ISSUE BRIEF

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PAKISTAN'S ENERGY CRISIS: THE NEED FOR A TRANSITION TO ALTERNATE ENERGY

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Like many other developing countries, Pakistan has been grappling with a severe energy crisis for several years. The demand for energy continues to surge due to population growth, urbanization, and industrialization, while the supply of conventional energy sources remains inadequate. This energy deficit has led to frequent power outages, hampering economic growth, disrupting daily life, and impeding technological progress. In this context, the adoption of alternative energy sources presents a compelling solution to address Pakistan's energy crisis.[1]Pakistan's energy crisis is a long-standing and multifaceted issue that has significantly impeded the country's economic growth and development. Pakistan witnessed acute energy crisis during the summer months from May-August 2023. The electricity shortfall widened to 7,000 megawatts with demand rising to 28,200 megawatts, while the power supply was 21,200 megawatts.[2]

1 INP, "Energy crisis a major obstacle to Pakistan's economic growth, industrialization," Nation, October 06, 2023, https://www.nation.com.pk/06-Oct-2023/energy-crisis-a-major-obstacle-to-pakistan-s-economic-growth-industrialisation

2 Usama Rehman, "Energy Crisis in Pakistan," Modern Diplomacy, March 11, 2023, https://moderndiplomacy.eu/2023/03/11/energy-crisis-in-pakistan/

Causes of Pakistan's Energy Crisis[3]

- *Lack of Investment:* One of the primary reasons for Pakistan's energy crisis is the insufficient investment in the energy sector. The country has not made substantial investments in building new power plants or upgrading existing infrastructure to meet the growing energy demand.

- *Circular Debt:* The circular debt issue in the energy sector exacerbates the crisis. This occurs when power generation companies are not paid on time by the government or consumers, leading to a shortage of funds for fuel and maintenance. As a result, the energy generation process is disrupted.

- *Over-reliance on Fossil Fuels:* Pakistan's energy mix is heavily skewed toward fossil fuels, particularly natural gas, and oil. This reliance on finite and expensive resources makes the energy sector vulnerable to price fluctuations and supply disruptions.

- *Inefficient Energy Use:* Wasteful industrial, commercial, and residential energy consumption practices contribute to the crisis. Lack of energy-efficient technologies and conservation measures result in higher energy demand.

- *Political Interference:* Frequent political interference in the energy sector has led to inefficiencies, mismanagement, and a lack of transparency, further worsening the energy crisis.

Pakistan's Energy Profile

Pakistan's energy mix has been a subject of change and development as the country seeks to address energy shortages, improve energy efficiency, and reduce its carbon footprint. The government has been actively pursuing energy diversification and cleaner energy sources to meet its growing energy demands while minimizing environmental impact.

Pakistan has traditionally relied heavily on fossil fuels, particularly natural gas, and oil, for its energy needs. According to the Economic Survey of Pakistan 2022-23, the energy mix consists of 58.8

3 Noah Berman, "What's at Stake in Pakistan's Power Crisis," Council on Foreign Relations, February 6, 2023, https://www.cfr.org/in-brief/whats-stake-pakistans-power-crisis

percent thermal, 25.8 percent hydel, and 8.6 percent nuclear power. Additionally, alternative power sources contribute 6.8 percent to the overall mix.[4]

Problems due to dependence on Fossil Fuels[5]

Pakistan's dependence on fossil fuel for energy generation has led to several challenges:

- First, the depletion of indigenous natural gas reserves has forced the country to import expensive liquefied natural gas (LNG), straining its foreign exchange reserves.
- Second, fossil fuel combustion contributes significantly to air pollution and greenhouse gas emissions, exacerbating environmental degradation and climate change.
- Lastly, geopolitical factors and volatile oil prices make the energy sector vulnerable to external shocks.

Pakistan's Alternative and Renewable Energy (ARE) Policy 2020[6]

On August 12, 2020, the then Government of Pakistan announced the Alternative and Renewable Energy (ARE) Policy 2020. The aim of the policy was to increase the share of ARE in total power supply to 20% by 2025 and 30% by 2030 from about 5% in 2020. This was to be achieved through offering generous tax facilities to investors and promising induction of power plants on open competitive bidding for lowest tariff and technology transfer. The five key features of the policy are as follows:

1. Investment would be solicited on competitive bid for lowest cost instead of upfront or cost-plus based tariff as was under all previous power policies.
2. The federal government would decide on annual and three-year basis about the quantity of additional power requirement instead of federating units and steering committee deciding the requirement.
3. The currency devaluation factor would be taken care of in bids for tariff.

4 Dr Ghulam Mohey-Ud-Din, "Pakistan's energy mix and export competitiveness," Business Recorder, July 22, 2023, https://www.brecorder.com/news/40253661#:~:text=Currently%2C%20according%20to%20the%20Economic,percent%20to%20the%20overall%20mix.

5 Sharmeen Sajjad, "Pakistan's Energy Enigma; A Historical Analysis," Macro Pakistani, July 28, 2023, https://macropakistani.com/pakistans-energy-enigma-a-historical-analysis/

6 Khaleeq Kiani, "Alternative energy policy unveiled," Dawn, August 13, 2020, https://www.dawn.com/news/1574133#:~:text=ISLAMABAD%3A%20The%20government%20on%20Wednesday,lowest%20tariff%20and%20technology%20transfer.

4. The policy will provide incentives for technology transfer for local manufacturing of solar panels, wind turbines and all related equipment for job creation.

5. The bidding would be based on two to three-year forward-looking energy requirements and on take and pay basis without allowing capacity payment price to ensure that tariff is paid only for the electricity purchased and not for capacity availability.

The Promise of Alternative Energy[7]

Alternative energy sources, such as solar, wind, hydroelectric, and biomass, offer a way out of this energy predicament as envisioned under ARE Policy. These sources provide a range of benefits that align with Pakistan's unique geographical and climatic conditions.

- *Solar Energy:* Pakistan boasts abundant sunlight throughout the year, making solar energy a viable option. Large-scale solar farms and rooftop solar installations can significantly augment the energy supply. By harnessing solar power, Pakistan can reduce its dependence on imported fossil fuels and minimize carbon emissions.

- *Wind Energy:* The coastal areas of Pakistan, particularly in Sindh and Baluchistan, have substantial wind energy potential. Installing wind turbines can provide a steady source of clean electricity. Wind power can diversify the energy mix, reducing the strain on conventional sources and promoting sustainability.

- *Hydroelectric Energy:* Pakistan's geography is characterized by rivers and water bodies. Developing hydroelectric power plants can not only generate substantial electricity but also regulate water flow for irrigation and flood control. This approach addresses both energy and water management challenges.

- *Biomass Energy:* Agricultural residues and organic waste can be converted into biofuels and biogas. This not only helps manage waste but also generates renewable energy. Promoting biomass energy can provide additional benefits to rural communities by creating local employment opportunities.

- *Geothermal Energy:* Although largely untapped, Pakistan has significant geothermal potential, particularly in regions with active tectonic activity. Geothermal energy can provide

7 Maryam Jilani, "Exploring Pakistan's Energy Sector: Sources and Trends," Paradigm Shift, May 3, 2023, https://www.paradigmshift.com.pk/pakistan-energy-sector/

a stable and continuous source of power, reducing the reliance on intermittent renewable sources.

Benefits and Challenges of Alternative Energy Adoption

Benefits:

- *Sustainability:* Alternative energy sources are renewable and do not deplete over time, ensuring a long-term and sustainable energy supply.
- *Reduced Environmental Impact:* Unlike fossil fuels, alternative energy sources produce little to no greenhouse gas emissions, mitigating climate change and improving air quality.
- *Energy Independence:* Relying on domestic renewable resources can decrease dependence on imported fossil fuels, enhancing energy security and reducing the impact of global oil price fluctuations.
- *Employment Opportunities:* The transition to alternative energy requires skilled labour for installation, operation, and maintenance, potentially creating jobs and stimulating economic growth.

Challenges:

- *Initial Costs:* The upfront investment required for infrastructure and technology can be substantial, deterring immediate adoption.
- *Intermittency:* Some alternative sources, such as solar and wind, are intermittent, requiring efficient energy storage solutions to ensure continuous supply.
- *Infrastructure Development:* Establishing the necessary infrastructure, such as power grids and transmission lines, is essential but can be challenging, especially in remote areas.
- *Policy and Regulatory Framework:* A supportive policy environment, including incentives and regulations, is crucial to encourage private investment and innovation in the alternative energy sector.

Problems with ARE Policy 2020[8]

- The policy falls short on adequately incentivising renewables, and also does not sufficiently provide for imperative steps required for the just transition of the workforce from fossil fuel electricity generation to renewable sources.

- The policy proposal to remove tax exemptions must be notified after examining the standard of locally produced products and the local production capacity to meet demand.

- The policy lacks long-term targets that may provide a clear trend and vision to the market and industry. The long-term targets have a high dependence on the political will and always need policy actions for proper implementation.

- Policy is not designed with the aim to overcome the key barriers such as the high cost of new technologies, insufficient energy infrastructure, and sustainability of the energy system.

- The policy ignores the importance of reliable empirical data and information about renewables' function, operation, maintenance, development, and performance.

Conclusion

Pakistan's energy mix is undergoing significant changes in response to the country's energy needs and environmental concerns. Embracing alternative energy sources is not only a necessity but also a valuable opportunity to address the energy deficit while moving toward a sustainable future. The formulation of the ARE Policy 2020 is a tangible step in the adoption of renewable energy technologies for affordable energy to gain the momentum of sustainable economic growth and tackle the climate challenges. The nation's abundant solar and wind resources, along with its hydroelectric potential, position Pakistan favourably for a successful transition to alternative energy.

However, Pakistan's energy crisis is a complex and deeply entrenched problem that can be resolved only through concerted efforts from the government, the private sector, and the general population. By investing in technology, infrastructure, and supportive policies, Pakistan can harness the power of alternative energy to resolve its energy crisis, drive economic growth, and contribute to global efforts in combating climate change. This would also enable Pakistan to work towards a more sustainable and prosperous energy future.

8 Maroof Mittha, "Renewable Energy Policy in Pakistan: A Critique," Courting the Law, April 19, 2021, https://courtingthelaw.com/2021/04/19/commentary/renewable-energy-policy-in-pakistan-a-critique/