Infrastructure Finance
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Lecture - 39
Context of Infrastructure Development

Hi, welcome back to this course on Infrastructure Finance, this lecture 39, and we will continue our discussion on trying to understand, in the context of infrastructure development. We have been looking that the power sector in the previous class, in this lecture, we will try and look at the root sector. But before we actually do that let us try and spend some time to discuss the thought questions that we had at the end of the previous lecture, we actually had 2 questions.

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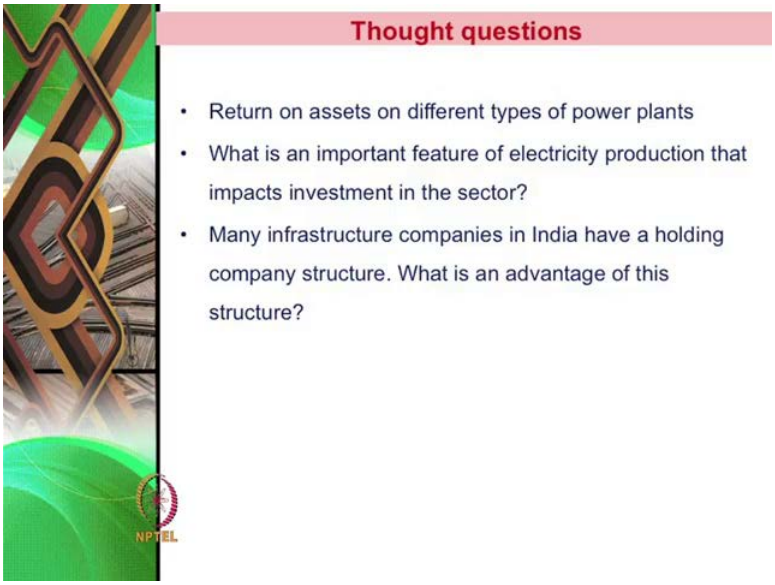

But I would actually asked you to, do a homework in the middle of the lecture, on return on assets of different types of power corporations.

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Different Sources of Power

All amount in Rs.Crores			
	NHPC	NPC	NTPC
	FY12	FY12	FY13
Revenues	6784.27	8708.91	70534.66
PAT	2765.74	1896.08	11395.16
Profit %	41%	22%	16%
Total Assets	45258	43627	133641
RoA	6%	4%	9%
Asset Turnover	0.15	0.2	0.53

So, we will try and discuss them one by one and the first the task is you need to find out the return on assets on different types of power corporations. So remember, if you actually look at it, we had discussed that there are 3 brought types of power generation, conventional power generation, hydro terminal and nuclear and we have looked at the net income or the profit percentage for each of these corporations. And we also discussed that you know the cost of capacity cost for power generation in each of this 3 types of corporation are going to be very different.

Thermal power corporation is probably has lowest capacity cost and nuclear is probably has the highest capacity cost and we said, we have to find out the return on assets for each of these corporations, because the cost of installing in a unit, capacity is going to be a very different for, each of those three types of power generation. And when you actually look at it, I have given the total assets, for each the power corporations and if your assume that, substantial part of it is assets is for cost of power generation install the capacity.

And we can kind of do the return on assets, to find out what is you know how efficient each of these corporations are… So, as expected you will find the national thermal power corporation has the highest the return on assets of 9 percent indicating that, on the cost of installing, units capacity of thermal generation plant is probably the lowest, because if

you are assumed that, power generated by all the 3 corporations are sold at a very similar rates.

And if the cost of capacity installation is different, then return on assets is a measure of you know how which of them is going to be the competitive in terms of installing capacity cost. So, if R O A is an indicator of how cheap, it is to install capacity, in each of this types of power generation, we find N T P C is probably the cheapest 9 percent and N H P C has ratio of 6 percent and then nuclear power corporation has a ratio of 4 percent. So essentially, if you assume that all the 3 corporations perform, the same level of efficiency, all 3 are public sector corporations.

So, the only differentiating factor between them could be, the cost of installing unit capacity of power generation. So, therefore, this is an indicator that, nuclear capacity is going to be the highest and thermal capacity is going to be the lowest cost, we can also look at the asset turnover. Asset turnover is nothing but the ratio of sales divided by total assets, that is how much of assets, how much of investment assets is needed, to generate given amount of revenues, again you find N T P C is actually having highest ratio.

So, indicating that, the total asset investment needed, is the lowest for a thermal capacity and it is probably, you know we need high amount of investment in assets, in hydro and nuclear. So, the question that, you might have is when the thermal is probably, you know having a highest asset turn over, having the highest return on assets, why as a country we want to actually look at hydro and nuclear power, because they are probably more expensive.

So, the reason is you know, it is not only cheapest that, we always look at in terms of power generation, but we need to be really not dependent on one single source of power. So, tomorrow example let us say if coal is in short supply, then we might need to have actually look at other forms of other sources for power generation that is one. Second is there are other benefits, let us say a for example, nuclear power corporation help us to develop, nuclear technology and in the long run nuclear generation is supposed to be you know very clean.

And today most of the developed countries are actually going for increasing emphasis on the nuclear generation simply, because it supposed to be environmentally, you know much more superior as compared to thermal power, because of the fact does not result in

any harmful emissions. So, there is a policy angle also, to actually look at generating power different sources. And so for the time being, we need to be really looking at developing different sources of power, because from a long term prospective, we may be able to capture much more benefits or that way.

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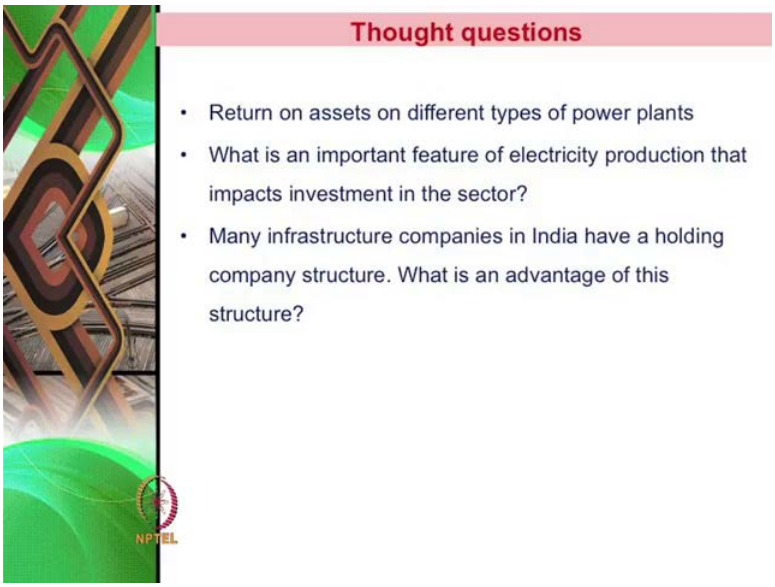

So, the second question that, we had is what is an important feature of electricity production, that impacts investment in this sector. So, unlike other products, where we can produce and then stores it use it later, in the case of electricity inventory of power that has been generated is not economically a feasible even today. Let us say for example, in terms of agriculture, we produce a crop and then store it, for use during the remainder of the year.

So, whatever is be produce can be stored and then use at a later period, let us say in the case of automobiles, we produce cars and then the store it, before it is actually being is sold. But, in the case of electricity, what is important is, it cannot be inventory that is it cannot be produced and then stored, before it can be used at a later stage or at least it cannot be done in a economical fashion. When we actually are able to store electricity, but it is in very, very minimum minimal fiction for example, today we are able to stored in electricity batteries fine.

So, that is very, very small proportion of the total power consumption, that we actually use for. So, therefore, it is important for us to actually have electricity capacity to the

extent that there is a demand and in the previous lecture, we also discussed that, demand is highly fluctuating in the sense that, if we look at a particular day.

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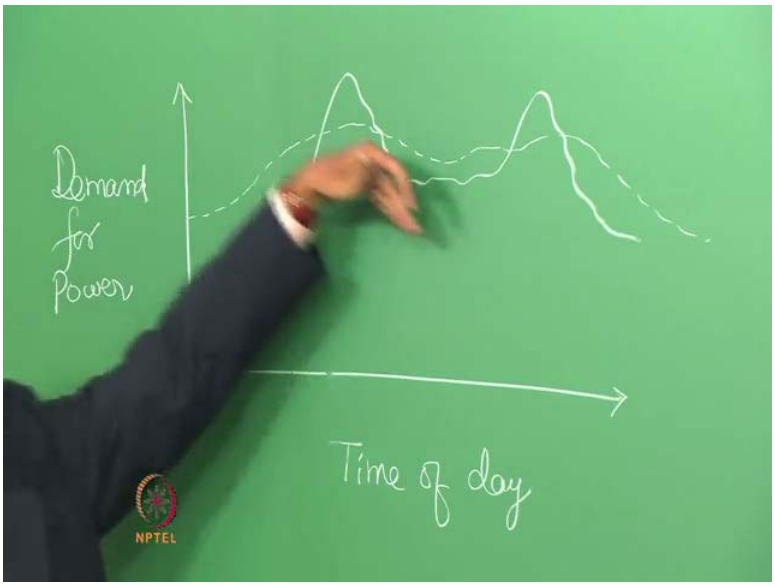

So, we said that on the x-axis this is your time of day and then the y-axis, we have demand for power. So, normally you find a peak in demand for power, twice during the day, corresponding to the early morning office, rusher word and then in the evening when people come back homes and then they need electricity for cooking and lighting all the other purposes right. So, essentially you find the demand is not consistent demand fluctuates and there are certain specific peaks.

So now, if you want to meet the electricity demand during this peak hours then we need, so much of capacity to meet the demand and this capacity, which is needed during the peak hours remains idle at the remaining part of the day. So therefore, this is an asset that is not being protectively used, for a long, for a large duration, during the day. And so therefore, it actually in any some senses an investment, that probably is being underutilized.

Now, what can we actually do, to radio this peak and then if you do not really have enough capacity to meet in the peak load demand, then obviously, people will go for, what is called as you know, shutdowns. There is a you know dedicated in some cases, there is dedicated power cut off during this peak hours to ensure that, the load is a kind of balance the reminder part of the day. Let us say for example, if people know that,

there is going to power shutdown, for a particular duration then what are they going to do, they are going to schedule, their task during the remaining period.

So, in effect what happens the peak gets distributed, during the remainder of the times, so in India, if you do not of capacity we are able to kind of in four shutdowns, but that is not a case in most developed countries, in developed countries, the actually use other forms, to encourage power consumption in the or to be basically reduce the peaks, demand peaks.

So, how they do it they have something called as time of the day pricing, that is when new actually consuming power, during peak hours then the cost of power is going to be quite, high as compared to consumption of power, during the remaining time periods. On that is also natural, because the cost of power at peak load is going to be higher, so therefore, the tariff also in line with the cost of power that is being generated.

So therefore, there are different ways, in which we can minimize have this peaks, basically either in terms of shutdowns or in terms of demand side management, we manage the demand in such a way, so that peaks can be reduced. So, for example, if we actually use some way to reduce the peaks, then overall the power demand can be something like this, you may still have some peaks, but then sharpness of this peak can be reduced and distributed during the other times.

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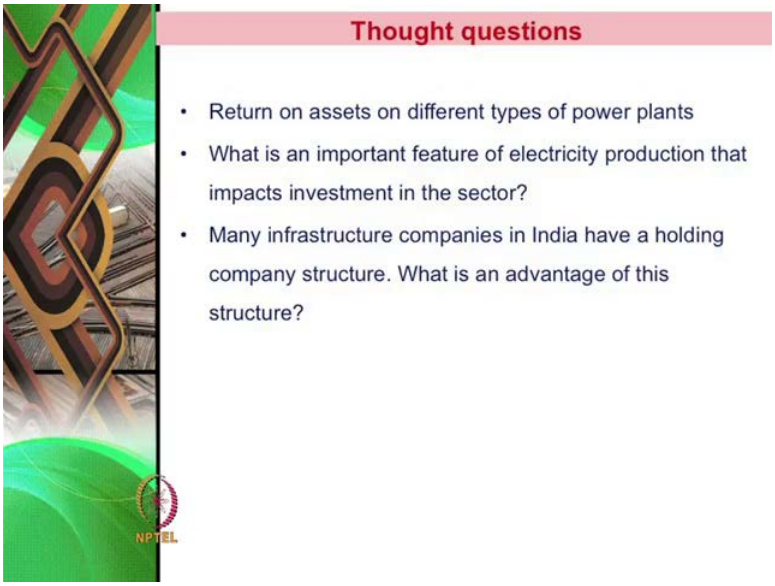

The next portion that we had was, many infrastructure companies in India have holding company structure, what is an advantage of this structure, first of all let us try and understand, what is the holding company structure?

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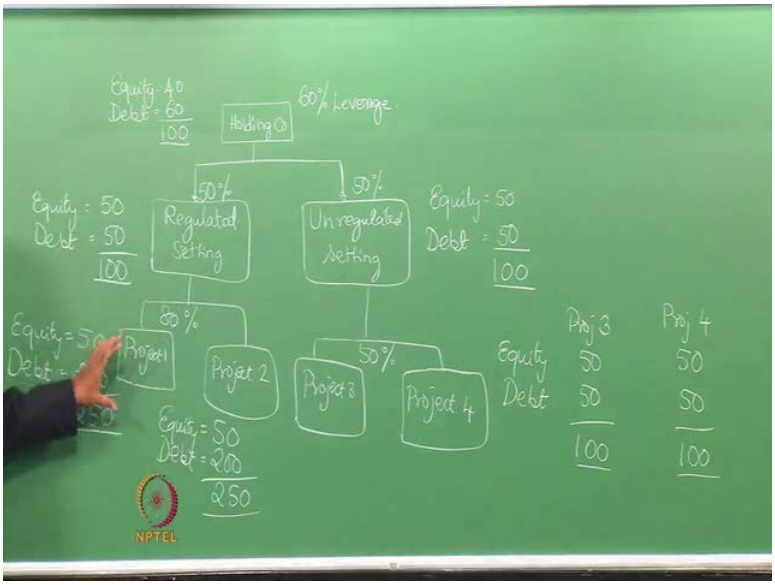

So, you have what is called as your holding company, we have called as your holding company, let us assume that, this company is involved in setting up a power plants and this holding company has, let us say 2 subsidiary corporations. And one corporation is involved in another business of setting a power plants, it is in a a regulated setting, so let us call it as your regulated setting. So, in a regulated setting you have regulation on how much can be the tariff, what will be the returns and so on and then you have an another corporation, which is in an unregulated setting.

So, un regulated setting means, there is no regulation, it is open to the market competition, so essentially, you were talking about, merchant power plants. So, regulated company is probably involved in setting up of independent power plants and then unregulated setting is involved in setting up of a merchant power plants. And let us assume that, there are 2 project finance companies, under each of the subsidiary corporations. So, I will call them as project 1 and then call them as project 2 and then call them as project 3 and call them as project 4.

So, now, this is something called as holding company structure, the holding company does not own any assets, but it is actually an investor in 2 subsidiary corporations, which

1 of the 8 operators regulated setting. And other operating unrelated setting and there are in turn to project finance companies, under each of these subsidiary corporations, so this is also called as a hybrid structure. Hybrid structure, because we also have a project finance arrangement and we also have a corporate finance arrangement.

So, this is a project finance arrangement and this is your corporate finance arrangement, since we have both in the same you know corporation, we call this is also a hybrid structure. So, now, let us say for example, you have project 1 and project 2, they are I P P is, in the case of I P P is you actually have contracts and therefore, the risk is much lower. So, you are able to actually have, let us say and 80 percent leverage right where able to have an 80 percent leverage.

And then project 3 and project 4 hour merchant power plants, there is a higher power level of risks. So, therefore, the leverage that, you can have is only 50 percent right, the leverage can have only the 50 percent and let us say are the corporation level is subsidiary corporation level, we are talking about, 50 percent leverage talking about, 50 percent leverage, in both the cases. And then at the holding company level, let us assume that, there is your 60 percent leverage.

Now let us see, if we assume, you know some hypothetical capital numbers, let us say at the holding company level, there is a equity of 40 and the company borrowers debt to the extent of 60. So, that the total capital is 100 at the holding company level right, so responses of the holding company bring in 40, they borrow 60, the total capital available is 100. And the holding company makes investments, in let us say the regulated entity and the unregulated entity in a equal manner.

So, out of the total capital of 100, it invests 50 in regulated company and 50 in the unregulated company. So, this 50 investment from the holding company is actually in the form of equity in the regulated entity right. So, and this 100 gets divided into equity of 50, in the regulated entity and another equity of 50 in the unregulated and using this equity of 50, the regulated entity can borrow another 50, because you are talking about, 50 percent leverage.

So, the regulated entity borrows an another 50 right, so the total capital available with the subsidiary corporation is 100 and same hear with the using this equity of 50, the unregulated entity borrowers another 50, so that the total capital available is 100 in the

case of an regulated entity. So here, we have let us say the total capital of 100, we have total capital of 100 and obviously, this is regulated entity is investing in 2 projects and this 100 is getting invested at the rate of 50 each in both the projects.

So, we are talking about, 50 in project 1 and 15 in project 2, so this 50 is a equity contribution of the regulated company in project 1 and this 50 is the equity contribution of the regulated entity in project 2 and we are talking about, 80 percent leverage right. So, using this 50, the company can therefore, borrow 200, so the company can actually make an investment in project, which can be constructed using a capital of 250.

So, for project 2, the equity of 50 and then we have a debt of 200 again, so the total capital available for project 2 is 250, now if we assume the same thing, for the unregulated entity. Then project 3 and project 4, the unregulated entity has a total capital of 100, it invest 50 both project 3 and project 4 as equity and then the leverage is 50 percent for project 3 and project 4. So, therefore, the debt that, they can borrow will be right, so the total capital for project 3 and project 4 is the 100 each.

So, they can actually implement a project, for about investment of 100 each, so now, the question, I have for you is what is the total leverage for this entire structure. So, first we will have to find out, what is the a total borrowing that as actually happened, what is the total amount of borrowing, that is actually happened from outside. So, what is the borrowing, that is happened lets actually go from the bottom of pyramid, so you have debt of 200 in project 1, you have debt of 200 in project 2.

This is total borrowing from project was and project 2 is 400 and project 3 and project 4, we have debt of 50 each, so the total borrowing for project 3 and project 4 will be 100. So, the borrowings for all the projects put together will be 400 pulse 100 that will be 500 borrowing.

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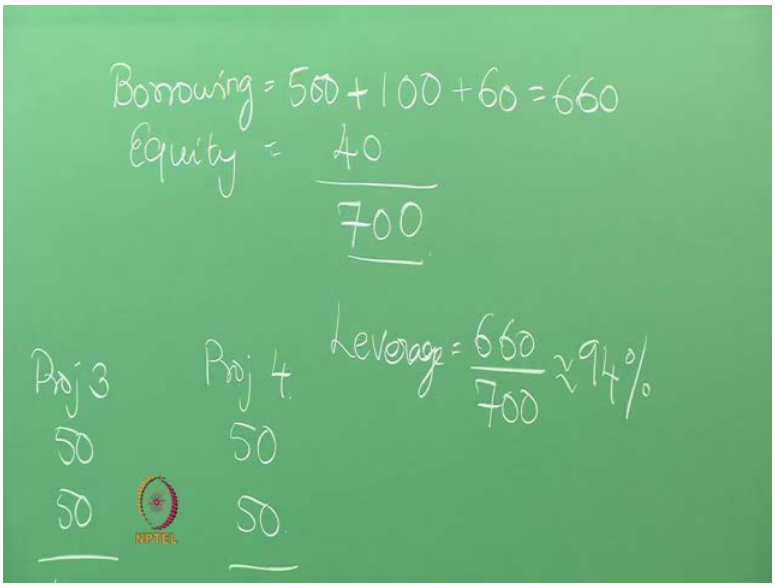

Total borrowing will be 500 at the project level pulse, then we find, there is a borrowing at the regulated sitting right, regulated company borrows 50 and the unregulated company borrowers 50. So, at the subsidiary corporation level, there is a total borrowing of 100, that is 50 plus 50, then we come to the holding company level, at the holding company level, there is been borrowing of 60 then. So, the total borrowing is it will be 660 fine, what is the equity the original of equity that has come in for the entire structure is only the 40 right, this only 40, this is original equity that has come in.

So the remaining is just a cascading of the original equity in the different entities, the original equity is only 40, so the total capital is 700. So, therefore, the leverage is nothing but 660 divided by 700 and this approximately equal to about 94 percent. So, we have a very high degree of leverage, when the use a holding company structure and this is one of the biggest advantages of using this kind of the structure, why because we have seen earlier, when we increase debt, when we are able to reduce the cost of capital.

And this actually helps us to generate power at much more competitive rate, simply because the cost of debt is lower as compared to the cost of equity. So, when you look at many of the Indian companies in infrastructure structure sector, like G M R and G V K or any such companies most of them will have this kind of holding companies structure, where you have a large number of subsidiary project companies. So, one of the reason, why they do to basically, to increase the leverage that, we have in the entire structure.

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Now, we will go to the topic of today's lecture, which is to really understand little bit about road sector. So, India as the one of the largest road networks in the worlds, you know, if I am right, I think US, if probably have words largest road network followed by China and then next comes in India. And roads in India actually in India play an important you know, position in the transportation matrix, though they have different types of transport, you have air transport and within surface transport, you have road rail and water and so on.

You know roads is actually important position, because they the estimated to carry 65 percent of freight and about 85 percent of the passenger traffic. So, in a for economic growth and development, therefore it becomes very important to actually have a very strong road infrastructure. If you look at the road network in India, they have broadly classified into 4 different categories, you know top of it you have an national highways, which is actually very important roads that, they are managed by the central government.

And then you have a state highways, which are actually managed by the state government and you also have other roads, such as district roads and then village roads and all of this will also come under the per view of state government. But, in terms of quality, in terms of the length, you know in terms of you know the strength of the network, obviously, it decreases as we go from national highways to village roads, national highways are probably much more well built as compared to the village roads.

So, how do we actually fund the road network in India, so really look at it this is been largely you know, 3 or 4 sources the first, what is called as the fuel cess. So, in India whenever we actually buy fuel or petrol or diesel, we actually pay a cess and part of the cess is actually is used for a road development. So, today the rate of cess is 2 rupees per litter of petrol or diesel and this 2, which is actually goes to a cess pool and from this cess pool, we actually distributed to a different road projects.

Let us say for example, out of this 2 rupees 50 paise goes to national highway or projects and then out of the remaining 150 another cess that been received from diesel goes to some state highway projects. And then remaining goes for rural roads and so on and so forth. But now, what I am really trying to say here is each and every road user, indirectly pays for development of the road sector in India, because of this fuel is cess and the second is budgetary outlays.

So, you have let us say a budgetary outlays from the government of India, it is annual process and the government allocates a certain amount of money, in terms of for road development. And then you have what is called your E A P external assistance programs and the external assistance program are let us say, the grants of the capital that, you know the government received from external agencies, such as world bank, Asian development bank and then Japanese bank front national corporation and so on.

So, if you really a look at the project or the economic survey, we find that, you know world bank Asian development bank and the Japanese bank for international corporation as contributed to the road development sector in India. And then we talk about, you know private capital, it could be in terms of equity investment or it could be in terms of debt. So, let us say using the capital under the government provides, some of the public sector organization can go head and raise money from the public markets.

So, this is this market borrowings and market, borrowings also certain extent considered part of your private capital, so this is by and large funding of the Indian road sector, there is a reason estimate, in a which talked about, total funding requirement.

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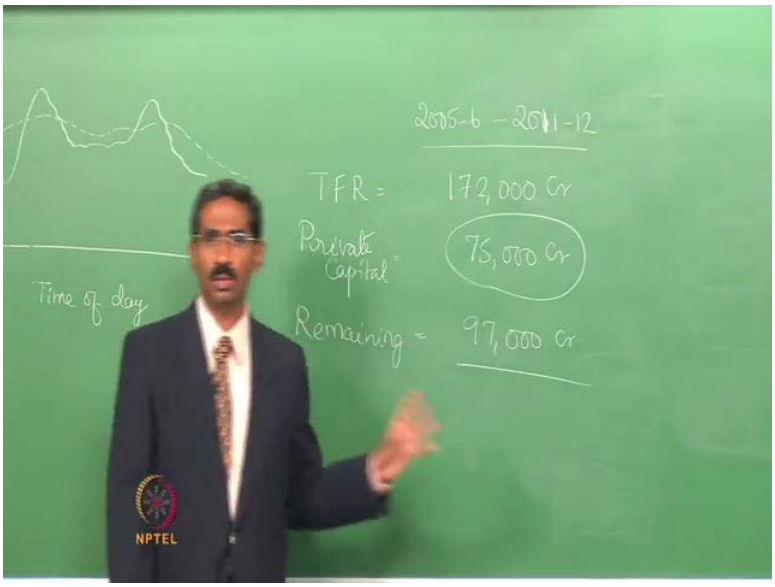

So, in 2004 government estimated the total funding requirement, for road sector development for the period 2005 6 to 2011 12 right, so the total funding requirement, during this period as of 2000, for prices was estimated at 172000 on crores. So, if you really look at this substantial part of the capital and is substantial part of capital and out of that, private investment right, private sources private investment is supposed to be about 75000 crores.

And then we have other forms, which includes cess external assistance budgetary outlays and market borrowings, all of them put together, the remaining later, we talked about, cess pool a market borrowings external assistance and all of these put together, it is about 970000 crores. So, essentially really look at it, when know government, when we saw that substantial part of road development to be, so assumed by the private sector in the going in the future years.

So, essentially you really look at a bulk this private sector largely in the national highways sector, because national highways sector carries a lot of traffic and this makes them commercially viable proposition for, the private investors. The private investors can charge tolls and they will be able to get return on their investment, as well as to also recover their investment that, they have actually made. And you know originally, you know the national highways in India was actually under the national highway authority of India and national highway authority of India as developed several plans.

So, you have national development plan, so today you have national highway development plan 1 2 3 4 5 and so on fine. And it is invisizes that, you know all investments in going forward is going to be using private sector investment in the national highway development plan.

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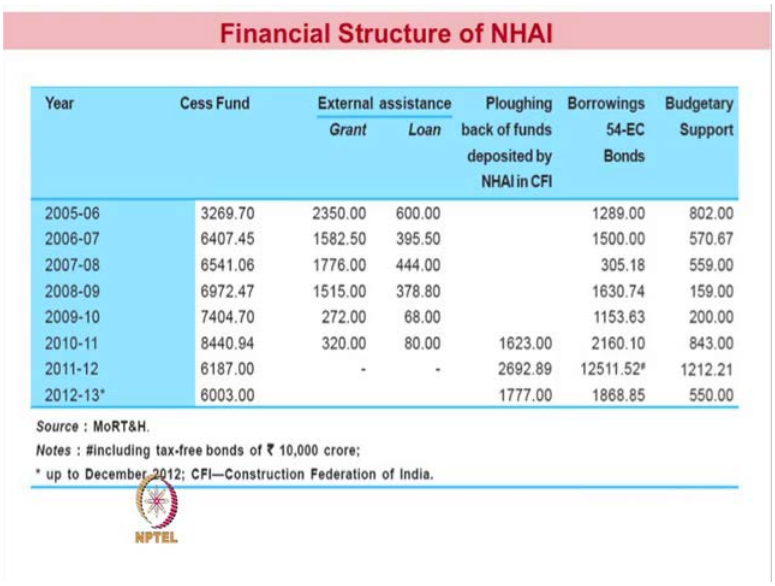

And let us really look at the financial structure of national highway authority of India, so I have actually taken it from you know, the economic survey and if we really look at it, you know, we have talked about different types of sources. You know, it indicates there is a cess fund, cess fund is what I have actually talked about and if you look at there is a big jump in the cess fund, from the 2005 6 to 2006 7. So, the reason is into 2006, the government you know leaved and additional cess of 50 paise per liter, of petrol and diesel and which was directly located for the, national highway development.

So, really are the cess was 1.5 rupees, which was allocated for the road network development and with an increase of another 50 paise, it actually became 2 rupees. And then the entire 50 paise that was actually charge was direct was completely allocated for national highway development. So, that was the reason, why there is been a certain been jump and in the cess fund into 2006 7 and then we had talked about external assistance, the external assistance from world bank and I D B come in 2 forms and can come in under brand and it can also be, in terms of loan.

So, the normally external assistance is for projects, to develop roads in areas that are not easily accessible, it could be hilly areas, it could be areas that are not well developed and so on. It is really look at it, these are essentially, from a development perspective not, early in terms of investment. So, therefore, the proportion of grant is always higher than a proportion of loan component, grant component in the case at the onetime investment more as a way to encourage stimulate development in this under development areas.

And then you also have a borrowings in N H A I borrows using the cess fund, it actually leverage such fund and borrows additional capital from the market. So, we can make actually investments in terms of different bonds N H A I, you know uses to raise money for example, you have the capital gains bonds and you have a tax free bonds and so on. So, N H A I raises money from the market, borrows money in terms of by issuing bonds and then over and above that, we have also called as your budgetary support. So, the government of India, during this annual budget, allocates certain amount of capital and towards national highway authority of India. So, this is the broad source of funding for development of national highways, brought sources from the public sector.

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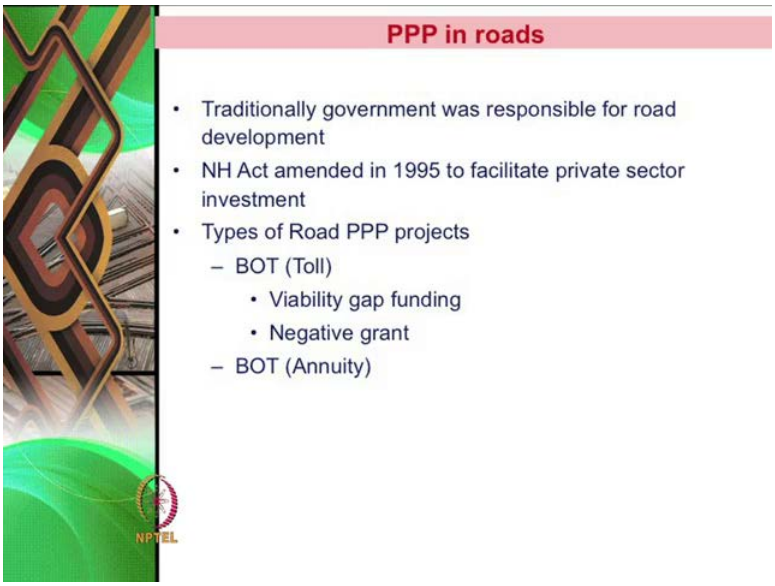

So, really look at PPP in roads, traditionally the government was responsible for road development, but in a given fact that as you mentioned, you know the total funding requirement for road development as very large. And obviously, the government was felt that, is not in a position to meet all the capital requirement by itself and therefore, they

wanted actually tap into private sector. And therefore, to enable facilitate and private sector investment in the road sector and the national highway amended in 1995.

And after this amendment, we have been actually having private sector investment in the road sector project in a significant way. So, we really look at the private sector roads in India is not really, you know very long, it is probably less than 20 years, since we have been actually having very active a private sector roads. Road P P P projects broadly classified into 2 categories generally, most of the road P P P projects are having a build operate transfer can type of a structure. So, that build operate structure has 2 variance one is BOT To l l and the other is your BOT and annuity.

So, let me actually explain, the major differences between this 2 types of P P P projects, if you look at B O T Toll project, what happens on the private concessioner, you know develops a road, next the initial investment. And is also responsible for maintenance of the road during, the during the concession period and then the private you know, the private investor is as the right to collect Tolls from the users of the road. So, the investor is expected to get a return on their investment using the toll collection revenues and there will be also other revenue collections, other sources of revenues.

For example, you know you are able to have a ride of way, for display of advertisement sometimes, we may actually have prize for real estate development around the around road area and so on. But, then primarily most of the most of the benefit are returns are in terms of Toll collections, that is your B O T Toll. So, in the case of a B O T and an annuity what happens is there is no toll collection, but the private sector makes an investment.

And therefore, it is also responsible for maintenance of the road network, road stretch and it enable to recover, the investments are the government pays an annuity or revenue steam, during the concession period. So, this annuity revenue is stream, helps the private investor to recover the investment made by them. So, the public sector can either collect Tolls of from the users of the road and then pay them as annuity to the private investor or the private public sector can say that, this road is actually been constructed, for development prospective.

And therefore, need not collect any Tolls, at just pay annuity payments at regular intervals to the private investor. In the case of the B O T Toll, there are 2 important, you

know concepts that, you may have to be aware of the first is called as you are a viability gap funding. Remember, whenever a private investor has 2 invest you know, he to bring certain amount of capital and he needs to actually get a return on the capital, that is invested.

So, remember private capital has the cost of capital is going to be higher as compared to public sector capital. So, therefore, if the entire investment is from private sector capital then for them to actually get a return on their investment, the Tolls would have to be charged a very high, at such high toll rates, now may not be very users, who are going to use a project. So, therefore, that traffic will be very less and if the traffic is less than, the corresponding economic development will also be lower. So, therefore, the government said that, the government will provide assistance, up to 40 percent of the project cost.

So, if say total of the capital is certain amount of capital is going to come from public sector then the cost of capital for is going to be reduced and the private sector needs to get return on the investment that only it has made. So, therefore, the Toll on the toll rates are going to be can also be correspondingly lower and at this lower rates of toll the road becomes viable, because the private sector is able to get return on the investment that has been made by him.

So, therefore, this is called as your viability gap funding, so that is founding provided by the public sector, which makes a project viable for the private sector right. So, that is your viability gap funding then the second concept that, you have to be aware of as called as your negative grant. So, in a viability gap funding the public sector provides grants to the private sector and in a negative grants, it is a reveres that is private sector pays a fee, to the public sector, for constructing developing and operating the road.

Here, because there may be some strictures of the road, which probably are commercially attractive, because of the fact that the traffic, the traffic forecast can be very large. And the private sector will be able to collect Toll revenues that can provide very attractive returns and it may not need any viability support from the government and over and above that, it may actually get excess return on the investments. So, therefore, they share a part of that excess return to the public sector in order to obtain the concession that is your negative grant. The private sector provides a capital, provides

certain private feed to the government, for obtaining the concession, so that is your negative grant.

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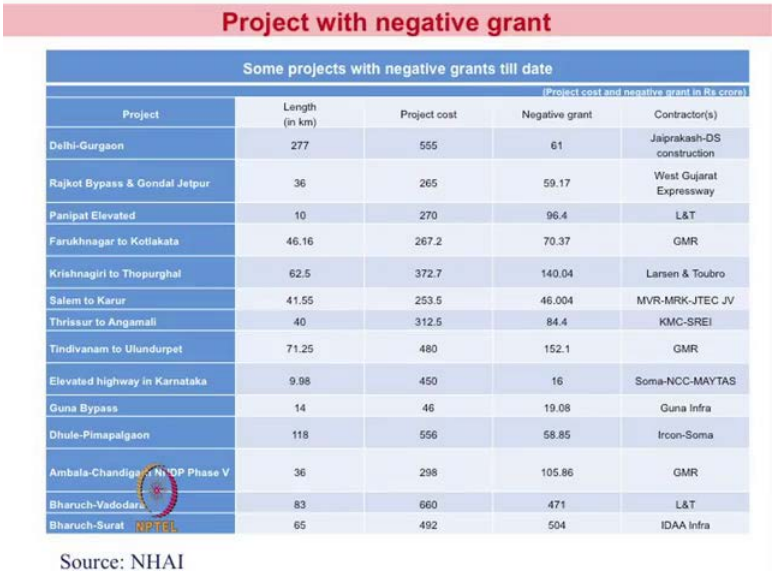

So, there are many projects that had been awarded, were the private sector is actually paid and negative grant to the a public sector. So, some of the projects that, I have indicated in this slide, so if I really look at it, there are some projects, which actually have very high and negative grants see for example, if we look at national highway development plan phase 5. Their which in Vadadra, which is basically about 83 kilo meter stretch and larsen and toubrao concessional has actually paid negative grant of 470 on crores to the government.

Simply because the concessioner feels that, this is going to be a very attractive road stretch and probably has a very high potential for Toll collection. And therefore, in order to get the contract, the concessioner is actually, the contractor is actually paying a negative brand to the public sector. Same is with an another stretch Bharich and Surath and the length is 65 kilo meters and I D E A N infrastructure is actually given a negative brand for 504 crores to the public sector. So, there are other projects, as well which actually have a different levels or negative brands that the projects are made.

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Can government has provided various incentives to encourage private sector investment in the road sector, for example, the government has agreed to bear the cost of feasibility study. So, for example, initially before we tried and open for bidding and the feasibility of the project as to be obtained and the government as agreed bear the cost of feasibility study for somebody, whose actually involved in initial development of the project, he will incur a lot of cost in terms of establishing the feasibility and so on and so forth.

And the government will reimburse the cost of this initial a project feasibility study and then the government will have 2 provide the land, for the ride of way and also for basic amenities, the cost of this will actually be borne by the government. So, let us say for example, there are some utilities that actually need to be moved for example, there could be a water lines, there could be telecommunication lines. So, any costs associated with shifting of utilities will also be the born by the government.

So, the private investor does not really have 2 bare this additional cost, then the environmental clearances and cutting of trees and all of these things will also be born by the government. So, essentially the government is trying to make the entire process of private sector investment simple by giving various incentives. The second is since objective of governments to attract the private sector investment and the government is thrown, it in open for foreign direct investment.

So, 100 percent of the investment in the road sector can come from foreign direct investment remember, you do not really have you know, not many sectors infrastructure can be actually, have such large amount of foreign direct investment 100 percent. And then we have provisions of subsidy of 40 percent of project costs, to make projects viable. So, this is what we talked about in the viability gap funding, the government will provide a part of the capital are the project cost, if needed to make the project viable for the private sector.

And then there is a very attractive tax exemption as well and 100 percent tax exemption and any consecutive 10 years out of 20 years after commissioning of the project. So that means, it is not that this exemption is there for the first any after commissioning and right. The private sector has the flexibility to decide, when it wants to actually claims tax exemption, it can be for any 10 years, it can be from year 5 to 14 or it can be from year 11 to year 20.

So, it can decide pending gone, what is beneficial for it need not be immediately after the commissioning of the project and the government is also encourage, when government is also made a imports a less expensive allowing duty free import of high capacity more and more route construction equipment. If they needs to be imported and by reducing this duty duties on imports, the government is also reduce the cost for the private sector.

And then the government as also relax norms for external commercial borrowing, you know external commercial borrowing means, that we are actually borrowing from a foreign markets. So, when we actually borrowing from foreign markets obviously, there is going to be cash outflow, when the loan is being repaid. So, therefore, a external commercial borrowing are highly regulated as compared to domestic borrowings given the fact that, it actually plays impacts the you know foreign exchange reserves of the country.

But, to encourage private investment in infrastructure sector and also to attract foreign capital, the government has liberalized the external commercial borrowings norms for the a route sector. And then another government is also provided right to collect Tolls and retained the Toll revenues by the private sector and not only that and there are as classes, which ensures that toll rates are indexed to the wholesale price and indexed.

So that means, the private investor need not actually approach the government for a regular Toll increases, the tolls automatically being increased based on the changes in your wholesale price index, as per regular intervals indicated in the concession agreement.

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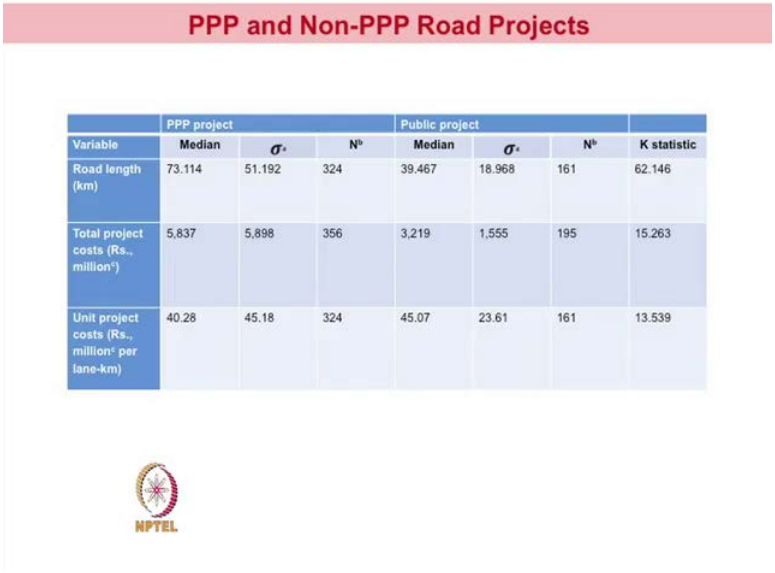

Now, let us really look at the performance of P P P roads and non P P P roads, so some of it is basically based on research that, we have done at I I T madras and so this table indicates, some different between P P P and non-P P P road projects. Remember, we had talked about, road sector development, it is not that all the roads are going to be developed by P P P more, now we are also going to have road sector development on non P P P basis. So, we try and compare and then see, what has been on the performance of P P P road projects, as compared to the public sector road projects.

So, we will look at it on 3 dimensional, the first is your road length, see if you look at road length P P P projects or much longer stretches as compared to public sector projects. So, the medium P P P road length is about 73 km whereas, in the public project the medium road length is about less than 40 km. So, private sector is able to develop long sketches so that means, they have the management capability to develop long roads.

And look at the total road project cost, the project cost of a P P P road is higher as compared to public project naturally, because there are actually developing longer road projects, so that therefore, the project cost is expected to be higher. And if we look at the

unit project cost, so the unit project cost is actually cost per lane kilo meter, because that is an appropriate way to actually calculate, because we cannot calculate is cost kilo meter different roads have different claims.

And normally the cost of developing 6 lane road is going to be higher than a cost of developing a 4 line roads. So, therefore, a unit project cost, we looked at in terms of per lane kilo meter and P P P projects had a lower per line kilo meter cost, as compared to a public project. P P P project had 40.28 and then public project had 45.07 in terms of unit project cost, remember, if you really look at it in the means, the comparison of mediums between P P P projects and public projects, there are significance, there are statistically, when we use the statistical test. Now before, we actually look at some other aspects of P P P and public sector road projects.

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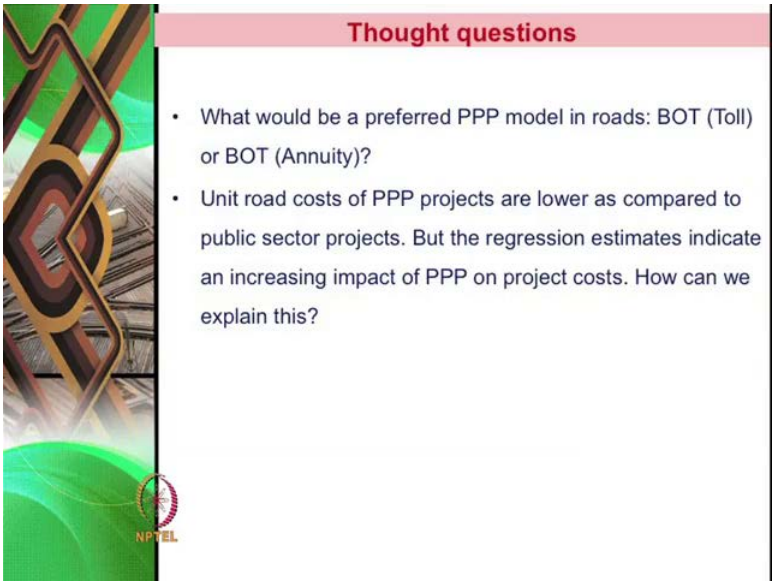

I have a few questions for this lecture, the questions for this lecture is what would be a preferred P P P models for roads will be B O T Toll or B O T and annuity. Second question is a we found that, unit costs of P P P projects all lower has compared to public sector projects might be, we saw that P P P projects had a cost of about 40 whereas, in the case of public sector projects had a cost of about 45.

But, when we actually did a regression estimate, which will probably indicating in the next lecture, in the regression estimate, you know we actually see that, P P P had an affects of increasing unit project cost. So, if we compare the medium the project cost,

public sector, P P P projects we find, P P P are having lower cost lower unit cost, but when we do a regression estimation, we actually find that, P P P is associated with an increasing effect on unit cost. So, how can we actually explain this, so we will discuss questions in the next lecture.