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Future of energy & climate change

By Huma Batool

Energy is a topic which is introduced to us very early in our lives. Probably in our text books of class 3 or 4, but unfortunately we tend to forget things in our text books. No work is possible unless energy is used; the world is handicapped without it. Consequently, energy security is a huge concern for countries like Pakistan, India or even China, America or Europe. It is required absolutely everywhere for example in industries, households, for running cars or for jet engines.

There are different forms of energy for instance, oil, gas, coal collectively known as fossil fuels. The fossil fuels are thought to be formed by the decay of dead bodies of prehistoric plants and animals that inhabited the earth millions of years ago. Anyway that's a long story it's more important to know that it can not be replaced once it's gone. The nature once provided us with great reservoirs of energy. Therefore it was our responsibility to use it carefully and save for the coming generations. The fossil fuels are not going to last forever that's why other energy sources were explored and a major breakthrough was the nuclear energy production. The two nuclear fuel sources are uranium and plutonium. Use of uranium is more common than plutonium. Since many years the human activities and green house gases (GHG) emitted by the use of these energy sources are being held responsible for the GLOBAL CLIMATE CHANGE, therefore alternative sources of energy are being explored. The popular forms of alternative energy are Solar, Wind, Hydropower and Biofuels. Basically there are two strategies of producing liquid and gaseous agrofuels. One is to grow crops high in sugar (sugar beet, sweet sorghum, and sugar cane) or starch (corn/maize), and then they are fermented by to produce ethyl alcohol. The second strategy is to grow plants that contain large quantity of vegetable oil, such as oil palm, soybean, algae, jatropha, or pongamia pinnata. The viscosity of these oils is reduced by heating, and they can be burned directly in a diesel engine, or they can be used to produce fuels such as biodiesel after they are chemically processed. Wood and its byproducts can also be converted into biofuels such as woodgas, methanol or ethanol fuel. Biofuels are renewable energy sources but their future is uncertain. In Pakistan energy breakdowns due to shortage of electricity and gas is often experienced since last year. In many major cities people have suffered from the problem of energy breakdown. Thus affecting the small industries and

people at offices, schools and homes. The primary commercial energy consumption of Pakistan is 55.5 MTOE (Million Tons of Oil Equivalent) in 2004-05, thus Pakistan ranks 30th in the world in amount of energy use (BP, 2006). Pakistan's coal resources are estimated to be the two percent of the world coal resources. Uranium exploration and mining is also intensified here to meet the growing energy demands of the country. Pakistan has the ability to design and build small reactors; moreover there is a good deal of advancement in this field over the past thirty years. In Pakistan 29 % of total energy requirements are fulfilled by oil, gas accounts for a large proportion of energy demands of almost 43 %, coal consumption is 12 %, while 16% energy demands are met by hydropower. There are some excellent sites for wind and solar energy exploitation in Pakistan. Some coastal areas of Sindh, Balochistan and Northern areas have been identified to have good wind power potential.

The first wind mills are expected to be functional in near future as they are in implementation stage. So far the solar energy potential is not used although southern and central areas of Pakistan can be best locations for thermal power plants.

Biofuels also have not been used here as a conventional energy source. It may take us long to grow crops for biofuels. All the energy related projects in Pakistan are dependant on extensive investment from the private sector. Moreover any positive outcomes are yet to be achieved. The greatest number of poverty exists in developing countries of the world and roughly two third of the world poor living on less than 1\$ per day in Asia. Poverty reduction is relevant to the energy security and global climate change. Poverty is identified as a logical reason of over exploitation of energy sources, for example the poor people who don't have access to the modern energy services are responsible for destruction of the forests. They use the forest wood and other sources to cook their food and to warm themselves in harsh winters. As a result the forests which play dual role in saving our environment by serving as carbon sinks and other climatic factors are lost. Thus further deteriorating the situation posed by the burning of the fossil fuels. There is a practical requirement for production and distribution of modern energy services but developing resources and transforming all inputs in to useful forms, such as processed natural gas, electricity and transporting them to the end users is quite a difficult

work. Poverty reduction is vital to the sustainable use of energy resources and for fighting the changing climate. The three E's (energy, economy and environment) are intrinsically linked and none can not be addressed alone. There are many ways to approach the issue but an absolute reduction target for emission by introducing clean technology is indispensable.

It's important to discuss the impacts of energy on the environment, Natural gas may be the cleanest fossil fuel but burning it adds carbon dioxide to the atmosphere. Burning coal for energy also release many GHG (green house gases) in the air, and same is the problem with burning oil for fuel. Nuclear power is even more dangerous as it poses direct health hazards to the humans due to the extremely long half life of uranium. The used fuel rods remain contaminated for million of years thus disposal of radioactive waste from nuclear plants is extremely difficult task. However, amidst growing fears of global warming, nuclear power have some environmental credentials. Unlike coal or gas power plants, nuclear reactors do not emit any GHG responsible for global warming. Hydroelectric dams have many negative impacts on the local environment and society. The aquatic life that gets caught in turbine blades is killed. The artificial reservoirs bring floods and destroy the farm lands and forests and displace the animals and people. Biofuels are also controversial because they are not proven energy efficient and compete with food and livestock production.

All this information may seem horrible but its better we know where we are moving to. The world is running out of useable energy. According to the vision 2030 the world will witness fierce competition for access and ownership of energy sources, unless transition and development to the alternative energy sources operating at large scale is assured. Pakistan's development will also need more energy. Serious efforts are required for long-term energy security and the link between sustainable development and energy must be recognized. A little contribution by everyone can save us from seemingly fatal problem of energy security. Efficient and leak proof use of energy can help in this scenario, for instance buildings and vehicles should be energy efficient. A very old example of energy efficient buildings is old fashioned mud houses. The most effective pathway is to conserve what we have as it is believed that prevention is better than cure.