**The energy landscape in Pakistan**

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Energy is a global issue which is directly linked with the global climate crisis. The global reliance on fossil fuel for electricity generation, vehicle combustion, and industrial usage has resulted in an unprecedented amount of CO2 in the atmosphere. It is a major chunk of the climate change problem as traditional energy sources are reasons for pumping tons of carbon dioxide into the atmosphere. The rise of hydro-powered electricity made energy greener and cheaper as the production resource became a renewable source with water. With the progress of science, different energy production avenues have been explored which include biomass, solar, wind, tidal, nuclear, and others.

The diversification of the energy portfolio is an asset as reliance on a single source is not wise from the security perspective. However, the diversification option is available to resourceful countries because of the huge initial capital investments required to build any production infrastructure. Pakistan, like other countries, has relied on fossil fuels for electricity production and the current energy mix of the country reflects that with thermal power at 59.4 percent, hydel at 30.25 percent, nuclear at 7.82 percent, and renewable at a meagre 2.23 percent. Pakistan’s energy crisis began in the 1990s because of the increased demand in electricity and the inability of the government to fill the energy deficit. The energy deficit led to excessive load shedding which affected industries and citizens equally.

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Pakistan announced the Alternative and Renewable Energy (ARE) Policy 2020, with an objective to increase the share of ARE to 20 percent by 2025 and 30 percent by 2030. These numbers exclude hydropower and the government plans to include hydropower in the ARE category so the cumulative share would go to 60 percent by 2030. A World Bank study projected that Variable Renewable Energy (VRE) , if increased to 30 percent by 2030, would save Pakistan 5 billion dollars in the next 20 years.

The heavy reliance on fossil fuel imports for electricity generation is impacting the current account deficit with the domestic energy demand not slowing down, thus causing a balance of payment issue. Almost 60 percent of Pakistan’s electricity comes from thermal power.

The government has stopped further development of more coal projects because of increasing climate concerns and Imran Khan’s vision for a clean and green Pakistan. The current government has been very dedicated to the climate change cause and has spearheaded multiple projects to cater to climate change consequences. Pakistan hardly produced 1 percent of greenhouse gases, yet it is one of the most vulnerable countries to climate change. The sitting government has set ambitious targets to increase ARE production to 60 percent by 2030. To meet the 2030 targets, Pakistan needs to install 24000 MW of solar and wind energy. With multiple solar, wind and hydropower projects in the pipeline, Pakistan hopes to achieve the said target within the time frame.

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According to the Alternative Energy Development Board (AEDB), six solar power projects are operational with the capacity of 430 MW and 22 with a total capacity of 890.80 MW under different stages of development. Currently, there are 24 wind power installations producing 1235.20 MW and AEDB is working on another 40 projects with a capacity of 2010.2 MW. Bioenergy installations also add to the overall renewable production. At present their contribution stands at 259.1 MW and a cumulative production of 878.4 is still under different process for implementation. Off-grid small hydropower stations are also included in renewable energy units. These units are very common in northern districts of Khyber Pakhtunkhwa and Gilgit Baltistan on natural river flow and they have been developed in Punjab and Sindh on different canals.

According to AEDB, small hydro power units are producing 125 MW, another 877 MW is under implementation and 1500 MW is available for development. Pakistan has huge potential for renewable energy production, but due to a lack of investment funds new development is delayed. Some energy experts studying the energy landscape in Pakistan contend that there are powerful policymakers, bureaucrats, and hydropower lobbies against solar and wind power installations. Moreover, land acquisition and delayed approvals also discourage investments.

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Renewable energy will have many benefits including cheap, improved, and independent energy supply and reduced environmental pollution. The adoption of the National Electric Vehicle Policy is also a step in the right direction. Giving incentives and tax relaxation will also help attract Foreign Direct Investment (FDI) in the renewable energy sector. Moreover, human resources must be simultaneously trained to manage and run these installations. Pakistan has huge potential for hydro, solar and wind energy production which if tapped will solve not only domestic energy problems but also make the country a net energy exporter.