

My remarks as Chairman of
Petrotech Theme Session on “Alternative Energy: Beyond Fossil Fuels”
6th December 2016, Vigyan Bhavan, New Delhi

Dear colleagues on the dais and distinguished participants. At the outset, I would like to compliment the organisers to have included a session on beyond fossil fuels in a conference on oil and gas. Clearly all of us have broadened our focus on energy as a whole rather than just oil and gas. You will agree with me that we had a good session with several important points made in the context of transition to non-fossil energy.

We need to recognise that India perhaps represents a unique story in the global energy context. We have the largest additional energy needs to realise a high level of human development index comparable with the advanced countries in the world. Being a fast growing economy, there is no doubt that the energy consumption in India would grow to a level commensurate with this objective. This may well be four or five times the current level. While the renewable energy use is indeed growing fast, our energy basket is likely to be dominated by fossil energy for a few decades at least. As has been mentioned, for energy transition or a new energy form to stabilize in the market, takes considerable time. Thus when we talk of beyond fossil fuels, we are talking about, maybe, fifty years and beyond. Sustainable energy resources available on Indian land mass would thus need to be assessed with respect to higher consumption expected at that time (as mentioned earlier, 4 or 5 times the present level). The only Indian resources that would be large enough from this perspective are Thorium and Solar. Luckily both are non-fossil. Thus moving beyond fossil fuels would also be consistent with sustainability objective as it would be with the objective of keeping global warming under check. I would like to develop this long-term scenario further. But before I do that, let me first recall some of the important points made by speakers before me from my own perspective.

Demand for hydrocarbon fuel has been projected to rise rapidly to cater to non-electricity segment of energy use. With this our import bill is expected to rise steeply. Demand of energy for transportation which would form the major part (nearly half of the total hydrocarbon use), would thus be responsible for large part of our foreign exchange outgo. Rapid adoption of electric mobility could avert a large part of this import need as our electricity generation is mostly based on coal. Availability of competitively priced high energy density batteries is the key here. This single innovation would not only lead to

significant reduction in energy imports through a large shift to electric mobility, but would also come in handy in terms of growth of renewable energy deployment where investments in electricity storage are expected to be significant particularly when share of renewables in the grids becomes a large fraction.

Mention was also made of creating a shift to methanol economy. While substitutes like methanol and DME or even other forms of liquid/gaseous fuels can be derived from our high ash coal, biomass and MSW, thus offsetting that much need for hydrocarbon imports; considering the time involved in making energy transitions, we should now have a better focus on non-fossil energy economy rather than methanol economy even while we look for some quick gains in terms of reducing our energy imports. We have already made some gains in terms of making use of biofuels (ethanol) and there are plans to expand this further.

Let me now come to some key points that I would like to add.

As I mentioned earlier, in the long term we need to base our energy supply on Thorium and Solar as primary energy sources. We should develop technologies that enable us to use these primary energy resources not just for production of electricity but also other energy forms that are consistent with user needs. Our vision for alternate energy beyond fossil fuels should thus consist of:

1. Rapid deployment of all available non-fossil energy technologies. That should include renewable energy and nuclear energy for electricity production. We should recognize that adoption of hybrids enables earlier deployment of a new technology in a competitive commercial environment. For example, hybrid electric vehicles, solar - thermal power plants etc.
2. Quick development of all other non-fossil primary energy based technologies to bridge demand supply gap for various end uses. Most important among these would be high temperature energy supply using solar and nuclear energy. This is needed for chemical or metallurgical transformations to produce fluid fuel substitutes for present day energy use assets as well as for other sectors of industry.
3. Quick adoption of technologies that could avoid or minimize imports if necessary by using high ash Indian coal. For example, technologies for coal

to liquid fuel, coal bed methane, gas hydrates, larger quantities of liquid fuels derived from biomass with the use of non-fossil hydrogen etc... and

4. Reduction of environment footprint of our energy operations. More importantly sequestration of CO₂ in specially engineered algae for further processing to produce useable fuel forms.

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