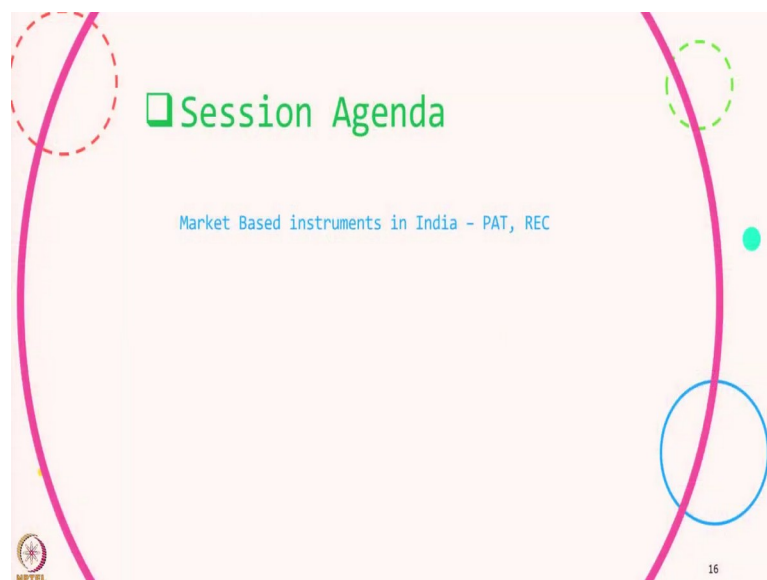


Business and Sustainable Development
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Lecture - 27
Market based Instruments in India

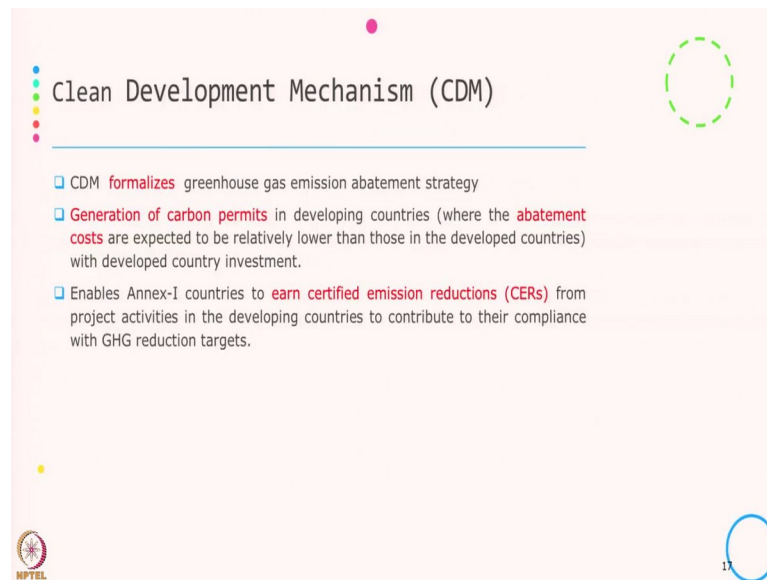
So, welcome back to the session on Environmental Regulation and Instrument. So, if you remember, in the last session, we are discussing about the difference between the command and control approaches and the market based instrument, then we have seen the different type of emission trading scheme, how it works, and we were discussing about the clean development mechanism.

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So, in this session, we will discuss the Market Based instrument specifically that is existing in India, one is PAT and second one is REC.

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Clean Development Mechanism (CDM)

- CDM **formalizes** greenhouse gas emission abatement strategy
- **Generation of carbon permits** in developing countries (where the **abatement costs** are expected to be relatively lower than those in the developed countries) with developed country investment.
- Enables Annex-I countries to **earn certified emission reductions (CERs)** from project activities in the developing countries to contribute to their compliance with GHG reduction targets.

NPTEL 17

But, before that we will complete our discussion on clean development mechanism. So, as I told in the you in the last class that this is a part of the flexibility mechanism given by the Kyoto protocol. And here the flexibility in term of in term of the operational flexibility given to the developed country or the Annex-I country that how to achieve or how to meet the emission reduction target.

And under CDM, under this clean development mechanism, the developed country can invest in the developing country, any developing country where the cost of abatement is low. And whatever the carbon permits, they are generating from the investment in the developing country that can be part of their GHG emission target, GHG reduction target or it can be their compliance with their GHG reduction target.

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Clean Development Mechanism (CDM)

- Allows Governments or private entities in developed countries
 - to implement emission reduction projects in developing countries
 - receive credit
 - in the form of certified emission reductions' (CERs)
 - which they may use to meet their national reduction targets
- Funding channelled through the CDM
 - should assist developing countries
 - in reaching some of their economic, social, environmental and sustainable development objectives
 - such as cleaner air and water, improved land-use,
 - accompanied by social benefits such as rural development, employment generation, and poverty alleviation

NPTEL 18

Now, what happens in this clean development mechanism? It allow the government and the private entity in the developed country to implement the emission reduction project in developing country. Receive credit, in the form of the certified emission reduction that is CERs, which they may use to meet their national reduction targets.

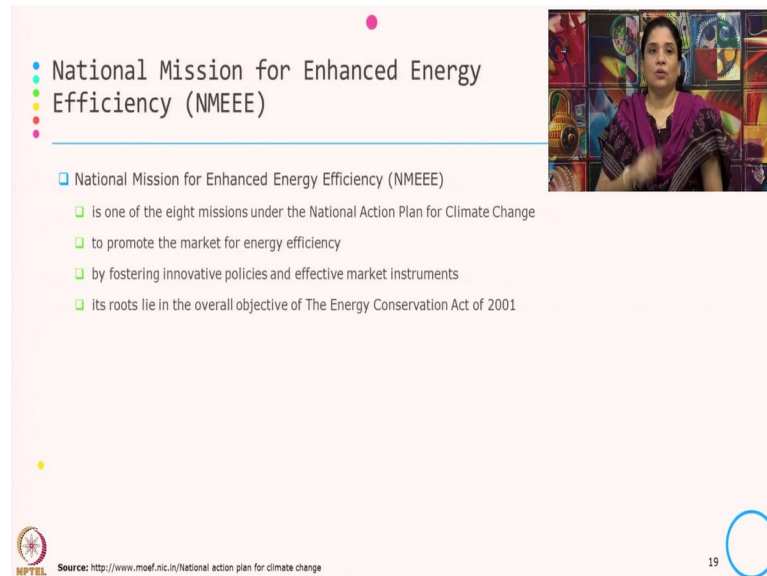
Now, developed country they do this because the cost of reduction or the cost of abatement is low in the developing country. Now, the question comes why developing country allows or why developing country encourages the developed country to invest in their country. So, funds channel through CDM, should assist the developing country. In term of what?

In term of their economic, social, environmental, and sustainable development objective. Such as, if the reduction project is being happening in the developing country, the benefit is clean air, clean water, improved land-use. Social or economic benefit like rural development, employment generation and poverty alleviation, because this is a source of income and employment opportunity because any investment has the implication for the economic, employment and also economic sorry, the income.

So, here the developing countries, they take this funding or they take they comes under this flexibility mechanism because the benefit what they get over here is the economic benefit in term of employment opportunity, income opportunity, and also the

environmental benefit, because if the emission is reduced then that gives the clean air, water and the improved land-use.

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National Mission for Enhanced Energy Efficiency (NMEEE)

- National Mission for Enhanced Energy Efficiency (NMEEE)
 - Is one of the eight missions under the National Action Plan for Climate Change
 - to promote the market for energy efficiency
 - by fostering innovative policies and effective market instruments
 - its roots lie in the overall objective of The Energy Conservation Act of 2001

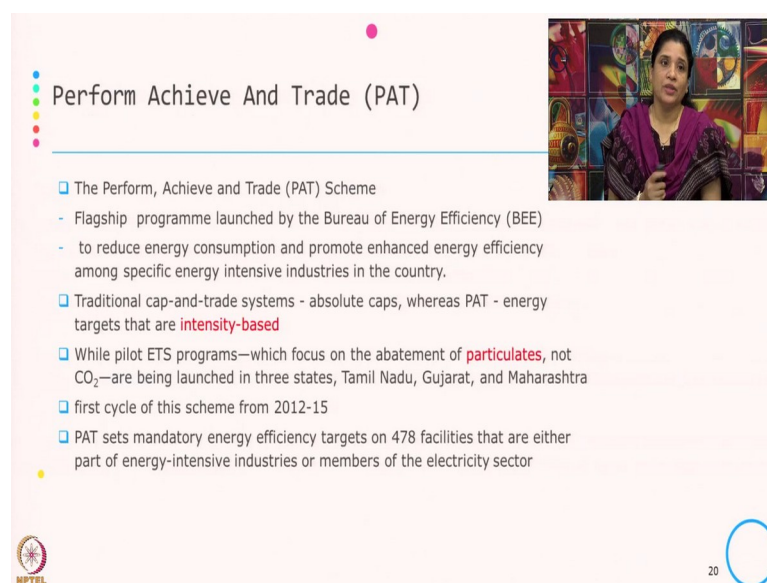
MPTEL Source: [http://www.moef.nic.in/national action plan for climate change](http://www.moef.nic.in/national%20action%20plan%20for%20climate%20change)

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Now, let us see the market based instrument which is existing in India. So, in 2011, the National Action Plan for Climate Change started under this, and they have started 8 mission under this National Action Plan for Climate Change. And National Mission for Enhanced Energy Efficiency is one of these 8 mission which came under National Action Plan for Climate Change.

And why this is, this mission came? To promote the market for the energy efficiency, fostering the innovation policies and effective market instrument, and its root lie in the overall objective of The Energy Conservation Act 2001.

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Perform Achieve And Trade (PAT)

- The Perform, Achieve and Trade (PAT) Scheme
 - Flagship programme launched by the Bureau of Energy Efficiency (BEE)
 - to reduce energy consumption and promote enhanced energy efficiency among specific energy intensive industries in the country.
- Traditional cap-and-trade systems - absolute caps, whereas PAT - energy targets that are **intensity-based**
- While pilot ETS programs—which focus on the abatement of **particulates**, not CO₂—are being launched in three states, Tamil Nadu, Gujarat, and Maharashtra
- first cycle of this scheme from 2012-15
- PAT sets mandatory energy efficiency targets on 478 facilities that are either part of energy-intensive industries or members of the electricity sector

MPTEL 20

Now, the instrument which comes under this NMEEE is known as PAT. This is a market based instrument known as Perform Achieve and Trade scheme. This is the flagship programme launched by Bureau of Energy Efficiency, to reduce the energy consumption and promote the enhanced energy efficiency among the specific energy intensive industry in the country.

So, typically, in case of traditional cap-and-trade system, the caps are absolutes, whereas, in case of this instrument in case of this scheme PAT, energy targets are intensity-based rather than absolute one. Pilot ETS program which focus on abatement of particulates, not CO₂ being launched in 3 state Tamil Nadu, Gujarat and Maharashtra. The first cycle of scheme from 2012 to 15.

They set the mandatory energy efficiency target under 478 facilities means the plants or the factory that are either part of the energy intensive industry or the member of the electricity sector.

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Slide 21 is titled "Perform Achieve And Trade (PAT)". It features a list of bullet points on the left and a video inset of a woman on the right. The bullet points are: "Facilities covered by PAT are called 'Designated Consumers,'" with a sub-bullet "the list of these facilities is published annually by BEE"; "Aim to reduce emissions" with sub-bullets "by 26 million tons of CO₂e", "as well as save 6.6 million tons of oil equivalent", and "over its first commitment period (2011-2014)"; and "Energy efficiency targets are measured" with sub-bullets "in terms of Specific Energy Consumption (SEC)" and "for which baselines are determined by the April 2007-March 2010 average". The slide includes the NPTEL logo in the bottom left and the number 21 in the bottom right.

- Facilities covered by PAT are called "Designated Consumers,"
 - the list of these facilities is published annually by BEE
- Aim to reduce emissions
 - by 26 million tons of CO₂e
 - as well as save 6.6 million tons of oil equivalent
 - over its first commitment period (2011-2014)
- Energy efficiency targets are measured
 - in terms of Specific Energy Consumption (SEC)
 - for which baselines are determined by the April 2007-March 2010 average

This facility covered by PAT is called Designated Consumer or DC. The list of this facility is published annually by Bureau of Energy Efficiency. And what is the aim? The aim is to reduce emission by 26 million ton of CO₂ equivalent, as well as 6.6 million tons of oil equivalents, and the first commitment period that is 2011 started, but it is 2012 to 2015.

Energy efficiency targets are measured in term of Specific Energy Consumption for which the baseline are determined by April 2007 to March 2010 average.

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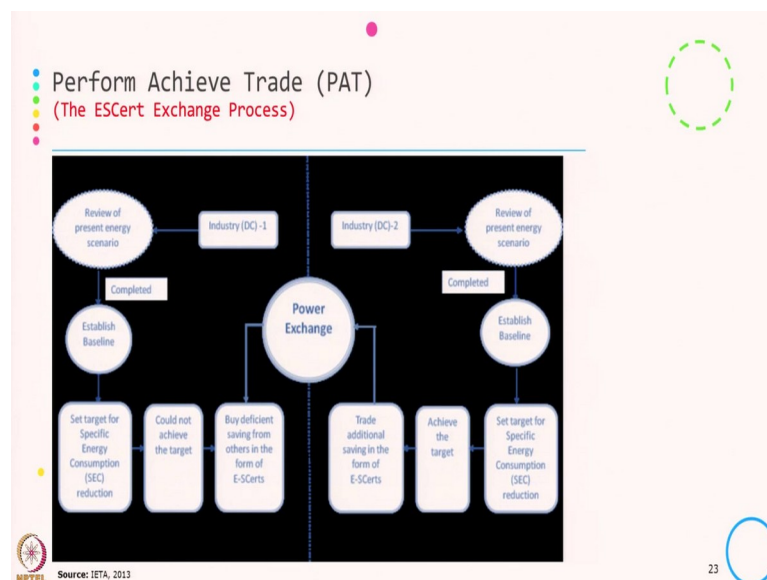
Slide 22 is titled "Perform Achieve And Trade (PAT)". It features a list of bullet points on the left and a green dashed circle on the right. The bullet points are: "An installation that fulfills and exceeds its SEC target will be able to sell Energy Saving Certificates (ESCCerts)"; "Trading will occur via" with sub-bullets "regulated exchanges" and "platforms for trading ESCerts have been designated in the two power exchanges IEX and PXIL"; and "Companies that purchase ESCerts would do so in order to achieve compliance obligations and avoid noncompliance penalties". The slide includes the NPTEL logo in the bottom left and the number 22 in the bottom right.

- An installation that fulfills and exceeds its SEC target will be able to sell Energy Saving Certificates (ESCCerts)
- Trading will occur via
 - regulated exchanges
 - platforms for trading ESCerts have been designated in the two power exchanges IEX and PXIL
- Companies that purchase ESCerts would do so in order to achieve compliance obligations and avoid noncompliance penalties

Now, an installation that fulfills and exceeds its SEC target will be able to sell energy saving certificates. So, whatever the if they are whatever the targets they are given, if the if they are saving more than that then they can sell the energy saving certificate which is known as the ESCerts. So, the name of the commodity in this trading scheme is ESCerts. And they can sell if they have achieve more than the energy saving targets given by the regulator.

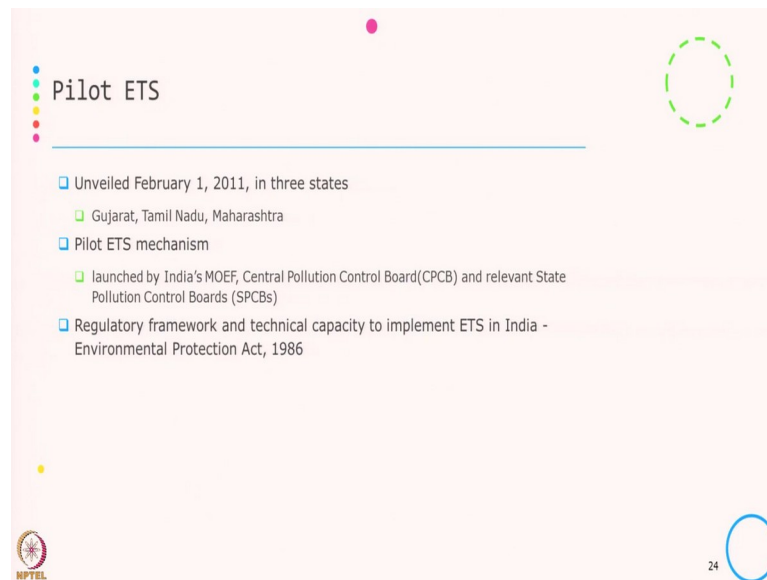
Trading will occur by regulated exchanges. Platform for trading exchange are designated two power exchange; one is IEX and second one is the PXIL. Company that purchase ESCerts would do so in order to achieve compliance obligation and avoid the noncompliance penalty.

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So, this is what the process for this ESCert exchange process that how typically this is being traded in case of the power exchange.

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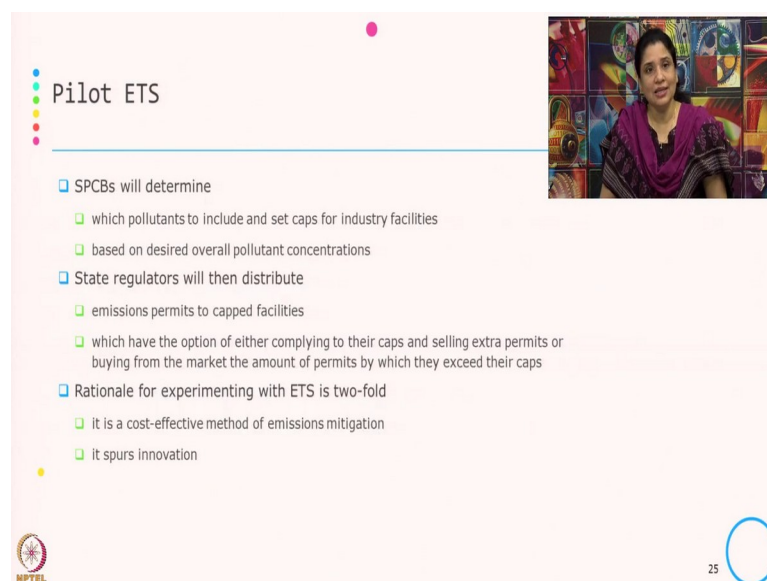
Slide 24: Pilot ETS

- Unveiled February 1, 2011, in three states
 - Gujarat, Tamil Nadu, Maharashtra
- Pilot ETS mechanism
 - launched by India's MOEF, Central Pollution Control Board (CPCB) and relevant State Pollution Control Boards (SPCBs)
- Regulatory framework and technical capacity to implement ETS in India - Environmental Protection Act, 1986

NPTEL logo and slide number 24 are visible at the bottom.

So, pilot ETS that is this environmental trading scheme started in February 1st, 2011 in three state that is Gujarat and Tamil Nadu and Maharashtra by the then Environmental Minister Jairam Ramesh. And it launch by Indian MOE, India's MOEF that is Ministry of Environment and Finance, later which become MOEFCC, when they incorporated the responsibility for the climate change, Central Pollution Control Board and relevant State Pollution Control Board. And regulatory framework and technical capacity to implement ETS in India is based on Environmental Protection Act of 1986.

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Slide 25: Pilot ETS

- SPCBs will determine
 - which pollutants to include and set caps for industry facilities
 - based on desired overall pollutant concentrations
- State regulators will then distribute
 - emissions permits to capped facilities
 - which have the option of either complying to their caps and selling extra permits or buying from the market the amount of permits by which they exceed their caps
- Rationale for experimenting with ETS is two-fold
 - it is a cost-effective method of emissions mitigation
 - it spurs innovation

NPTEL logo and slide number 25 are visible at the bottom. A video inset shows a woman speaking.

Here, each state pollution control board would be responsible for the facility coming under their state. Here they will determine which pollutant to include set caps for the industry facility, based on the desired overall pollutant concentration. State regulator will then distribute emission permits to the cap facility, which have the option of either complying to the caps or selling the extra permits or buying from the market the amount of permit by which they exceed their cap.

There are two-fold objectives for this. This is the cost-effective method for the emission mitigation and it spurs innovation. Means, if you look at if the simple decision point what I was trying to explain in the last class also, which one gives you, which one is more cost effective, whether making changes, the process, bringing innovation, bringing technology will lead to more cost or when you are buying the permits from the market rather than reducing on the own which one will cost more. And whatever the least cost effective that is typically being taken by the company.

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PAT

- PAT cycle I (2012-13 to 2014-15)**
 - was applicable on eight energy-intensive sectors
 - there are about 478 numbers of Designated Consumers
 - accounting for about 165 million tonnes of oil equivalent of energy consumption annually (i.e., 33% of India's primary energy consumption)
- PAT cycle II (2016 to 2018-19)**
 - includes 3 new sectors i.e., (petroleum refineries, discoms and railways)
 - along with the previous 8 energy-intensive sectors of PAT cycle I
 - aims to achieve an overall energy consumption reduction of 8.869 MTOE
- PAT cycle III (2017-20)**
 - includes 116 new units under it
 - have been given a reduction target of 1.06 million tonnes of oil equivalent

MPTEL Source: <https://beeindia.gov.in/content/pat-cycle>

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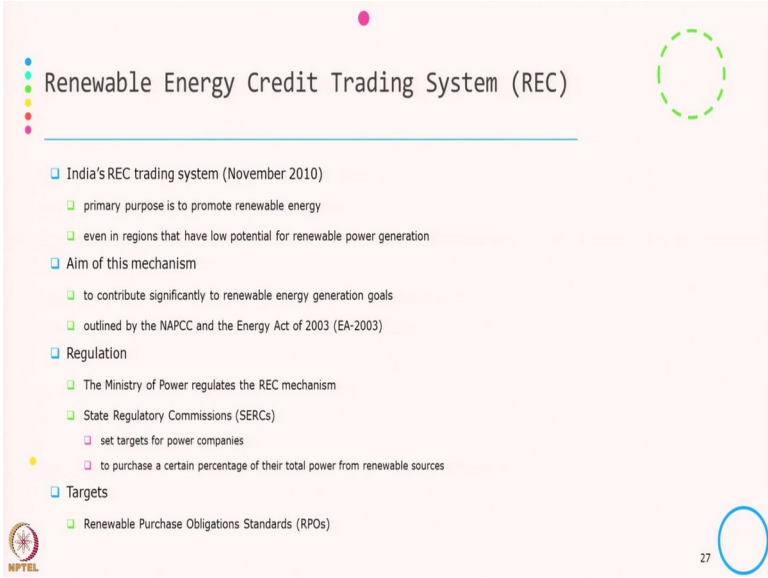
So, in the cycle 1, it was applicable to 8 energy intensive sector. There are about 478 numbers of DC accounting almost 33 percent of the India's primary energy consumption. Then, its and interestingly in cycle 1 they over achieved, and the whatever is being plan is the targets, whatever is being plan is the goal that they over achieved in cycle 1.

And one of the criticism comes because of this over achievement is that possibly whatever the targets given for the energy saving it was much more below the capability

of the industry. Then PAT cycle 2 which is from 2006 to 2018 and 19 includes 3 sectors, that is petroleum refinery, discom, and railways, along with the previous 8 energy intensive sector of the PAT cycle 1. They aim to achieve an overall energy consumption reduction of 8.869 million metric ton equivalent.

Now, PAT cycle 3 that is from 2017 to 20, along with all these previous this is, they also include 116 new units under it. And they have been given the reduction target of 1.06 million tons of the oil equivalent.

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Renewable Energy Credit Trading System (REC)

- India's REC trading system (November 2010)
 - primary purpose is to promote renewable energy
 - even in regions that have low potential for renewable power generation
- Aim of this mechanism
 - to contribute significantly to renewable energy generation goals
 - outlined by the NAPCC and the Energy Act of 2003 (EA-2003)
- Regulation
 - The Ministry of Power regulates the REC mechanism
 - State Regulatory Commissions (SERCs)
 - set targets for power companies
 - to purchase a certain percentage of their total power from renewable sources
- Targets
 - Renewable Purchase Obligations Standards (RPOs)

NPTEL 27

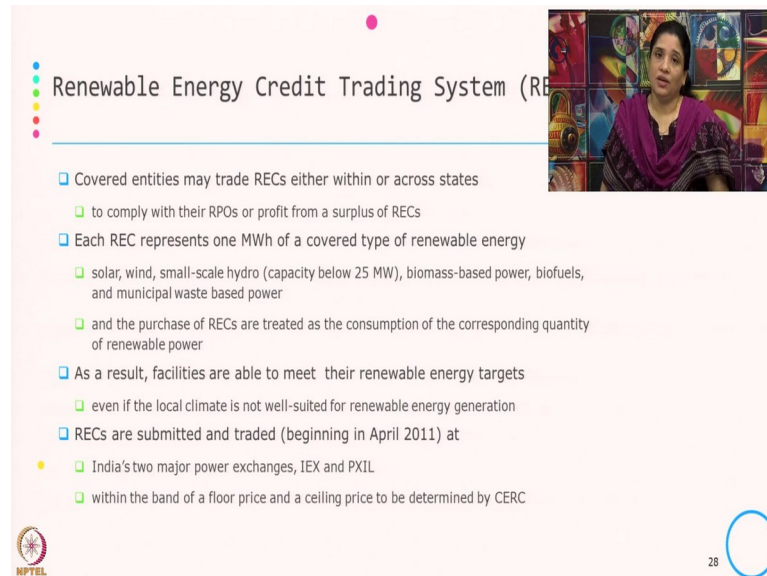
Now, the second market based instrument what is being used in India is Renewable Energy Credits System that is REC. So, this started in November 2010 and the primary purpose is to promote the renewable energy. Even in region that have low potential for the renewable power generation.

The aim of this mechanism is to contribute significantly to the renewable energy generation goal. And this is being outlined by a National Action Plan on Climate Change and Energy Act of 2003. Ministry of Power regulates this REC mechanism. State regulatory commission SERC set the targets for the power company, to purchase certain percentage of the total power from the renewable sources.

And the targets what they give is that the renewable purchase obligation standard. So, whatever the certain purchase or certain percentage of the total power which should

come from renewable that gives us the renewable purchase obligation standard that is RPO.

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Renewable Energy Credit Trading System (RECS)

- Covered entities may trade RECs either within or across states
 - to comply with their RPOs or profit from a surplus of RECs
- Each REC represents one MWh of a covered type of renewable energy
 - solar, wind, small-scale hydro (capacity below 25 MW), biomass-based power, biofuels, and municipal waste based power
 - and the purchase of RECs are treated as the consumption of the corresponding quantity of renewable power
- As a result, facilities are able to meet their renewable energy targets
 - even if the local climate is not well-suited for renewable energy generation
- RECs are submitted and traded (beginning in April 2011) at
 - □ India's two major power exchanges, IEX and PXIL
 - within the band of a floor price and a ceiling price to be determined by CERC

MPTEL 28

The cover entity may trade REC either within or across state. Now, here what would be the trading mechanism? So, that the renewable purchase obligation standard is given to each of the industry. If they are using more of renewable energy beyond the target then they have the surplus standard.

The surplus standard they can sell it to the other industry who are using or who are using less renewable energy whatever given in the target. So, cover entity may trade REC either within or across state to compliant with their RPO or profit from the surplus of REC.

Each REC represent about one type of the or the covered type of the renewable energy that is solar, wind, small-scale hydro, biomass-based power, biofuel, and municipal waste based power. And the purchase of REC treated as corresponding to the quantity of the renewable power. So, the typical example is that, if I am buying 25 megawatt of solar of this REC, then it will be considered that the industry is using 25 megawatt of solar in their production process.

As a result, facilities are able to meet their renewable energy targets even if the local climate is not well suited for the renewable energy generation. So, the simple way to

understand this is that there is a purchase renewable purchase obligation is given to the industry.

If they cannot generate, then or if there cannot generate cannot use in their production process, they need to buy the equivalent amount of the renewable purchase or renewable usage in the form of the REC. And if they are buying the permit then that would be considered that the part of their consumption of the in the form of the renewable energy.

This is also some this is also traded through the power exchange that is IEX and PXIL, and the floor price the range of the floor price and the ceiling price for this REC will be determined by the CERC that is Central Electricity Regulation Committee.

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Challenges and Issues

- Political reluctance to create an ETS
 - due to fears that such a policy could hinder economic development
- Need to build its capacity
 - to improve its data collection and its supply of trained manpower to implement ETS effectively
- Non-compliance penalties are relatively weak
 - so they could fail to incentivize compliance
- PAT is the first of its kind—a market system
 - geared towards enhancing energy efficiency—in the developing world
- Few other countries, especially developing countries, have three national market-based environmental programs
 - PAT, REC, and CDM—that are active with potential to reduce GHGs

NPTEL 29

Now, what are the challenges and issues when it comes to market based instrument in India? There is always a political reluctance to create an ETS because there is a fear or there is a apprehension that such policy could hinder the economic development. Then, the second challenge when it comes to market based instrument is that there is a need to build its capacity to improve the data collection and supply of trained manpower to implement the ETS effectively.

Then, non-compliance penalty are relatively weak. So, if someone is not complying to the standard typically there is a whatever the penalty is given that those are very weak. So, they could fail to incentivize the compliance. And PAT is the first kind of it kind it

market system and enhancing the energy efficiency in the developing world. So, it will take some time to set. And that one good thing is that already the third cycle is there for the PAT.

Then few other country, especially the developing country have three national base market environmental program that is PAT, REC, and CDM. They are active with the potential to reduce the GHG. But CDM is no more operational mostly, so if you look at the market based instrument mostly this is with PAT and REC that is that exist in India.

So, in the next session we will try to see what are the different environmental laws related to the, which contributes to the sustainability. And also, little bit about the disclosure regulation in order to understand what are the what are the changes that has happened over a period of time for the disclosure regulation.

Thank you.