

India needs a 30-fold increase in renewable energy, 30-fold increase in nuclear energy and doubling of thermal energy, making 70% of energy carbon-free: Dr. Anil Kakodkar

Countries need to adopt decarbonization strategy based on their level of HDI: Former Chairman, Atomic Energy Commission

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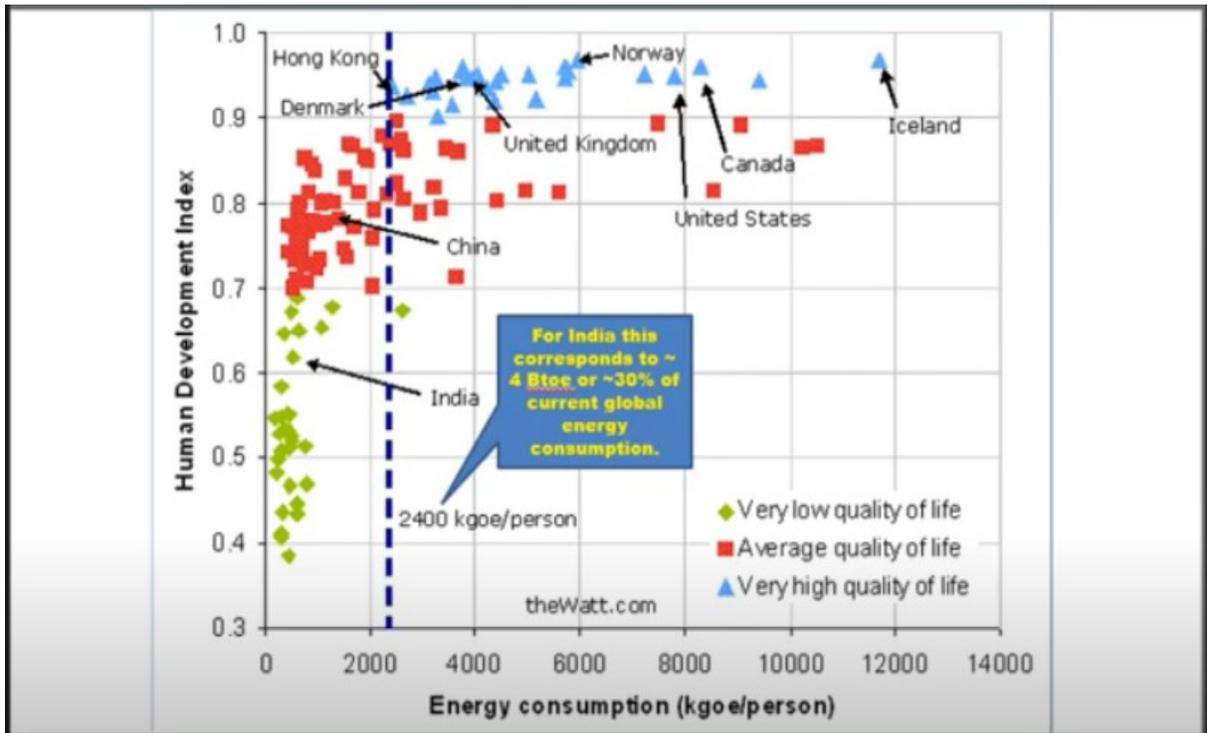
On the occasion of National Technology Day, a day which marks the anniversary of Pokhran Nuclear Tests of 1998, Former Chairman, Atomic Energy Commission and Chairman, Rajiv Gandhi Science & Technology Commission, Padma Vibhushan Dr. Anil Kakodkar, has conveyed a message to the people of India, about **Dealing with energy needs in the Context of Climate Crisis**.

Lockdown Lecture : Dealing with energy needs in the conte...



'National technology day is celebrated to commemorate the nuclear test that took place 22 years ago, that brought us national security', he said in his online lockdown lecture organised by Nehru Science Centre, Mumbai, while talking about India's progress in the field of science and technology. After that India has entered into many International agreements with various countries to promote nuclear commerce for peaceful purposes. The idea was to secure energy security through nuclear energy, he added.

In his presentation, he explained about the correlation between Human Development Index (HDI) and Per Capita Energy Consumption all over the world. As per the statistics, countries with higher HDI where citizens enjoy high quality of life have higher per capita consumption of energy.



However with the rising climate issues, a developing country like India faces the challenge where we are caught between energy security on one side and climate security on the other. "The need of the hour is to strike a balance between enhancing the quality of human life as well as keeping a control over the climate crisis."

- **Staying below 1.5°C in 2100 will require cuts in GHG emissions of 45 percent below 2010 levels by 2030 and to net zero by 2050.**

Ref. IPCC Special Report on Global Warming of 1.5°C

- **We thus have only 10 years to realise deep emission cuts and 30 years to reach zero emission while addressing development aspirations of much of the world. Actions have to start **now leveraging available/rapidly deployable technologies** that can achieve the goals.**

- **While renewable energy is an important deployment option, nuclear power can make a vital contribution to meeting zero emission target while delivering the increasingly large quantities of base load electricity needed for global economic development. Without nuclear contribution, the cost of achieving deep decarbonization targets increases significantly.**

Ref. 1. The Future of Nuclear Energy in a Carbon-Constrained World. An Interdisciplinary MIT Study 2018

2. IAEA report on "Climate Change and Nuclear Power 2018"

Researchers across the globe are studying about climate change on how to control CO₂ emissions, which is a serious threat to the environment. As per the report of Inter Governmental Panel on Climate Change, "staying below 1.5 degree increase in 2,100 will require cuts in Green House Gas (GHG) emissions of 45% below 2010 levels by 2030 and to net zero by 2050"; which means we have only 10 years left to realise deep CO₂ emission cuts while ensuring development aspirations of many countries across the world.

To achieve this, the world has to act now by leveraging available/rapidly deployable technologies. This is where the requirement of nuclear energy, which can easily meet the 'zero emission' target, arises. **With the contribution of nuclear energy, the cost of deep decarbonisation can be reduced.** Decarbonising means reducing carbon intensity, i.e. reducing the emissions per unit of electricity generated (often given in grams of carbon dioxide per kilowatt-hour).

Decarbonisation of energy production in the country is essential since the demand for electric power from industries/commercial sector is high. Decarbonisation is possible by increasing the share of low-carbon energy sources, particularly renewables like solar, hydro and biomass together with nuclear which can greatly contribute in achieving zero emissions to a great extent.

Action Required:

Even when many countries are making active efforts in the field of energy efficiency the CO₂ emission is still high when compared to preceding years. This shows we need better plans to control the same.

➤ **Actions:**

- **Countries with high quality of life**
(green dot countries in fig. below)
- **Reduce electricity consumption**
- **Decarbonise electricity generation**

} No impact on HDI.

- **Countries with average quality of life**
(pink dot countries in fig. below)
- **Increase non-fossil electricity consumption**
- **Decarbonise electricity generation**

} +ve impact on HDI. Much larger market, most of them being emerging economies.

- **Countries with very low quality of life**
(purple dot countries in fig. below)
- **Subsidise energy access including through international action**

In order to control CO2 emission, **different levels of consumption strategy need to be observed by different countries based on their HDI.** For example, those countries with high Human Development Index, should reduce their energy consumption since it may not affect their HDI, much. In addition to this they should also decarbonise their electricity generation. And the countries with moderate HDI should focus on non-fossil electricity consumption while countries with low HDI should be able to provide subsidised source of cleaner energy to their citizens. This way every country can actively contribute towards low / zero emission.

Meeting climate targets

Germany

- 2020 Climate Goals

Reduce greenhouse gas emissions by 40%

Reduce primary energy consumption by 20%

Increase share of renewables in energy consumption to 20%

Sources: German Environment Agency, AG [Energiebilanzen e.V.](#)

Germany's Electricity production 650 BU (~50% renewable)

Phasing out Nuclear

Germany, the nation that did more than any other to unleash the modern renewable-energy industry, is likely to fall short of its goals for reducing harmful carbon-dioxide emissions even after spending over 500 billion euros* (\$580 billion) by 2025 to overhaul its energy system.

*> Rs. 40 lakh crores

Japan

- 2030 Climate Goals

Aims to reduce emissions by 26% from 2013 rates

Japan's Electricity production 1100 BU (~15% renewable)

In 2018 the Japanese government revised its energy plan to update the 2030 target for nuclear energy to 20%-22% of power generation by restarting reactors, compared to LNG 27%, coal 25%, renewables 23% and oil 3%.

India's Electricity production 1600 BU

Japan is a country which has seen the brunt of the negatives of nuclear energy – the cruellest nuclear bombing at Hiroshima and Nagasaki that raised the global sensitivity of nuclear energy. But still the country has drafted an energy plan, to generate 20% to 22% of their total energy consumption as nuclear energy, to reduce CO2 emissions by 2030. Countries like Germany and Japan are already planning to cut GHG emission by 2020 and 2030 respectively which has allotted huge amount on production of renewable energy.

For a country like India, in order to decarbonise the energy consumption, **we need a 30-fold increase in renewable energy, 30-fold increase in nuclear energy and doubling of thermal energy which would make 70% of energy carbon free.**

Indian nuclear power at a glance:

Indian Nuclear Power Program at a glance

• Operating :	22 units ---6780 MWe	PHWRs, BWRs, VVERs
• Under construction :	9 units---6700 MWe	PHWRs, VVERs, PFBR
• Projects approved :	12 units----9000 MWe	PHWRs, VVERs
• Projects in planning :	23 units---26700 MWe	VVERs, AP1000, EPRs, FBRs & AHWR
Total :	66 units--- 49180 MWe	

To meet the energy requirements of the country, currently there are 66 units with the capacity of 49180 MWe (including projects that are operating, under planning, under construction and those that are approved).

Nuclear Waste:

The major concern that pops up now is of how to manage the nuclear wastes, that is produced during energy generation. Dr. Kakodkar said, India adopts the policy of 'Nuclear Recycle Technology' - where the nuclear fuel - Uranium, Plutonium etc, once used for generation of energy, is reused as a resource material by the commercial industries to be recycled. More than 99% of Nuclear waste is reused as the waste management program in India prioritises recycling.

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pibmumbai@gmail.com

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