

## Experts discussed India's future energy resource options on TIFAC foundation day

The panel of experts that came together for a discussion organised on the occasion of 33rd Foundation Day of TIFAC deliberated on the clean energy resource options that are available for the country and are expected to dominate the energy sector in future and strategies to migrate to a non-fossil fuel-based economy.

Dr. V K Saraswat, Chairman GC, TIFAC, and Member, Niti Aayog, pointed out that as far as non-fossil fuel are concerned, coal is the main ingredient for energy. He added that if coal is going to be the main energy source, technology is required for clean coal technology.

The discussions were inspired by the Technology Vision 2035, which has identified 'Making Indian Economy Non-Fossil Fuel Based' as a Grand Challenge.

A study by NITI Aayog and Institute of Energy Economics (IEE) Japan estimates that coal will have a share of 42%-50% in India's energy mix, even in 2047. As on date, 62.8% of India's electric power generation is from thermal power plants that use mainly coal and other fuels such as lignite, gas, and diesel to some extent.

While the contribution of renewable energy sources has grown to 23.1%, the share of hydropower is only 12.4%, and that of nuclear power is even less at 1.9%. As for the overall commercial energy mix, the total energy consumption in the year 2015-16 was 28337 peta Joules, with the source wise break-up being coal – 12660 peta Joules, lignite 480 peta Joules, crude petroleum-9750 peta Joules, natural gas – 1843 peta Joules and electricity -3604 peta Joules.



Dr. Saraswat also highlighted the other sources of energy and said that bioenergy is emerging in a big way because we are a large biomass producer. India also has huge geothermal resources, particularly in the Himalayan region. The current use of this resource in India very low, but institutes and industry are working on this technology.

“Hydrogen economy will also come up, but we have to solve the problems of technology in hydrogen storage, transportation, and production economically,” he added.

The International Energy Agency (IEA) declared 2019 as a critical year for Hydrogen and further stated that it has a key role in clean, secure, and affordable energy.

Professor Ashutosh Sharma, Secretary Department of Science and Technology said that India has coal, but it does not have other resources such as petroleum and gas and hence we need to figure out how to improve use of coal in terms of emission, pollution control, power generation efficiency, advanced ultra-supercritical technology, gasification of coal and such forward-looking solutions.

“The other options are fusion technologies, which will be the ultimate problem solvers. There is already a big fusion reactor in our solar system, sun. So, we can make use of solar energy in all different forms,” Prof Sharma pointed out.

He also mentioned that in the future, the major issue in renewable would be storage in order to use that energy when we need it, and we need to work on it. We don't have lithium either, so we should try storage without dependency on lithium.

Dr. Saraswat suggested that as far as storage is concerned, other than lithium, other alternatives are coming up, and one of them is zinc-bromine.

On the issue of the hydrogen economy, Prof Sharma said that Hydrogen should really be the choice for the future, but the easier way of course is to get it from methanol. He added that if hydrogen technology works out, it would really be a good optimal solution for energy needs.

Dr. P.S. Goel, Professor, NIAS emphasised that which technology is enabler is very difficult to decide, all have some issues. “Need of the hour is a very larger policy for energy research, funding, and engagement, as well as participation,” he added.

Dr. Y S Rajan, former ED, TIFAC, said that it is impossible to replace fossil fuel, but it needs to be made more efficient and clean. He also discussed on solar energy, storage problems, and associated Intellectual Property Rights.

The panelists also highlighted the role of academia and research community and the ways in which industry can accelerate this evolution. They underlined the need for preparing a vision for a non-fossil fuel-based economy to ensure coordinated actions among all stakeholders enabling the transition to a sustainable future.

The panel discussion chaired by Dr. V K Saraswat, Chairman GC, TIFAC and Member, Niti Aayog and the panelists included Professor Ashutosh Sharma, Secretary, DST, Dr. Y S Rajan, former ED, TIFAC, Dr. P.S.Goel, Professor, NIAS and Santanu Chowdhury, Director, NRSC, Hyderabad.