BCG

Weekly Brief

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The Road Ahead for the Energy Transition

Two years ago, we published *A Blueprint for the Energy Transition*, laying out what it would take to align the global energy system with climate goals while sustaining prosperity. Since then, energy markets have been buffeted by geopolitical shocks, rapid technology deployment, and shifts in both political dynamics and public sentiment. Some things have moved faster than expected, others slower.

Last week, with BCG's Center for Energy Impact, we released an update to the original report. *The Energy Transition's Next Chapter* explores seven significant shifts that are pushing the transition into a new, more complex phase:

Countries are doubling down on energy security. In the US, policies support domestic oil and gas development while incentivizing domestic alternatives such as nuclear, geothermal, and hydro. China is surging ahead in solar and wind capacity while also tapping into its vast coal reserves to ensure energy security. And the EU has explicitly tied its decarbonization agenda to reducing dependence on Russian gas.

High prices are wearing down public support. Industrial and residential users in Europe pay two to three times higher prices than those in the US, China, and India. And that reality can influence public opinion. For example, while support in the EU for the energy transition remains strong, the number of its residents who ranked sustainability as a top three priority for the region has

declined by 7 percentage points since 2020.

Electricity demand has entered a "supercycle." In the US alone, consumption from data centers is expected to rise by about 800 TWh through 2030—more than 1.5 times Germany's total current power use. And in India and China, industrialization, cooling needs, and population growth are driving 30% to 50% increases in national demand by the end of the decade.

Natural gas and nuclear are part of the conversation. Natural gas, as a flexible and lower-carbon alternative to coal, is seeing new investment globally, though LNG remains too costly for many countries. Nuclear is experiencing a renaissance; capacity projections for 2040 are rising, with both traditional and advanced reactors of various sizes gaining traction. It remains to be seen whether the cost of the technology can drop enough to be economically attractive.

This is a new era of asset building. After decades of optimizing existing infrastructure, annual corporate energy capex is projected to jump from about $7 trillion to about $10 trillion between 2024 and 2030. Much of the investment will be in grids and renewables, which have high upfront and low operating costs. Companies and supply chains are not yet configured for this reality, and governments are facing competing demands on limited budgets.

Oil and gas demand is stickier than forecasted. Even in accelerated transition scenarios, oil production in 2040 remains close to today's levels. Meeting increasing demand will require about $350 billion in upstream investment annually through 2050. Meanwhile, global LNG demand is expected to rise by 80% by 2040, with 38 new importing countries joining the market and the US emerging as the leading exporter.

Technology cost trajectories are diverging. The cost of solar, onshore wind, and batteries continues to fall, with 80% to 90% declines since 2010. Those technologies have had decades to mature. But firm, 24-7 low-carbon solutions remain costly. Green hydrogen; carbon capture, utilization, and storage; and long-duration storage present greater infrastructure needs, slower learning curves, and volatile input costs.

Takeaways for the Energy Transition

Reduce the cost and increase the speed of the infrastructure build-out, particularly grids. This means rethinking design choices, scaling supply chains, and making permitting reform nonnegotiable. Governments and businesses must embrace standardized approaches and shared infrastructure to avoid reinventing the wheel.

Make better use of proven technologies while placing smart bets on emerging ones. Roughly two-thirds of emissions can be tackled with generally commercially viable tools—solar, wind, EVs, and electrification of heating. The rest will require active but patient investment and stable policy frameworks.

Keep consumers engaged. When energy prices are high and the benefits of clean energy unclear, support erodes quickly. Winning propositions for the public that allow consumers to shape their energy use will be an essential part of progress. A new generation of customer-facing energy models is already emerging, offering ways not just to lower costs but build lasting support.

Acknowledge that every country has a unique starting point. Companies, investors, and governments must tailor their plans, adjusting sequencing, leveraging local strengths, and mitigating local risks. And pragmatism, rather than perfection, should be the guide.

Progress in the energy transition is not about declaring victory or defeat. It's about managing complexity with eyes wide open—transforming the portfolio and business with a resilience mindset.

Until next time,

Rich Lesser
Global Chair

Further Insights

The Energy Transition's Next Chapter

The energy transition has entered a new phase—and a number of shifts, including an increased focus on energy security and affordability, are reshaping the path ahead.

LEAD THE TRANSITION

Strategies to Ride the Surge in US Natural Gas

With natural gas poised to dominate the world's energy markets, US producers are presented with five possible future scenarios for growth.

TRANSLATE INTO GROWTH

Mind the Queue: Connection Reform for the Electricity Grid

The world is building clean power and electricity offtake faster than grids can absorb it, underscoring the urgent need for grid reform.

UNBLOCK THE GRID