Balochistan Journal of Engineering & Applied Sciences (BJEAS) – (p-ISSN: 2518-2706)
Volume 4, No. 1

Solar Energy Prospects in Pakistan. Challenges and Opportunities

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Abstract—Confronting the climate emergency, enhancing energy security, and encouraging socio-economic development, an unprecedented transformation of electricity generation methods, and transition to renewable energy is required. To address climate concerns and boosting sustainable economic development, Pakistan is striving to deploy renewable energy in its total energy mix. Among Renewable Energy Technologies (RET), solar power has gained prominence among all consumption sectors. Therefore, this paper has attempted a holistic evaluation of the Strengths, Weaknesses, Opportunities, and Strengths (SWOT) of solar energy in Pakistan. The SWOT-Delphi technique has been used to diagnose the drivers and barriers of solar energy. The resulting SWOT analysis reveals that Pakistan has high resource potential, with validated maps and increasing interest in private sector investment. The main challenges are a lack of manufacturing products, weak infrastructure, and lack of incentives from the government. If the barriers are overcome, solar power can become one of the promising candidates in the total energy mix of Pakistan. To realize this scenario, enabling framework and policy support are needed to move forward rapidly.

Keywords—Solar Energy Technology, SWOT Analysis, Energy Security, Environmental Sustainability