**Infrastructure Finance**
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**Lecture - 1**
**Introduction**

Hi there, welcome to this course on Infrastructure Finance. I am going to briefly talk u about what we are going to cover in this course in this initial introductory lecture, and then we will go on from there. This first lecture is going to be a overview of, what this course is all about and I am going to explain to you, what are the different topics that we will cover in this course. I am also going to talk to you about, the different examples and sectors that we are going to cover and I will also tell you, what we will have to do at the end of each and every lecture.

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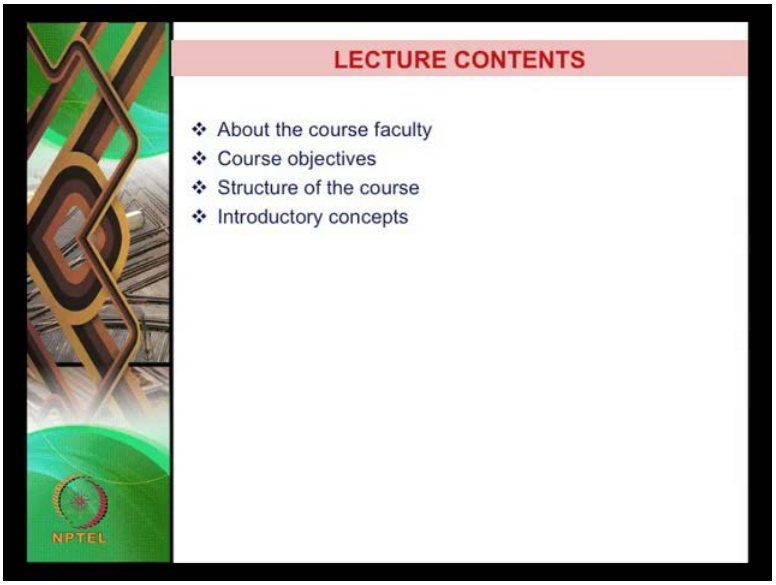


Quickly, I am going to talk about myself for some time, we will also talk about course objectives, and then how are we going to do this course followed by some introductory concepts on infrastructure finance. Let me talk little bit about myself, I am an associated professor at IIT Madras, the department of management studies. I am actually teaching this on course infrastructure finance for the last about 7 years to the graduate students at IIT Madras, both in the civil engineering department and in the department of management studies.

And the topics are been handled in that course are fairly advanced and we felt that there has to be a course that introduces the subject of infrastructure finance to a large number of student. So, the objective of this course is essentially that to provide a much basic understanding about infrastructure finance to a large number of students, both from engineering, financial, business, and who are having exposure to economic subject as well, now let us go to the course objectives.

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So, the first objective is to provide an overview of the various features of infrastructure sector, infrastructure sector has several unique features that are not found in most of the other industries. So, we will have to first understand, what are the different features that characterized infrastructure sector, and then how we finance an infrastructure project, is largely influenced by the characteristics of the sector. So, we cannot study financing in isolation, we will have to look at the various project characteristics, before we actually look into the aspects of, how we finance them.

So, the first few lecturers is going to be to really understand about infrastructural sector and then look at how we are going to finance it in the later parts of the course. The second objective of this course is also to give an introduction to project finance, so there are several ways, in which the projects or companies are being financed. One of the ways is project finance, we find project finance commonly being used in infrastructure sector.

And we will also try and see, what is this project finance all about, why is it more suited to infrastructure sector, what are the advantages, what are the drawbacks, under what circumstances project finance should be used, how project finance should be structured and so on and so forth. The third is also to expose to, what is called as financial analysis, I understand many of them would have different backgrounds. Some of you would have an engineering background, some of you would have background in science, some of you might have several years of work experience in the industry in terms of implementing projects, in terms of project operations, in terms of project management.

But, there are many of you who might not have understood some of the basic concepts of finance. So, before we actually get into dealing with infrastructure finance, we have to really understand some of the basic objective of financing and that is what we will do in the 3 rd module of this course. So, here we will try and understand the basic concepts in finance, as far as a company is concern for example, we will look at a profit and loss account, we will look at a balance sheet, we will look at how do we actually decide, whether project is worth financing or not and topics related to that.

Fourth, we will look at project finance markets, what do we actually mean by project finance market that is, we are looking at finance markets and there are different types of finance markets. For example, if you look at broadly, financing can be divided into two categories, first is equity, the second is debt and within that, there are long term debt, there is mezzanine debt and then there is short term debt and so on. So, we will have to understand the characteristics of this different finance markets.

If we look at equity, there are again several types of equity that is, external equity by individual investors and we also have, what is called as sponsor equity, where the promoters of the project invest in the equity of the project. So, we will have to really look at the different characteristics of each of this finance markets and then see, how we can leverage them to finance our project. The 5 th module and which I think is also the very important one is to understand a risk management aspects in infrastructure projects.

Most of these projects have several unique features and it is very important that, these projects are structured in such a way that, the risk aspect is appropriately addressed. So, today we are looking at substantial amount of private investment in infrastructure sector and the basic decision of a private investor is to check, whether he is going to get

adequate returns, is he going to recover his investments and in addition to that, is he actually going to get his returns from the project, to make it financially worthwhile.

So, to ensure that, the project gives the inventor adequate returns, he will have to ensure that there are appropriate risk management strategies in place. So, this 5 th module is going to talk about various ways of risk management in infrastructure project and how do we ensure that, this are appropriate enough to ensure return for the private investor. Next, we look at a different types of infrastructure project, so infrastructure is very, very broad term and within infrastructure, there are several sectors, we have energy, which in turns consist of oil and gas, electricity, non conventional energy and so on.

Then, we have transportation sector then we have water supply sector, we have telecommunication sector, so each of the sectors have different characteristics. And we need to check, understand the characteristics of each of the sectors to synthesize ourselves into, what would be the most appropriate way of financing this projects. So, we will look at details and the unique features of different sectors and how this are very important in understanding, how their financed in the 6 th module.

And then finally, the 7 th module will look at some the special topics in infrastructural financing, this is for example, when people start finding a project, they do not do it everything on their own, a group of lender joined together to find a project, which is called as syndication. So, that is what I will called as one of the special topics, we will look at, more recently what we find is, we have a lot of private equity investments that is happening in infrastructure sector. So, we will also look at, what is this private equity investment, and what is the impact of having private equity in infrastructure projects and so on. So, these are some of the advanced topics trying to encapsulates the recent trend, that we see on this subject.

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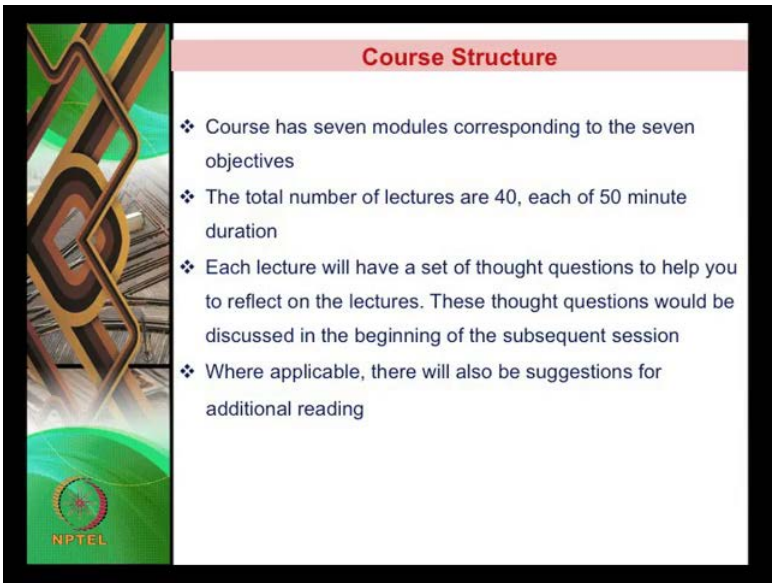


So, in terms of the core structure, which I have just explained, the core structures has 7 modules and each of the 7 objectives that we just mentioned, is going to be discussed in each of the modules. The number of lecture would be about 40 and each lecture would have about 50 minutes duration. At the end of the each and every lecture, I am going to list out a couple of thought questions, which will help you to reflect on, whatever we did in these lectures.

So, you can go back and think of, what we did the lecture and then try and put on your thinking cap to see, whether you can give a response to thought questions, that I have put in the end of the every chapter. And in the subsequent session, we will start with the thought question and then see, whether you have proceeded on the right track. But, it is very important, that you try and think and grasp the response to these questions, before we moved to the subsequent session.

In addition, some of you might be interested to know more about topic that we have discussed. So, wherever possible, I am going to give you a list of additional reading, which you can refer to, if you are interested. So, in case you want to get additional knowledge, in case you want to know more about a particular topic more than what we are covered in a lecture, you can look at the sources of additional reading and then try and enrich yourself.

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Next, we will look at, what we are going to cover today, which is to get an overview of infrastructure. First question is, what do you mean by infrastructure, so we have to really look at infrastructure in totality, before we go down to a sectors. Why is infrastructure important? Every one of us is obviously going to use one service from an infrastructure at least in our daily life. For example, when we get up in the morning, when we switch on the power supply in our room, we are actually getting access to electricity, so electricity is one of the basic infrastructure sectors.

So, the reason, why infrastructural is actually occupying a lot of importance in policy making is, it is very critical for economic growth. Today if you look at it, most of the countries think that and talking about, how do we actually improve the country's economic growth and economic growth actually plays a very very important role in the minds of the policy makers. So, there are different engines, which can actually increases the economic growth and it is now recognized that, infrastructure is going to play a very very important role in improving the economic growth.

Providing more infrastructure, providing better infrastructure, providing high quality infrastructure is actually going to increase a economic growth and that is the reason, why infrastructural is playing a very important role for policymakers. It also plays a very important role in our day to day life as I have just mentioned, it helps us to makes our

life more productive, it gives us a lot of convenience, it facilitates day to day economic transactions.

So, not only it is important for the policymakers, it is also important for the common citizens in improving their day to day life. But, one thing that we have to understand is, infrastructure means, many things for many people. There is an attempts to actually define what is infrastructure, but a consistence definition has not emerged so far. Though there is some kind of deformity in understanding what you mean by infrastructure, a clear definition that categorizes what is infrastructure and what is not, is still underway.

There are obviously definitions, as we will see later from the government prospective, but there are differences between the different the version as well. So, a simple definition of infrastructure can be something like this, the physical components of interrelated systems providing commodities and services essential to enable, sustain or enhance societal living conditions. So, this is fairly broad, but that is what is one of the simple definition of infrastructure. So, what it means, generally people say, infrastructure means power, it means telecommunication, it means water supply, sanitation, sewerage, it means roads, it means railways, it means sports, airports, etcetera.

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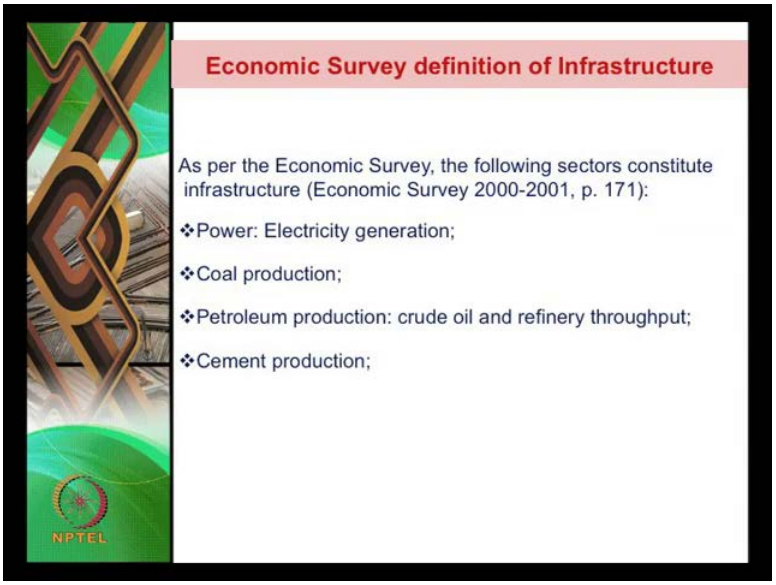


Let us look at the definition in little bit more technical sense, the economic survey defines infrastructure as consisting of the following 9 th broad sectors. For example, it

says power specifically electricity generation is under infrastructure, coal production is infrastructure, petroleum production, crude oil, refinery throughput, cement production.

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Railways, specifically if you are looking at freight and passenger traffic then you have ports then you have civil aviation consisting of airports then you have roads and telecommunications. So, these are the 9 sectors that I will been defined as infrastructure in the economic survey. Now, there is another definition of infrastructure under the ministry of statistics and program implementation, let us look at what are those.

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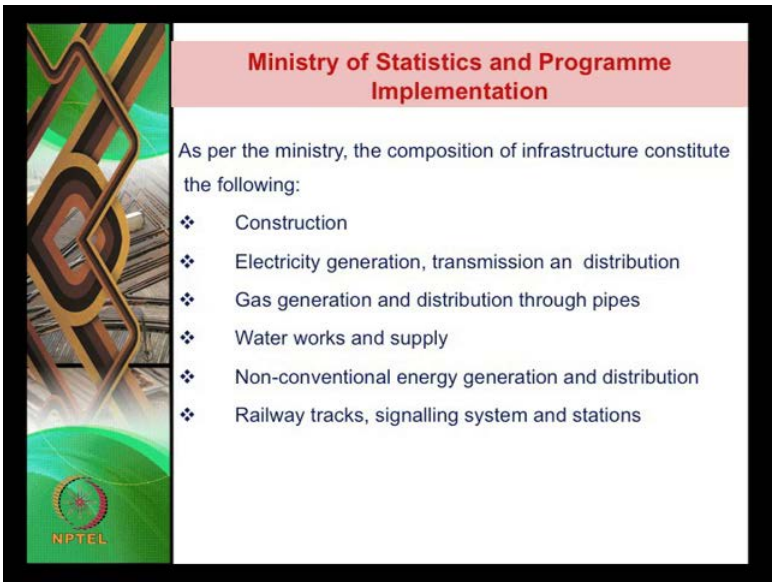

So, they have the following definition, they starting with construction, as you might see, this definition of the ministry is much more broader as compared to what we have seen in the economic survey, because it looks at lot of other activities and segment as infrastructure. For example, it looks at construction as infrastructure, so construction, infrastructure project can be classified under construction but then construction can actually mean a whole lot of other things, it could be in construction of real estate and it could be in construction of industrial parks and so on and so forth.

Then, we look at electricity and electricity, again it looks at broadly three different segments and each of the segments are classified under infrastructure. For example, you have generation, you have transmission and then you have distribution, all of it is electricity and all of will constitute as infrastructure. Then we have gas generation and distribution through pipes, in India we do not really have pipe distribution of gas, most of it is transported physically, at least to the consumers.

But, in overseas locations, like we have water, like we have electricity, gases transported to individual households in terms of pipes, so that is actually is integral part of infrastructure and in many western countries. Water works and supply is part of the infrastructure and energy, we have non conventional energy that is, generating power from wind, generating power from solar, all of this will also be considered as part of infrastructure. Then we have railway tracks associated infrastructure to railway track such as signaling systems and railway stations, this will be classified under infrastructure.

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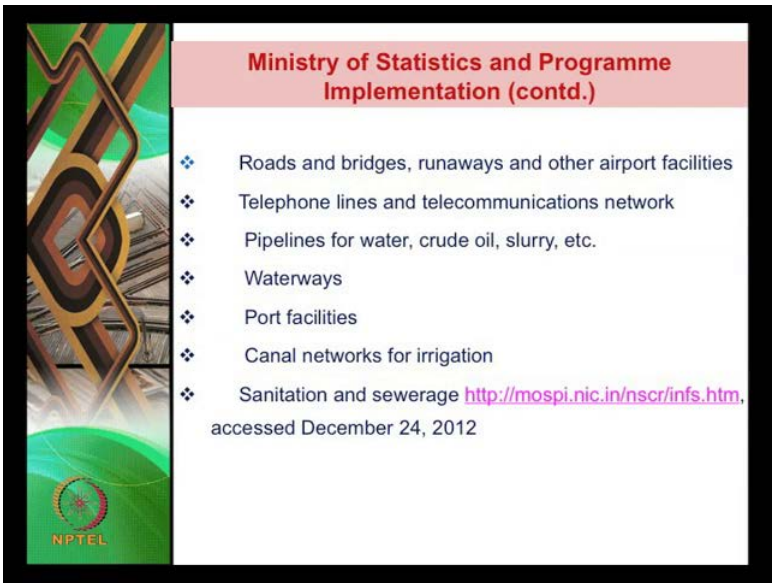


And then road transport, roads, bridges, runways, they all been infrastructure then you have airport facilities as infrastructure. Telecommunication, telecommunication lines, basically there is fixed line telephone, there is mobile line telephone, so both of this telephone lines and the telephone network is classified under infrastructure. Then you have waterways, both river ways and sea ways, all of this will come under infrastructure.

Then, airport facilities, along with airport we also have seaports, so the port facilities will be under infrastructure then you have various canal networks that are used for irrigation, that will also be under infrastructure then sanitation and sewerage. So, if you really look at it, the ministry defines infrastructure as something very broad, consisting of several segment and from the ministry prospective, would qualify for being tagged as an infrastructure.

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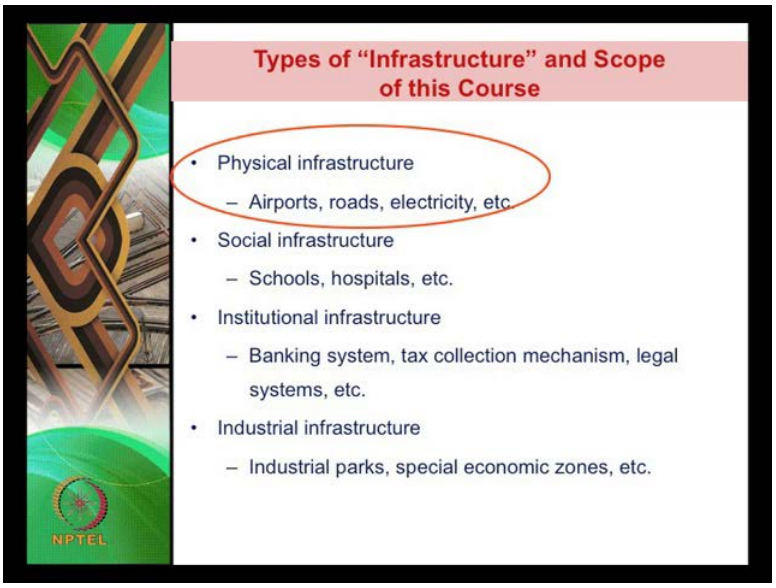


Let us broadly look at types of infrastructure and see, what is the scope of this course on infrastructure, first is physical infrastructure. So, physical infrastructure is something that, what we have look at all along so far, whatever is been mentioned under the economic survey, whatever is been mentioned by the ministry, is all coming under what is called as a physical infrastructure.

For example, airports, roads and electricity is all physical infrastructure, we should also in understand that, there are other types of infrastructure that it should be aware of. The next is very important, which is called social infrastructure, so social infrastructure will include things like schools, hospitals and so on. They have several characteristics that are common with some of the physical infrastructure project but then they also have so many differences.

The next would be, what I was call the institutional infrastructure, institutions such as banks, tax collection mechanism, the legal systems, they all could generally been classified as institutional infrastructure. So, these are systems and these are institutions, that are needed for the day to day transaction to happen. Then you have industrial infrastructure, these are basically industrial part, special economic zone and so on. So, for the promotion of various industries, it is very critical that, there is high quality industry infrastructure that is available.

So, we have several of those initiatives, that have been undertaken by various governments. So, in essence, we will look at it, there are several types of infrastructure, so my question is, infrastructure can be used as a noun or can be used as an adjective. So, noun is essentially to denote different ways, in which we classify infrastructure and then when we say an adjective, we qualify in most precise terms. For example, when we look at infrastructure financing, there are some special ways and techniques that are involved in infrastructure financing.

So, many of the techniques that we actually use in financial infrastructure projects, is also used in sectors other than infrastructure. See for example, today if you look at in information technology, setting up of off shore development centers, people use it what is called as BOT concept to set up many of this off shore development centers. Remember, originally BOT was a concept that was used in financing of infrastructure project.

So, what we are saying is, today most of the techniques that are used in financing infrastructure are being used in non infrastructure as well, so is infrastructure noun or an adjective and my answer is, it is both. What do we specifically do in this courses, we will look at only the physical infrastructure aspect of it obviously, there are limitation in terms of times and there are limitations in terms of how much we can cover in 40 lecture course.

So therefore, we will stick to our discussion on physical infrastructure but then there are several components in physical infrastructure that we are going to handle, is also going to be applied in other sectors of infrastructure. And I will leave that to you to your imagination to see, how this can be applied in a very beneficial way in other types of infrastructure as well.

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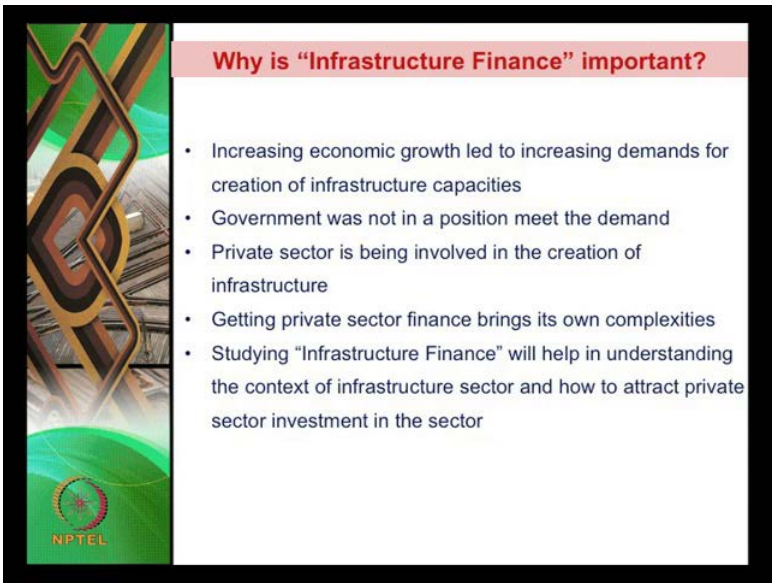


Why is this important, why should you actually being studying about infrastructure finance. I will tell you the reasons, traditionally if you look at it, infrastructure is largely founded by the government, when I say traditionally, I would say starting from middle of 19 th century that is, from 1950s onwards. So, before that, there has been substantial private enterprise in the infrastructure sector, but from 1950s onwards, most of the infrastructural development, starting from developed countries or in developing countries, is been largely done by the government secto.

Now, we have seen earlier that, infrastructure is very important for economic growth, now as countries wanted to achieve higher and higher economic growth, the demand for infrastructure creation also increase tremendously. So, when they wanted to increase or achieve higher, they need to invest more in infrastructure. Now, there is only so much, the government can actually do in terms of increasing more and more investments in infrastructure beyond a point, obviously the questions in terms of, how much deficit that the government can undertake by continuously finding infrastructure.

So, because of this limitation of governments unable to continuously meet all of the requirements of infrastructure, the government started opening to private sectors for investing in infrastructure. So, the government was not in the position to meet the demand, but at the same time, they have to sustain the economic growth, the investment needs to be made somehow and that is where, the private sector started coming in. So,

today what we see is, there has been increasingly potential amount of private sector coming in, in creating infrastructure.

But, private sector coming in and creating infrastructure and bring his own complexities, mainly because of the unique features of infrastructure sector. So, we have to really understand the complexities, the challenges today to see, how we can attract private sector investment in infrastructure. And how we can sustain the private sector investments in the infrastructure and how private sector get adequate returns from this projects. And at the same time, not adversely affect the population, who is going to be consumers of the various infrastructure sector.

And studying infrastructure finance will help us to really understand, the dynamics of the infrastructure sector, the context of the infrastructure sector and at the same time, how to attract private sector investment in the sector. So, it is important because it touches each of our life under daily basis, it is important because the amount of finding needed is very large. And it is also important, because it has substantially very attractive investment opportunity for the private sector, so studying this is important from several prospectors.

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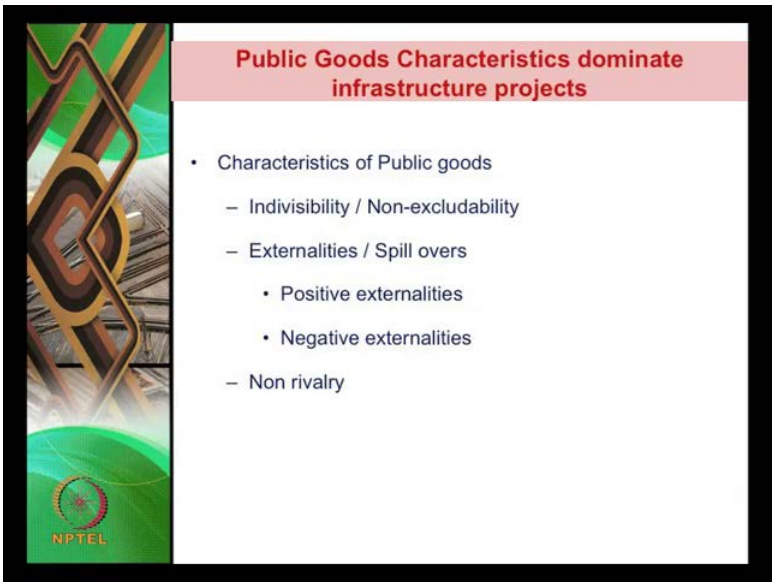


Now, let us look at some of the characteristics of the infrastructure projects, before we look at characteristics of infrastructure project, we also understand little bit about public goods. In economics, any goods can be classified into two categories, public goods and

private goods. What is a public good, we can understand public goods by the main characteristics, which is called as your indivisibility or non excludability.

That is, it cause no more to provide a service to an individual, as compared to several that is, the costs takes to provide service to a single person is not going to be very different as compared to the total cost it takes to provide a service for a large number of users. So, that is the main characteristics of a public good, there are also the other characteristics such as indivisibility or non excludability. It is very difficult to exclude somebody from consuming a particular service and services, which makes this very difficult to exclude anybody from consuming services can be called as the public goods.

What is an example of a public good, the classic example of a public goods is, what is called as the lighthouse. So, when we actually have a lighthouse, a lighthouse can actually provide direction to ships that come to a harbor, but at the same time, it is going to be very difficult to exclude a ship from obtaining direction from the lighthouse. And the cost of constructing a lighthouse is going to be no different, if it is actually going to provide direction to one ship or to provide direction for all the ship that are coming to the harbor.

So, there is this question of non excludability, practically becomes very difficult to exclude a ship from getting direction from a lighthouse, if it is functioning when it is approaching a harbor. The second characteristics of a public goods is, what is called as externality that is, those who are not directly being affected, those who do not consume the service, they might also be affected by some of this pillow verse that hibernate from the project.

Let me again give you an example, let us take the case of an airport being constructed, so the people who are going to be benefited by the airport is actually those who are going to use the airport that is, people who are going to fly in from other destination or people who are going to fly out from the particular city. So, airport is generally going to be beneficial for people, travelers and it could also be actually be beneficial for the people, who are going to be the part of the airport activity.

For example, there could be a hotel, who is going to cater to the demand of the travelers who are coming to the airports. There are retailers, who might have actually been opened up shops within the airport to provide various products and goods to the travelers in the

airport. So, they all are people, who are directly connected to the airport but then , when an airport comes up, the airport is also going to affect the people who are living nearby.

For example, because of the planes landing and because of the planes taking off, that could be increase amounts of noise pollution for people, who are living in the vicinity of the airport. Now, these are the people, who are not going to use a services of the airport, but at the same time, they are getting affected because of the presence of the airport, so this is an example of an externality. So, in this case, this noise pollution can be seen as a negative externality, there are people who are not going to be in any way benefited because of the airport.

But, at the same time, they have to endure the higher level of noise, because of the functioning of the airport. Now, there could be positive externality as well, what are the positive externalities, the airport brings in a lot of development to particular region. So, there could be more travelers coming in and because of the travel, that could be demands in terms of higher quality of infrastructure, there could be a higher level industrial development and so on and so forth.

And because of this increase level of development in the region surrounding the airport, the real estate value can increase. So therefore, people who have actually have real estate holdings around the airport, they might actually experience an increase in their wealth. So, in this case, this is a positive externality, so there is an increase in wealth because of the presence of the airport. They are people who is not going to use airport, but at the same time, because of the presence an the airport, they are getting some benefit.

So, that is a positive externality, so this externalities are features of several infrastructure projects and this externalities are features of public goods as well. The third is the non rivalry, one person’s consumption is not going to affect the consumption of another person, so this is very different when compared to let us say, a private good. Let us take the example of simple bread, a bread when consumed by somebody is available for another person to consume, so it actually has characteristics of rivalry.

Now, let us take the case of infrastructure projects, in a road, a moment of the car is not going to affect a moment of a 2 nd car, till we actually reach some level of conjunction. So, till the time that we actually reaching the point of conjunction, presence of one car is

not going to really affect the presence of a 3 rd car or else 4 th car in the row. So, that is what is called as non rivalry characteristics, which we see in public goods.

Many infrastructure projects have shades of this public goods characteristics, remember they are not pure public goods, because at some point in time, infrastructure project have kind of features that are not purely public. Let us take an example of road project, a road project the non-rivalry characteristics exist, till we reached the point of the conjunction, when after that, presence of any additional car is actually going to affect the moment of all others who are present in the road, but till we actually reach the point of conjunction, it is a non rivalry characteristics. So, infrastructure project have shades of public goods characteristics and this is very important for us to understand, when we actually look at the next aspect of financing.

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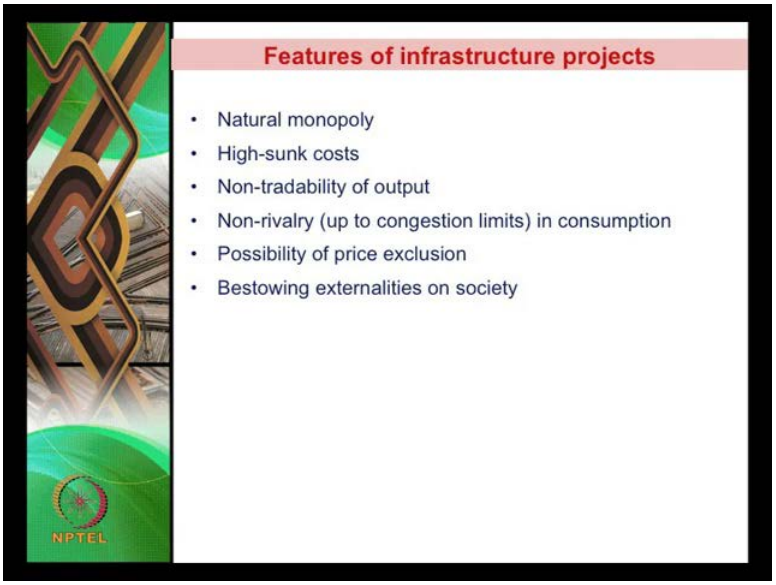


There are also other features of infrastructure project, there are natural monopoly, what you mean by natural monopoly. A natural monopoly indicates that, it is economically socially not beneficial to have a competition in the segments, because having a single player will be able to provide the services at the lower cost. Because of the factors of economic of scale, an existing provider will be able to provide services at a lower cost as compared to a second player coming in a competition.

So, many of the infrastructure projects are natural monopolies for example, we have electricity distribution, it is not make sense to have competition in electricity distribution,

because a single player will be able to supply electricity cheaply to residential and other consumers, as compared to having multiple competitors. The second feature is high sunk costs, substantial investment need to be made before the project can actually start delivering an output or they can actually start providing a service.

And not only that, the investments that is actually made cannot be used for any other purpose. Let us say for example, we actually install a pipeline for delivering water supply, now that pipeline cannot be used for anything else, it cannot be used for delivering let us say a gas, it cannot be used for let us say provide a sewerage network and so on. So, an asset that is been created for a particular purpose can actually be used only for that purpose, there is very, very little alternative use.

So therefore, if there is any change in economic conditions, all the investments that has been made comes to not, so there is a high amount of sunk cost that is being seen in a infrastructure sector. The third aspect is non tradability of output that is, a surplus at one region cannot be trade at to meet shortfall in the other. Let us say, there is going to be surplus water in a particular region or let me take another an example that, there is surplus power in a particular region and there is a short fall in power in region b.

It becomes very difficult to transfer power to region a to region b, unless until there is adequate transmission network, so this is actually used to refer to the non tradability of output. Fourth is non rivalry in consumption upto conjunction limits, that we have discussed it just a little while ago. There is a possibility of price exclusion, you can actually exclude some consumers consuming infrastructure sector by pricing it appropriately.

Remember, demand in economy is also another question terms of price and we can actually influence demand by actually pricing it appropriately. And we have also seen, there are substantial amount of externalities in infrastructure projects, which is what the last point states.

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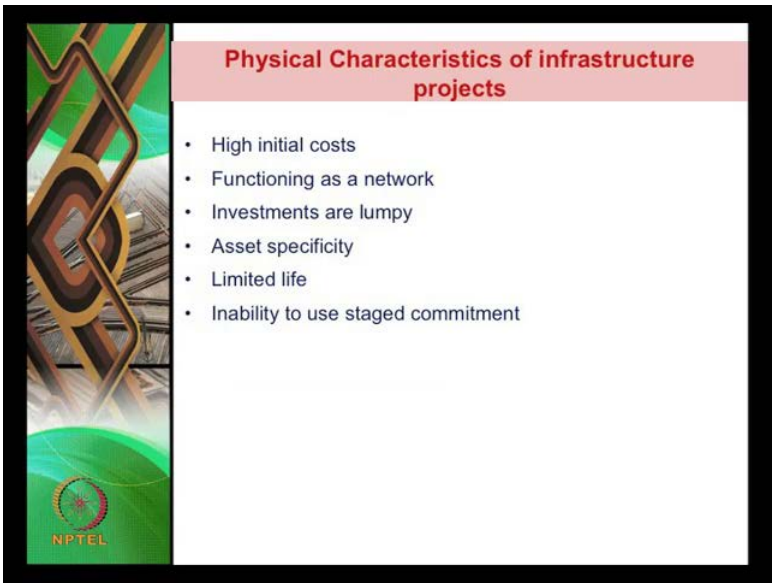


Physical characteristics of infrastructure projects, the projects have very high initial cause. When I say high initial cause, I am really comparing it with let us say sectors other than infrastructure. In sector other than infrastructure, it is actually possible to generate service, generate revenues without making all the investments that is needed at one go, but in infrastructure, it is not possible. If an airport needs to be constructed, the entire investment that is needed for the airport to be constructive has to be put in place before planes can land or takeoff., so this level of initial cost as compared to other sectors is very, very high.

Second, infrastructure projects function has a network, it cannot derive value in isolation for example, the value of a single phone is 0, unless until there is another telephone, with which it can communicate with, there is no value in a particular aspect. Similarly, we look at power sector, unless until there is a transmission line, which can actually take the power generated in a generating stations to the n consumers, there is no value in generating power.

So, infrastructure sectors derive value from a network and not from individual isolated projects. The third is investment are lumpy, we cannot make incremental investments in the infrastructure sector that is, we cannot increase supply in tune with the demand, because the fact that, there are substantial economics of scale in creating supply. When

we actually put up a generating plant, the bigger generating plant the lower is the cost of power that is actually generated from that plant.

So, when we actually have to invest in power, we actually make substantial investment anticipating future demand so that, we are able to generate power at least cost. In many other sectors, the investments happen on incremental basis, but in infrastructure sector, we see there is a substantial amount of lumpiness in investments. The fourth characteristics is asset specificity, which you just mentioned earlier as such as highly specific, it can be only used for that purpose, for which has been created.

The alternative uses are very very less and in many cases, there are no alternative uses, asserts have a limited life and additional investments are needed for the assets to be functioning for a longer period. We need to actually have maintenance investments done after a certain period of time for the assest to be functioning on for a longer duration. And the fifth point, the inability to use stage commitment, we cannot actually finance and infrastructure projects in parts. In many sectors project are being financed in parts, because one is able to see the progress and make the next investment, if the progress in the previous stages is satisfactory.

But, in the infrastructure sector, one may not be in the position to assess the progress made, unless until the project is fully complete. For example, think yourself, what is the value of the bridges that is half complete, there is no value, unless until the bridges is fully complete, we may not be able to see, what is the worthiness of the bridge. So, a stage commitment, which looks at the benefits of the project at each and every stage is something might not be applicable, in case of infrastructure sector.

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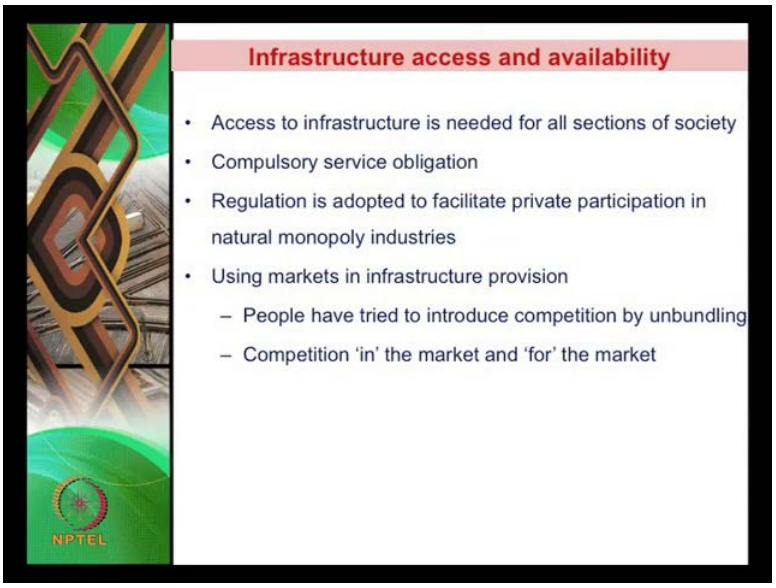


Let us look at some of the concepts as related to infrastructure axis, is very important to realize that, economic growth needs infrastructure. But, it is also more important for us to understand that, infrastructure should be available across all section of society, it cannot be made restricted to some of the allied segment, in that case economic growth unlike to happen. So, our vision of achieving the economic growth can be realized, only if infrastructure is made available to a large section of society.

So therefore, there is something called a compulsory service obligation, infrastructure providers cannot refuse to provide service, if the consumer is satisfying all the criteria. What happens when you enter a restaurant, when you enter a restaurant, you might see a signal prominently displayed at restaurant saying that, rights of admission reserved that is, the restaurant owner has the rights to stop you from using the restaurant service, if he chooses to.

But, if he look at an infrastructure project, the provider cannot refuse to give you a service, if you are able to meet all the other stipulations that have been put together by the service provider. That is, if you are a resident of a particular region, if you are able to pay the connection and the sub scribal charges, in other words if you are valid consumer, they would have to compulsorily give you service, so that is a compulsory service obligations.

The third aspect is regulation, you have seen that, many of this infrastructure projects have natural monopoly characteristics. So therefore, you actually have private service providers delivering the service, there is possibility that, they may take advantages of your monopoly power. So, to prevent that from happening, there is what is called as regulatory regime. So, today in society, there are several organizations, which help us to carry on with our daily functions.

For example, if we have any complaints, we actually go to the police station, similarly if there are any complaints with the infrastructure service provider, the regulatory agency ensure that, there is a level playing field. The private service providers are not exploiting the consumers, so the regulatory agency ensure that, the consumers are not taken advantage of by the service providers. People also trying to introduce competition in several infrastructure sectors, we have the classic case of telecommunication.

So, today if you are not satisfied with one telecom service provider, you switch to another telecom service provider. We see competitions in several other economic segments for example, in other consumer goods. We are also seeing aspects of competition in infrastructure sector, we do not see it in all, but we see it in some segment of infrastructure, notably in telecom. And when we look at competition there are several types of competition, we are having competition not only in the market, but we are having competition for the market.

When we talk about the competition in the market, an example is the telecom market, where there are several service providers competing to provide services to the consumers. But, there are other segments, where it is economical to have only one service provider, so in that case, we do not really have competition in the market. So, what we have is, we have competition for the market that is, when the government makes a bid for the private sector to participate in the project, there is competition. So, competition happens at the bidding stage, but not in the operating stage, so that is called as your competition for the market.

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So, quickly let us summarize what we have done in the session so far, four important points emerge, one is the provision and the availability of infrastructure plays important role in a economic growth. So, let us also remember that, the provision and availability of infrastructure should be for all segments of the society. More the people who have access to the infrastructure, higher will be the economic growth. And when we say infrastructure, we also have to also remember that, the quality of infrastructure is very high.

So, in many cases, there is provision of infrastructure, but the quality levels are very bad, so we have to understand that, infrastructure should not only be present, but it should also be provided fairly higher quality levels. Second, infrastructure has characteristics that makes it very different from other sectors, what are the characteristics that we saw. We saw that, they have the shades of characteristics that are seen in the public goods, the investments are lumpy, infrastructure derives it is advantage when they function as a network.

They are very, very specific in the sense at assets created for a particular purpose, cannot actually be put into use for alternative uses, so these are the some of the features of infrastructure projects. And but we are trying to finance project that have this characteristics then what are the things that we should take care of, so that is something we will look at in the subsequent lectures.

And three, we have very high economic growths in emerging countries today and most of the emerging countries are very keen that, they sustain this economic growth. And the strategy, that they are using the sustain this economic growth is to create adequate infrastructure to continuously invest in infrastructure to meet the demand. And there are limitation in terms of, how government on it is own can fund this additional demands.

So therefore, the sector is been open to a private sector, there are lots of challenges in having a private sectors invest in infrastructure sector, because of the some other characteristics that we have seen, now here in this lecture. So, the challenges, the ability to attract private sector investment by taking into account this challenges and trying to put in place a structure and a format, which will address many of the issues that we see in the infrastructure sector.

And finally, ensuring infrastructure axis for all section of the society will play an important role in ensuring what is called as equity. Today the burning topic is, when you are looking at a development, are being ensuring equitable development to all sections of the society. Providing infrastructure with access across all the segment of the society will ensure that, the development that we have is equitable.

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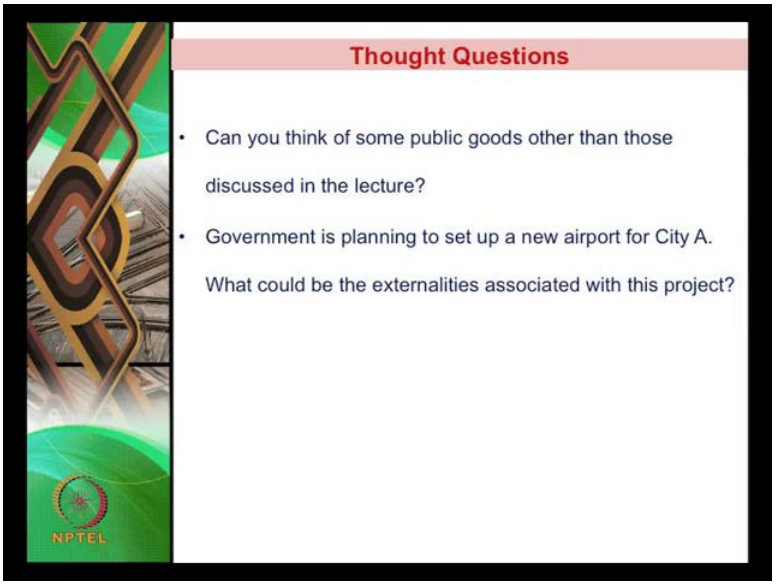


Now, what I will do is, I will post some thought question for you to ponder about, question number 1, can you think of public goods, we have discussed let us say an example of lighthouse earlier. But, can you think of public goods, other than that what

we are discussed in the lecture and see, why their public goods, what characteristics of public goods that we have discussed is present in those projects that make them as public goods.

The second question I have is, let us say government is planning to set up a new airport in city A, what could be the externalities associated with the project. We have touched upon it briefly earlier in the lecture, but I would want you to discuss this in greater detail. You should also look at both, the positive externalities as well as the negative externalities. Remember, successfully implementing a project would mean that, not only it is financially viable, but project for it to be successfully implemented, it should be able to encounter most of the objections that come from the local publics.

And for that to be successfully, for us to successfully overcome the objections of local public, we would have to understand what could be the various negative externalities that such project could bring about. So, let us think through and see, what are the different externalities that could be associated with this projects.

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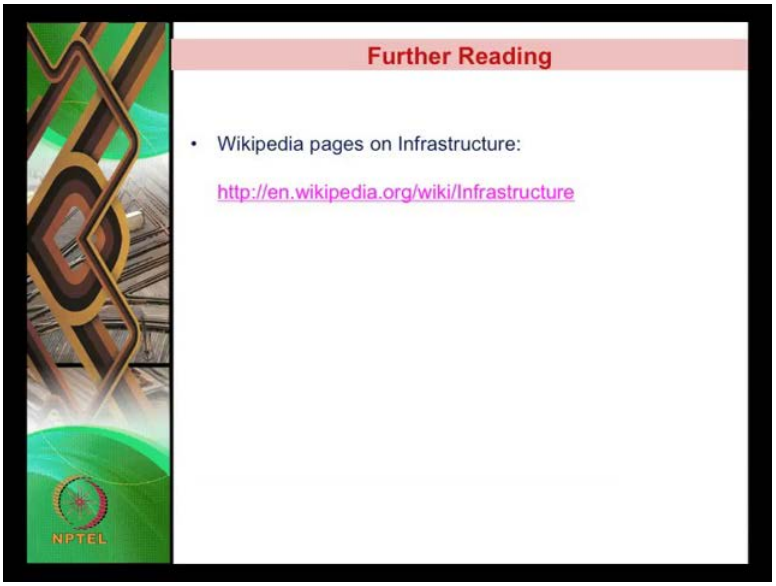


And finally, in case you want to know more about infrastructure, the most simple and a very interesting place, where you can look at is Wikipedia, so the link that I show here, gives you the link on infrastructure in Wikipedia. And it provides you in a very, very simple language on various aspects of infrastructure and why it is very important for us to know these aspects to implement and finance these projects.

Thank you and see you in the next lecture.