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The China-Gulf Green Rush: Fueling Renewable Energy Cooperation

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COVER IMAGE:
An aerial drone photo taken on June 20, 2025 shows a view of the Wucaitan wind farm in Burqin County, Altay Prefecture, northwest China's Xinjiang Uygur Autonomous Region on January 25, 2026. (Photo by Nurbek Nurman / XINHUA / Xinhua via AFP)

The evolving dynamics of China-Gulf energy cooperation, from structural dependency to complex interdependence, represent a profound paradigm shift that reflects broader global transitions in resource geopolitics. During the era of conventional fossil fuels, the Gulf states, endowed with vast hydrocarbon reserves, served as pivotal suppliers. They met China's substantial demand, as the world's leading energy importer, forging a unidirectional trade nexus based on oil and gas flows. This relationship is however undergoing a transformative reversal due to an accelerating energy transition, heightening climate emergencies, and technological innovations.

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This policy note argues that the Gulf states and China must respond by strategically deepening their cooperation in the energy transition, namely in renewable energy systems. It calls for robust and multidimensional bilateral partnerships that enhance industries on both sides and optimize economic returns, while closely aligning with evolving societal needs for sustainability and inclusive prosperity.

Strategic Synergy: The Pivot to Renewables

China is expanding its renewable energy sector at a rapid pace. In the 2025 Government Work Report, China's Premier Li Qiang argued that "China should promote energy conservation and carbon reduction transformation in key industries and advance the development and utilization of new energy sources."[1] In 2024, investments in key projects—such as new energy storage, charging and swapping infrastructure, hydrogen energy, and integrated energy generation, grid, load, and storage—reached nearly 200 billion yuan ($28 billion), making China the world's largest investor in the energy transition.[2] China's pursuit of renewables is impelled by complex strategic calculations that are underscored by a national pursuit to balance domestic imperatives with international responsibilities.

The first of these drivers is the demand for energy security. China is systematically bolstering its energy architecture to counteract the inherent fragilities of excessive dependence on imported fossil fuels. By cultivating domestic resources including solar, wind, and hydrogen capabilities, it not only augments its energy autonomy but also attenuates geopolitical vulnerabilities, such as those arising from volatile international supply chains and potential embargoes.

Second is Beijing's drive for a green, low-carbon transition, wherein renewable energy initiatives facilitate the quest for rigorous climate objectives—notably peaking carbon emissions by 2030 and achieving carbon neutrality by 2060. This approach not only indicates that China is unwilling to sacrifice its natural environment to achieve economic growth, but also exemplifies its adherence to multilateral accords like the Paris Agreement, positioning the nation as a proactive steward in global environmental governance. Moreover, these efforts help amplify China's soft power as the Belt and Road Initiative (BRI) matures from the phase of "overarching frameworks (daxieyi)" to "meticulous implementation (gongbihua)."[3] Beijing's recent advocacy for the "Green Silk Road" seeks to demonstrate its commitment to fostering sustainable development and mitigating cross-border ecological vulnerabilities through multilateral cooperation on clean energy infrastructure and cutting-edge environmental technologies.

A third factor in the renewable energy pivot is an economic reconfiguration, precipitated by the waning efficacy of legacy export paradigms represented by the "old three items" (jiusanyang)—the three traditional, low-tech, labor-intensive export categories that dominated China's foreign trade from the 1980s through the early 2000s.[4] The competitiveness of these products has eroded due to narrowing profit margins, exacerbated by surging domestic inputs like labor wages and property rents. In response, China has orchestrated a deliberate shift toward the "new three items" (xinsanyang)— electric vehicles, lithium-ion batteries, and solar photovoltaic modules—symbolizing its shift from low-value manufacturing to high-value, innovative industries.[5] Capitalizing on its preeminent technological edge and economies of scale, China is seeking to inject vitality into its export portfolios and establish a key position in emerging global markets.

The long value chains associated with these sectors engender a multiplier impact which invigorates both upstream and downstream industries, catalyzing job creation across diverse skill strata. A recent government document argued that "it is necessary to accelerate the construction of a new energy system, continuously increase the proportion of new energy supply, promote the safe, reliable, and orderly replacement of fossil fuels, focus on building a new power system, and build a strong energy nation."[6]

Although the economic structures of China and the Gulf states are starkly different, the latter are also channeling growing investments into renewable energy as a cornerstone of their diversification agendas, such as Saudi Arabia's Vision 2030, Qatar's National Vision 2030, and Kuwait's Vision 2035. These countries' energy transition strategies are fundamentally propelled by the gradual erosion of their long-held dominance in global energy markets, catalyzed by the shale revolution and the broader proliferation of unconventional hydrocarbon sources.

The surge in shale oil and gas production, particularly in the United States and Canada, has considerably reshaped international supply dynamics, and is diminishing the Middle East's strategic leverage as the world's energy hub. For example, The Organization of the Petroleum Exporting Countries' (OPEC) exports to the U.S. market decreased from 5.6 million bpd in 1977 to 980,000 bpd in 2022.[7] This shift, compounded by rapid advancements in Canadian oil sands, deep-sea extraction in the Gulf of Mexico and Brazil, and biofuels, has compelled Middle Eastern oil producers to diversify beyond fossil fuels to mitigate existential threats to their economic models.

The energy transition is further intensifying this pressure. Moreover, natural endowments are diminishing and states' energy capacities have come to hinge on technological innovation and industrial capabilities—areas in which the traditional energy giants lag, owing to historical underinvestment in research and development. This dynamic necessitates a proactive adoption of renewables to avert marginalization within a technology-driven energy paradigm that emphasizes low-carbon alternatives for long-term growth.

Compounding these dynamics is growing uncertainty among the Gulf states with persistently low oil prices that have exposed the vulnerabilities of oil-dependent economies. Moreover, international demand for petroleum remains sluggish, amid decarbonization efforts, and oil prices have generally remained subdued over the past decade, leading to curtailed investments, reduced production quotas, and fiscal strains that threaten long-term viability, particularly for nations with finite reserves.

This volatility, inherent to a resource destined for eventual depletion, is amplifying survival anxieties, prompting governments to view energy diversification as an indispensable strategy for preventing economic collapse and securing national stability. This reflects a pragmatic calculus: by accelerating the adoption of renewables, such as solar and wind projects that have achieved record-low costs in the region, these states aim not only to hedge against price fluctuations but also to align with global climate imperatives, thereby preserving market access and fostering resilience within a transitioning global energy order.

Finally, the Arab Gulf states' adoption of renewables is motivated by intensifying domestic pressures from rapid population growth, surging energy consumption, and persistently high inflation, which are collectively reducing the benefits of oil revenues and necessitating structural reforms. Exponential population growth in countries like Saudi Arabia has driven electricity demand to grow at nearly 7% annually,[8] with air conditioning alone accounting for up to 70% of peak usage,[9] thereby diverting substantial oil volumes from lucrative exports to subsidized domestic needs and resulting in billions annually in opportunity costs.

This internal consumption boom, intensified by the post-2008 global inflation which saw commodity price hikes outpace oil's gains, has strained government subsidy regimes and risks eroding living standards, with potential impacts on state-society relations. Against this backdrop, renewables offer further avenues for economic growth and development.

Fostering Energy Interdependence

As China and the Gulf states channel substantial investments into renewable energy, it is worth examining the trajectory of their relationships. Whereas the historical energy partnership cast China predominantly as the importer and the Gulf states as the exporters, current dynamics have shifted into a more intricate form of interdependence, characterized by deeply interwoven industrial supply chains and mutual strategic interests.

At the core of this complementarity lies an alignment of comparative advantages in distinct areas of renewables. Simply put, the Gulf states' resource endowments synergize with China's energy storage prowess. The Gulf boasts unparalleled potential in solar, wind, and hydrogen energy, facilitated by the region's geographical attributes. It experiences world-leading solar irradiance levels, with daily averages reaching up to 6.5 kilowatt-hour per square meter (kWh/m^2) and direct normal irradiance ranging from 3 to 6.5 kW/m^2 per day,[10] rendering it ideal for concentrated solar power (CSP), concentrated photovoltaics (CPV), and photovoltaic applications. Its wind resources are equally robust, particularly along the Red Sea coast, where windspeed often surpasses the 6.9 m/s threshold for economically viable large-scale wind farms.[11] Furthermore, the abundance of natural gas in the region, exemplified by Qatar's production, enables cost-effective blue hydrogen generation via carbon capture, utilization, and storage (CCUS), building upon established traditional energy infrastructure for seamless integration into global hydrogen markets.

However, a primary challenge in harnessing wind, solar, and hydrogen energy lies in their inherent intermittency. Achieving large-scale deployment requires robust energy storage solutions. While the Gulf states are hampered by gaps in storage technologies and infrastructure, China excels at mitigating the variability of these renewables through its advanced energy storage ecosystem, which encompasses a comprehensive supply chain from materials to system integration, with leading installed capacities in pumped hydro and electrochemical storage that enhance grid stability and renewables uptake. This mutual reinforcement—Gulf resources fueling scalable projects and Chinese innovations ensuring reliability—creates a virtuous cycle, mitigating the Gulf's storage deficit while providing China with expansive markets for its exports.

This opportunity for enhanced interdependence between China and the Gulf states extends to the structural complexities of renewables industrial chains, which require high-tech innovation, sophisticated manufacturing, and robust infrastructure—domains in which one country's capabilities are often insufficient, necessitating collaborative ecosystems. Unlike fossil fuel extraction, which relies primarily on resource availability, renewables hinge on precision equipment (e.g., lasers and vacuum deposition for high-efficiency batteries and photovoltaic cells) and intelligent grid management to accommodate variable wind and solar inputs.

Meanwhile, manufacturing acts as a key enabler of scalability by transforming laboratory prototypes into durable and cost-effective products, such as solar modules with a 25-year lifespan or offshore wind installations.[12] In this context, China's economies of scale and learning curves have helped slash costs. Infrastructure serves as the vital backbone of these systems, supporting logistics for transporting components, from large wind turbine blades to exported photovoltaic modules. For the Gulf states, which possess substantial resource wealth alongside varying levels of high-tech research and development, manufacturing and infrastructure capabilities, partnering with China provides a practical route to industrial upgrading, enabling deeper integration into supply chains through joint ventures and technology transfers.

The evolving dynamics of the energy partnership between China and the Gulf states are also evident in their reciprocal investments. On one hand, Chinese entities have actively infused capital and expertise into Gulf-based renewable projects, most notably through the Silk Road Fund's 2019 acquisition of a 49% stake in Saudi Arabia's ACWA Power Renewable Energy Holding.[13] This has

facilitated joint ventures in large-scale solar initiatives such as Dubai's Mohammed bin Rashid Al Maktoum Solar Park, contributing to the United Arab Emirates' Net Zero 2050 ambitions while leveraging China's manufacturing prowess for cost-efficient scaling.

This influx has enabled Gulf nations to rapidly expand their clean energy capacities, with Chinese firms participating in projects totaling approximately $9.5 billion across the Middle East, between 2018 and 2023, , including solar and wind manufacturing facilities in Saudi Arabia.[14] Conversely, the Gulf states, through sovereign wealth funds and national champions, are channeling substantial resources into China's renewables sector as a hedging mechanism against oil price volatility. For instance, Saudi Arabia's ACWA Power has secured over 1 gigawatt (GW) of projects in China, encompassing a 132-megawatt (MW) solar photovoltaic portfolio in the Guangdong province in partnership with Sungrow Renewables, and a 200 MW wind portfolio with Mingyang Smart Energy, with initial investments amounting to $312 million and long-term plans reaching up to $50 billion by 2030 for up to 20 GW in clean power assets.[15] Abu Dhabi's CYVN Holdings also invested $738.5 million in the Chinese electric vehicle manufacturer NIO in 2023,[16] underscoring the Gulf's strategic bets on China's dominance in electric vehicle (EV) and battery technologies.

The Gulf states' strategic pivot toward renewable energy development is poised to substantially enhance their position within the global energy landscape, as they evolve from hydrocarbon exporters into versatile frontrunners in sustainable power generation. Through a dual-pronged strategy of preserving their vast oil and gas reserves while channeling substantial investments into emerging sources like solar, wind, and green hydrogen, they are actively enhancing their geopolitical leverage, harnessing untapped economic opportunities in export-driven green sectors. This is allowing them to cement their pivotal role in an increasingly multipolar energy system.

Future Avenues for Cooperation

The Gulf States and China should deepen and solidify their energy partnership, seeking integration across the value chain along with systemic decarbonization, spanning upstream renewable resource development, midstream manufacturing and infrastructure modernization, and downstream applications in clean mobility and "green molecules" (low-to-zero carbon energy carriers and feedstock). To harness synergies in this evolving partnership, policymakers should emphasize the development of a comprehensive hydrogen energy industry chain in the Middle East.

By leveraging China's technological prowess in hydrogen production and infrastructure, alongside the Gulf's abundant renewable resources and strategic location, this collaboration could position the region as a global leader in hydrogen. This could not only transform the Middle East into a hub for hydrogen processing and manufacturing, but also bolster its export capabilities, thus enabling regional actors to diversify their energy export products in addition to traditional hydrocarbon products.

China could play a role in supporting the establishment of smart grids that seamlessly integrate renewables, enabling Gulf countries to convert clean energy into reliable electricity and expand its utilization across sectors. Given the region's demographic patterns, characterized by concentrated urban populations amid uneven regional development, ultra-high voltage transmission technologies will be essential for efficiently transporting power from remote desert-based solar installations to high-demand cities. This strategy would optimize energy efficiency, reduce transmission losses, and promote sustainable development, ultimately contributing to a more balanced and resilient energy ecosystem in the Gulf.

Policymakers should focus on expanding EV infrastructure in the Gulf by integrating charging networks directly with clean energy sources, thereby lowering electricity costs for residents and accelerating the transition to sustainable mobility. Chinese enterprises, with their proven track record in EV technology and infrastructure, could invest in and collaborate on building charging stations, facilitating a shift away from oil-dependent transportation. This would allow Gulf nations to conserve oil for export, generating additional revenue while mitigating domestic environmental impacts such as carbon emissions and air pollution which would simultaneously only align with international climate goals and position the Gulf as a forward-looking player in the global energy transition.

Conclusion

As the energy transition accelerates, China-Gulf relations are undergoing a profound transformation. Central to this shift is the evolution of energy partnerships, from the traditional fossil fuel exports that fueled China's industrial rise, to strategic, mutually beneficial collaborations in clean energy technologies. Looking ahead, both sides should prioritize three interconnected initiatives: establishing a Middle East hydrogen hub, modernizing regional grids to enable seamless integration of renewables, and rapidly scaling EV infrastructure to promote sustainable transportation. Together, these efforts can foster resilient, symbiotic ecosystems that strengthen energy security, enhance industrial competitiveness, and ensure long-term environmental sustainability.

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