capital come from, that inequity, correct.

So you have done this earlier right I do not want to be wasting your time if you have done this earlier so there is a cost of debt and there is a cost of equity obviously when we spoke about returns what returns did we speak about equity or debt? When we said 18, 20, 25, 15 was it equity or debt? Equity, correct so you studied the concept of weighted average cost of capital, you have studied that so I would not get into that.

So frankly speaking, the revenue risk related projects 18 to 22 percent non-revenue risk, 12 to 16 percent, would you hold onto a project for eternity till it exhausts its lifespan or would you like to, you have to decide how many years you want to hold the project right, you want to hold it till maturity or you want to hold it till you reach a particular IRR and then you get rid of the project or you sell it, get rid meaning sell it right you sell the project I realize the value and then move on.

So when you are constructing the portfolio all these aspects become very important you will have some non-revenue risk related project, you will have some which are revenue risk credit project and some which are very strategic, an airport project is very strategic, a port project is very strategic, it can keep scaling up depending on the runway capacity and all other capacity constraints but it is it is far more strategic than a road because it tends to move towards monopoly right you cannot, you land in Bangalore or in Chennai there is only one airport, you do not have a choice to go to X Airport or Y Airport or Z Airport, unlike a road where you can take any road and go, point A to point B you may have two or three alternatives, you do not have such alternatives in an airport, you do not have such alternatives as far as a port is concerned.

So it is more strategic, so consequently the valuation of strategic projects are the highest, evaluation of BOT projects come next and the valuation of annuity projects which are non-

revenue risk related are the least and they are nothing but the flip side of the coin, your returns are all so calibrated accordingly, in a strategic project either you succeed or you fail right but the returns if you succeed the returns are supposed to be very good similarly you know in a road project if you succeed the returns are tending to be very high however because of competition you might choose to compete very aggressively get into a low return situation because you want the project and then the project does not do well and then you are in a situation what (())(17:28) faces in a manner of sorts plus a number of other reasons right.

So at the end of the day your investment objectives have to be very clear what is the valuation that you are seeking which is nothing but the other side of what are the returns that you are seeking, how long do you want to hold the investment and have a portfolio approach when you grow up and you make tons of money your savings are also going to be unless you already have the money ok your savings are also going to be along these three or four you know percentages there will be some savings in debt which is a fixed constant yield that you will get, there will be some savings in equity where you get much higher returns but the risks are also high, fluctuating with the fortunes of the stock market and there will be some savings where you know the returns will start multiplying, for example real estate okay you purchase real estate and that is very strategic provided of course it is in the right location, you have bought it at the right time all those all those other variables are there but that is very strategic.

So your all investment, your own personal investments are going to be guided by pretty much the same principle so when you are young you can take more risks so your investments will mostly be geared towards equity as you get older you will pull out of equity and start putting it into debt because you are more interested in getting constant risk free returns provided you have mutual funds to invest in triple-a rated securities, triple-a rated companies and here when you are building a portfolio for a private sector investor let us say a large infrastructure fund or a large family fund and you are investing their money in infrastructure assets then also you will build the same logic you will have some in non-revenue risk related projects, some in revenue risk related projects and some strategic assets, is the concept clear?

So the investment objectives are extremely important when you start looking at private sector investment in infrastructure, in India it did not quite happen that way because what happened was there was a plethora of opportunities and a whole lot of people rushed in, they all thought

that they will make a lot of money in the right and the wrong ways I must admit right and consequently the sector is almost collapsed and now they are looking at various ways to revive the sector and there are various challenges that are there in reviving that sector.

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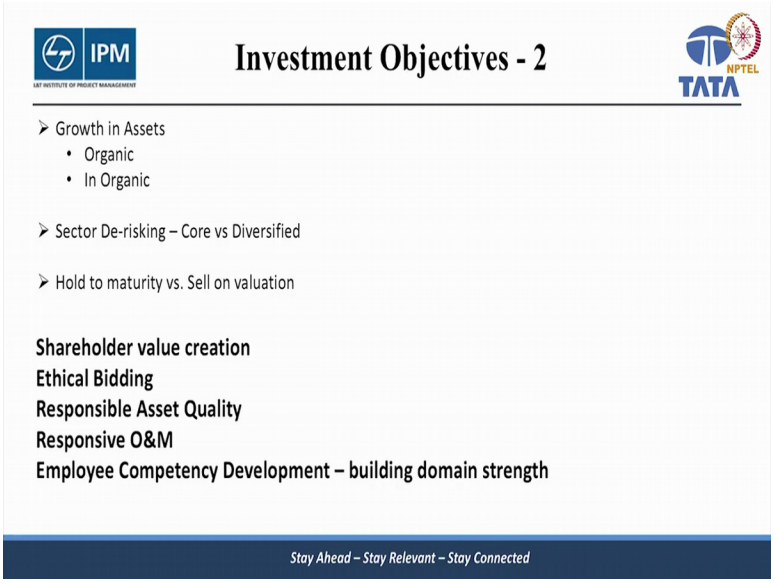

So I will skip the first three okay, shareholder value creation we discussed, there is a whole lot of stuff around ethical bidding, when you are to make an investment obviously there is a certain amount, there is a lot of competitiveness that comes in, so how do you make sure that you remain above the board in terms of ethical bidding and that is where you know certain countries like ours have a little bit of a distance to carry when all our bidding comes right above board and this is across infrastructure unlike other sectors in infrastructure you have to strive very hard on both sides, A, to ensure that the right practices are followed for bidding and B, the responders that is people like us who compete also have a high standard of ethics when it comes to bidding which means no fixing, which means no gold plating, which means you know bidding now and then claiming a lot of money later and then getting it tied into all kinds of litigation and so on and so far there are 150 ways in which you can beat the system if you decide not to be ethical .

So you have to decide ke bhai are you going to be an ethical player or you are not going to be an ethical player very clearly because there are opportunities that you may have to let go because of problems around ethics, third is of course responsible asset quality, now all of you are engineers

there is something called good industry practice which is there in all contracts whether you are going to build assets by cutting corners, are you going to build assets properly right.

And each one of these topics can be discussed at length but I am just putting those bullets here, Responsive O and M, since in the private sector you own the asset for that period so you are responsible to make sure that the service quality does not deteriorate and therefore a very responsive O and M which is what and there are there are there are there is a lot of technology behind O and M, there is a lot of Six Sigma practices around O and M.

So O and M by itself is a field for each sector whether its power, whether it is roads, whether it is water supply, whether it is ports, whether it is Airport and you have whole lot of studies that are constantly being done to improve efficiencies and to bring down the cost and then you have employee competency development which is fine.

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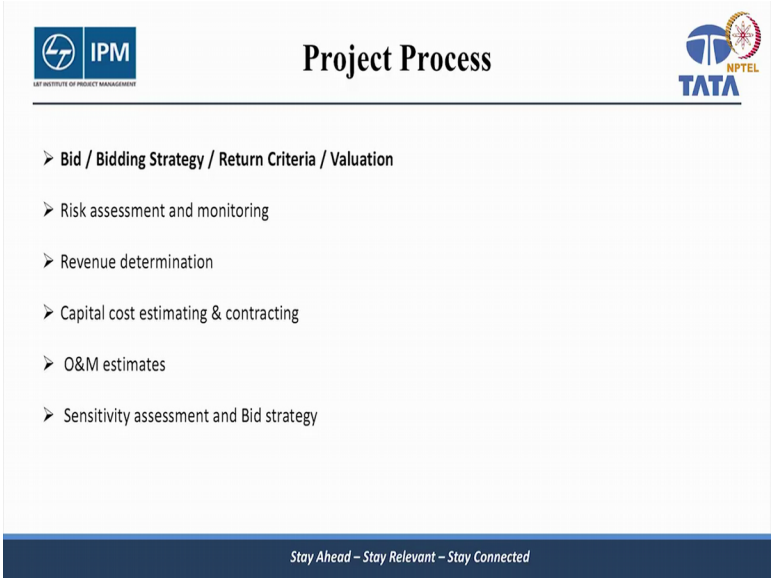

So we get into project processes which is the crux of building an organization or sustaining an organization which is involved in this whole business of infrastructure building, a while ago we discussed the concept of conflicting objectives right the guy who makes the investment obviously he needs to get a high return and he wants to make the maximum profits, the government is responsible for delivering the asset because it is the public at large which uses the asset and consequently the costs have to be low and the only way you can get all this to happen is through competition right, ethical competition.

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Now any contract in the infrastructure space, any contract follows the normal process of a DPR which is the detailed project report which makes the business case for why this asset is needed, why are you building a metro, why are you building a road, why are you building a port, why are you building an airport, it requires a business case to be established okay, the second arising out of that will be the specs and the scope gets decided, it results in putting out two processes, one is the RFQ and the other is the RFP.

The RFQ process is to ensure that you get a responsible bidder to come and bid for the asset or to come and build the asset for you, the RFP is when he actually puts in the bid itself right and as we discussed the bid should be at a point where the ultimate delivery of the asset is at the lowest possible cost provided it complies with the scope and it complies with the specs, so you have the RFQ request for qualification and the request for Proposal, RFQ is to ensure that you get quality bidders, bidders with certain experienced.

RFP is to ensure that the bidder complies with all the specs and the scope that is there and then you build the asset, the asset gets built and then you operate and maintain the asset so whether it is public funded or whether it is the private sector the format is the same, you want to build an asset you have to follow this process very simple but there are several nuances when you get into every single step.

So bid, bidding strategy, return criteria and the valuation are extremely important again so when you are looking at a proposal to be given to the government when you are looking at a tender you are reading every single line as to how you are going to bid what are strategy that you are going to adopt, how do you do the pricing, how do you do the costing, how do you do the calculation, what kind of structuring you do, etc. there are a whole lot of variables that you need to decide before you put in a bid.

Risk assessment and monitoring which is any large asset has a number of risks during construction phase right forget about the risks that come during the revenue phase I am talking about during construction or during the project implementation process there are a number of risks, you must be studying the risks right so every time you look at risk you look at mitigate, you look at mitigation and therefore you look at cost and that has an impact on the return.

So you have a dynamic model which ensures that you study all the risks, you look at the mitigating costs but can you eliminate all the risks, for example let us say you have a risk of, let us take the biggest example going on oil, suppose you had bid for this project let us say a year and a half ago and the project is now under implementation, would you have expected oil prices to be going from 30, 35 dollars a barrel to 80 dollars a barrel, I doubt not a single project manager would have estimated oil to go up like that right.

So which is why you know the kind of return, now it is a project where you know oil constitutes 20, 25 percent of your of your project cost normally it will be about 8 to 10 percent, let us say 10 percent and oil has doubled right so if a project cost is a 100 so 100 has become 200 so you have straightaway a 10 percent cost overrun, the moment you get a 10 percent cost overrun your returns come down by, correspondingly your returns come down, your valuation comes down.

So how do we ensure that all the risks are, you have done the risk mapping exercise? All the risks during project phase but have you done the risks during operations phase in a PPP project? Revenues? You have done the way the revenue curve goes up or down, so the point is that you know these risk assessments are extremely important at the bidding stage itself because depending on the way you can control the risks you are going to pitch your returns, the higher the risk obviously your returns are going to be higher and so on.

So how many of you have actually participated in a bid? If there is a mock bidding exercise and the tender documents are available to let us say three groups right and you have to give one number as a bid number let us say you have to give project cost as a bid number right so have you done that mock exercise in terms of participating in a bid, I think it would be really useful to understand the dynamics of risks returns when you do that mock exercise of a bid because then you will know, you will start compromising on certain criteria to win the project and the entire dynamics of what has happened in the country.

Banks started competing to lend to projects because their profitability depends on the more they lend, entrepreneurs started participating in projects because they wanted a higher valuation, consequently a combination of these two was such a heady cocktail that you had project failures and these project failures are what resulted in NPS and the whole discussion around NPS is because of a failed a bidding or a failed restructuring process, there are solutions to it but the fact is that from both points a few risk assessment and monitoring is important, revenue determination, capital cost estimating and contracting.

Have you, you know when you estimate a capital cost what are some of the facts, what are some of the points that you will take into account some points, sorry, okay well I will start writing down the constituents of a capital cost.

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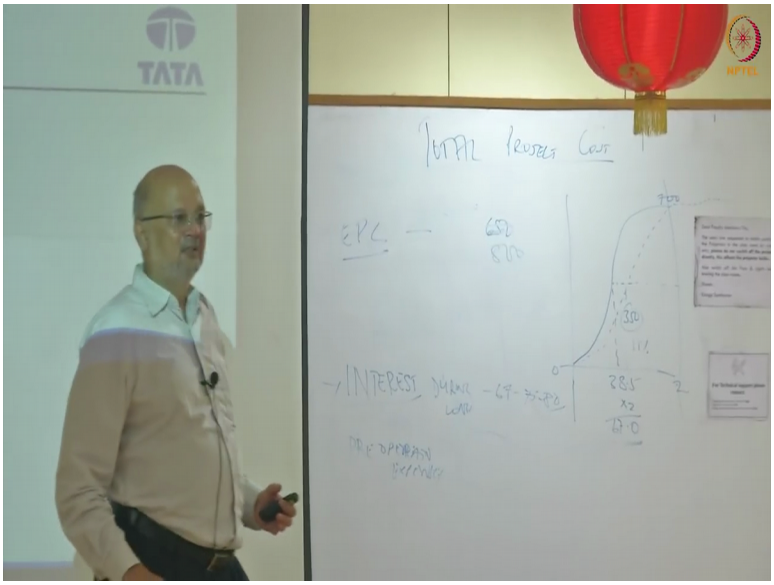

Normally it is known as the total project costs okay, in a total project cost how does interest come, interest does play a role but how do you calculate interest, that is a rate, that is the rate but how do you apply it, fine so you take a loan right I assume that you have justified the project the bankers are happy they are willing to give you loan, debt equity 70-30 so if it is a 1000 you are taken 700 of debt and then let us say you negotiate the rate of interest and the rate of interest is 11 so how does interest affect project cost, anyone?

Now we are talking about total project cost okay so you heard of the S curve right, everyone knows what an S curve is, so you are drawl of debt, you draw the debt as you build the project right and every month you have to pay interest so 700 is your, 700 let us say is the debt component and that 700 you will start drawing 10, 20, 30, will bank give you money if the project does not progress, it will not.

So you draw 10, you draw 20, you draw a 30, you draw 40 and like that cumulatively you will reach 700 and that cumulative, that pattern of drawl cumulatively will reflect an S curve right nothing but a total project cost curve but only as far as debt is concerned so the interest that that is calculated on an average if it is 0 over here and that say it takes two years to build the asset and 700 is here and this is the second year, the average utilization, average utilization will be about 350 correct, two years 0 to 700 average utilization will be 350 simplistically speaking.

And if 11 percent is the interest rate right 5, 5, 38.5 multiplied by two years so 67 crores that is the interest cost component so your interest which is why it is called interest during construction and that is 67 crores this is assuming that you have followed the project schedule the way you add (())(34:19) which is a perfect s-curve right, what happens if your project shifts, let us say there is a delay of six months on the project, what happens to this perfect assumption goes haywire.

So you instead of having 67 crores as your interest during construction it can be 75, it can be 80 and would the bank fund this, bank will not fund it, they will say you put in your own money, you delayed the project put in your own money to complete it and if you put in more money than what you had in research in the beginning what happens to returns, returns fall so at the end of the day capital cost estimating and contracting, interest is one component but the big component

here interest as a component generally speaking for a project which takes two and a half to three years.

Generally speaking interest during construction is about 10 to 12 percent, 10 to 12, 13 percent of the project cost, the big element of course is the construction cost right the EPC, the engineering, the procurement and the construction which will be normally say about of 700 it will be around 650 right, sorry we said a 1000 right 1000 so it will be around at least 800 so the three broad headings of any project are A, construction which is the EPC, B, interest during construction and C, preoperative expenses.

What are preoperative expenses, any guesses, no we are still at the project stage, I am just talking about capital cost, estimating and contracting. I am still trying to get a grip on what is my total project cost, we discussed interest, we discussed construction which is all engineering procurement construction since you took the example of a metro it includes the Civil Works, the coaches, the signaling, the automation, the tracks, the traction, the station buildings, the electrical again mechanical stuff around the station buildings, the whole works that is construction cost right which is about say 800 in a unit of 1000, you say 1000 crores, 1000 dollars whatever it is right.

70 percent debt we calculated the interest, we took the construction cost, now we are at preoperative expenses, sure it is part of it I agree so commissioning expenses, let me call it commissioning expenses, sorry bribes, no one finances bribes, see we all we all started by saying ethical bidding where are you, hello the reason why I brought in the concept of ethics is only because any infrastructure you have to decide what kind of a player you want to be and if you start off by saying look I am going to increase include bribes as part of project cost forget it I mean it is it is not going to fly, very dangerous right.

So let us come back so here are some of the heads of preoperative costs, first of all project management right you will need project managers, you will need staff, project management staff, the entire works, the office set up, the site set up right you will need consultants, you will need engineering consultants, you will need someone to ensure that safety is properly done, you need an independent engineer to make sure that you are doing what is required in the document and you are not cutting corners so independent engineers expenses.

So site office expenses, corporate office expenses, project management staff to look at quality, cost and schedule independent engineer expenses ,consultant fees if any, all that stuff that goes in before even you start earning a penny on the project all the expenditure which is non-construction related and not interest is preoperative expenses, normally preoperative expenses are in the range of 5-7-8 percent depending on the length of the project, the longer it takes to complete a project the higher the expenditure, correct, which is why I thought we should spend a little time in understanding what is capital cost and how do you ensure that it is kept under control.

Of course the single most deciding factor on controlling capital costs is what, one, just one primary factor which controls capital costs, sorry, absolutely right, project duration, you control time, you control cost provided you do not sacrifice quality and safety okay so this whole business of estimating capital costs keeping in mind these three large elements is the crux of your efficiency in capital cost estimation and it plays a huge role in ensuring that that one part of your risk on the entire project is taken care.

What kind of contracts are you familiar with, what types of contracts are you familiar with, lump sum turnkey contracts LSTK, EPC, item rate right so you have to decide at this point of time what is the contracting mechanism that you are going to have, tell me what would determine which kind of contract you get into, suppose you want to go on an item rate contract, what are the advantages, what are the disadvantages, sorry, it will remain with you true, very true, but then more also importantly you have to be familiar with the BOQ correct, if you are not familiar with the BOQ and you walked into the project and you want to do an item rate you have a big problem, not only that you need a large project management setup because you need to ensure that all the items are being done the way they should be done, you are tracking it, your entire project management setup will be different.

Whereas in an EPC who carries the price risk, price risk is moved to the contractor but there you have to be dead sure that your RFQ process is efficient, RFQ is you are qualifying someone to quote right if you get all kinds of guys quoting you are finished with your project, your duration is gone because one thing is very clear you cannot change contractors midstream very easily, A, it is highly litigious meaning there is going to be a lot of claims, counterclaims etc. and B, you lose time.

So your RFQ process is so important that you choose the right kind of people to do the right kind of job and if companies like L and T have grown in the past 18, 20 years just to give you some numbers when I joined the turnover has hardly 2,500 crores of the entire construction division, today the construction division does about 70,000 crores, so it has grown 35 times, in 16, 17 years, the reason being only one and that is because demonstrating the capability to do complex projects again and again and again on a turnkey basis, no item rate contractor can grow like this of demonstrating growth of CAGR of 18, 20, 25 percent in some years is phenomenal. So the point is the kind of contracting that you are going to use is clear, O and M is fine, sensitivity is okay I think all of you know it so I do not want to get into that.

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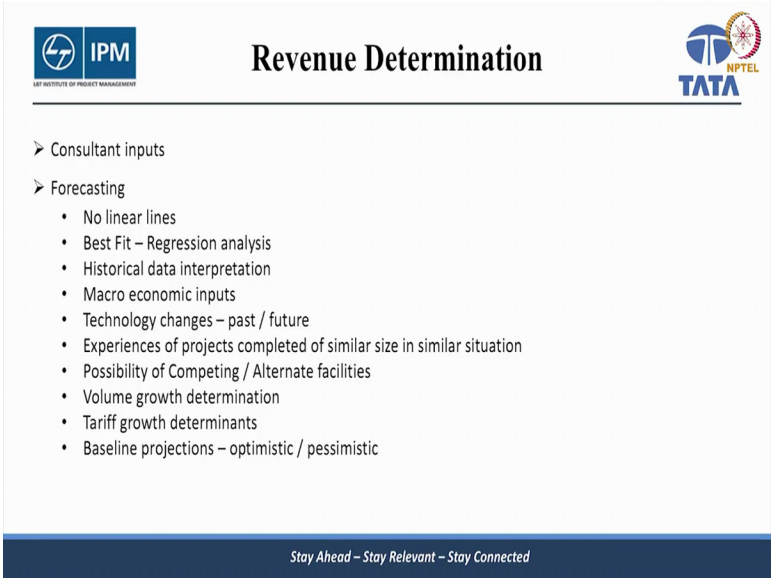

To determine revenue on a project is one of the key aspects of ascertaining viability right so based on our experience I have just put down some of the learnings that we had on forecasting right, all of you would have been studied a lot of advanced mathematics right in your subjects you would have done a lot of mathematics, can revenue forecasts be linear in nature, they cannot be but unfortunately financial projections, financial projections have to be linear is not it, with some growth built in.

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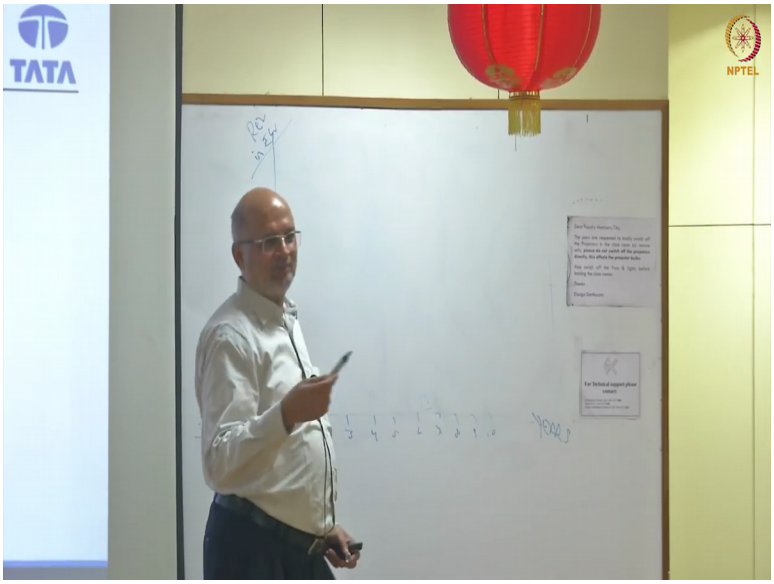

When you go with an application to the bank, years, revenue in and let us say rupees crores, how the revenue curve looks like and let us say this is the project construction phase minus 3, minus 2, minus 1 and the project is commissioned here, how would the revenue curve look like and this is years 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, can someone come here and plot the revenue curve, plot a straight line based on a projection that you make at the beginning of the project based on which you go to the bank with an application saying please give me money 700 as we discussed, the bank is going to look at that and see whether how is your revenues looking like because from the revenue you deduct the cost, you deduct the interest and that is the money left to pay back the bank right.

So he is going to plot cash flow based on that but the beginning of cash flow is revenues so anyone would like to come and plot the revenue curve as a projection, as a projection anyone would like to plot, would you just come up and plot the revenue curve, as a projection no problem please come up, come come, just plot it as a projection right you are going to the bank and you are going to tell them that look this is the money that I am going to earn so how would you explain to the bank, would you like to be the banker, come he is trying to explain the revenue curve to you, come, please come.

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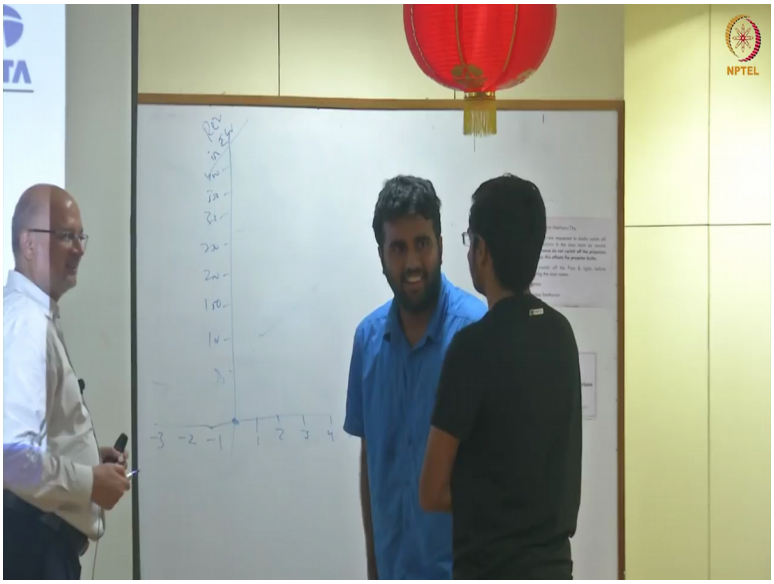

So you are the banker right and you are going to explain the revenue curve to him, this is projection, you have not even started the project you have gone to him with the loan application so what are you going to say, let us say it moves in terms of a 100 okay now or 50 you have let us say 50 crores here 100, 150, 200, 250, 300, 350, 400 right and these are the years so now you are going to tell him look this is what I planned to earn in this project and yearly revenue I just want to get a sense of how you were going to explain the banker, you have commissioned the project in this year so you are going to build it minus 3, minus 2, minus 1, these are your revenue earning yes right, year 1, let us say year 0, 0 to 1 okay you tell him okay.

Perfect okay, terrific, terrific, you are you happy with this? You happy with it all right now please sit down, so conceptually what you guys have done is correct right tell me why does it become a constant thereafter, why do you think it became a constant, no, no we are only on revenues, we have not come to costs at all, revenues means what you earned, I am not talking about net gross, it reaches its capacity, excellent.

So normally a revenue curve would look like this maybe you know it is this is still a projection you are not even started the project, the project will be minus three but in reality it never happens that way normally revenue will have two components, there is a volume component and as a tariff component correct, so let us take the example of a road, in a road how do you estimate

capacity, as far as vehicles are concerned you express it in PCU terms, passenger car units it is called right.

So even a truck is equal to depending on the number of axles it is equal to X number of passenger car units, multi axial, three axle, two axle, etc. so the capacity of a road is estimated based on passenger car units but you hit the capacity on year one, no, you hit in year 10, year 12, year 14, depending on what is traffic depend on, depends on growth, it depends on (())(49:47), it depends on competing roads, it depends on and we discovered to our surprise not so pleasant that it also depends on technology, do you see two axle trucks on highways anymore, you do not, do you see even three axle trucks on major highways, you do not, you only see multi axial trucks why because it makes sense for that for a guy who owns a trucking company.

But if I have made my projections based on increase in two axle trucks, I am dead because it will never it will never get realized if I had three 2 axle trucks replacing replaced by one multiaxial truck, I do not get a revenue differential which is multiplied by three, it does not happen that way so revenue depends on traffic, revenue also depends on tariffs as for the agreement I am allowed to increase my tariffs by what is known as WPI wholesale price index, can anyone predict wholesale price index, can you predict the inflation in the second year, third year, fourth year, fifth year, or sixth year, what is the average inflation that is there that has been there in your lifetime that you know since you started reading, four percent?

You know we have lived and projected inflation of seven eight percent we have lived in those times when inflation or seventy eight percent and we thought it can never come down and it came down to four percent it, came down to zero.

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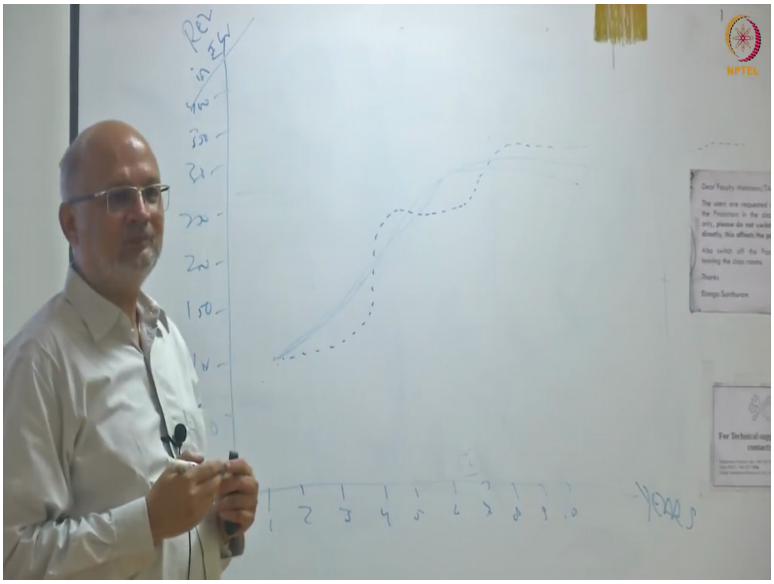

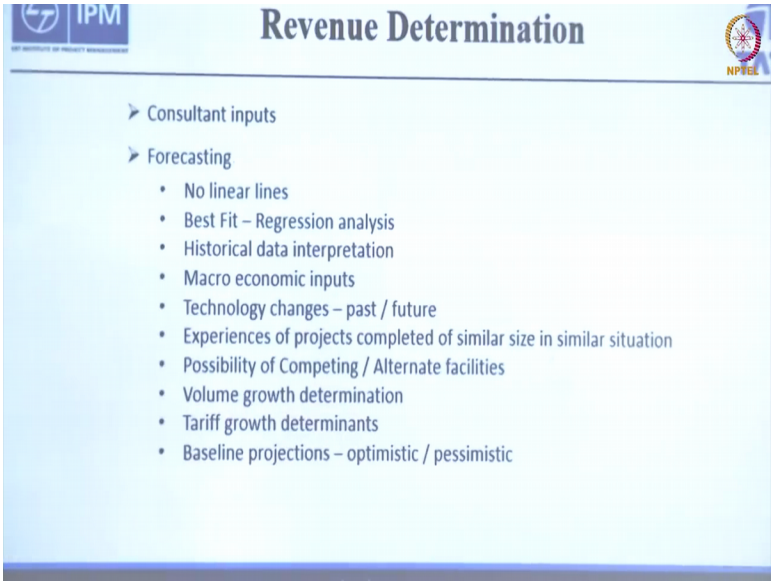

So your revenue curve which is a function of traffic multiplied by tariffs in reality will actually be somewhere like this, sometimes you get a pleasant surprise, sometimes you do not right and having been in this business now for fifteen years, if capital cost determination is one pillar for project viability and project valuation, revenue forecasts is the other pillar and all these points that I have mentioned there are no linear lines, a best-fit regression analysis is possibly one way to mitigate the risk of fluctuating revenues, historical data interpretation extremely important which means collect as much data as you can and figure out what intelligent stuff you can get out of that data, macroeconomic inputs, technology changes, experiences of projects completed of

similar size and similar situation, possibility of competing and alternate facilities, volume growth determination, tariff growth determinants and baseline projections.

So I think all of you have done project management where you do that you know A plus X, B plus Y, C divided by 6 should be your best fit, the standard very thumb rule stuff maybe you need to do something similar for evidence, you come up with different curves, different you know trajectories and then you take the average and say this is going to be my review, now as a banker my dear sir if you have not employed all this and you have not forced your borrower to employ all these techniques your money is down the drain because he will project a very very optimistic revenue curve, he will not be able to realize it consequently he cannot pay the money back to you and you become an (())(53:29).

So revenue determination extremely important, capital cost extremely important, type of contracting extremely important, I am just giving you the fundamentals of how do you put together a project and if there is a bidding environment and if there is a bidding environment you are also competing against each other so please understand the dynamics, they want to win the project, these people want to win the project, you want to win the project, now which levers will you use, will you use the capital cost lever where you optimize the capital cost, optimize the schedule, bring down the cost, whether you will use the revenue lever that your view on revenues is more optimistic than someone else's.

Will you use the schedule lever that they estimate they will complete in 36 months these guys estimate they will complete in 32, you say I will finish it in 30, what happens if you finish it in 30, any guesses, what happens if you finish it in 30 months instead of 36 months, sorry, no there is no one this is your project who is going to give you an incentive, no one, no one will give you an incentive, there is an incentive I agree but no one will give it to you but what is that incentive, sorry, more revenue for six months, excellent, that is the highest incentive right what next?

You are right, absolutely right, bang on, highest, lowering the interest cost during construction so two big advantages, one, six months of advance revenues, two, lower interest cost during construction and then you have another one, any guesses? Your escalation which you had budgeted, you will have a lower degree of escalation built into the project cost than earlier okay, so it in a competitive environment all these factors start playing a role but what happens if you

win the project with very aggressive capital cost assumptions and then do not realize it in reality it drifts, your valuation suffers correct.

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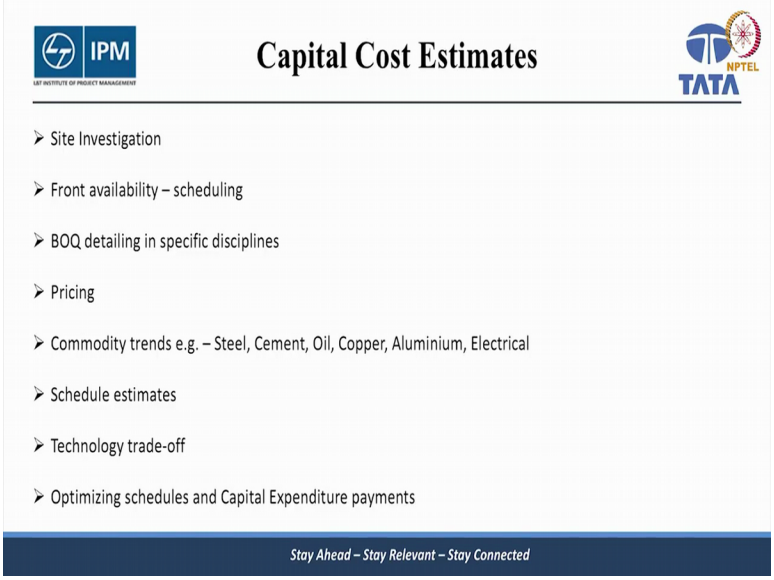

So again for capital costs estimates about site investigation, front availability, BOQ, pricing, commodity trend, schedule estimates, technology trade-off and optimizing schedules and capital expenses, I will just put some bullets there is a lot of science between each one of those bullets in practice, in practice there is a lot of science between every single bullet that is there and all that goes into your capital cost estimation, now you can imagine if one is bidding for an airport the complexities involved or one is bidding for a port or one is bidding for a metro the complexity is involved in putting together the capital cost and then the complexity is involved in putting together the revenue estimate right.

O and M estimates, cost elements, all of you understand what O and M is right, now we come to them from the gross which is revenue we come to the net which is net of O and M costs which includes cost elements of power, fuel, labor, minor maintenance, major maintenance, responsive maintenance, insurance, industry benchmark, service level agreements, Six Sigma, all of you know what Six Sigma is right, anything that is that you are doing it repetitive you can achieve a level where it comes to 99.X percent of predictability, sustainability and actual occurrence.

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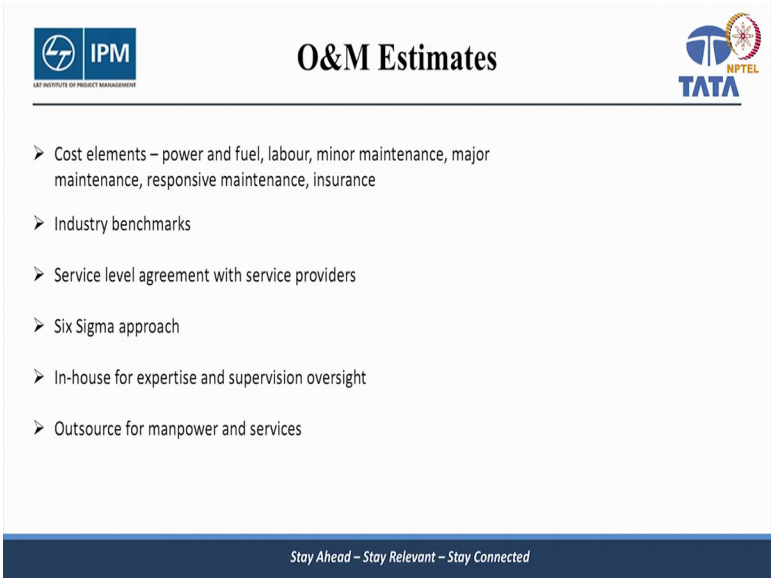

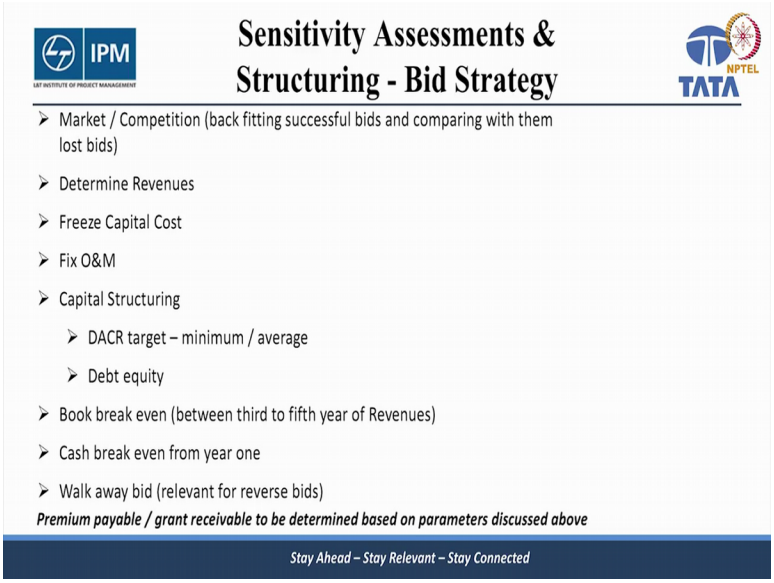

In-house for expertise, supervision, outsourcing manpower, etc. then you do the sensitivities, you do the sensitivities for market, revenues, capital cost, O and M, capital structuring, breakeven and the walk away. Tell me one thing let us talk a minute or two on walk away, if the competition is getting very very tight right in the sense that every bid sees five player, six players and you lose the bid and you find that your numbers you have gone over it thoroughly, you have estimated capital cost thoroughly, you have estimated revenues thoroughly, you have estimated O and M thoroughly, they have taken the best interest cost into account and you lose the bid right.

And then there is a next bit coming up, would you be inclined to be aggressive enough to win that at any cost, sorry, I should not do that, any reason why you should do it, agreed, you should not do it I fully agree, any reason why you could do it or should do it, sorry, if you are a new player and you make a mistake you want to commit (())(59:04) okay fine agreed, anything else, haa, you have to stay relevant, you have to stay relevant otherwise who is going to work with you and big players can fail right so but I fully agree with you to start with and that is to walk away and wait till the market becomes more sensible right, provided how do you judge whether what you have done is right, you could be in the solution that I am the best whatever I am doing is right and whatever the other guy is doing, he will go kill himself and willy-nilly he actually survives and you just missed an opportunity in optimizing your own working.

So there is something called a loss tender analysis right, very very important to do a loss tender analysis very objectively throw your books open to an outsider and say, hey look tell me what I where have I gone wrong, why is it that I am not competitive enough and get the best in the industry to look at it right.

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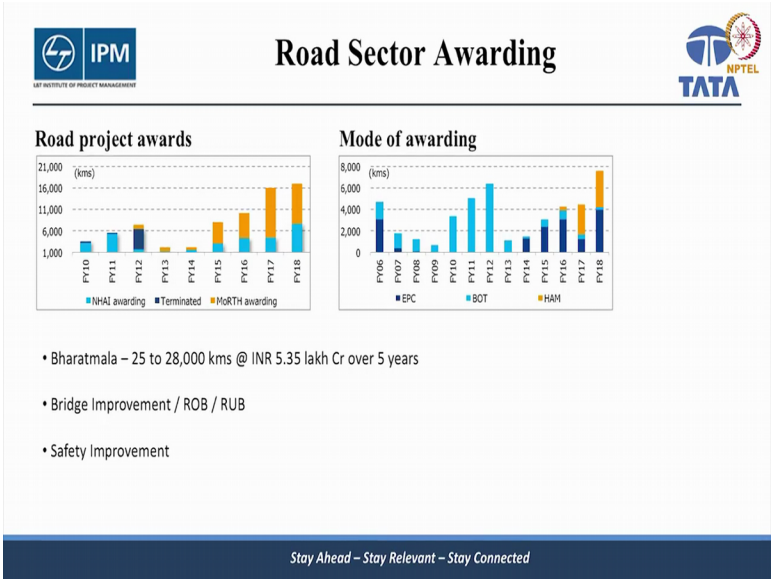

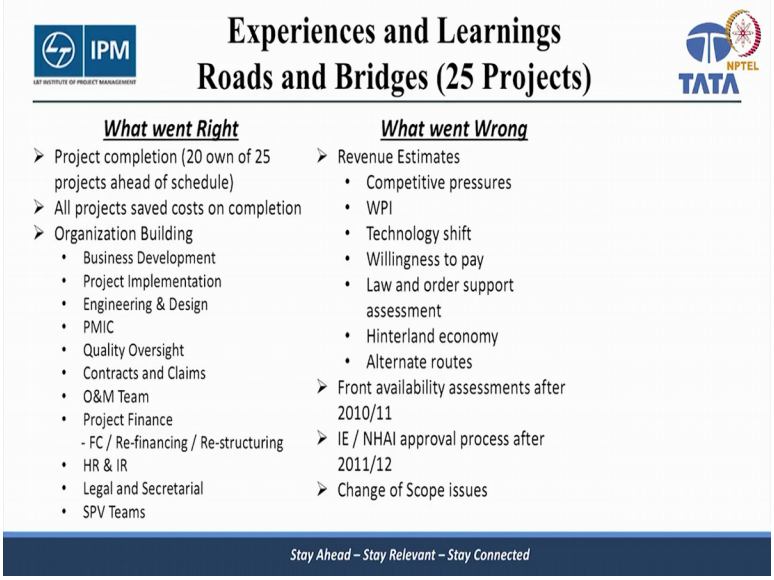

So bid strategy, I do not want to get into all this, very quickly I think experiences and learnings, so some of the things that I went that went wrong is more important for a discussion of this type, forget about what went right, there will be went wrong in our revenue estimates because of competitive pressures, WPI, I explained to you technology shift I explained to you, willingness to pay, see most of infrastructure projects the public has to pay and if there is a law in order situation and you lose revenues for three months, four months, six months, your project becomes less and less and less valuable.

So to assess the willingness to pay and to get the political sentiment around it is extremely important, law and order support, hinterland economy, alternate routes, front availability, etc. you know a lot has been spoken and written about land acquisition and right-of-way availability I do not want to get into that I think you would have been reading it in every way partly (())(61:23) problems are that as well, that they could not finish their projects on time because the front was not available for construction for various reasons right either approvals were not there, acquisition not completed, demolition did not happen, utility could not be shifted, you name it.

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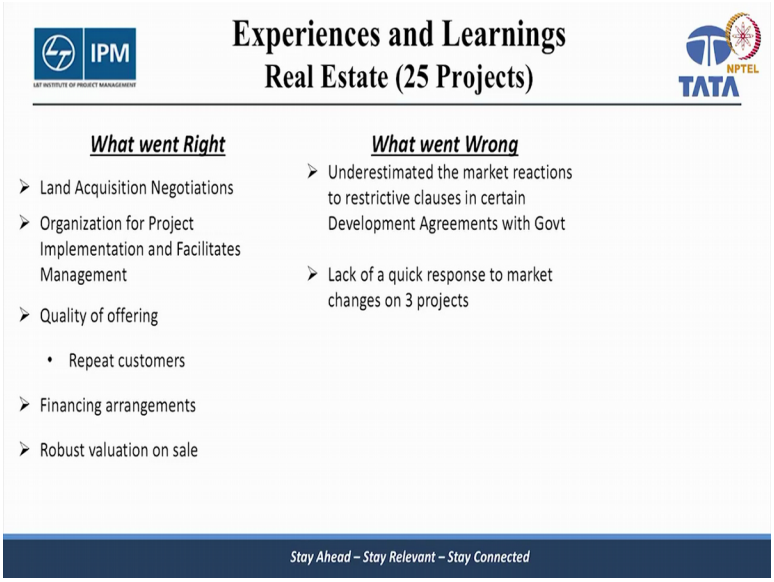

Similarly on real-estate, underestimated market reactions to restrictive clauses and certain agreements and also lack of a quick response to market changes, Metro dealing with change in politics, see infrastructure and politics are two sides of the same coin, so you better figure out without paying bribes of course you better figure out how to deal with a politician if you want to be in infrastructure and if you want to remain clean right and believe me there is a way, it is not that all is lost and if you do not carry sacks of money which in any case you cannot do these days, sacks of money you know nothing will happen.

At the same time I tend to agree with you that there is a lot of crony capitalism that goes around infrastructure unfortunately but you can make your stand clear which is why I put it as one of the first things, you have to choose as an employee you need to choose as to which kind of infrastructure organization you want to work for right.

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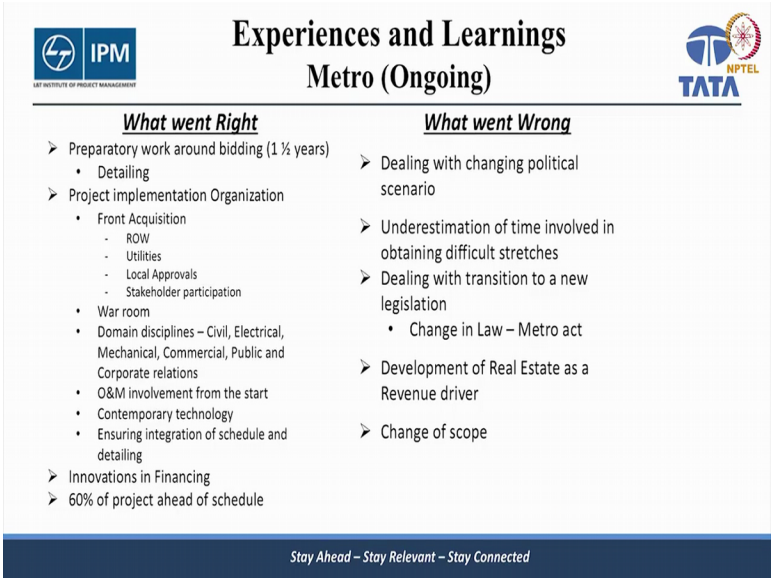

So dealing with political situation, under estimation in obtaining difficult stretches which is capital cost estimation, schedule time, dealing with transition to a new legislation, development of real estate change of scope, etc. So I will take just 2 more minutes if it is ok with you, how do you monitor a project, we discussed so many aspects right.

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We discussed aspects of project cost building, we discussed aspects of revenue, we discussed aspects of interest, we looked at RFQ processes, RFP processes, monitoring the financial health of a project is extremely important, these are some of the issues that are there and if there are

certain aspects where the government has to come give you like for example land and they do not give it to you for a year or two years, would you like to walk away, agreements are clear you can walk away if you want to but then you have to face the flip side of termination, litigation, all that stuff but in our opinion and experience you have to have a threshold right and that threshold is I am going to wait for six months, I am going to wait for three months or eight months, make it clear to the government upfront and they do not give it to you say thank you very much and just walk away.

So your calibration of how much money that you have to commit till you reach that threshold you have to take a calculated view, if you pour in a lot of money and then it becomes a no-go situation and you are stuck between the devil and the deep sea there you have to be very careful right.

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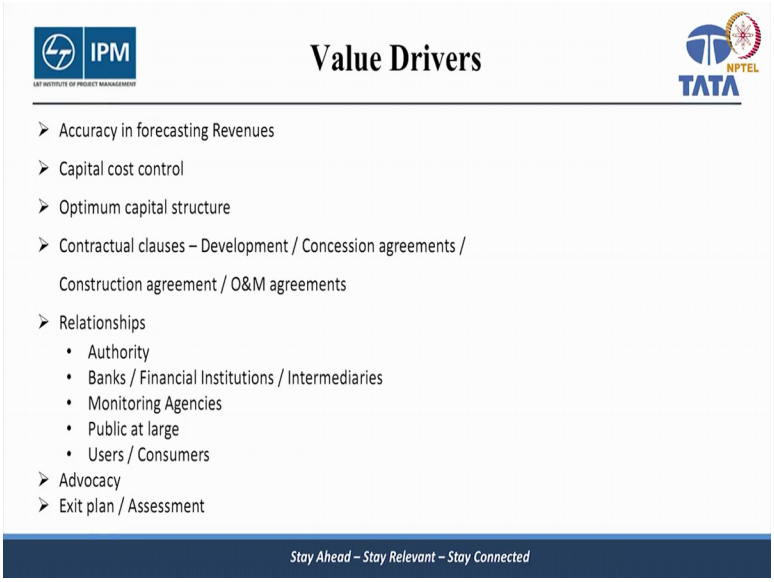

Value drivers are similar, we have discussed this, that is about it, thank you.