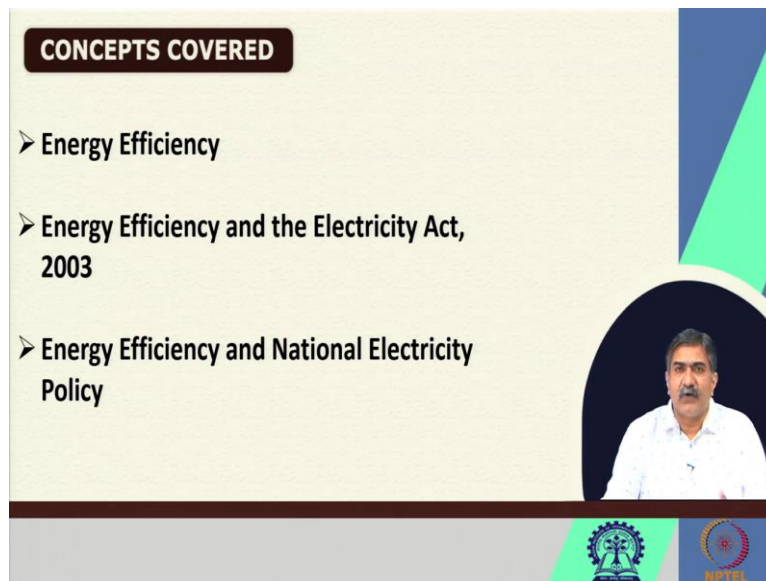


Introduction to Law on Electricity
Professor Uday Shankar
Rajiv Gandhi School of Intellectual Property Law
Indian Institute of Technology Kharagpur
Lecture 38
Energy Efficiency

Greetings to all the learners. Till now, we have studied on the salient features of the Electricity Act. We have discussed the main provisions and the powers and functions of the regulatory commissions; what are the powers of appellate tribunal. And also, along with that, we have studied that how under the Electricity Act, renewable energy is featuring.

Now, taking the debate further, we need to discuss, and we need to make a kind of comprehensive study. It is also suggested to look at the necessary framework on energy efficiency. So, in this module, we will be discussing about energy efficiency. So, what we will discuss is, how the energy efficiency is being discussed under the Electricity Act.

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CONCEPTS COVERED

- Energy Efficiency
- Energy Efficiency and the Electricity Act, 2003
- Energy Efficiency and National Electricity Policy

The slide features a small video inset of Professor Uday Shankar in the bottom right corner. At the bottom of the slide, there are two logos: the Indian Institute of Technology Kharagpur logo on the left and the Rajiv Gandhi School of Intellectual Property Law logo on the right.

Because we have been discussing about the Electricity Act, the idea is to look at whether an Electricity Act also deals with energy efficiency or not. And then, we will also look at that how the electricity policy deals with the energy efficiency issue. And then, in the next session, we will be looking at how energy efficiency and energy conservation have been discussed under the Energy Conservation Act of 2001.

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- Global Oil Crisis – Arab-Israel War – contributed to the growth of conservation narrative
- Later on supplemented by environmental concerns - energy efficiency attained a much higher pedestal in the policy
- Petroleum Conservation Action Group, was formed in 1976 by Ministry of Petroleum and Natural Gas
 - Established as a nodal agency for promoting fuel efficiency in the country - consisting primarily of senior officials of MoPNG and Public Sector Enterprises
- Energy Management Cell – was established by Ministry of Power

So, that is how the scheme of the presentation will be. When we talk about energy efficiency, it is important to look at the history and the background which made the policymakers, which made the government to give a serious thought on energy efficiency, energy conservation and energy security. And in this regard, Arab and Israel war played a prominent role.

Because of the war in 1970s, the fuel price went up when there was a crisis of oil supply because of the cut in production. There was a serious discourse, serious debate, and serious discussion took place that how long a country would be dependent upon the import of energy sources. So, this event served as a reminder to the global community, I would say not only for India but in general for countries in the world.

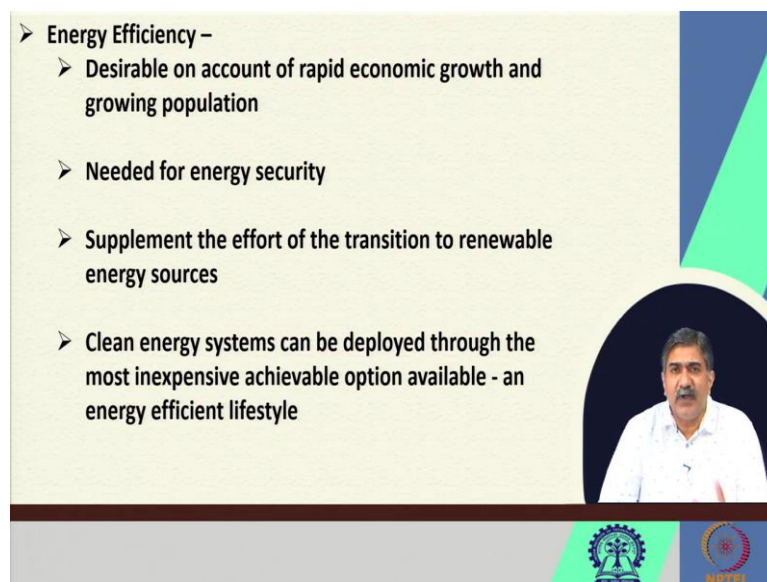
The necessary measures are required to be taken to not only minimize the dependency on the imported oil and natural gas but also to take necessary measures for conservation and efficiency. Now, this very effort got supplemented with the issue of climate change, global warming, and environmental concerns, and the government felt a kind of compulsion; there was kind of atmosphere where the energy conservation, the issue of energy efficiency occupied a central focus. It became a core point of discussion on energy management system.

So, the debate what is started with minimizing the dependence on the import, got a new dimension because of the environmental concerns. And along with the very drive on increasing the access to electricity to the population for better living, additionally, a drive was also put in place, additionally, an agenda was presented on the board that along with installation of electricity power plant, along with the improvement in distribution network, what is needed, what is desirable, is to also focus on energy conservation and energy

efficiency. Now in 1976, Petroleum Conservation Action Group was constituted by the Ministry of Petroleum and Natural Gas, which was given the task to suggest the necessary measures to bring in efficiency in oil and natural gas sector. Primarily, this action group was comprised of officials from the Ministry and the officials from Public Sector Enterprises.

Later on, this action group was registered under the Society Registration Act and renamed as Petroleum Conservation Research Association. Now, if you look at the name, the name itself indicates the scope of the group, the scope of the association. That it would suggest measures related only to oil and natural gas. Therefore, other energy sources were not covered, and not taken up by the association. And that is why a separate cell was established Energy Management Cell under the Ministry of Power, which has been given the responsibility to advise that how the efficient use of energy would take place.

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➤ **Energy Efficiency –**

- Desirable on account of rapid economic growth and growing population
- Needed for energy security
- Supplement the effort of the transition to renewable energy sources
- Clean energy systems can be deployed through the most inexpensive achievable option available - an energy efficient lifestyle

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Now, when you talk about energy efficiency, why is this discussion important for understanding the significance of Electricity Law? Why is this discussion important for understanding the supply in quality sense, in a reliable sense? Because on the one hand, when we talk about the very need to increase the access to electricity, whether it has been done through more install capacity, whether it has to be done by improving the necessary infrastructure, all these are needed for economic growth. And at the same time, the access is also very much demanded by the growing population. Because population is growing and with that, the consumption is also increasing. With the consumption increasing, there is a demand in the power market. Now, one way of fulfilling the demand is to work on the installation of power plant.

One way of meeting the demand is to augment the installed capacity and accordingly improve the distribution segment. Now, there is another aspect to it, and what is the another? The another aspect is that along with the very effort to increase the installed capacity, along with the effort to increase the generating capacity, it is prudent to also work on efficiency issue.

So, that there shall be optimal use of the generated resources and that, in turn, would also satisfy the requirement of energy security. So, energy efficiency gets driven from both the aspects. One aspect is the growth in demand, one aspect is about meeting the demand, and the other aspect is that how the efficient use of electricity would facilitate in fulfilling the demand. And in a way giving a sort of assurance to the end consumer that quality and reliable supply of electricity is assured.

Additionally, because of the huge dependence on fossil fuel-based power plant, which is damaging the environment, which is contributing to climate change, there is a very significant movement, very remarkable argument of converting the various sources from fuel fossil fuel to renewable. Now, this very transition, this very shift is also going to get further support from the focus on energy efficiency.

Because the moment we talk about transition to renewable, the moment we talk about transition to cleaner energy. Obviously, it is more to do with how efficiently we are using the energy sources. And that is why it has been suggested that clean energy system can be deployed through most inexpensive achievable option available. Now, as we have discussed while discussing renewable energy that every consumer is now a producer.

So, if every consumer becomes a producer that is in case of renewable sources, obviously, it is not only contributing in improving the environment, but it is also creating an awareness in the consumer that how efficiently the electricity should be utilized.

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- Enhance energy access
- Limit the environmental implications of growing use
- Energy sector accounts for the largest share of GHG emissions (around 77%)

- Increase in energy efficiency can also lead to lowered growth in total electricity demand, reduce peak demand and help manage the electricity load curve

- India's Nationally Determined Contributions submitted to the UNFCCC on October 2, 2015 emphasizes on energy efficiency as a key measure to manage the power sector demand -To reduce the emissions intensity of its GDP by 33% to 35% by 2030 from the 2005 level

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And this also would improve the energy access. Because if the energy is being used in an efficient manner, obviously, there will be availability of the same. And if there is an availability, it could always be diverted, and it could always be resource to the needy people. And that is the reason why the focus on energy efficiency is gaining prominence these days. This is also because of the very fact that energy sector itself contributes to greenhouse gas emissions.

Now, if there is overall drive of reducing the emission of greenhouse gas emission, obviously, the focus needs to be changed from coal based, thermal based power plant to cleaner energy, renewable energy. And in that process, energy efficiency again plays a significant role. Increase in energy efficiency can also lead to overall lowering the demand. Lowering the demand, if the number of appliances which are put in use in a household is being used in a very scientific way, it has been used in a very meticulous way. Obviously, the demand can be managed. And at the same time, it can also reduce the peak demand and accordingly, it can help in managing the load. So, if you if you look at the very relevance of conservation and efficiency in the overall management of power market, it has potential role to play. It can make a revolutionary impact on the very availability of the resources and the use of resources by the end consumer.

Further, the very drive on energy efficiency gets legitimized, and gets additional support, when you look at the commitment of the Indian Government given on the convention on climate change, where it has said that it will reduce emissions intensity of its GDP by 33 to

35 percent by 2030 from 2005 level. So, in order to meet the international obligation again, there is a need to focus on the program on energy efficiency.

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➤ Challenges for Energy Efficiency

- Subsidised electricity contributes to lack of incentivisation to save electricity
- Involvement of cost in implementing conservation projects in industrial or commercial sectors – considering the technological advancement required

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But then, when we talk about the very need, when we talk about the very requirement of focusing on energy efficiency, there are challenges into it. What are the challenges? That how do we subsidize electricity contribution in order to create a situation where there shall be incentive for the one who is meeting the benchmarking required for maintaining the efficiency.

So, what is important to understand? What is important to understand is that, on the one hand, supply subsidized electricity, there would be a probability and possibility of not valuing the cost of that subsidized electricity. And if it is not there, then obviously, the incentive to minimize the use when it is not needed would be not there.

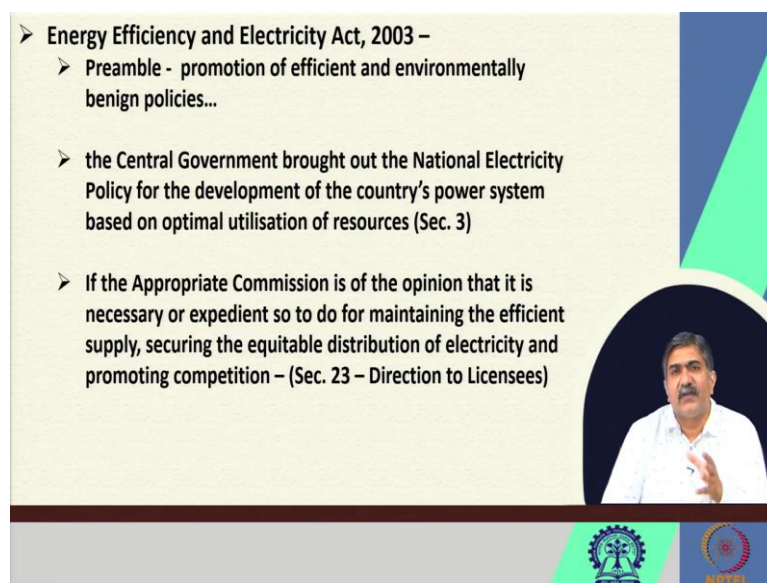
Therefore, it is desirable that when such supply is happening to the consumer, which is paying concessional rates, or subsidized rates, such consumers need to be informed; they need to be educated on the benefits of conservation. Otherwise, they would think that they are getting on a lesser price and they are free to use it as per wishes of the end consumer, even if when certain appliances are to be used or not to be used.

The other important challenge is when you talk about bringing in necessary efficiency approach in the power sector; what is needed is the technological intervention. Because it is only with the help of technology the machines and the equipments can become efficient apart

from the uses by the end consumer. Now, when technology has a role to play, technology comes with cost.

So, whether the user would be willing to pay the cost to procure the technology which would facilitate the efficient use of energy. Let us say, for example, the large industry. If large industry has been asked to buy those equipments which are costlier, but at the same time, it would be better for saving energy, whether they would go for it? Whether the large industry would go for it or not? So, that cost, whether it is going to deter the consumer who has been entrusted with the task of conserving energy, saving energy or putting efficient use of energy.

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➤ Energy Efficiency and Electricity Act, 2003 –

- Preamble - promotion of efficient and environmentally benign policies...
- the Central Government brought out the National Electricity Policy for the development of the country's power system based on optimal utilisation of resources (Sec. 3)
- If the Appropriate Commission is of the opinion that it is necessary or expedient so to do for maintaining the efficient supply, securing the equitable distribution of electricity and promoting competition – (Sec. 23 – Direction to Licensees)

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Before we move to the discussion on the Energy Conservation Act of 2001, which is the law to deal with issue of conservation and efficiency, let us look at how efficiency is featuring under the Electricity Act 2003, and this is being done just to give the continuation of our discussion. Because we have been discussing about Electricity Act right from the beginning, and therefore, let us look at how Electricity Act addresses the issue of efficiency.

Now, when you look at the preamble, the preamble itself talks about promotion of efficient and environmentally benign policies. Now, efficient and environmentally benign policies certainly reflects that the institutions which are responsible for framing policies and regulations, they must keep in mind that regulation should address the objective laid down in the preamble.

So, there is a reference, there is a sort of, if not binding responsibility, there is a sort of directory, there is a responsibility which is direct in nature, which in a way is advising the

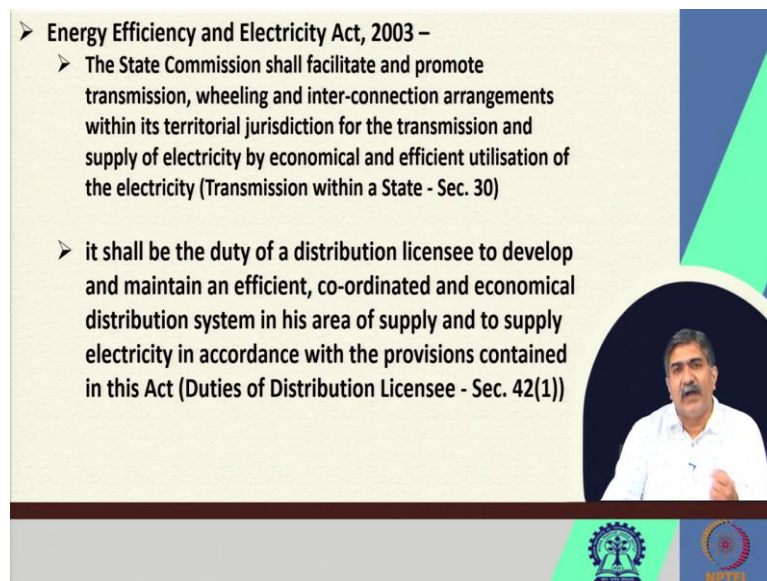
institutions, be it Regulatory Commission, be it Central Electricity authority, they do have a responsibility to take into account the very need of policies, which would put the uses of energy in efficient manner.

Section 3 talks about the formulation of National Electricity Policy and Plan. Central Government has a responsibility of formulating the plan, and if you look at the language, it says that the country's power system should be based on optimal utilization of resources. Because we know very well that electricity is one product which is needed by everyone, but the source through which it is being supplied as on date is not in abundance. There is a scarcity.

Coal is not going to be with us forever, and oil and natural gas are not going to be with us forever. Obviously, there is a hope that complete transition would happen on renewable, and then we can very well say that it would always be available with us considering the main sources from which renewable gets generated. That is why on the policy, it is been said that let there be optimal utilization of resources.

Now, optimal utilization of resources, if you give a closer understanding, if you make an attempt to understand the same, it would certainly indicate, it would certainly cover, the issue of conservation, it will certainly cover the issue of saving. Section 23, which talks about direction to licensees, it says that appropriate commission can very well give necessary direction to the licensees to maintain the efficient supply securing the equitable distribution of electricity. Maintaining efficient supply, so the word "efficient" here is not only talking about the uninterrupted supply of electricity. It is also talking about improvement in the infrastructure so that quality supply is ensured. So that there is lesser technical loss or commercial loss. That is what is the mandate of Section 23.

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➤ **Energy Efficiency and Electricity Act, 2003 –**

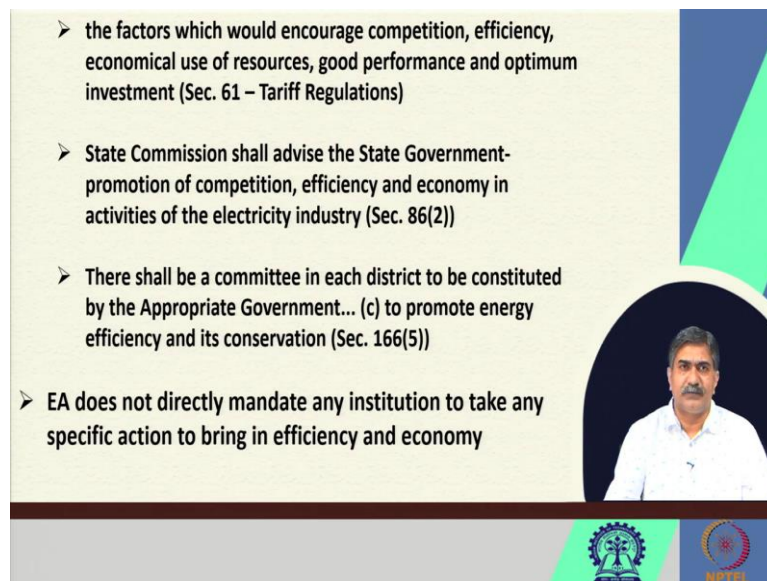
- **The State Commission shall facilitate and promote transmission, wheeling and inter-connection arrangements within its territorial jurisdiction for the transmission and supply of electricity by economical and efficient utilisation of the electricity (Transmission within a State - Sec. 30)**
- **it shall be the duty of a distribution licensee to develop and maintain an efficient, co-ordinated and economical distribution system in his area of supply and to supply electricity in accordance with the provisions contained in this Act (Duties of Distribution Licensee - Sec. 42(1))**

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When you look at section 30, which talks about transmission within a state again, it says that the state commission shall have the responsibility of providing transmission within a state by economical and efficient utilization of the electricity. Now, here again, when you talk about efficient utilization, what is it referring to, is necessary improvement, necessary mandate, on investing on technology so that the produced electricity can be conserved, can be saved.

So, there is a reference of the same in section 30. Now section 42 which talks about the duty of distribution licensees here again; if you look at it, it says that distribution licensee has a responsibility to develop an efficient, coordinated and economical distribution system. So, it has the responsibility to do so. So, while laying down the infrastructure for distribution network, it is advisable that it should get the product which is having the necessary labelling for efficient use. So, all this is sort of mandate of the law, you may argue in this way.

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- the factors which would encourage competition, efficiency, economical use of resources, good performance and optimum investment (Sec. 61 – Tariff Regulations)
- State Commission shall advise the State Government- promotion of competition, efficiency and economy in activities of the electricity industry (Sec. 86(2))
- There shall be a committee in each district to be constituted by the Appropriate Government... (c) to promote energy efficiency and its conservation (Sec. 166(5))
- EA does not directly mandate any institution to take any specific action to bring in efficiency and economy

Section 61 which talks about laying down the terms and conditions for a tariff determination. There again, it entrusts the responsibility on the commission where it says that while deciding on terms and conditions, it is important to keep in mind the efficient, economical use of resources. So, that has to be also looked into when the commission is coming up with the regulation. Perhaps that is the reason why a commission has come up with the regulation to promote the procurement of electricity from renewable sources.

Because that promotion in a long term is referring to, is going to, fulfil the conservation of resources. And therefore, one can validly argue, one can validly claim, that those regulations have got legal backing under section 61 of the Act. Section 86, again on the similar line, says that efficiency and economy in the activities of electricity industry. So meaning thereby that the State Electricity Regulatory Commission needs to cooperate and support any measures which are being taken to improve the functioning of the industry.

That is what it says. Section 166, which talks about the district committee, again, it says the responsibility of the committee shall be to promote energy efficiency and its conservation. So, committee can very well give the advice for change of equipment, change of the gadget, which consumes electricity more than what is needed. So, all this is getting necessary sanctions under the Electricity Act.

But then, when you overall look at the approach of the Electricity Act, when you try to analyse that how the Electricity Act addresses the issue of efficiency, you would find that Electricity Act has not created any institute which shall be responsible for maintaining this efficiency or working on this economic use. There is no institution which has been entrusted

with it a specific task. So, that way Electricity Act gives an advisory, but if it has not been done, what shall be the consequence Electricity Act does not talk about it. Who shall be monitoring the implementation? Electricity Act does not talk about it.

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➤ **Energy Efficiency and National Electricity Policy, 2015**

- **Energy efficiency and demand side management is to prioritised for energy savings**
- **Energy Audits may also be encouraged non-power intensive industries**
- **Energy conservation measures shall be adopted in all Government buildings**
- **Gradually, labeling of appliances should be mandated**

The slide features a video inset of a man in a white shirt speaking. At the bottom, there are logos for IIT Bombay and NPTEL.

When you look at the electricity policy and how the electricity policy discusses the issue of efficiency, electricity policy, in a big way, talks about improvement on demand side management. Demand side management is very prominent step for improving energy savings that; how I, as an end consumer is utilizing the electricity? What is my pattern for utilizing the electricity?

And what necessary change can I bring in for efficient use? For example, as a consumer at retail level, if I convert all my bulbs and tubes to LED, it would work on efficiency front. So, demand side management is becoming very important. And if you can recall, we discussed on it while discussing on renewables; supply side, emphasis on supply side when you talk about RPO, emphasis on demand side when you talk about feed-in-tariff.

So, we find that demand side management has a very influential role to play. And then further it says that let there be energy audit be done for non-power intensive industries also. As we have read, that energy sector contributes and makes a significant contribution in the emission of greenhouse gases, but then it is also desirable to look at non-power intensive industries, e.g. big malls and shopping complexes. Energy conservation measures need to be also adopted in the government buildings. And the policy of 2015 uses the expression “shall” so, meaning thereby there is a mandate. Further, it says that labelling of appliances which initially started on a voluntary basis, now, it should become mandated. When I say started on

a voluntary basis, there are certain equipment which certainly talks about labelling and that gradually is now suggested to become a kind of legal mandate. So, this is all possible only when there is information with the people on the benefit of using such appliances.

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- Energy efficient technologies should be used in the agricultural sectors
- Energy conservation should become national campaign
- First time identification of the role of BEE in the field of Demand Side Management (DSM)
- Did not clearly place the responsibility to initiate the DSM measures on any particular institution
- Clarifies the role of Bureau of Energy Efficiency

And that is why it started with voluntariness that first you make the people aware, let the people up for it, and gradually then you make it mandatory. And further, it says that let the efficient technology be used in agriculture sector because we know very well that there is a huge consumption of electricity in agricultural sector because of irrigation through the electric pump.

And therefore, it is advised that why not to use efficient technology so that we can have some saving there. And that is how you see solar pump being used for irrigation purpose in rural areas. Because it is also important to take note of that agriculture consumers pay a subsidized price, they do not pay the actual cost. It further says that let the energy conservation become a national campaign.

Because end users can make a significant contribution. If all of us start buying appliances with five-star rating, it would make a huge impact on energy conservation because it has a direct relationship with the installed capacity or with a generation. More you save, lesser you need to produce. And in that way, it will minimize the damage to the environment. And that is why this campaign is important.

Policy of 2015, for the first time, identified the role of Bureau of Energy Efficiency, which we will talk about in detail in coming session that what is this bureau? What are the powers

and functions? It says that this bureau has a main responsibility to work on demand side management, which is overlooked area till now. But then the policy failed to identify the clear responsibility that how this demand side management framework is going to work.

So that is what is a sort of grey area which has been identified. But as far as the responsibility of the Bureau of Energy Efficiency is concerned, the policy further clarifies it, that what is to be needed by this bureau and how this bureau can play a role of good regulator though it has a quasi-regulatory feature. But then how it can play the role in a very effective manner for making efficiency, an important campaign in the whole country.

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➤ **Integrated Energy Policy, 2006**

- **Regulatory Commissions can allow utilities to factor EE/DSM expenditure into the tariff**
- **Utility should set Energy Efficiency/DSM Cell**
- **No institutional arrangement was suggested to implement DSM programme**

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We have Integrated Energy Policy 2006, which also talks about regulatory commissions can very well allow utilities to factor energy efficiency and demand side management, when tariff determination is going on. Because if there is some saving, which has been done, then that has to be factored in for tariff determination. That is what the Integrated Policy 2006 talks about.

It also suggests that utilities should set up a cell on energy efficiency, demand side management cell, that would, in a way, suggest to adopt best practices for demand side management. But then, at the same time, the policy has not suggested the institutional arrangement that how the demand side management is done; who shall be responsible if it is not being implemented the way it has been designed? What shall be the mechanism to penalize the wrongdoer, penalize the entities which are not complying with it? So, that is what is not been suggested in the policy.

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- National Mission for Enhanced Energy Efficiency under National Action Plan for Climate Change – scaled up the commitment of EE (2010)
 - Four specific energy efficiency initiatives were undertaken
 - Perform, Achieve and Trade – Energy Saving Certificates are to be given on achieving the target by energy-intensive industries
 - Market Transformation for Energy Efficiency - Promoting adoption of energy efficient equipment and appliances
 - Energy Efficiency Financing Platform - Increasing the confidence of financial institutions and investors
 - Framework for Energy Efficiency Economic Development - Promoting energy efficiency initiatives by hedging against investment risks

Apart from the policy, this important national mission also refers to the very drive on energy efficiency. The National Mission for Enhanced Energy Efficiency, which has been adopted under the national action plan for climate change. In 2010, when it was adopted, the idea was to give a necessary thrust to the drive on energy efficiency. Under this mission, four specific initiatives were being taken, i.e. Perform Achieve and Trade which is all about asking the big industrial houses to conserve energy.

And with the successful conservation of energy and efficient use of energy, they would be entitled to get an energy saving certificate, which they can trade in the market. So, who can buy that certificate? The industry which has failed to meet the requirement of conservation to meet the obligation of conservation, so that industry would be buying it. So that is what is being suggested.

We will be talking more about this Perform, Achieve and Trade when we will talk about on Energy Conservation Act. Then another initiative taken was Market Transformation for energy efficiency, promoting the adoption of energy efficient equipment and appliances. Because this very initiative would, in a way, give this message to the consumer, to the producer, that these appliances are needed for efficient use when you look at it from the manufacturer side, when you look at it from the producer side. And for the end consumer, this is to be projected that if you use this appliance, it would save the cost. You would get lesser electricity bill. So, that is what is the responsibility also, which has been taken up under this mission. And as I said that technology is an important aspect to work on efficiency aspect. And for the same, there is a need to invest money.

So, Energy Efficiency Financing Platform is a program to give the necessary capital to the investor, who shall work on the new technologies related to energy efficiency. Because, after all, the uncertainty in the market, who would invest? Therefore, this kind of financial institutions, and this kind of financial arrangements, are very much needed.

So that any investor which is coming, they will have the kind of confidence that there is some kind of support, they are going to get from the government. And for this, this platform was suggested. And also at the same time, it has been suggested with another initiative that is on Framework for Energy Efficiency Economic Development, that if investor is coming and taking the risk by investing on new technologies to be used for energy efficiency. There should be some kind of mechanism to cover that risk.

And under this framework, that necessary policies to be designed that how that risk can be covered or can be minimized. So, I am just giving these thoughts to understand that how the Electricity Act, the policy and how this mission addresses the issue of energy efficiency. That is all for this session. Thank you very much.