Education for Sustainable Development
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Lecture - 31
Sustainable and Clean Energy (Contd.)

Welcome viewers, let us come back to our discussion on Sustainable and Clean Energy. Last class we have discussed about renewable energy and what are the policies to be implemented for renewable energy, how it can be made sustainable.

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So, to continue with that discussion now let us discuss about. So, what are the drivers of renewable energy policies? Ok. So, as we know the three there are primarily three drivers of sustainable development sustainable consumption production whatever we say that is the it has to be eco friendly, it has to be people friendly that is and it has to be prosperity friendly.

So, when the economic prosperity is advanced around the world, so the this renewable energy; renewable energy the sustainable development and renewable energy this definitely it will minimize its negative impact; impact in the economy in this in the in our financial structure, financial state.

So, economic prosperity automatically will minimize the negative impacts in the in our market, in our financial conditions. So, all these drivers like economic along with

economic prosperity another driver for the renewable energy technology also provide that is energy it provides energy services including, the lighting, electricity, heating, cooling etcetera; energy mobility etcetera.

So, it reduces not only the financial burden, it reduces not only our stability or the stability, so and enhances the mobility, enhances the you know all kinds of technology use etcetera. So, it also bring us the economic prosperity around the world.

So, relative to other types of energy for example, fossil oil, fossil fuels, nuclear power and traditional biomass etcetera. So, the modern renewable energies definitely would provide a variety of additional socio economic benefits additional, socio economic benefit in improving the quality of life in you know reducing the air pollution, reducing the carbon emission.

So, and socio economic benefits are you know are also a major force driving force for the policy makers. So, to adopt this renewable energy targets and support the policies because it also enhances the quality of life and even the it also protects the ecosystem, environmental system in by reducing the air by reducing the negative impacts on the air quality environmental you know in climate and other resources.

So, how to adopt this renewable energy? So, the renewable energy drivers its benefits now has been; have been categorized in under varieties of ways not only economic, but also ecological and the social benefits also.

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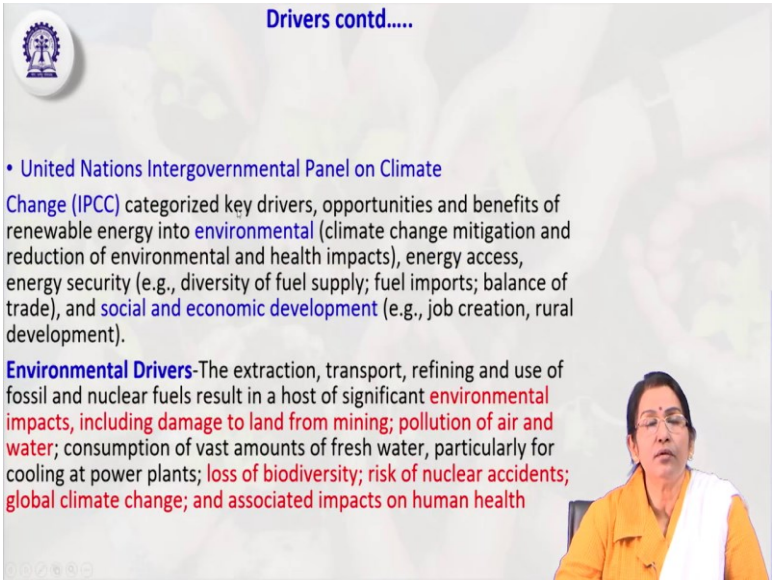

Now, let us see what are these ways and means. So, united nations intergovernmental panel on climate change they have already categorized the drivers and opportunities and benefits of renewable energy are related to environmental; that means, in element; that means, the climate change mitigation and reduction of an environmental and health impacts.

Like due to the negative impact in the environment the; that means, health is my health is being affected because due to the all kinds of the diseases and health hazards that will be minimized. So, environmental impact that also environmental in impacts also like it affects; that means, it will positively influence the climate change and help us in mitigating this thing and reducing the environmental health related impacts. So, and also it enhances the energy access, energy security by security fuel import balance of trade.

So, socio economic development also takes place; socio economic development takes place. As well as in and because of the environmental impact and gradually reduces the; that means, reduces the environmental hazards and improves the quality of health and quality of life.

So, let us discuss about the environmental drivers. Environmental drivers like you know extraction of and transport of the refined use of the fossil and nuclear oil results in host of significant environmental impacts including the damage of land for mining, air pollution, carbon emission even polluting the water also.

So, these are the environmental risk and hazards that has happened because of these traditional or the conventional sources of energy. So, this so, at also it also affected this loss of biodiversity, then risk of you know nuclear accidents global climate change all kinds of the health hazards and negative impacts that also directly or indirectly affect the human health.

So, these are the you know these are the outcomes of this climate change impact on the environmental aspect environmental drivers.

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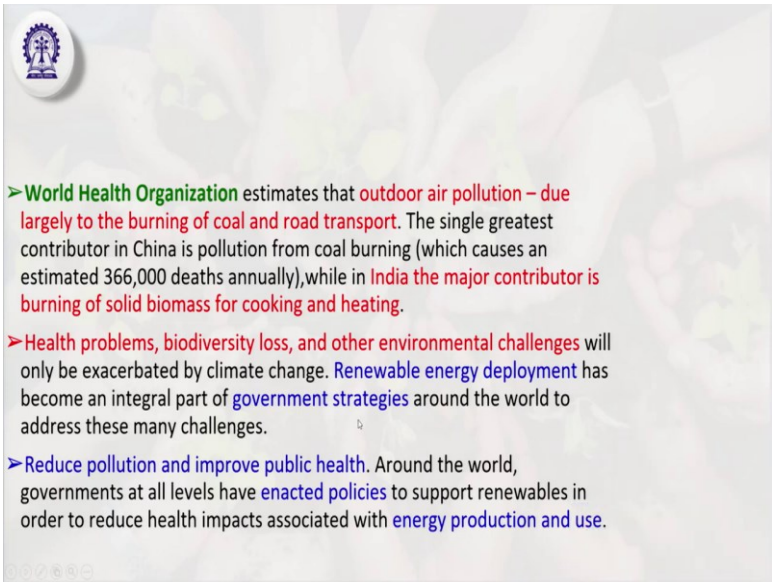

So, WHO has also said that outdoor air pollution due to largely burning of the coal and road transport and you know all kinds of things even in like in the country wise country wise even the urban cities and the then the; that means, expansion of the urban cities and the infrastructure etcetera like then the countries like China also has created enormous coal burning has grew and pollution due to the coal burning.

So, that has also cause the deaths also death annual deaths. So, China has also not only economic prosperity it has progressed, but at the same time it has also damaged the ecology and environmental aspects drivers.

So, that is why. So, India is the again India is the major contributor in its it burning the solid biomass cooking and heating. So, that is why our you know governments initiative

and you know providing the gas; that means, cooking gas to every household in the rural sector and even supplying the electricity; electricity led bulbs street lane and other kind.

So, that the environmental hazards environmental risk will be minimized. So, health related problems like biodiversity loss and other environmental challenges also will also be you know are because of this environmental effects. So, that can also be minimized. So, renewable energy deployment also with its a its a; its an integrated government strategy around the world to address these challenges especially the not only creating producing the renewable energy, but how consumption uses consumption and the business and supply transport everything.

So, the government has already made the strategies and rules and regulation in terms of policies to how to use it how to produce it, how to use it and for you know for health benefits, for the quality of life improvement and for the business purpose and the inflow and fuel efficiency or energy efficiency.

So, reduce the pollution and also improve the public health. So, renewable energy definitely it improves the public health, it improves the quality of air in the community the open source in the open space, then reduce the pollution and so, all if all these policies are to be enacted will be enacted at all levels starting from the rural level to the urban cities level. So, energy production, consumption etcetera and uses can also be better enhanced in a very sustainable way.

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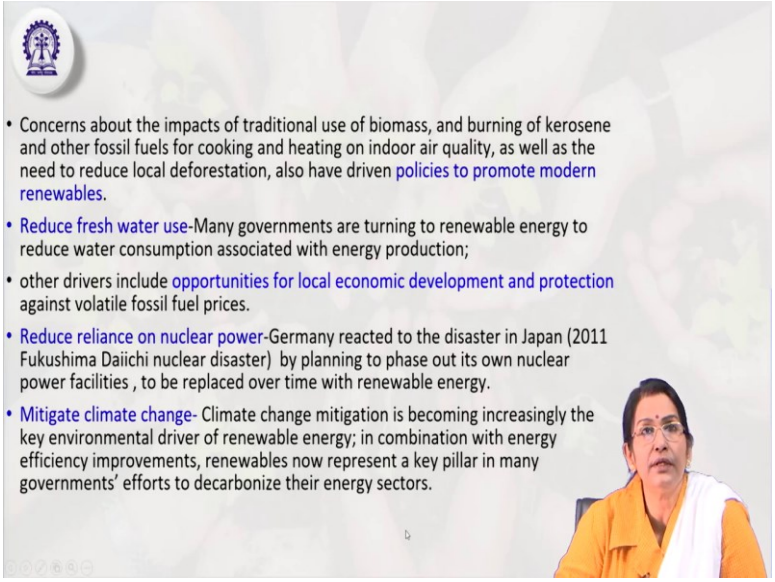

So, the therefore, that is we have to be very concerned about the policies to promote the modern renewable, then again another thing is that reduce the phrase water use. So, now many governments are also turning to renewable energy to reduce the water consumption associated with the energy productions. So, how we can save or conserve our water resources that is also another thing.

So, other drivers related to environment is like the opportunities for the local economic development and protection. Protection against this fossil fuel prices price hike and you know air pollution all these things that can also be protected. Then reducing the; reducing the reliance on the nuclear power because Germany after the disaster that happened in 2011 Fukushima plant nuclear plant; plant in Japan. So, Germany has also planned to phase out its nuclear power facilities to be replaced over time through the by the renewable energy.

So, major countries those who have witnessed this Japan disaster nuclear disaster after that they are also shifting their targets towards renewable energy sector than and slowly withdrawing themselves from the nuclear energy. So, mitigate the climate change that is also another factor of environmental driver that is climate change mitigation is becoming increasingly important and the key environmental drivers the key environmental driver for the renewable energy.

So, in combination with the energy efficient movements improvements renewable energy is now present I represent the key pillar in many of the government's effort to decarbonize the energy sector to protect our ecosystem environmental system not only through the plantation and greenery increasing the greenery, but also how to reduce it.

So, how so, the environmental driver that is the major driver of for mitigating the climate change and how we can slowly and steadily shift towards the renewable energy and minimize the pollution in the environment.

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So, now coming to the economic drivers. So, economic benefits are again immense because cost effectiveness renewable energy cost especially the cost of solar PV and wind powered machines or hydro power hydro energy system infrastructure etcetera.

So, that will also gradually reduce in the long run actually it will be very cost effective, but gradually it will continue to decline. So, so similarly your renewable energy also helps us to our number of indirect economic expenses or cost associated with you know increasing fuel price, fossil energy production, then health care expenses.

So, if you will energy will be available with cheaper and better quality in the cheaper cost and the better quality and definitely we can a maintain our lifestyle maintain our health facilities and etcetera and even after consuming required or optimum level of energy then we can also save it; we can also save it.

So, to reduce the long term cost associated with the global climate change such as certain disruptions due to disruption displacements of the people and disruption in their economic activity in the employment etcetera because of this situations like the pandemic COVID or disasters or maybe sometimes because of the political violence or the internal violence some forced migration of the people because of these social factors environmental factors.

So, when we talk about the cost associated with this climate change not only the climate change, but the after effects or the impacts of the climate change in disrupting our normal life disrupting our society disruptive to our day today activity and even though socioeconomic activities also its it has becoming very highly expensive.

So, how to reduce the cost? That is also another factor. So, therefore, the investment in sustained economic growth is environmentally sustainable. So, sustain in order to achieve the sustainable economic growth; sustained economic growth that will also go in hand in hand with the environmental sustainability. If you can achieve environmental sustainability automatically it can also help us in achieving slow and steady sustainable economic growth.

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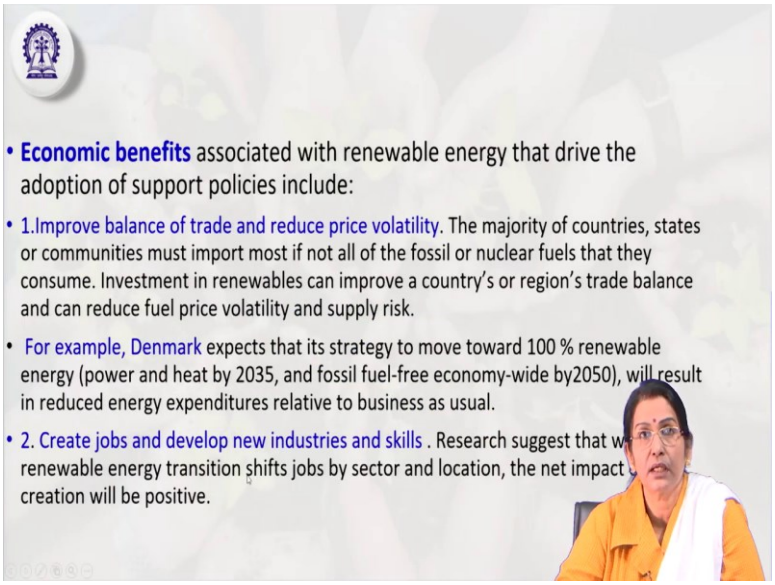

So, similar this these economic benefits like it also improves the balance of trade and reduce the price volatility because economic benefits empower the people not only for the purchasing power and etcetera, but it can you can say it can control the market in terms of reducing the other kinds of not only reducing the pollutions, but also price stability price stability.

Because investment in the renewable energies can improve the countries and regions trade balance also because of course, we have to bring some kind of reforms in trade policy, but; however, it can control check control this volatility of price volatility and the risk and the supply risk, risk also in the market.

So, this it can control this kind of this trade balance can control the risk price volatility and the supply risk supplies supply risk that can also be controlled. So, similarly in Denmark for example, its say example in Denmark its strategy has been to move towards 100 percent renewable energy by 2035 and removing all kinds of fossil oil; fossil oil free economy or nuclear slowly coming down to withdrawing gradually from the nuclear power etcetera.

So, how to establish a 100 percent renewable energy based consumed sector economic sector and reduce the fossil fuel free fossil fuel or make the society make the economy 100 percent fossil fuel free by 2050. So, that will result in reduced energy expenditure because in the long run automatically it will be cost effective, reduce the energy expenditure.

And then we can also develop in other areas like the industry infrastructure, health other kinds of things because of the less expensive energy sources. So, it can also create more and more jobs you know if suppose when we are planting your planning a solar power farm, rural sector or wind power or even the bio energy bio energy sources or plants etcetera.

So, not only youths are being youths and the both women men women youth are being empowered or being or being trained to participate in this kind of activities taking care of their own area and community and maintaining the maintaining this kind of infrastructure.

But at the same time it also creates more and more jobs in the rural sector and educate the people, train the people towards the learning new types of skills industry and new type of skills and competencies. So, that bring gradually it actually bring a transition a shift from the you know unemploymentphase unemployment scenario towards the gradual slowly economically empowered kind of society.

So, this kind of things this research has also established that you know while gradually shifting towards the renewable energy also transitions it brings transition and shift in the jobs by sector, by location and the net impact on the job creation will be positive and constructive.

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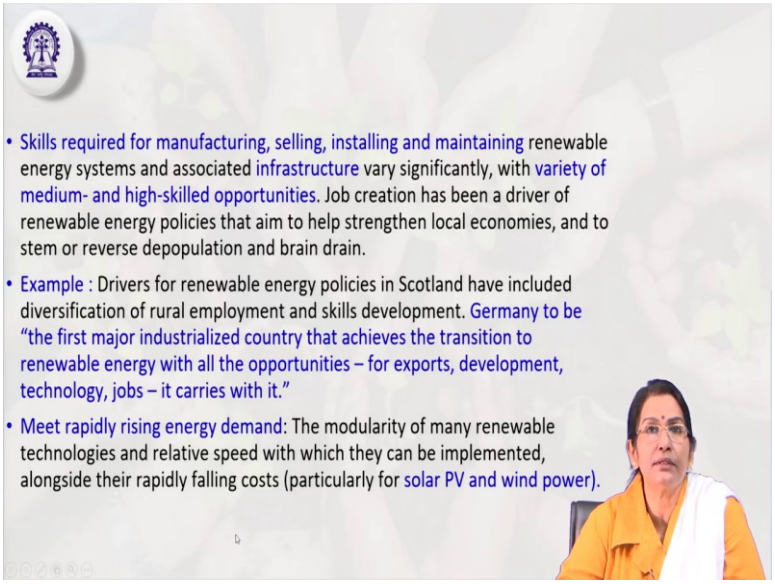

So, similarly skills required for manufacturing selling installing and maintaining all kinds of varieties of medium and high skill opportunities can be created driver. So, people can be trained. Similar the example like Germany for example, the Germany to be the first major industrialized country that achieves the transition from the transition to renewable energy with all opportunities; for export, for development, for trade, for technology, for jobs that it carries with along with this. So, this kind of economic benefit prosperity can also be possible.

So, it can also meet rapidly rising energy demand then out then after slowly if we not only will be self sufficient and reduce the expenditure in the energy sector, but gradually will be capable more capable of exporting the energy more exporting, then it is because with the increasing day slowly though energy demand globally energy demand has been increased energy requirement has been in case the more the sooner the country will be self sufficient self empowered and self sufficient, then definitely they can start the business of exporting the energy, exporting the you know solar unit, PV units wind power machines or other hydro energy related infrastructure.

So, they can export it export the infrastructure to other countries for you know starting the renewable energy scenario in infrastructure and operations in then and the on the under developed or developing countries. So, that can also incur the business profits and business opportunities also.

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So, similarly to provide access to energy and elevate the poverty is definitely poverty elevation removing the and; that means, they are bringing the zero hunger removing the hunger across the country across the thing that is also possible that can also be possible.

So, alleviate fuel poverty also advanced rural economic development there is a in the inter industrialized countries with a fuel with energy efficiency and sustainability definitely that can also improve the quality of life keep the energy the revenue local. For example, when the fuel imports and displaced with the local renewable, whether at the national and the sub-national an energy expenditure can spur further economic activity in the local economy.

So, when we are planting the solar unit solar PV or the wind power system infrastructure in the rural areas that also not only create the jobs and opportunities and the economy that also you know that also that will also boost the local economy financial activity economic activity it will engage the people you know all kinds of the economic activity financial activity and empower them. So, economy locally economy also will be enhanced.

So, increase the tax revenues automatically when the income of the people enhances the GDP will grow and that automatically then tax revenue will also collected tax revenue will also increase. So, that will definitely that will be again re invested in the social infrastructure in.

So, this additional revenue can be can enable the government to you know reduce the tax rates for the other inhabitants such as the low income category people and spend it for the more social infrastructure; social infra structure health facilities and the security system.

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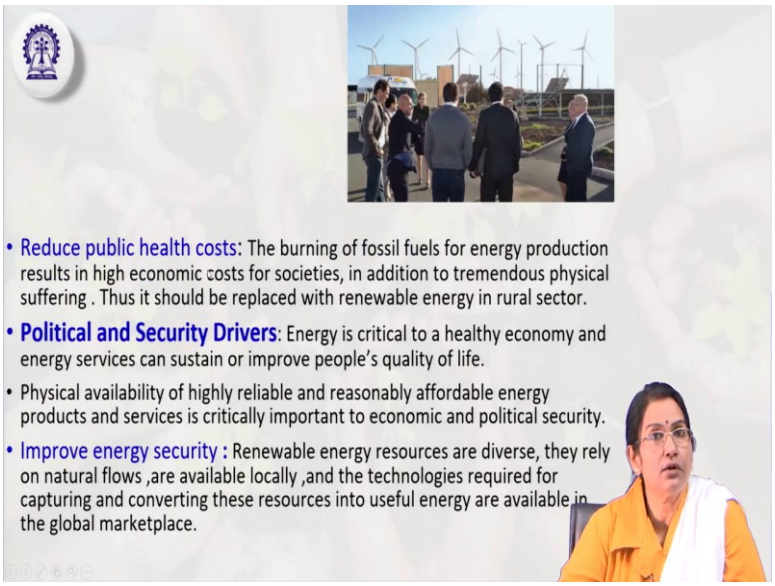

So, reduce the public health cost automatically the public health cost. So, that we can make it as a as. So, here sustainable health and services health services can all be can also be affordable can be affordable and the cost effective.

So, similarly the another is in here another is that political and security drivers that is also another safety and security drivers of energy sector and the political will that we have discussed. So, these also these two are also very important driver.

So, energy is critical for the healthy economy and energy services can also sustain to improve the peoples quality of life, but at the same time we have to very careful about its you know its safety risk, it has how to prepare it make it as risk free.

So, so, how to address its as hazards? So, so physical availability of highly reliable and reasonably affordable energy products, services etcetera are not only very critical for the economic scenario, but for political security also political security. And this improvement in the energy security can also can be diversified; can be diversified and

with and with available local availability and technology is required for you know capturing converting into other resources of useful energies.

Like how this renewable energies can be captured, store, saved and can be diverted and can be diversified for other kinds of activities in the global marketplace and the industries also.

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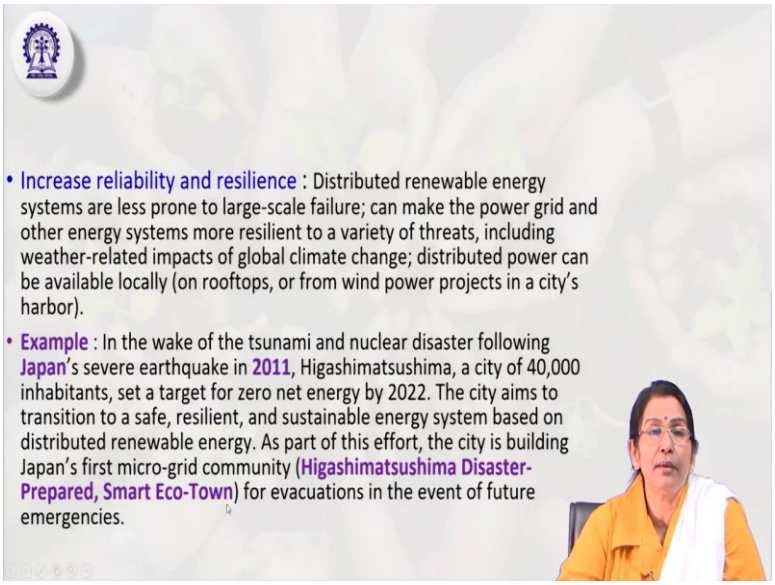

So, increase in reliability and resilience definitely will be more self sufficient the more will be self sufficient and empowered and capable of producing the renewable energy. So, it enhances the reliability increasing reliability that will positively affect the economy environment sustainability, peoples quality of life of the people and resilience also. So, it will be the more sustainable it will be then it will be resilient; resilient to withstand to face any kind of disaster any kind of challenge.

So, sometimes what happens in the local areas also in the rooftops also the some wind power projects are also being installed. So, for example, in Japans also after the severe earthquake in 2011. So, where the, so 40,000 more than 40,000 people have displaced with energy etcetera.

So, so because of this disaster and so then all kinds of the activities like the evacuation and the present in the event for future emergencies all kinds of things. So, how to so, that

it has the city actually aims. So, aims to transit itself towards a safe resilient and sustainable energy system.

So, these kind of pandemic or this kind of natural disaster calamities until you know challenges and accidents and disasters actually helped us actually taught us actually taught us to build a robust safe resilient and sustainable energy system. Because energy again and our energy system is you can say its a backbone of our economies it is a backbone of our life human life it is a backbone of the you know sustainable environment as well.

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So, so how to ensure the energy democracy? Democracy is like access to like access to affordable renewable energy clean energy that is that access itself it has to be democratized ok. So; that means, the it is related to more towards the you know climate justice movement climate justice movement; that means; that means how to decarbonize not only the society, but decarbonize the energy economy also.

De-carbonize the environment society ecosystem, but also de-carbonize the energy economy, so which is also very critical in mitigating the climate change factors. So, then only we will be able to more invest more in our in taking care of our environment ecosystem and facing the challenges of climate change.

So, therefore, an equitable ecologically sound energy system; equitable that is equal distribution equal access affordability and ecologically sound energy systems should serve the needs of the worlds people ok. And that an energy in translation will be advanced by a shift of shift to public and community control. So, gradually it will be handed over to the public to the community to maintain it to manage it, to control it and to use it sustainably.

So, now the gradually the responsibility the ownership will be transferred towards the stakeholders towards the community people. So, for example, in Japan also in as of the December 15, the 14 cities had formed the companies to generate the renewable energy from the local resources.

So, they have been empowered the people are being trained local people are being trained through different workshops training programs etcetera and the infrastructure are being installed in different local areas community areas and the people are being trained. So, now, automatically the cooperatives those companies, the societies are being built up, so that the people they own their own responsibility they take the community responsibility they are the major shareholders major stakeholders.

So, they after installation, they maintain, they learn they run the business, they operate it and they save it, renew it maintain it. So, in this way not only the it will facilitate the economic aspects of local economy, but also empowers the people educate them towards using it sustainably.

So, similar in Japan 14 cities have been they have formed the companies to generate this renewable energy from the local resources. So, in order to reduce the dependence on the foreign energy or become dependent on the government sources or from any private sources; that means, self form self empowerment.

So, they have been and self and they have been empowered to sustain to enhance their self sustainability and to create energy and maintain it as and become less dependent on other sources.

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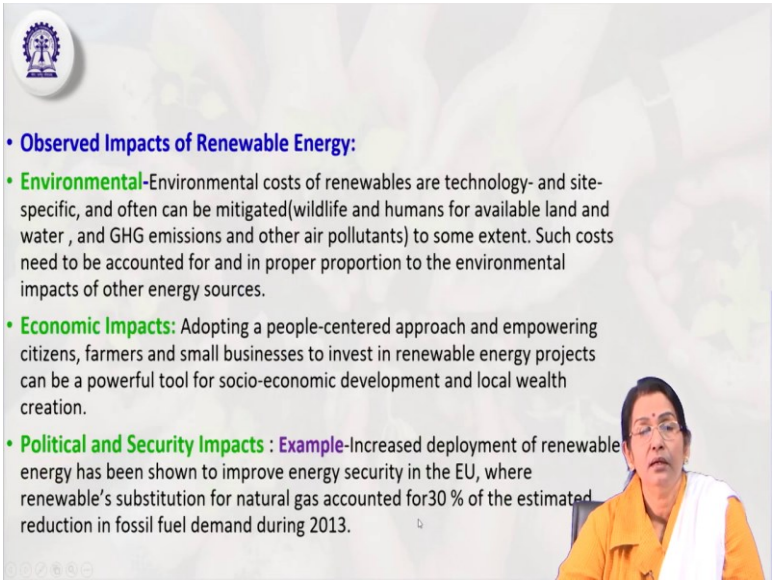

So, these are some of the observed impacts of the renewable energy the environmental impact economic impact and the political and social impact as we have already discussed.

So, environmental cost of definitely renewable technology and onsite specific things like the greenhouse gas emissions will be reduced their pollutants will be reduced. So, such cost need to be you know in the long run it will be reduced, it will be reduced in the long run it will be more cost effective and sustainable.

Economic impact increasing the business and empowering the farmers in the village in the agriculture small scale entrepreneurs, then citizens so citizens and you know powerful. So, it can there is some renewable energy projects can also be very powerful tool for the socioeconomic development, local wealth creation, job opportunities. So, it has the immense economic benefits.

Similarly political and scrutiny security impacts like for example, with increased deployment of renewable energy has been shown to improve the energy security of the country. Similarly in European Union also it has also enhanced the energy security in European when a union where renewable substitution for the natural gas accounted for 30 percent of the estimated reduction in the fossil fuel demand during the 30.

So, this renewable energy has replaced replace the these 30 replaced up to 30 percent the this natural gas consumption from the fossil fuels and the in different in European countries union countries under European Union.

So, in that way not only it saves money, but cost, but it will also it has the you know it saves the security even it also make it more risk free or the more risk free more self sufficient and also and risk free and political and the security impacts are also and then political will political consensus takes place security; that means, security impact in terms of risk free uses and not being that being self- sufficient not being dependent on other foreign sources

So, that kind of empowerment enhancement and efficiency and efficacy are possible as a as the observed impact of renewable energy in our life in our social in society in our economic system.

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So, right now so, these are some of the platform as you can see now the solar panels the different kinds of infrastructures of the renewable sustainable affordable and clean sustainable energy. So, now, I am concluding the session here right now. So, after this we will discuss other things ok.

Thank you very much.