The Energy Transition Needs a Reality Check

Expectations of a rapid, linear transformation of the global energy system have proved misplaced. A major rethinking is in order

NEW YORK, Feb. 25, 2025 /PRNewswire/ -- The energy transition will be more difficult, costly, and complicated than expected, according to a new article by Daniel Yergin, Vice Chairman, S&P Global; Peter Orszag, CEO and Chairman, Lazard; and Atul Arya, Chief Energy Strategist, S&P Global.

S&P Global

Writing in the March-April edition of *Foreign Affairs*, they say that it is time to rethink priorities, polices and investments in light of the complicated realities today.

"What is becoming clear is that the shift in the global energy system will not unfold in a linear or steady manner," Yergin, Orszag and Arya write. "Rather, it will be multidimensional—unfolding differently in different parts of the world, at different rates, with different mixes of fuels and technologies, subject to competing priorities and shaped by governments and companies establishing their own paths."

It has not been and will not be the energy transition that many envisioned, they say.

The substantial (though temporary) reductions in energy demand and carbon emissions during the COVID-19 pandemic gave many the false impression that a rapid and singular transformation of the global energy system would be feasible.

"This ambition, however, has collided with the magnitude and the practical constraints of completely overhauling the energy foundations of a $115 trillion global economy in a quarter century," they write.

The disconnect is evident. The world is far from on track to achieve the often-stated target of reaching net-zero emissions by 2050, and there is no clear plan for delivering the massive investment that would be required to do so, the authors say.

"Part of the problem is the sheer cost: many trillions of dollars, with great uncertainty as to who is to pay for it. Part of the problem is the failure to appreciate that climate goals do not exist in a vacuum. They coexist with other objectives—from GDP growth and economic development to energy security and reducing local pollution—and are complicated by rising global tensions, both East-West and North-South," Yergin, Orszag and Arya write. "And part of the problem is how policymakers, business leaders, analysts and activists expected the transition to go, and how plans were shaped accordingly."

"A new North-South divide has emerged on how to balance climate priorities with the need for economic development. This is a key factor behind rethinking the pace and shape of the energy transition," they write.

The path forward will require significant tradeoffs and a more pragmatic approach—one that considers a multitude of factors such as the need for economic growth, energy security and energy access, they say.

"The first step in this rethinking is understanding why the key assumptions behind the [energy] transition have fallen short," Yergin, Orszag and Arya write. "That means grappling with the geopolitical, economic, political, and material tradeoffs and constraints rather than wishing them away."

The complete article is available at: https://www.foreignaffairs.com/guest-pass/redeem/YxSIFt7hbEA

Selected excerpts:

(Edited slightly for brevity only)

More Energy "Addition" than Transition

"What has been unfolding is not so much an 'energy transition' as an 'energy addition.' Rather than replacing conventional energy sources, the growth of renewables is coming on top of that of conventional sources…. This was not how the energy transition was expected to proceed."

"The fundamental objective of the energy transition is to replace most of today's energy system with a completely different system. Yet throughout history, no energy source, including traditional biomass of wood and waste, has declined globally in absolute terms over an extended period."

"In 2024 global production of wind and solar energy reached record levels—levels that would have seemed unthinkable not long before…. Yet 2024 was a record year in another regard as well: the amount of energy derived from oil and coal also hit all-time highs. Over a longer period, the share of hydrocarbons in the global primary energy mix has hardly budged: from 85 percent in 1990 to about 80 percent today."

How Much—and Who Pays?

"Past transitions, such as the shift from wood to coal, were motivated by improved functionality and lower costs, incentives that are not yet present across much of the entire energy system. The scale of the transition means that it will also be very costly."

"Based on such estimates [from the Independent High-Level Expert Group on Climate Finance], the magnitude of energy-transition costs would average about five percent a year of global GDP between now and 2050.

"If global South countries are largely exempted from these financial burdens, global North countries would have to spend roughly 10 percent of annual GDP—for the United States, over three times the share of GDP represented by defense spending and roughly equal to what the U.S. government spends on Medicare, Medicaid, and Social Security combined."

Energy Security

"Russia's invasion of Ukraine and the subsequent disruption to global energy markets put the issue back on the table."

"Governments simply cannot tolerate disruptions to, shortages of, or sharp price increases in energy supplies. Energy security and affordability are thus essential if governments want to make the transition acceptable to their constituencies."

"Assuring that citizens have access to timely supplies of energy and electricity is essential for the well-being of populations. That means recognizing that oil and gas will play a larger role in the energy mix for a longer time than was anticipated a few years ago, which will require continuing new investment in both hydrocarbon supplies and infrastructure."

A New Divide

"In the global South, the transition competes with immediate priorities for economic growth, poverty reduction, and improved health. The trilemma of energy security, affordability, and sustainability looks very different in Africa, Latin America, and developing Asia than it does in the United States and Europe."

"At the moment, almost half the population of the developing world—three billion people—annually uses less electricity per capita than the average American refrigerator does. As energy use grows, 'carbonizing' will precede 'decarbonizing.'"

"The clash of priorities between the North and the South is especially striking when it comes to carbon tariffs. Many global North governments have, as part of their efforts to reduce emissions, put up barriers preventing other countries from taking the same carbon-based economic development path that they took to achieve prosperity."

Big Shovels

"A global economy in transition depends on another transition—a shift from 'big oil' to 'big shovels.' That means much more mining and processing, driven by major new investments and resulting in much-expanded industrial activity. Yet the complexities surrounding mining and critical minerals represent another major constraint on the pace of the energy transition."

"The International Energy Agency has projected that global demand for the minerals needed for 'clean energy technologies' will quadruple by 2040….

"This is extremely unlikely, considering that, based on S&P data that tracked 127 mines that have come online globally since 2002, it takes more than 20 years to develop a major new mine; in the United States, it takes an average of 29 years."

Great-power Rivalry

"The energy transition is increasingly intertwined with the great-power rivalry betweenthe United States and China. That is true not just when it comes to implementing targets, but also when it comes to the 'green supply chain.'"

"The growing tensions will likely slow the deployment of clean energy technologies, add costs, and constrain the pace of the

energy transition. Governments are now mobilizing to 'diversify' and 'de-risk' supply chains. But in practice this is proving very difficult because of costs, infrastructure constraints, time required, and the substantial roadblocks to getting projects permitted."

Electricity Surge

"A new challenge for the energy transition has emerged: assuring adequate electricity supplies in the face of dramatically increased worldwide demand. This is the result of a quadruple piling on: a coming surge in consumption arising from "energy transition demand" (for example, for electric vehicles); reshoring and advanced manufacturing (for example, of semiconductors); crypto mining and the insatiable energy appetite of data centers powering the AI revolution."

"Some estimates have suggested that data centers alone could consume almost ten percent of U.S. electricity generation annually by 2030; one large tech company is opening a new data center every three days."

"Electrification trends suggest that power demand in the United States will double between now and 2050."

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We are widely sought after by many of the world's leading organizations to provide credit ratings, benchmarks, analytics and workflow solutions in the global capital, commodity and automotive markets. With every one of our offerings, we help the world's leading organizations plan for tomorrow today.

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