Energy Resources, Economics and Environment
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Lecture 4 P2
Energy Balance of Japan

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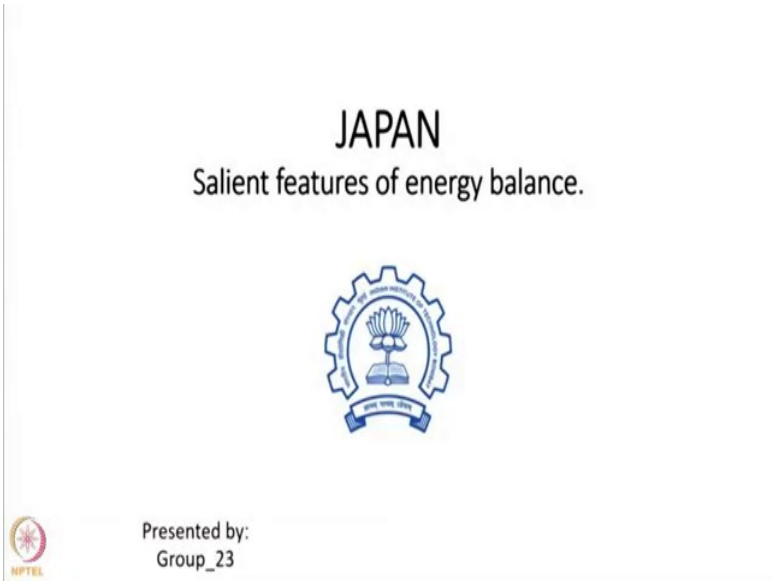

Hello everyone, I am Nitin, I along with my group member Mohammad Hafiz Niral will be presenting our assignment on the salient features of energy balance for the country Japan. Before going ahead, let first understand what are the issues that Japan is facing in terms of energy.

If you look at Japan, the country as such has a very low self-sufficiency ratio in energy. Low self-sufficiency ratio means that a country has a strong dependence on the energy imports. As per 2015 statistics the self-sufficiency ratio of Japan was about 7.4 %which is very low when compared to the other OECD countries. For example, the Denmark which has the highest self-sufficiency ratio is at 702 percent. The Britain is at about 65 percent.

The another issue that the Japan is facing is, the availability of the stable power supply. Other issues is the rise in the increase of CO_2 emissions after the Fukushima accident since the dependence on the fossil fuel based energy sources as increased from 81 %to 89 %since 2010 to 2017.

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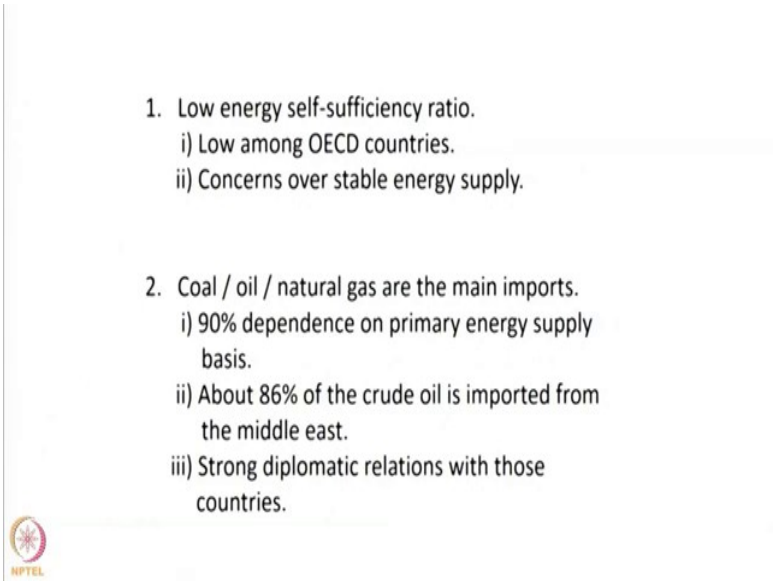

So, some of the key issues that is faced by the Japan is as flashed on the screen. So, the 90 %of the dependence for the primary energy supply input is, is from the coal, oil or from the natural gas. About 86 %of the crude oil is imported from Middle East. As far as the natural gas is concerned, it is distributed amongst the countries. The major supplier being Australia which supplies about 27 %followed by Malaysia which supplies about 18.5 percent.

So here, the Japan has tried to diversify its primary energy supply sources which will ensure that it has a good energy security in case one of the countries fails to meet the required amount of export. So, to ensure this Japan has also got a very strong diplomatic relations with these countries.

Now, let us look how and how the energy sector of Japan has changed before and after the earthquake in 2011.

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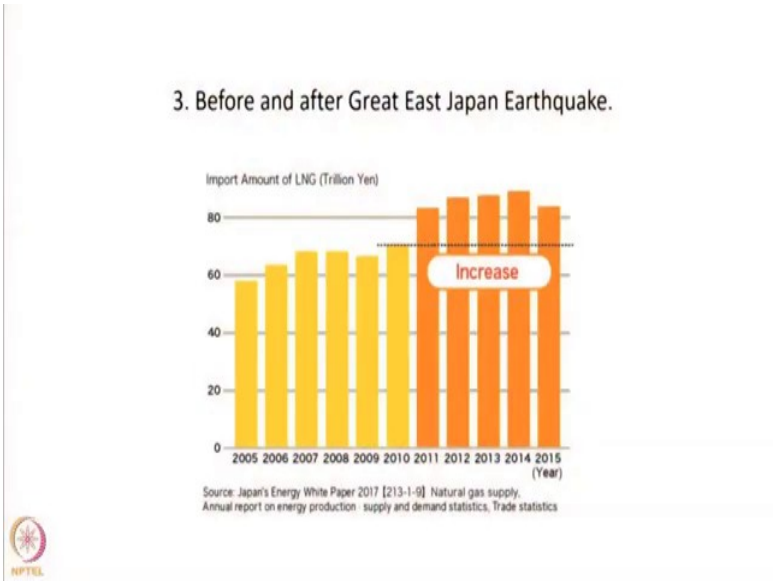

Prior to the earthquake, Japan has a dependency of 11.9 %share by the nuclear power energy which reduced to about 0.8 %in the year 2016. Consequently to cater for this excess demand that is left unmet the share of increase of LNG has significantly increased. So, you can see from the slide that the share of the LNG has increased and it has peaked in the year 2014. This was the year when the tariff for the electricity in Japan has increased by 25 %from the rates what was there in 2010.

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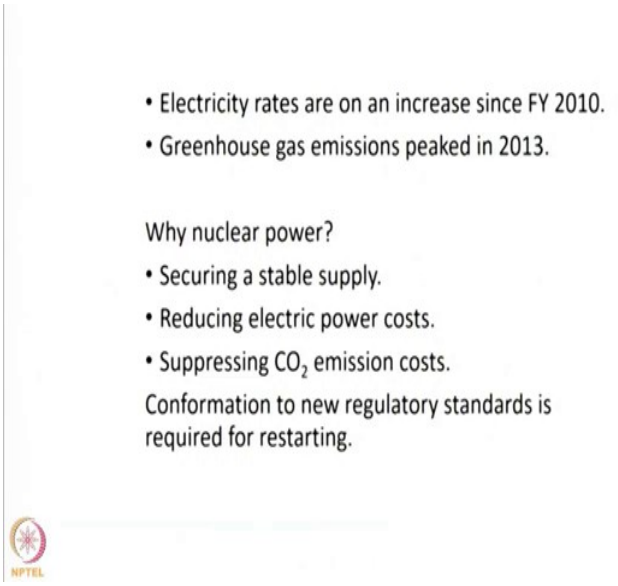

The greenhouse on the other hand, the greenhouse gas emissions has also peaked since, as also peaked after 2011 incident and it peaked in 2003 there was a total increase of 4 %greenhouse emission gases from the Japan. Why does Japan need the nuclear power? Japan

need to nuclear power to have stable supply. It needed the nuclear power to reduce the electricity cost. It also helped in reducing the CO2 emissions from the country. So, as flashed on the screen, we can see those are the important points that why nuclear power was important to Japan. Now restarting the existing nuclear plants will meet, will require conforming to the new military standard that was given by the National Regulatory Agency.

As per 2017, there were 5 plants which were operational. There were 17 which were undergoing the inspection and in case if the policy depends with the policy basis itself to have more energy from the nuclear supply, we can see that the nuclear power plants may again be restarted by 2020 or subsequently more plants will be restarted. At present, the pathway to the Japan's energy is not very sure whether they will be going totally, total dependence on the nuclear power plant as earlier before this Fukushima incident or it will be totally out of the dependence on the nuclear power energy.

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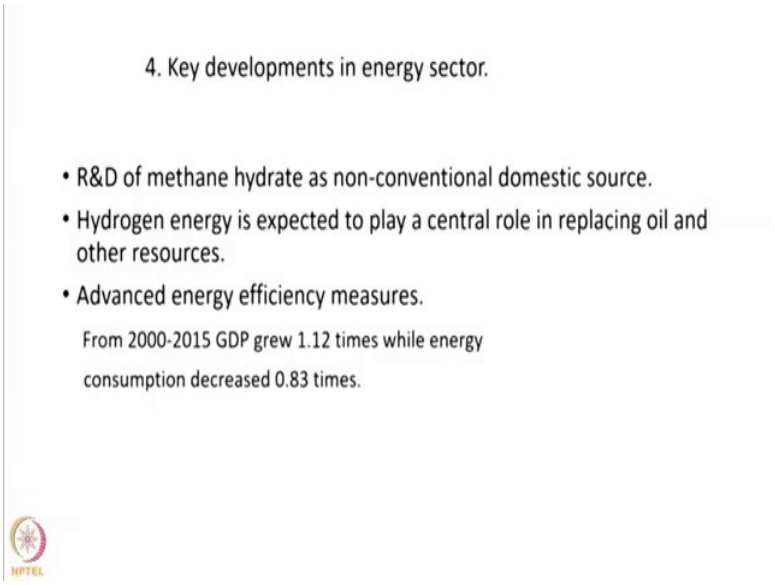

There are some of the key developments that has taken place in the energy sector. Japan has been progressively pursuing the R and D on, R and D of methane hydrate as nonconventional domestic source. The methane hydrates can act as energy source to meet the growing demands of the Japan and as well as to reduce the CO2 emissions.

Hydrogen is being seen as the another major energy source to meet the growing demands, growing energy demands of the Japan. Japan has been actively pursuing the hydrogen in the transportation sectors and in the power generation for the residential areas. The fuel, fuel cell-based vehicular application has received a lot of impetus in the Japan and for the coming up

2020 Tokyo Olympics Japan is going to use hydro, fuel cell-based vehicles as the main transportation unit during this Olympics. Further, a large amount of electricity in the residential areas is also going to come from the fuel cells that will play, that will be used in each of the residential areas.

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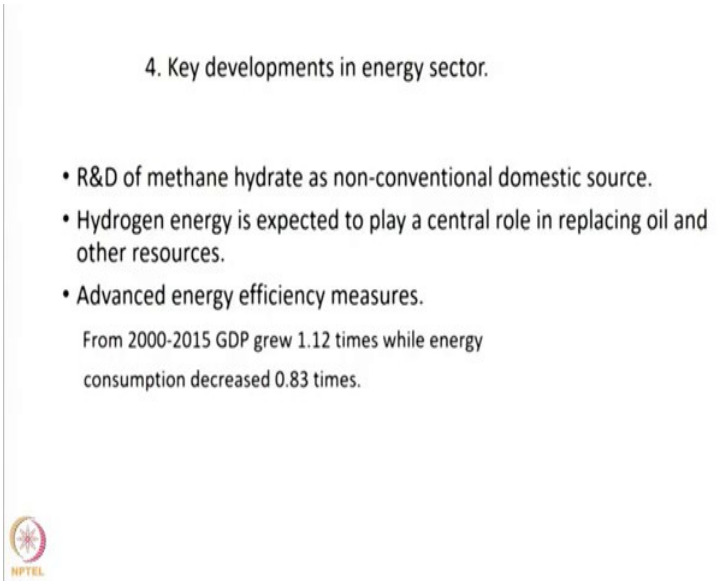

So, as flashed on the screen the hydrogen energy or the hydrogen economy is expected to play a pivotal role. Another important measure that the Japan has taken continuously is enhancing its energy efficiency. The energy efficiency of the Japan has increased, we can say that from 2000 to 2015, the GDP of the Japan grew by 1.12 % and the energy consumption at the same time decreased by 0.83 times. This only goes to show that Japan has been adopting new and new energy efficient measures.

The sector of renewable energy has also received a significant boost. New laws such as feed in tariff system as ensured that the renewal energy has grown by at an annual growth rate of 26 since 2010. The feed in tariff system eases by which the renewable energy will be installed in the country.

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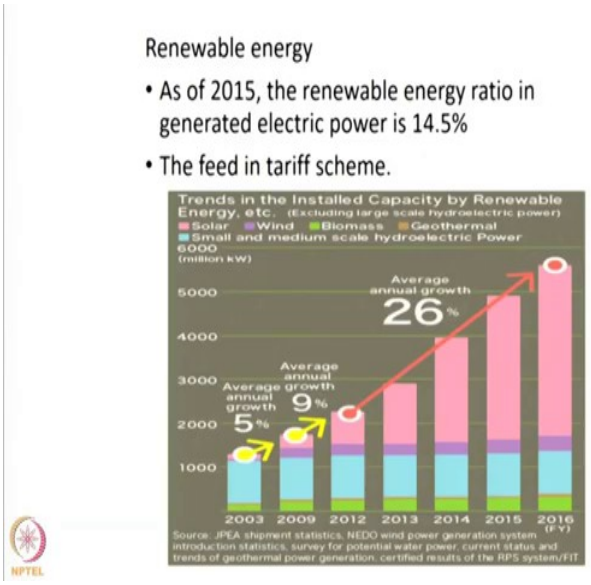

As of 2015, the renewable energy ratio in generation electric power has increased up to 14.5 percent. So, as we can see from the screen there have been a significant rise from 2003 to 2016 in the share of the renewable energy and this has also been attributable to the new laws such as feed in tariff scheme where the energy that is generated from the renewable sources it directly purchased by the electric supply companies and the taxes are there after levied on the customers.

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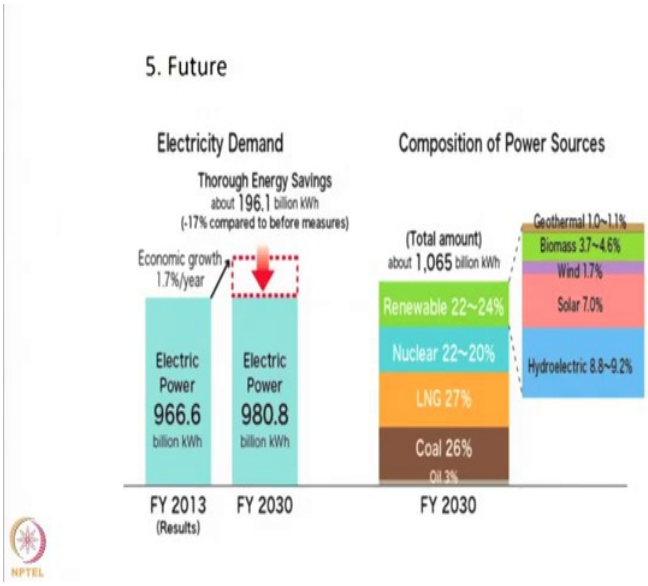

Now, the future of the Japan in terms of its energy security, it seems that it is, it will be a mix from the renewable energy and the dependence of, on the fossil fuel based energy sources it is going to decrease as Japan has also promised the INDC of the Paris Agreement to reduce

the CO2 emissions significantly. So, this is what is the expected composition of the power resources, in case if Japan's policymakers decide to have a dependence on the nuclear resources of the energy.

This is with my presentation about the energy analysis of the Japan, thank you very much.