

Research and Innovation for Energy Sector Development

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The primary energy source potential in South Asia is significant though it continues to be a net energy importing region. The region is estimated to have reserves over 100 billion tons of coal, 6 billion barrels of oil, 95 trillion cubic feet of natural gas and 300,000MW of hydropower. In addition, the potential for development of non-conventional renewable energy sources such as wind power, solar power, small-hydropower and biomass is expected to be substantial. Development of some of these sources such as wind and solar power has been given priority under national programs. However, in general, exploitation of all these clean energy sources for power generation has been slow compared to their technical potential due to many barriers specific to the countries concerned.

At the same time, these generation sources are geographically distributed both within the countries and in south Asia region. Also the behavior of electricity demand in different geographical regions differs because of the time differences as well as variation in the type of consumer mix. For instance, a large part of the hydropower generation potential in Sri Lanka is concentrated in the Kelani and Mahaweli river basins in the central region. Wind resources are presently being developed in the North-Western region. Solar power may be spread all over the country with more efficient utilization factor in certain geographical areas. As for the electricity demand, significant contribution comes from the Western province where large part of the country's industrial and commercial activity is confined to. The demand in the rest of the country is largely dominated by household demand and some commercial activities. Further, the climatic conditions in the country vary depending on the geographical area and the season of the year impacting on the demand for electricity. This diversity, while providing a great opportunity to

share energy resources through regional integration, also poses challenges when absorbing them into the power systems and their operations.

In this backdrop, it is important to examine how research and innovation in the energy sector undertaken locally would help to further the country's development agenda. Most of the research in the energy sector, as applicable to Sri Lanka, is applied research. These research activities are largely in the areas of (i) policy and regulation (ii) planning (iii) design and technology adoption (iv) system operation and (v) plant operation and maintenance. Development of such research capacity within the country is essential to ensure sustainable and rapid expansion of the energy sector to suite the local needs. Further, such capacity within the country will enhance its ability to export expertise to other countries. One such example is research and development in the small hydropower sector. The development of the micro and mini hydropower sector in Sri Lanka since 1980s has led to innovations in adopting the associated technologies to the Sri Lanka context. It has led to local manufacture of some of the equipment and also some of the Sri Lankan developers venturing into countries in Africa to establish small hydropower plants. Further, there are a few internationally recognized consulting firms in South Asia which can provide expertise to a wide variety of development activities in the energy sector. Each of these activities is associated with some form of research and capacity building within, which brings valuable inputs to the local economies.

Research and innovation are critical to the development of an economy and its contribution in the energy sector is significant considering that energy is a key input in all the economic activities.