

Investing in Energy Transition 2.0: Navigating Rising Demand, Cost Pressures and Geopolitical Complexity

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The global energy transition is entering a more complex, demand-driven and geopolitically fragmented phase. The immediate path is increasingly forged by rapidly rising electricity demand, shifting geopolitics, cost pressures, infrastructure constraints and uneven policy environments. We outline the macro forces reshaping the transition, the investment implications we at Calvert believe matter most, and identify companies positioned to create long-term value in an evolving energy system.

A More Complex, Multi-Factor System

The global energy system has shifted meaningfully over the past two years as cost dynamics, technology adoption, policy volatility and geopolitical shocks reshape the path of transition. Progress is no longer defined solely by emissions trajectories, but also by the system's ability to deliver affordable, reliable and scalable energy amid accelerating demand and unseen levels of disruption to globally traded oil and natural gas supplies.

Rapid cost declines and scaling have made renewables the most affordable and fastest-to-deploy sources of new energy globally. As shown in Exhibit 1, global clean-energy investment surpassed \$2 trillion in 2025—roughly twice the level of fossil-fuel investment—reflecting an increasing focus on low-carbon technologies with proven economics and predictable revenues – eg. Renewable generation and energy storage. More nascent or policy-sensitive solutions, such as green hydrogen or carbon capture continue to attract less capital¹.

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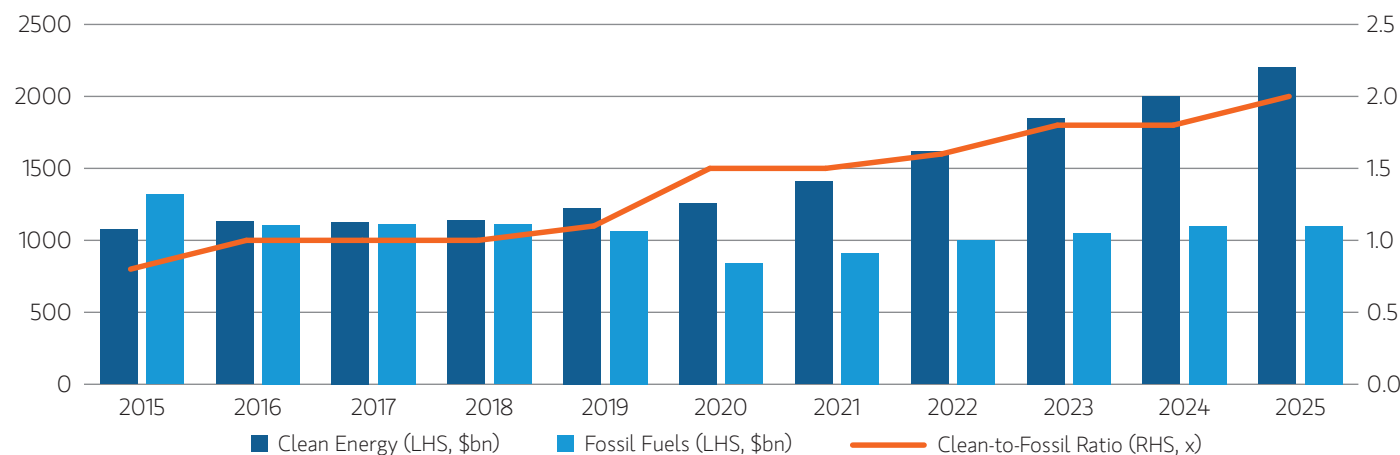


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¹ Green Debt Sales Hit Record Levels Despite Climate Backlash, Bloomberg, December 25, 2025.

EXHIBIT 1**Global Clean Energy Investment is Now Double That of Fossil Fuels**

Source: World Energy Investment 2025, International Energy Agency, June 5, 2025.

AI (Artificial intelligence) is transforming electricity demand and exposing grid constraints

AI and data-center growth have become structural drivers of power demand and disruptors of supply chains. Hyperscalers prefer low-carbon electricity, but availability, speed of access and system reliability remain non-negotiable. In many markets, renewables alone cannot meet the expected growth in uninterrupted-power requirements, elevating the importance of grid expansion, energy storage and complementary flexible generation.

Policy and geopolitical uncertainty remain elevated

Shifting climate policy stances, trade tensions and geopolitical events have become recurring features of the energy landscape. For long-duration energy investments,

this raises the bar on economic robustness, supply-chain resilience and business-model credibility. Despite uneven global agreement on climate action, we believe long-term secular trends such as energy security, AI-driven electricity demand growth and affordability considerations, remain durable and continue to define investment opportunity sets across regions.

Climate volatility is increasing operational and financial risks

More frequent and severe weather events are generating larger and less predictable financial impacts across the economy, including energy-sector operators. Physical risk assessment and climate resilience considerations are therefore playing a more prominent role in Calvert's company evaluations and engagement priorities (see below).

Assessing Transition and Physical Risk in the Utilities Sector

Calvert has developed proprietary custom indicators to assess climate risk in the utilities sector. Two examples are:

Calvert Regulatory Pathways to Decarbonization (CRPD) Indicator

A proprietary framework used in security selection to assess transition risks related to affordability, reliability, and policy support across all US states and 150 countries.

Calvert Utilities Physical Risk Composite (CUPR)

Assesses utilities' exposure to climate-related physical risks, incorporating FEMA National Risk Index data on climate hazards overlaid with legal and regulatory protections.

Geopolitics as a Structural Driver of the Energy Transition

The energy transition is unfolding within the most geopolitically fragmented environment in decades. Heavy dependency on global commodity markets or individual exporters is now seen as a strategic weakness, reshaping national energy strategies and supply chains.

Competing energy visions

The U.S. and China—who together lead the world in both carbon emissions and energy investment²—are pursuing increasingly different paths:

- China is treating clean technology as a core industrial and economic strategy. It dominates global manufacturing of solar modules, batteries and electric vehicles, and continues to expand capacity despite external trade friction.
- The U.S. is leaning more heavily into its role as a major oil and gas producer, expanding LNG export capacity while instigating a more volatile, sometimes recessionary domestic climate-policy environment.

This divergence continues to shape global commodity prices, energy trade patterns and narratives around what defines “energy security”.

Energy-importing nations and resource concentration

Countries with limited fossil-fuel resources—and where demand is rising fastest—are increasingly turning to domestic renewables to reduce exposure to external supply or price shocks. The International Energy Agency estimates that 70% of global cleantech investment in the last five years was made by energy-importing countries seeking to improve energy independence, protect trade

balances and insulate their economies from fuel-price volatility; in light of recent geopolitical events we would expect this trend to accelerate going forward³.

Separately, low-carbon technologies such as electric vehicles, solar panels and batteries require large volumes of mined minerals such as copper, nickel, lithium and rare earth elements. (see Calvert’s approach to investing in mining [here](#)). This makes the mining value chain a critical enabler—and a strategic vulnerability as parts of the metals value chain are dominated by China (as shown in Exhibit 2). This concentration can create geopolitical flashpoints, particularly when downstream industries depend heavily on single-country supplies of refined minerals.

Policy responses and investor implications

To mitigate supply-chain risk, nations are allocating capital to develop domestic natural resources, build strategic stockpiles of key commodities, and reshore critical manufacturing and processing capacity. The energy shocks of 2022 and 2026 are stark reminders of how costly and disruptive over-reliance on a single energy supplier or energy type can be.

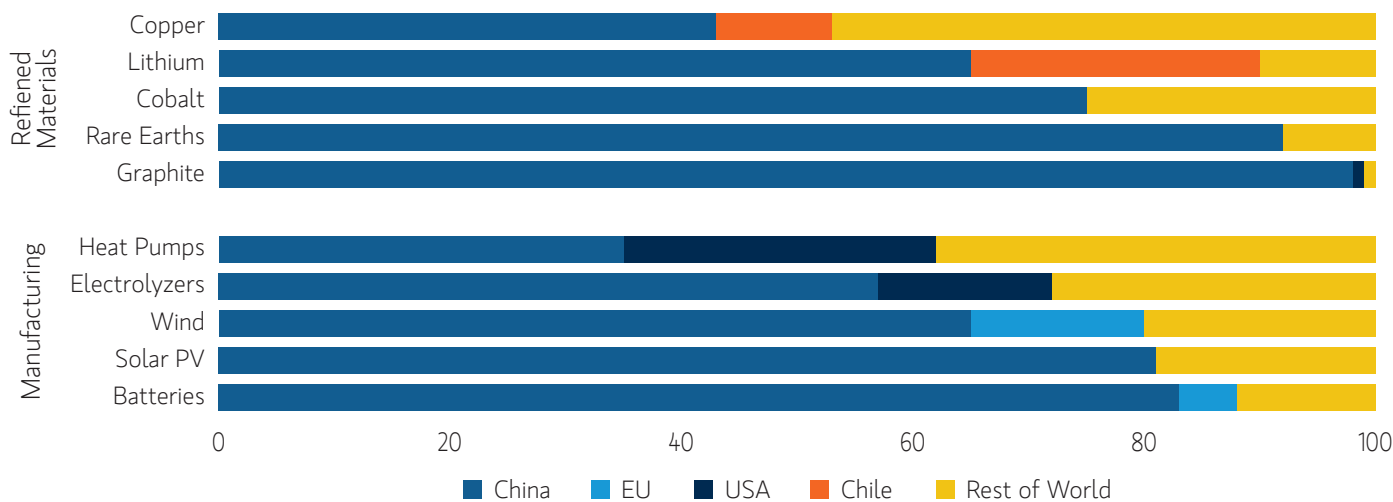
For investors, these shifts complicate project economics, cost curves, supply reliability and policy visibility. But they also create opportunities in:

- diversified and resilient cleantech supply chains
- deployment of cost-competitive domestic renewables
- materials and services that enable electrification

Calvert Take: Geopolitical fragmentation is reshaping how countries and companies pursue the energy transition. While uncertainty is rising, we think the attributes that many clean-tech options offer will be increasingly valuable going forward as the definition of “energy security” evolves.

EXHIBIT 2

China Dominates Cleantech Supply Chains Across Multiple Stages of Production



Source: International Energy Agency, data as of December 31, 2023.

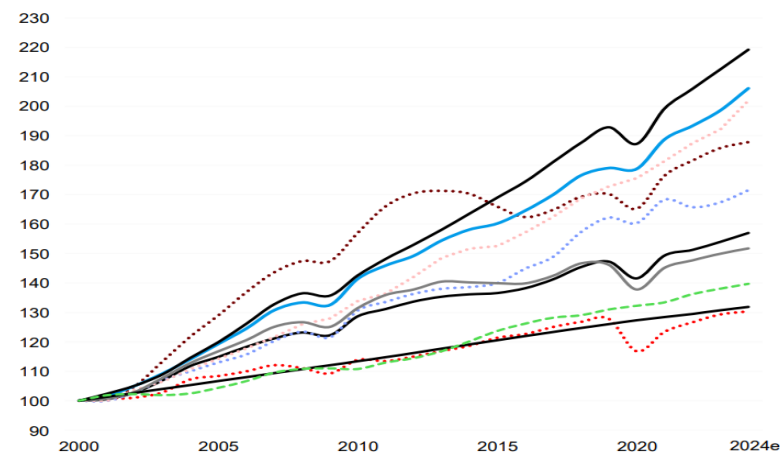
² IEA, World Energy Investment 2025; EDGAR (Emissions Database for Global Atmospheric Research) 2025

³ World Energy Investment 2025, International Energy Agency, June 5, 2025.

EXHIBIT 3

Clean Power is Growing Fastest as Electricity Demand Surges

Evolution since 2000
2000=100



Compound Annual Growth Rates (CAGR)

	2000-2024e	2023-2024e
GDP	3.3%	3.2%
Electricity demand	3.1%	4.3%
Renewable energy supply	3.0%	5.8%
Coal demand	2.7%	1.0%
Natural gas demand	2.3%	2.7%
Total primary energy demand	1.9%	2.2%
CO ₂ emissions	1.7%	0.8%
Energy efficiency	1.4%	1.0%
Population	1.2%	0.9%
Oil products demand	1.1%	0.8%

Source: TotalEnergies and Oxford Economics, Enerdata, IEA “Global Energy Review 2025”

Meeting Rising Energy Demand

Electrification remains the most feasible route to decarbonizing large parts of the global economy, and is also increasingly a way to enhance energy security. Supplying vast amounts of clean power was already a considerable challenge before AI and data-center growth reshaped electricity demand trajectories. Today, global energy use is rising by roughly 2% per year, while demand for electricity is growing twice as fast⁴.

This divergence is illustrated in Exhibit 3, which shows clean power expanding fastest as electricity demand accelerates—highlighting both the opportunity and the strain placed on energy systems.

Fossil fuels continue to supply around 80% of global primary energy demand, even as clean-energy investment surpasses \$2 trillion annually. Cleantech spending is increasingly concentrated in electricity generation and transmission, meaning that nearly all recent global demand growth is being met by new renewable supply⁵. This dynamic may cap electricity-sector emissions in the near term, but only if clean generation continues to scale fast enough to meet rising load.

Structural challenges are emerging

Rising demand growth is exposing system-level bottlenecks that increasingly shape investment outcomes:

- **Grid infrastructure is now a central constraint.** Global grids require more than \$500 billion per year in upgrades and climate resilience investment, spanning utilities, transmission developers, equipment manufacturers and mineral supply chains.
- **Renewables need quick connections to realise timing advantage.** Utility-scale solar can be deployed in 12–18 months, compared with longer lead times for natural gas (around 2030) or nuclear projects (typically a decade). Ensuring clean energy projects are promptly permitted and connected to grids is critical.
- **Efficiency remains underutilized.** Electrification improves efficiency by lowering energy input requirements, while efficiency efforts can also reduce energy demand and capital requirements at relatively low cost—yet remain under-invested relative to their system value.

Calvert Take: A successful transition must deliver reliable and affordable power amid accelerating demand and rising global energy supply disruption. We see the strongest investment opportunities in companies providing cost-competitive, scalable solutions—particularly in grids, energy efficiency and supply-demand balancing—that strengthen system resilience and limit carbon backsliding as electrification accelerates.

⁴ Electricity Mid-Year Update 2025, International Energy Agency, July 30, 2025.

⁵ Global Electricity Mid-Year Insights 2025, Ember, October 7, 2025.

Cost Pressures loom large in Global Energy

Affordability has become a defining constraint shaping energy choices for consumers, corporates and governments. Despite significant technological progress, global energy systems continue to grapple with high and uneven prices, elevating cost competitiveness as one of the most powerful forces influencing policy, capital allocation and technology adoption.

Clean technologies have established durable cost and speed advantages

As shown in Exhibit 4, the levelized cost of solar and lithium-ion batteries has fallen by at least 40% while natural-gas plant costs have risen by roughly 10% since 2020. Renewables also offer a critical speed-to-market advantage, a valuable attribute in an environment of rapidly rising demand.

Gas faces mounting cost competitiveness challenge

While natural gas has played an important role in displacing coal in some markets, its long-term competitiveness is increasingly dependent on its relative cost. In many Asian emerging markets coal remains dominant due to its low-cost and domestic resources. Imported liquified natural gas (LNG) struggles to compete at scale globally given higher infrastructure and transport-related costs⁶. In the United States, rising LNG exports contribute to upward pressure on domestic natural gas prices, affecting household energy bills.

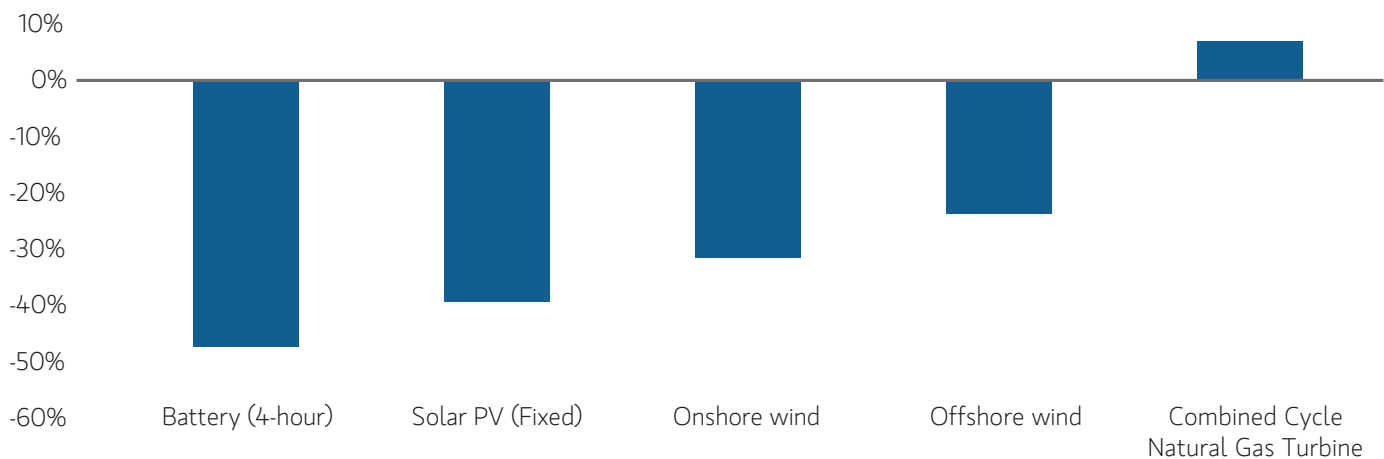
At current prices, natural gas risks falling into a “no-man’s-land”: not low-carbon enough to benefit from climate-policy momentum, and not consistently cheap enough to compete with coal or increasingly low-cost renewables. Price volatility and concentration of supply further erode its attractiveness as a long-term “secure” fuel, particularly for cost-sensitive energy-importing nations.

Utilities must balance growth, modernization and affordability

Utilities face simultaneous mandates to expand generation to meet rising demand, modernize and expand transmission and distribution networks, and decarbonize their systems—all while protecting customers from cost inflation. Regulatory design, capital discipline and exposure to physical climate risk increasingly determine whether these objectives can be reconciled in practice.

Calvert Take: Cost is now a central determinant of global energy technology and fuel investment decisions. As clean technologies gain sustained cost advantages, we favor companies offering resilient, scalable solutions that support decarbonization without exacerbating affordability pressures.

EXHIBIT 4
Renewables Continue to Get Cheaper as Natural Gas Project Costs Rise



Source: BNEF. Note: Change in Global Levelized Cost of Energy (USD/MWh) since 2020.

⁶ Gas Is Still Too Expensive for the World's Emerging Economies, Bloomberg, February 14, 2025.

Calvert's Investment Framework for Energy Transition 2.0

Periods of policy volatility, geopolitical tension and uneven macro conditions demand a forward-looking investment approach grounded in research. Rather than focusing on emissions metrics alone, our investment process emphasizes three priorities: established market positioning; cost-competitive, high-usefulness technologies; and clear alignment with energy system-level needs. We combine these top-down insights with proprietary, sector-specific indicators to identify durable, scalable transition leaders.

These factors illustrate how we focus on solutions that are essential to system reliability, affordability and decarbonization — and why companies with proven competitiveness and credible pathways to scale are best positioned to create long-term value.



What We Look for in Uncertain Conditions

Established Market Position. We prioritize companies with durable competitive advantages—proven technologies, strong customer relationships and scale that allows them to navigate policy or macro changes with greater resilience.

Cost-Competitive, High-Usefulness Technologies.

We focus on solutions the system needs to function reliably and affordably: grid hardware, energy storage, electrification components, efficiency technologies and critical materials.

Alignment with System-Level Needs. The transition increasingly depends on grid reinforcement, higher efficiency performance, diversified supply chains and cost-competitive clean technologies. We invest in companies that directly enable these structural requirements.



How We Evaluate Companies: A Forward-Looking, Value-Creation Lens

Our company-assessment framework integrates financially-material research with proprietary indicators designed for energy transition-exposed sectors. This helps ensure we identify companies that can cut carbon and create long-term value, not simply those with low emissions today.

Sector-Specific, Financially Material Research

Guided by the Calvert Principles for Responsible Investment⁷, we analyze:

- technology-adoption curves
- capex trends and corporate strategies
- regulatory and policy evolution
- market structure and competitive dynamics
- relative cost trajectories and scalability

These inputs shape a forward-looking view of how industries and technologies will evolve across markets and time horizons, directly informing our company selection process.

Proprietary Indicators for Transition-Exposed Sectors

We use custom indicators tailored to oil & gas, utilities, metals & mining, and other highly energy transition-exposed industries. These assess:

- capital-allocation and investment priorities
- addressable market opportunities from energy transition
- feasibility of technology-led decarbonization
- strategy execution credibility
- exposure to physical and regulatory climate risks

Crucially, this approach places less emphasis on today's emissions (which while still an important input, is more reflective of historical actions) and more on whether a company has a scalable, credible route to reduce its carbon footprint and create durable value for its investors.

Evaluating System-Level and Real-World Impact

We go beyond evaluating corporate emissions to assess whether companies' products, technologies or services reduce emissions for others at scale. We prioritize companies that:

- enable electrification, efficiency improvements or clean-generation build-out
- support grid reliability, resilience or flexibility
- provide critical materials and components
- deliver meaningful second- and third-order climate benefits

In Energy Transition 2.0 — where bottlenecks, demand growth and geopolitical complexity shape outcomes — these system-level contributions are increasingly important.

⁷ The Calvert Principles for Responsible Investment (Calvert Principles) provide a framework for Calvert's evaluation of investments and guide Calvert's stewardship on behalf of clients through active engagement with companies and other issuers.

Our investment framework prioritizes companies with durable competitive positions, cost-advantaged and system-critical solutions, and credible transition pathways—the attributes we believe are most compelling in Energy Transition 2.0.

How This Framework Informs Sector Views

Grid Infrastructure. Electricity transmission and distribution are now structural growth markets. Grid equipment manufacturers — transformers, cables, cooling systems and protection technologies — benefit from multi-year visibility as utilities modernize and expand networks.

Energy Efficiency. Heating, ventilation and air conditioning (HVAC), insulation, smart controls, energy-use optimization software and heat-pump solutions offer strong economics, potential for rapid deployment and lower climate policy sensitivity.

Copper & Mining Services. Copper remains a critical enabler of electrification and digitalization. We are constructive on companies mining the metal, or providing

equipment and aftermarket services to miners — business models tied to metal production rather than more cyclical capex trends.

Renewable Developers. Scale and diversification improve resilience. We prefer developers with broad portfolios, strong pipelines and long-term contracted cash flows that can weather policy and market volatility.

Electric Utilities. Utilities that own and operate transmission and distribution assets remain high-conviction opportunities given regulated returns, essential investment needs and multi-decade growth programs.

Energy Engineers & Contractors. E&C firms and systems integrators are critical “builders” of the next-generation energy system; we prioritize those with strong balance sheets, differentiated technical expertise and long-standing customer relationships.

Oil & Gas. Most oil & gas companies remain slow to structurally reposition for the transition. While LNG is a growth lever for some majors, we maintain a cautious view on assumptions requiring persistently robust global natural gas demand.

EXHIBIT 5

Our Investment Picks- What Drives Value Creation in Energy Transition 2.0



Grids

Multidecade investment cycle in critical energy infrastructure



Energy Efficiency

Crucial to affordability & furthering electrification



Metals

Increased material intensity of the energy transition



Generation

Scale & diversified developers of established technologies

This represents how the portfolio management team generally implements its investment process under normal market conditions.

Conclusion

Energy Transition 2.0 is unfolding in a more complex environment defined by rising demand, cost pressures, geopolitical fragmentation and infrastructure constraints. While the path is less linear than once envisioned, the direction remains clear: electrification, efficiency, resilient grids and cost-competitive clean technologies will anchor the next phase of the global energy system.

For investors, we believe success requires focusing on companies with durable positions and solutions that address system-level needs. We believe this approach positions investors to participate with a long-term perspective in the opportunities emerging across Energy Transition 2.0.

Risk Considerations

Investing involves risk including the risk of loss. There is no guarantee that any investment strategy, including those with an ESG focus, will work under all market conditions. Investors should evaluate their ability to invest for the long-term, especially during periods of downturn in the market.

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