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Renewable energy technologies a viable solution for the development of rural areas

The phenomenal pace of technological progress which has brought about a transformation in the world economy is dependent on a country's own degree of self-reliance, on the availability of conventional sources of energy.

Energy provides an essential ingredient for almost all human activities: it provides services for cooking and space /water heating, lighting, health, food, production and storage, education, mineral extraction, industrial production and transportation.

Modern energy services are a powerful engine of economic and social development, and no country has managed to develop much beyond a subsistence economy without ensuring at least a minimum access to energy services for a broad section of its population.

Subsistence energy supply and ensuring the efficient use of energy is one of the major challenges of the 21st century. As the economies grow, the energy consumption grows but energy sources deplete with time.

Pakistan lacks in conventional energy resources exploration and spends more than 12.0 billion dollars on import of oil.

It has relied almost exclusively upon fossil fuels and hydroelectricity as its primary energy supplies. Because of fast growing economy and population the demand of energy is rapidly increasing.

Pakistan is in danger of facing huge deficits in the coming years and even at

present the primary energy supplies are not able to meet the existing demand in proper way.

The situation has become more difficult in the wake of meeting international obligations under Kyoto protocol to reduce green House Gases emission and at the same time to meet the increasing demand for energy.

We need to have a paradigm shift in the energy production from the traditional resources to the more sustainable and environment friendly renewable resources, while bringing an affordable strategic balance between cost effectiveness and environment friendly sources.

There are large areas in the country having extremely remote character. These are far away from the grid line and there is no hope that these areas will get electricity even in coming 20 years.

Energy services are to be extended to the poorest of the poor living in the far-flung areas to raise their standards of living to a respectable level.

This goal can be achieved by utilizing renewable energy sources. Pakistan needs to tap all energy sources that are locally available. The major Renewable Energy sources in Pakistan are Solar, Wind, Microhydel and Biogas/Biomass:

Solar Energy is the most abundant and widely distributed source of energy in the country.

The number of clear sunny days in the country varies from 250 in the Northern region to above 300 days in the most part of the rest of

the country.

It is divided into Photovoltaic and Solar Thermal. Photovoltaic that converts the sun energy directly into electricity is

Baluchistan are very remote and extension of grid to these areas is very difficult and expensive.

PV is quite viable and economical source of electric

ity clean water, drying fruits and vegetables and producing hot water for domestic and industrial use.

For wind power generation the actual land used is

wind farming is the best utilization of that barren land.

The potential wind corridors highlighted for the wind farming are southern Sindh (Keti Bandar, Gharao

Hyderabad as 43000 MW. If all these corridors added together, have a potential of more than 300,000 MW.

Most of the hydropower potential lies in the Khaiber Phakhtoon Khah, Gilgit - Baltistan and Azad Jammu & Kashmir (AJK).

There is also potential available in canal system and in small rivers and streams. Pakistan has hydel resource of about 50,000 MW but unfortunately we have exploited only 6595 MW.

The vast irrigation system of Pakistan provides hundreds of sites for micro/mini and small micro-hydro plants. Depending upon the head and flow of water suitable turbines can be utilized to generate electricity from few KW to MW.

Therefore, abundant potential is still need to be identified. The country has offered 2000 MW of sites with studies to pre-feasibility and beyond for small and mini hydropower project less than 50 MW capacity, with many more sites yet to be identified.

Small and mini hydropower projects are suitable for domestic investment and individual projects can come on line within 2 to 3 years to mitigate serious problems of load shedding being faced in the country.

Biogas in Pakistan comprises fuel wood, agricultural waste and animal dung which is available in surplus in all parts of the country.

Urban areas of Pakistan generate over 55000 tonnes of solid waste daily. As per livestock census 2006, there are 56.9 million animals (buffaloes & cows) in Pakistan.

Biogas is an environment friendly technology.

It contributes towards ecosystem management and biodiversity conservation. It provides soot-free gas for domestic fuel need as well as enrich bio-fertilizer for improvement of fertility /productivity of agricultural lands.

The dung from animal is the source of biogas. The raw material is available in Punjab, KPK, Sindh and some parts of Balochistan.

Keeping in view the current global scenario in general and Pakistan's energy scenario in particular, the adoption and deployment of Alternative and Renewable Energy (ARE) technologies makes perfect sense as it inherently favours indigenous, vast energy resources which also happen to be the most energy efficient.

A major shift in Government's policy and planning is required to favour deployment of ARE technologies.

The technologies can be easily deployed in areas where conventional grid electricity can not have access and entry due to technical and economic reasons.

The deployment of RET technologies have direct and indirect impacts on poverty alleviation, energy security and independence, environmental benefits, growth of local engineering industry, job creation and image-building of the country as a socially conscious and responsible nation.

Therefore, renewable sources may be developed and their contribution in the energy mix at national level may be increased gradually.

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power for these areas and it can play a very important role for the socio-economic development of the people.

Solar Thermal applications including Solar Dryer, Solar Water and Space Heaters, and Solar Desalination units are very effective, simple and low cost technologies that can effectively be utilized for produc-

ing clean water, drying fruits and vegetables and producing hot water for domestic and industrial use. For wind power generation the actual land used is very small as compared to the total area. In fact only 2% to 3% area is used by installation of turbines, substation and internal wind farm roads. The rest of the area is available for any low height cultivation or cattle grazing. Co-incidentally almost all potential wind corridors in Pakistan are situated in barren areas; hence

Hyderabad), northern Punjab (Kalar Kahar), Mardan area in KPK, Nokundi, Kolpur, Makran and Chaghi area in Balochistan.

By virtue of actual wind measurement and calculations, Pakistan Met. Department has defined the potential of only one corridor i.e. Keti Bandar, Gharao