

Greener route to energy security

Prolonged disruption in Strait of Hormuz could add \$4.5 billion to import bill; Under CPEC 2.0, the proposed Green Corridor provides an opportunity to place renewable energy alongside industrialisation, agriculture, mining and digital cooperation

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Pakistan's next economic shock may be triggered far beyond its borders, but its impact could be felt directly in household budgets, businesses and the country's already fragile external position.

A prolonged disruption in the Strait of Hormuz could add an estimated \$4.5 billion to the import bill, large enough to place renewed pressure on an economy still struggling to rebuild its external buffers and avoid another IMF adjustment.

Energy shocks travel quickly; a spike in fuel prices raises transport costs, feeds into food and manufacturing prices, squeezes businesses, and reduces the purchasing power

of working households. Pakistan has spent decades responding to these disruptions after they occur rather than building an energy system capable of absorbing them in the first place. Genuine macroeconomic stability will therefore remain elusive as long as economic growth is tied to expensive and volatile imported fossil fuels. The immediate task is twofold: reduce the vulnerability of the fuel we still need to import while accelerating the transition toward energy we can produce domestically.

The first step is therefore logistical. Pakistan has already explored having oil supplies rerouted through the Red Sea port of Yanbu, allowing shipments to bypass the Strait of Hormuz. Diversifying import routes and building alternative supply corridors can provide some insulation from sudden geopolitical disruptions. But they should be treated as strategic risk management. Rerouting imported fuel changes the route of dependence; it does not eliminate the dependence.

That distinction makes the longer-term transition far more important. Under CPEC 2.0, the pro-



posed Green Corridor provides an opportunity to place renewable energy alongside industrialisation, agriculture, mining and digital cooperation at the centre of Pakistan-China economic engagement.

In practice, however, renewables cannot compensate for the institutional inertia that has already prevented Pakistan's Special Economic Zones from becoming productive industrial ecosystems. Of the nine SEZs designated during the first phase of CPEC, only four, Rashakai in Khyber Pakhtunkhwa, Allama Iqbal Industrial City in Punjab, Dhabeji in Sindh, and Bostan in Balochistan, have progressed beyond the planning stage, with development remaining partial, largely because gaps in utilities, land-title security, approvals, electricity distribution and investor-developer dispute resolution continue to deter investment. These weaknesses are further compounded by inadequate logistics and transmission infrastructure and the absence of a clear, sector-specific proposition for Chinese investors. Fiscal incentives alone cannot overcome such structural barriers, particularly when approval processes remain fragmented and time-consuming.

Distributed solar is effectively the first stage of household energy resilience. It reduces dependence on grid purchases, lowers exposure to rising tariffs and can ease pressure on the system during periods of peak demand. But as the grid becomes more constrained and the regulatory framework shifts away from traditional net metering, solar generation alone will not be enough.

The next stage must therefore be storage. Hybrid rooftop systems combining solar with battery energy storage systems can allow households and small businesses to maximise self-consumption and shift solar energy into evening peak hours, reducing their dependence on the grid when electricity is most expensive. This also creates an opportunity to think beyond the technologies that currently dominate global battery markets. Sodium-ion batteries could eventually offer a lower-cost and more thermally stable alternative for stationary applications, particularly in a country where extreme summer

temperatures make thermal performance important.

This opportunity becomes even more significant when domestic resources are considered. Pakistan possesses substantial rock-salt resources, including the high-purity salt associated with the Khewra region. Turning those resources into battery-grade sodium compounds would not, by itself, create a domestic battery industry; the manufacturing chain requires specialised chemical processing, cathode and anode materials, cells, electronics and quality-control capabilities, but it could provide one domestic building block for a broader sodium-ion ecosystem. The objective should therefore not be to leap immediately from raw salt to complete batteries, but to build the industrial capabilities progressively.

That makes local battery assembly and manufacturing the logical next step. Pakistan should begin by developing domestic assembly capacity, technical standards, recycling systems and testing infrastructure while gradually localising components and chemical processing. The same approach should extend to solar equipment and other clean-energy technologies, linking domestic demand with industrial policy. In this way, the transition would do more than replace imported fuels; it could create new manufacturing capabilities, strengthen domestic supply chains and generate export opportunities.

Ultimately, Pakistan's energy transition must be pursued as a strategy for both climate resilience and economic security. In the short term, that means diversifying the routes through which we import the fuel we cannot yet replace. At the household level, it means moving from rooftop solar towards solar-plus-storage systems that reduce exposure to grid volatility.

An economy so dependent on external energy markets will remain vulnerable to shocks it cannot control. Diversifying energy sources, decentralising generation and building domestic clean-energy manufacturing can change that trajectory. That said, the energy transition is steadily becoming a pathway to greater economic resilience, energy security and sovereignty.

