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**Module – 06**  
**Lecture - 26**  
**Regulatory Authorities for Infrastructure Development**

As a part of the new discussion on Regulatory Authorities for Infrastructure Development.

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**Brief Outline**

- Economics of Regulation
- Privatization and Regulation
- A Brief Outline of Regulation
- Regulatory Authorities for Infrastructure in India



This particular presentation will include the discussion on economics of regulation, we will also try to link how regulation is one of the major contribution in privatization process. We will have a brief outline of regulation in the world and then, we will also try to have a discussion on regulatory authorities for infrastructure in India.

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## Economics of Regulation

- Economic Regulation involves direct legislation or regulation through administration of either the prices or the entry into markets or any specific industry
- Normative approaches of regulation focuses on market failures: natural monopoly, externalities, public goods, information asymmetries
- This provides rationale for government intervention in the markets
- The theory of regulation assumes that regulators will attempt to maximize objective function (the regulator's utility) by the implementation of regulatory policies



Let me begin with what is basically the economics of regulation. Economic regulation is basically one of the step to involve the direct legislation or regulation through the administrating mechanism, either for the price or through entry into the markets or any specific industry. One can question that, why regulatory mechanism is important, why regulation is important, we have seen in our previous discussion that market failures, which is one of the feature of infrastructure development, which happening due to the natural monopoly, externalities, public goods and information asymmetries.

And when we are working in the environment of non-regulatory mechanism, infrastructure development, infrastructure maintenance and fee collection for the infrastructure will become very problematic. It is the experienced based on the global understanding from different projects of infrastructure, that not only the infrastructure development, but also the maintenance and day to day care of the infrastructure becomes really burden for the developers.

And in such a situation, it is indeed important to have a regulatory mechanism for the infrastructure. So, this provides rationale for government intervention in the markets, the theory of regulations assumes that, regulator will attempt to maximize the objective function by the implementation of the regulatory policies.

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## Economics of Regulation...

- There is a trade-off between the economic interests (maximizing the profits) of the private firms and public interest (maximizing social welfare or utility)
- There are also interests of those who are not involved in the transactions (externalities)
- Governments have therefore provided the proper regulation for effective functioning of the economy without hampering the development process and optimizing the interests of both producers as well as the consumers



So, there is a tradeoff between the economic interest of the private firms and the public interest. Through a diagram also we are going to learn today that what basically the private interest and public interest works and how regulatory involvement is reducing the gap between the private interest and the public interest. So, the government have a very positive role to play and this positive role is to provide a proper regulation for effective functioning of the economy without hampering the development process and optimizing the interest of the parties involved in the development of infrastructure and production of the various services to the people.

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## What Regulatory Authorities Do?

- One of the task of any regulatory authority is to fix the prices or fees charged by the service provider
- Common method to do so is the fair-return pricing
- The price is set at the point where it is equal to average total cost. i.e.,  $P = ATC$
- It is allowed to include market rate of return in the ATC
- This ensures new investments flows to the development of infrastructure facilities

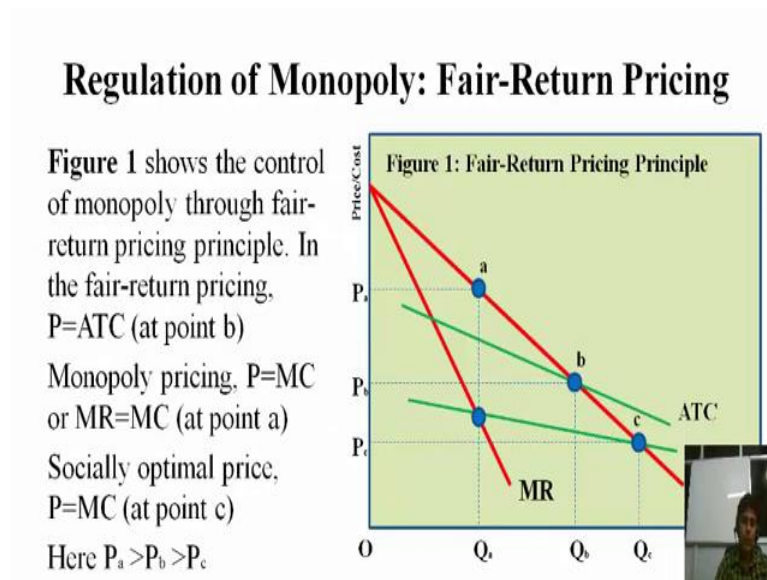


So, one of the task of any regulatory authority is to fix the prices or the fee, which is

charged by the service provider. So, the common method is to find out the fair-return pricing principle and the price is set at the point, where it is equal to average total cost. So, the price is equal to ATC, which we are going to also see in the diagram and it is allowed to include market rate of return in the ATC.

This also provides a guarantee to the new investors or to have the new investment flows to the development of infrastructure facilities, because if price is not equal to the average total cost, there might be loss for the infrastructure developers.

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We can see it in the diagram here that there are three different point shown here as a point of a, b and c. Point a is the point, which is indicating the price; that price says about the price of P b and the P b price is the price, which is at the point of average total cost. But, if firm is charging P a price, which is higher than the other total cost price and that price is basically the monopoly price.

But, we are also finding here, there is a P c price, where the P is equal to the marginal cost and that is the price, which is socially optimal price. But, the private firms will not go for this type of price, because they are not having more revenue in that case. So, they will certainly go for the higher price, which may be the highest price P a in this diagram, but due to the interference from the government regulatory mechanism, the price is coming down from the P a level to P b level.

So, this reduction is not possible without the involvement of the regulatory body. So, through this diagram we are just finding the role of the regulation to have the fair-return

pricing. If it is not properly functioning, then in that case, we are far away from the price which will be really much higher price from the level of socially optimal price and the society cannot effort such price.

So, the highest price is  $P_a$ , but the middle level of price is the  $P_b$  price and ultimately this type of price is acceptable for both the society as well as the firms. So, regulator has to take care of the benefits not only for the consumer, but also for the developers and that is the role which the regulator has to play. Because, one should consider that, there should not be any harm to the supplier, at the same time; there should not be any harm to the consumer also. So, extraordinary benefits should not be in favor of either the producer or the consumer. But, both should enjoy the benefits of the market; that is really the benefits of a regulator in the market.

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### **Privatization and Regulation in the World**

- Privatization in Chile after mid-1970s
- British Aerospace and British Telecom were privatized in the early 1980s
- Privatization in France began in 1986, New Zealand privatized telecommunications, air, rail etc. in late 1980s and Japan privatized telegraph & telephone in the late 1980s
- For successful privatization process there is a need for regulation, so that the public interest be protected



So, world has seen various examples of various incidence of privatization, Chile in 1970s, also in 1980s in British Telecom, we have seen, France having privatization process 1986, New Zealand in 1980s, Japan also in 1980s. And no privatization program of the world was one of the successful program without having a proper regulatory interference and why it is important, as we have discussed that it reduces the chances of monopoly prices. It reduces the chances for negative externalities and there are fee riding problem also, which can be well taken by these regulatory boards.

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## A Brief Outline of Regulation in the World

- Last one and a half decade witnessed rapid growth in infrastructure regulatory bodies in developing as well as developed countries
- After 1995, more than 200 such regulatory authorities have been established in the world
- These bodies are primarily concentrated in telecom, energy sector (electricity, power, natural gas) and few in water and transport
- Telecom has emerged as the first sector that has been regulated by these authorities in most of the countries
- Following 1995, more than 100 regulatory authorities have been established in the energy sector



So, a brief outline of the regulation in the world can be also seen here, that in last one and half decade a rapid growth in infrastructure regulatory bodies in developing as well as developed countries are noticed. After 1995 more than 200 such regulatory authorities have been established in the world and these bodies are primarily concerned in telecom energy, natural gas, power and few bodies, regulatory bodies are also working for the power, water and transport.

Telecom has emerged as the first sector that has been regulated by these authorities in most of the countries. And we are finding that around 100 regulatory authorities have been established for energy sector alone after 1995.

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## A Brief Outline ...

- **Civil Aviation** - Federal Aviation Administration (FAA) of USA (1958), Civil Aviation Authority (CAA) of UK (1972)
- **Energy/Electricity/Power** – The Federal Energy Regulatory Commission (FERC) of USA (1977), National Electricity Regulatory Commission (NERC) of Ukraine (1994), Gas and Electricity Markets Authority (GEMA) of UK (2000)
- **Railways** – Federal Railroad Administration of USA (1966)
- **Telecom** – Federal Communications Commission (FCC) of USA (1934), The National Telecommunications Agency (Anatel) of Brazil (1997), TRAI (1997), The Office of Communications (Ofcom) of UK (2002)





So, a brief outline is presented here, The Federal Aviation Administration of United States 1958, Civil Aviation Authority of UK 1972. In the Federal Energy Regulatory Commission of United States 1977, National Electricity Regulatory Commission of UK in 1994, Gas and Electricity Markets Authorities of UK 2000, Federal Railroad Administration of USA in 1966.

Telecom Federal Communication Commission of United States 1934, The National Telecommunication Agency of Brazil in 1997, Telecom Regulatory Authority of India 1997 and The Office of commissions of UK in 2002. So, we have a long history of regulation not only in one sector like Civil Aviation, but also in energy, railways and telecom.

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**Regulatory Authorities for Infrastructure in India**


	<b>Tariff Authority for Major Ports (TAMP)</b>
	<b>Airport Economic Regulatory Authority (AERA)</b>
	<b>Central Electricity Regulatory Commission (CERC)</b>
	<b>Telecom Regulatory Authority of India (TRAI)</b>



Now, one cannot considered the development of infrastructure regulatory authorities in India, we can see here the Tariff Authority for Major Ports (TAMP), Airport Economic Regulatory Authority (AERA), Central Electricity Regulatory Commission (CERC) and the Telecom Regulatory Authority of India, (TRAI).

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## Ports Tariff Regulation

- Tariff Authority for Major Ports (TAMP) was set up in April 1997
- TAMP was created by the amendment in the Major Ports Trust Act- 1963 by Port Laws (Amendment) Act 1997
- It is an independent Authority for the regulation of tariffs, both vessel related and cargo related
- It also fixes/determines the rates for lease of properties in respect of Major Port Trusts and the private operators 

So, the ports tariff regulations, Tariff Authority of Major Ports was set up in April 1997 not very old, but at the same time, it was created by the amendment in the major ports trust act 1963 by ports law act 1997. It is an independent authority for the regulation of tariff both vessel related and cargo related and it also fixes and determines the rates of, for the lease of properties in respect of the major ports trusts and the private operators.

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## Major Functions of TAMP

- Regulation of tariffs levied by the ports
- Fixation of charge for the use of properties belonging to the ports
- Fixation of fees for pilotage, hauling, hooking and other services 

The major functions are the tariffs levied by the ports, fixation of charge for the use of properties belonging to the ports, fixation of fees for pilotage, hauling, hooking and other services.



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## Major Achievement After TAMP

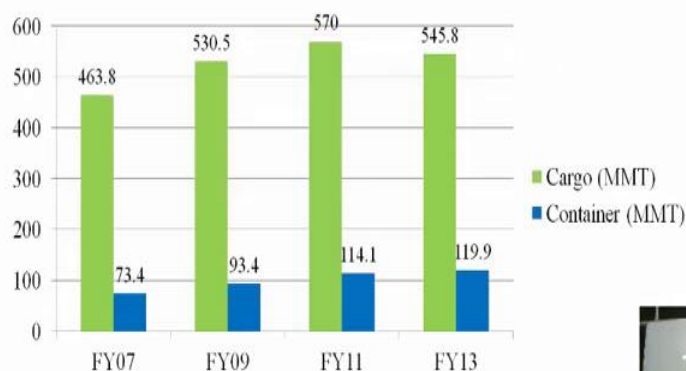
- TAMP organized 39 hearings mutually with the Ports, Port users, BOT operators and the bidders for PPP Projects. Tariff proposals were refined by these hearings and helped in regulating tariffs
- TAMP allowed market linked tariff for Major Port Trusts
- Currently, India has 13 major ports and about 200 non-major ports



Major achievement after TAMP is, it has organized 39 hearing mutually with the ports, port users, build operate transfer operators and the bidders for the PPP. Tariff proposals were refined by these hearings and helped in regulating the tariffs. It has also allowed market linked tariff for major port trust, currently India has 13 major ports and about 200 non-major ports.

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## Growth of Cargo and Container at Major Ports of India



Source: India Brand Equity Foundation, 2015




One can see the growth of cargo and container at major ports of India, compare to financially year 2013, we are finding that the financially year 2011 has the fastest year of growth in last few years. We are also finding that especially for the container services also, we have added at the advantage in last few years and this is not possible without


having a regulatory authority.

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## **Regulation of Civil Aviation**



- Airports Economic Regulatory Authority of India (AERA) was created by Airports Economic Regulatory Authority of India Act, 2008
- Regulatory functions of AERA were notified with effect from September, 2009
- AERA works in open and transparent environment
- It has mandated to regulate and monitor the tariffs for the aviation sector in India




Similarly, in civil aviation sector also airports economic regulatory authority of India was created by an act in 2008. The act was airport economic regulatory authority of India act and the regulatory functions of AERA were not notified with effect from September 2009. AERA works in open and transparent environment and it has mandated to regulate and monitor the tariffs for the aviation sector in India.

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## **Functions of AERA**

- Determine the tariffs for air services
- Regulate development and user development fees
- Decide the passenger service fees
- Set the standards and monitor the quality and reliability of services
- The capital expenditure incurred for airport facilities
- Set the rules for improvement of services
- The cost for improving efficiency
- Economic and viable operation of major airports



The major functions are determined the tariffs for air services, regulating the development and user development fees, decides the passenger service fees, set the

standards and monitor the quality and reliability of services. The capital expenditure incurred for the airport facilities, set the rules for the improvement of services, the cost for improving efficiency and the economic and viable operation of major airports.

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### Progress of Aviation Sector After AERA

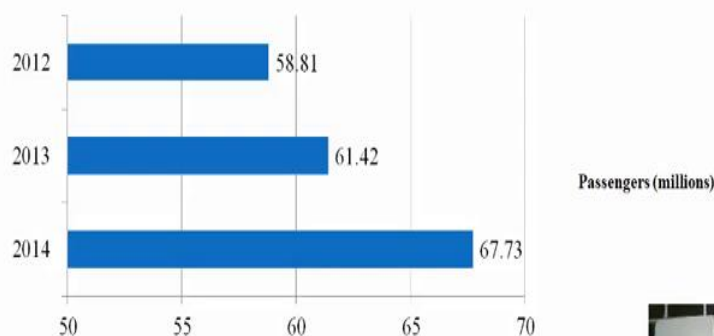
- The total passenger throughput in India in 2009-10 grew to 123.75 million from 40 million in 2000-01
- There is an increase from 68% in 2004-05 to 74% in 2010-11 in the number of domestic passengers to the total passenger throughput at Indian Airports
- Total cargo increased at compound annual growth rate (CAGR) of 10.4% during 2004-05 to 2010-11



So, one of the progress may be noticed here with some of the statics, the total passenger in India in 2009 and 10, grew to 123.75 million from 40 million in 2000 and 2001. There is an increase from 68 percent in 2004-05 to 74 percent in 2010-11 in the number of domestic passengers to the total passengers at Indian airports. Total cargo increased at compound annual growth rate of 10.4 percent during 2004-05 to 2010-11.

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### Passengers Carried by Scheduled Airlines in India



Source: India Brand Equity foundation, 2015




Passengers carried by scheduled airlines in India has a past growth and which has 67.73 million number and this shows that, compared to the 2 years also, we have increased in terms of adding the more and more passengers. And this shows that, how the size of the market especially in airlines sector is increasing compared to the previous year.

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## Electricity Regulation in India

- **At the Central level: Central Electricity Regulatory Commission (CERC)**  
It regulates companies of the central government and companies generating and selling electricity in multiple States and inter-State transmission and trading
- **In the States: State Electricity Regulatory Commissions (SERCs)**  
Regulation for intra-State generation, transmission and distribution of electricity
- CERC provides guidance and principles for SERCs for tariff determination




In terms of electricity regulation in India at the central level, we have the central electricity regulatory commission. At the same time, various states are also having a state electricity regulatory commission.

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## Central Electricity Regulatory Commission

- Central Electricity Regulatory Commission (CERC) was established on July 24, 1998 by the Electricity Regulatory Commissions Act-1998 to regulate electricity/power sector of India
- It is a statutory body that functions under the Electricity Act of 2003 (Sec 76)
- It promotes competition, efficiency and economy in electricity generation
- CERC aims to raise the quality of supply by removing institutional barriers and promoting investments to bridge the demand-supply gap and protect consumer's interests
- An efficient and developed power market is also promoted by the CERC



So, central electricity regulatory commission was established on July 24, 1998 by

electricity regulatory commission act 1998 to regulate electricity power sector of India. The main function under the electricity act of 2003 was, to promote competition, efficiency and economy in electricity generation. CERC aims to raise the quality of supply by removing institutional barriers and promoting investments to bridge the demand supply gap and to protect consumer interest.

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## Functions of CERC

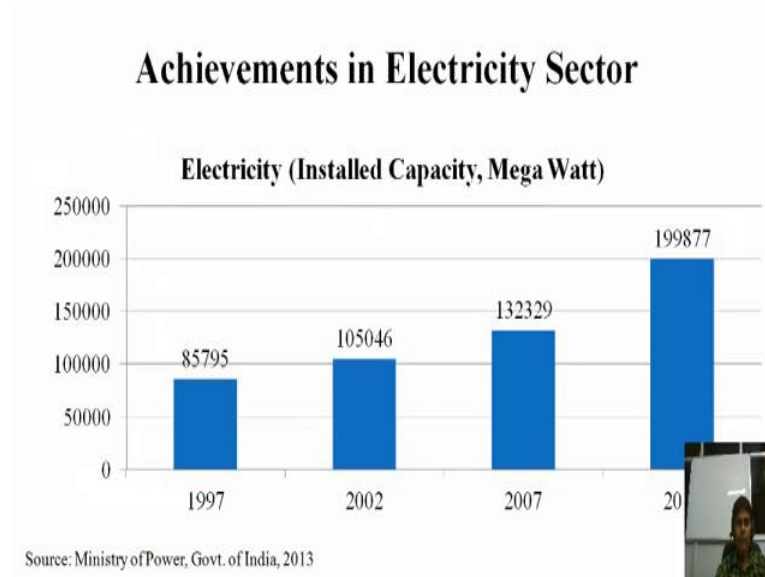
- Tariff Regulation of companies owned or controlled by the Central Government
- Regulation of tariff of other generating companies
- Management of the inter-State transmission of electricity
- Determine tariff for inter-State transmission of electricity
- Issuance of licenses to electricity traders with respect to their inter-State operations
- Improve access to information for all stakeholders
- Adjudicate upon disputes involving generating companies or transmission licensee
- Levy fees for the purposes of the Act
- Specify Grid Code for Grid Standards
- Ensure the standards with respect to quality, continuity and reliability of services
- Fixation of the trading margin in the inter-State electricity trading



An efficient and develop market is also promoted by CERC. The major functions are tariff regulations of companies or controlled by the central government, regulation of tariff of other generating companies, management of the interstate transmission of electricity. Determining the tariff for interstate transmission of electricity, issuance of licenses to electricity traders with respect to their interstate operations, improve access to information for all stakeholders.

Levy fees for the purposes of the act specify grid code for grid standards, ensure the standards with respect to quality continuity and reliability of services, fixation of trading margin in the interstate electricity trade.

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So, some of the achievements are in terms of installed capacity mega watt, the ministry of power government of India data 2003 shows that compared to 1997. We have almost crossed the just double capacity of the megawatt and this is one of the achievement in the post regulatory data.

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### Telecom Regulation

- The Telecom Regulatory Authority of India (TRAI) was set up on 20th February 1997 by an Act of Parliament, called the Telecom Regulatory Authority of India Act, 1997
- The aim was to regulate and fix or revise tariffs for telecom services
- It also aim to provide fair, transparent and conducive environment to telecom operation in the country
- TRAI Act was amended in 2000 to establish Telecommunications Dispute Settlement and Appellate Tribunal (TDSAT)
- TDSAT took over the adjudicatory and disputes settlement functions from TRAI

In terms of telecom, the telecom regulatory authority of India, which was set up on 20th February 1997 by an act of parliament called the telecom regulatory authority of India act in 1997, as the major objective to regulate and fix or revise tariffs for telecom services. It also aims to provide fair transparent and conducive environment to telecom operation in the country.



TRAI act was amended in 2000 established telecommunication dispute settlement and appellate tribunal. TDSAT took over all the disputes settlement functions from the TRAI.

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## Functions of TRAI

- Regulation of the telecom services in India
- Tariff setting and notification of the call rates for domestic and international calls
- Make recommendations on the need and timing for introduction of new service provider
- Ensure conformity of terms and conditions of license
- Management of spectrum
- Ensure the quality of services by setting the standards
- Protection of the consumers' interest
- Ensure effective compliance of universal service obligation



So, the main functions of the telecom regulatory authority of India regulation of the telecom services in India. Tariff setting and notification of the call rates or domestic and international calls make recommendations on the need and timing of the introduction of new service providers. Ensuring the conformity of terms and conditions of license management of spectrum, ensuring the quality of services by setting up the standards, protection of the consumer's interest and it also ensures effective compliance of universal service obligation.

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## Progress of Telecom in India After TRAI

- Growth of the telecom sector can be evaluated as the increase in tele-density by 1.92% (1948-1998) and 18% in just 10 years after TRAI's inception
- 6 million subscribers are added every month
- India has the 4<sup>th</sup> largest network in the world
- The contribution of telecom service industry is 2.71% to the GDP



The growth of telecom sector can be evaluated as the increase in Tele-density by 1.92 percent during the period 1948-1998 and which is now 18 percent in just 10 years after TRAI's inception. 6 million subscribers are added every month. India became the 4th largest network in the world and the contribution of telecom service industry is 2.7 percent to the India's GDP.

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<b>Achievements in Telecom After TRAI</b>				
<b>Items</b>	<b>1997</b>	<b>2002</b>	<b>2007</b>	<b>2014</b>
Wire line Subscribers (millions)	14.54	38.29	40.75	28.49
Wireless Subscribers (millions)	0.34	6.68	165.11	904.51
Total Subscribers (millions)	14.88	44.97	205.86	933.0
Tele-density (%)	1.56	4.29	18.23	75.23
Internet Subscribers (millions)	0.09	3.42	40.57	251.59
FDI in Telecom (million INR)	22328.4 (March 1997)	39384.61 (March 2002)	21495.77 (March 2007)	79,872.83 (March 2014)

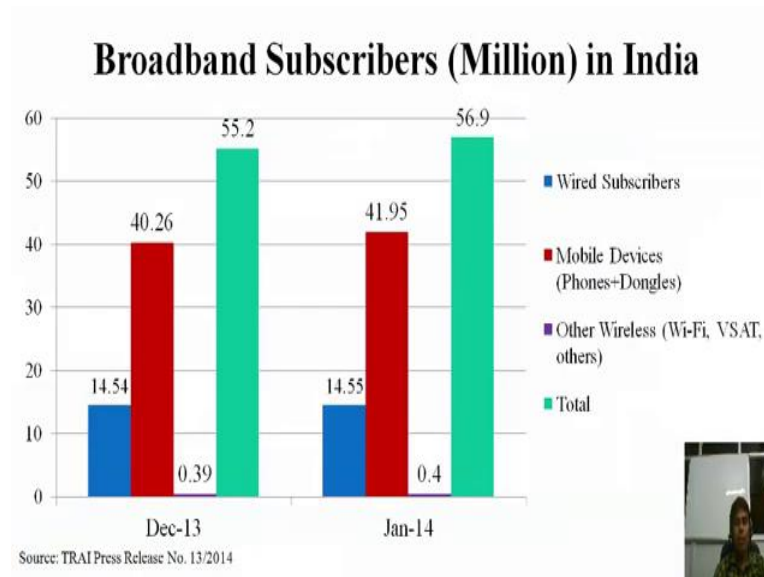
Source: TRAI (2007), TRAI Annual Report 2013-14 and Dept. of Telecommunications, Govt. of India

The recent statistics also shows that in the post regulatory era, we have a wide improvement in terms of the subscriber's in terms of wire line subscriber. While in 1997 we had 14.54 million subscribers, now it has 28.4 million subscribers. While in the wireless subscribers sectors, we had a huge jump, which was 0.34 million subscribers in 1997, now, it has raise to the 904.1 million subscriber.

So, the total subscriber, which was around 15 millions in 1997 as now raise to the new high and that is 933 million subscribers and the Tele-density, which had 1.56 in 1997 is now reaching to the new height of around 75 percent. So, this is all about contribution of the regulation by the telecom regulatory authority of India. In terms of internet subscribers also the subscribers, new subscribers added is 250.19 million, which was 0.09 million.

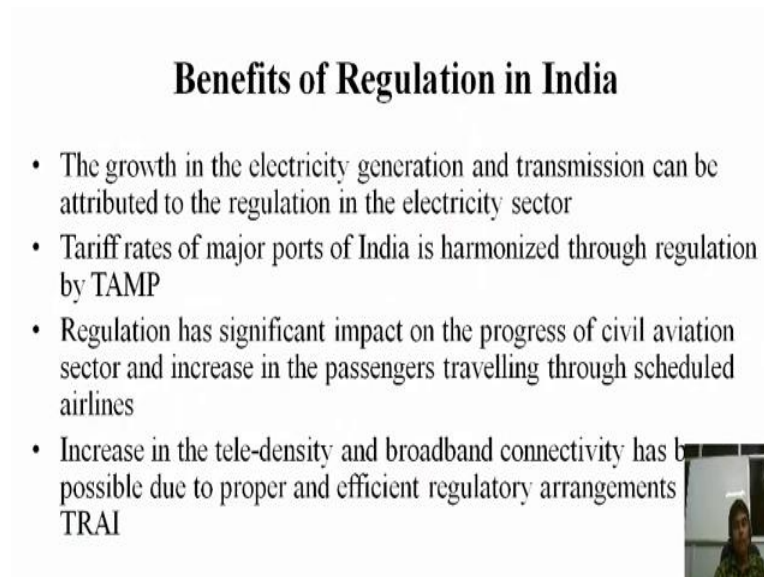
This particular sector has a really achieved a new targets in a foreign direct investment and we are also thing that compare to 1997 by the kind of 2014 by the end of March 2014. India has really around 80 million FDI in telecom sector in terms of rupees.

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So, in terms of broadband subscribers, we can see here that total subscriber we have 46.9 million in India by January 2014. This is based on the Press release by the telecom regulatory authority of India, the data received from this particular press release.

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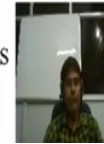
And if one can really want compare the benefits from it is past the growth in the Tele-electricity generation and transmission can be attributed to the regulation in the electricity sector. Tariff rates of major ports of India is harmonized through the regulation by TAMP. Regulation has significant impact on the progress of civil aviation sector and increase in the passengers traveling through scheduled airlines and in terms of Tele-density and broadband connectivity has the new heights only because of the efficient

regulatory arrangements to TRAI.

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## To Sum Up

- There was a need for independent regulatory bodies when the Indian economy was opened to domestic as well as foreign private sector
- This necessitated the creation of regulatory authorities in the country
- Likewise regulators for sectors like ports, civil aviation, electricity, telecom etc. were established
- All the sectors that established regulators witnessed fast growth as is highlighted in the previous slides, particularly telecom regulator (TRAI) has huge achievements
- There is a need for regulators for other infrastructure sectors railways and roadways



So, to sum up, we can only say that there was a need for independent regulatory bodies, when Indian economy was liberalized in 1991. And domestic as well as foreign private sector were allowed to participate in various decisions in especially in services and production and when it comes for the infrastructure like telecommunication or port or airline services and electricity generation and distribution.

Whatever new statistics, we are gathering today that was not possible without proper support from the guidelines and the line to time to time regulation provided by different regulatory operating different sector in India. And we have seen at the global level also that, it is not India alone, which is a really active in providing such regulations. But, developed as well as many developing countries have similar practice in the past and sectors like ports, civil aviation, electricity, telecom, were already having likewise regulators.

And all the sectors that established regulators, they have really witnessed for fast growth, India alone each one of the example, where we can say that, it is not possible in India become the port largest telecom market in the world. But, it is happening just because of the active regulatory authority, which is a telecom regulator of India. So, there is a need for regulators for other infrastructure sectors like railways and roadways.

And the entire discussion shows that more we have the clear cut rules norms policies and supportive guide lines. Then, particular sector has especially infrastructure building up

infrastructure is one of the challenge that we have already seen in our previous discussion. And at same time, maintaining that infrastructure is another challenge to minimize those challenges it is indeed important to have a regulatory mechanism and in any sector, wherever we were having this regulatory mechanism, we were in the position to have more better infrastructure facility developed.

And we were having more expansion in the size of the market and at the same time, we were able to have the world class growth performance. So, this particular discussion gives us an idea that how regulatory authorities, regulatory bodies and regulatory mechanism works not only in terms of proving the service. But, providing the services in a very suitable price for the consumer and that price is not only suitable to consumer, but also for the service providers.

So, I hope this entire discussion, we gave you some idea, so how a regulatory authority works and how this particular functioning of the regulatory authority helps in getting a very competitive price as well as satisfactory level of the service.

Thank you.