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The evolution of the energy transition

As power grids strain under the rapid expansion of wind and solar, and geopolitical events bring renewed focus on energy security, investors are turning to a wider range of technologies to drive the next critical phase of the global energy transition.

For much of the past decade, the energy transition story has been dominated by two technologies: wind and solar. That remains true at scale. Global renewable capacity additions hit a record 582 gigawatts in 2024, according to the International Renewable Energy Agency. In Europe and other energy-importing OECD economies, geopolitical tensions in the Middle East are also reinforcing structural tailwinds for renewables as governments prioritize domestic energy security. Yet beneath these headline figures, a more complicated reality is emerging.

Wind and solar may be increasingly mainstream components of the global energy mix, but they are also exposing weaknesses in aging power systems that were built for a very different era. By the end of 2024, renewables represented almost 50 percent of global installed electricity capacity. Grids designed around a handful of large fossil fuel plants are now being asked to manage thousands of smaller, intermittent renewable assets.

That challenge is reshaping infrastructure investment. Increasingly, institutional capital is moving beyond renewable generation itself and into the technologies that make renewable-heavy systems work and extend decarbonization to all corners of the economy, such as battery storage, green hydrogen and biomethane.

Sean Maguire, partner in the investment team at Schroders Greencoat, sat down with Hillary Ripley, who leads Schroders Greencoat's business development activities in North America, to discuss the next stage of the global energy transition.

Hillary Ripley: Given the still-strong expansion in traditional renewables, why do you suggest the energy transition is evolving beyond wind and solar?

Sean Maguire: If you look at the evolution of electricity markets during the past two decades, the shift has been profound.

Historically, grids were built around coal, gas and nuclear plants that generated power predictably and provided stability to the system. Renewables have fundamentally altered that equation. Wind and solar generation depend on weather conditions, creating variability that traditional infrastructure was never designed to handle at scale.

Generation is scaling faster than the systems needed to integrate it. Global wind and solar alone are projected to account for roughly 30 percent of global electricity generation by 2030, according to industry forecasts.

The industry has done a good job of getting wind and solar onto the grid; now the system is starting to creak. Wholesale electricity prices, which have become more volatile, illustrate that stress..

So, in short, this is not about wind and solar becoming less important continued build out of traditional renewables remains key to energy systems and, crucially, boosting domestic energy security in many regions. But, increasingly, investment is needed to deliver key enablers – and to develop wider technologies that can help decarbonize parts of the economy that have been stubbornly carbon-dependent. Both are critical to turn the potential of the energy transition into a reality.

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Ripley: There's been a lot of discussion about battery storage – why has this become such a high-profile investment theme?

Maguire: Battery storage has emerged as one of the fastest-growing segments of clean infrastructure because it solves one of renewables' biggest structural weaknesses: timing.

Solar generation peaks during the middle of the day. Electricity demand often peaks in the evening. Storage bridges that gap. The IEA estimates that 108 gigawatts of new battery storage capacity was deployed globally in 2025, up 40 percent year-on-year and roughly 11 times higher than 2021 levels.

In Europe, deployment is accelerating rapidly, and with good reason as we learned from recent outages in Spain last year and Texas 2021. These events also highlight a broader issue: because grid stability is becoming more difficult as systems rely more on intermittent generation and less on traditional sources of system support. As the role of large, rotating fossil fuel plants declines, so too does the inherent stability they once provided, increasing the need for technologies that can respond quickly to imbalances in the system.

EU battery storage capacity rose 45 percent in 2025 to more than 77 gigawatt hours, but analysts estimate the European bloc will need roughly 780 gigawatt hours by 2030 to meet decarbonization targets. For investors, batteries generate value in two ways. First, they provide ancillary grid services – balancing frequency and stabilizing systems during periods of volatility. Second, they create arbitrage opportunities by storing electricity when prices are low and dispatching it when prices rise.

That second revenue stream is becoming increasingly important. In mature markets such as the U.K., battery revenues initially came largely from grid-balancing services. But as competition has increased, a growing share of revenues has shifted toward arbitrage. In response, investors have increasingly moved toward longer-term revenue agreements, including tolling contracts and structured power purchase agreements. That evolution is making battery storage increasingly compelling for investors seeking predictable cashflows.

Yet, not all storage assets are created equal. Project economics remain highly dependent on location, grid connection costs and market design. The most attractive projects tend to be located in regions where renewable penetration is rising quickly, but grid flexibility remains constrained.

Revenue visibility is another critical factor. Merchant battery projects can generate attractive returns, but many investors and debt providers, continue to favor assets with contracted revenues. As markets mature, financing structures are becoming more sophisticated, reducing volatility and broadening the investor base.

Ripley: OK, let's switch gears and discuss another technology that's been gaining attention recently, but which has been a

challenging area for investors historically: green hydrogen. Should investors drop the skepticism?

Maguire: Few clean technologies have experienced a sharper sentiment swing than green hydrogen. This truly clean fuel is produced from water using renewable energy-powered electrolysis and generates no carbon by-products. Only a few years ago, it was promoted as a universal decarbonization solution.

Today, many investors have become far more selective – and that may ultimately strengthen the investment case.

According to the International Energy Agency and industry estimates, more than 200 low-emission hydrogen projects have now reached committed investment stage globally, but deployment is heavily concentrated in Europe, with additional clusters emerging in the U.S. and Australia – although overall progress remains slower than early projections because of high costs and infrastructure constraints.

The problem was never green hydrogen itself; it was unrealistic expectations. Hydrogen makes far less economic sense in passenger transport or domestic heating than originally suggested. Where it remains compelling is in hard-to-abate industrial sectors such as steel, chemicals, fertilizers and industrial heating. These are sectors where electrification simply doesn't solve everything.

Projects located close to industrial users are particularly attractive because they avoid costly transportation infrastructure. That is pushing investors toward more targeted opportunities rather than broad thematic bets.

Government policy also plays a significant role here. Green hydrogen today resembles offshore wind a decade ago: strategically important, but not yet fully cost-competitive.

That means subsidy frameworks remain essential. The U.K.'s hydrogen business model offers long-term support contracts that help provide revenue certainty for investors. Across Europe, policymakers are taking similar approaches as part of broader industrial decarbonization strategies. The expectation is that scale will eventually drive costs lower, much as it did in offshore wind.

Ripley: While we're on the topic of clean fuels, another one – biomethane – is also attracting more attention. Why is that?

Maguire: Biomethane, or "renewable natural gas" as it is more commonly referred to in the U.S. in its less refined state, is produced from food and other organic waste. It is often overlooked because it lacks the visibility of hydrogen or batteries. Yet it offers one major advantage: existing infrastructure.

Most European countries already have extensive gas pipeline networks. Rather than rebuilding entirely new systems, biomethane can be used as an alternative to natural gas without any changes to that transmission infrastructure – allowing cleaner gas to be injected into infrastructure that already exists. That has become increasingly attractive following Europe's energy security crisis.

Since 2021, the E.U. has installed 260 gigawatts of renewable capacity, while renewable energy's share of Europe's energy mix has risen from 10 percent to 25 percent since 2006.

But, as noted above, heating, heavy transport and industrial processes remain difficult to decarbonize. Biomethane offers a practical transition solution – and it can be used as a low-emission alternative fuel in transportation. That could be especially important at a time when there is renewed focus on reducing reliance on imported fossil fuels.

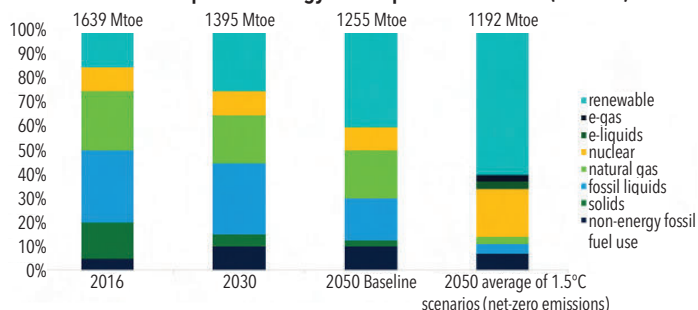
Ripley: What does all of this mean for infrastructure investors?

Maguire: What it all means is that the next phase of the energy transition will look very different from the last one – albeit with some familiar features and traditional infrastructure characteristics – and is likely to be adopted at varying speeds across different regions depending on policy, market design and energy needs.

The first phase was largely about building renewable generation. The second phase is about building flexibility, with new technologies transitioning from early-stage development risk to established, low-risk cashflows. Recent geopolitical events have reinforced this shift – and the policy imperatives that support it.

For investors, this broadens the opportunity set considerably, into battery storage, grid modernization, cleaner fuels, distributed energy systems and demand-side infrastructure. The energy and fuel mix will become more diverse as the reliance on fossil fuels declines.

Forecast changes to energy mix and total consumption
Gross inland consumption of energy in Europe: 2016 to 2050 (forecast)



Source: European Commission, "Going climate neutral by 2050" (2019)

The most attractive opportunities may no longer be the most visible ones. Wind and solar remain essential, but they are increasingly just the foundation. The infrastructure that enables them to work at scale may prove even more valuable in the decade ahead.

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Schroders Capital is the global private markets arm of Schroders Group, the UK-listed global investment manager with \$1 trillion in assets under management. Schroders Capital provides investors with access to a diversified range of investment strategies across private equity, private debt and credit alternatives, infrastructure, and real estate, with \$112 billion under management as of Dec. 31, 2025.

Schroders Greencoat is the specialist energy transition infrastructure manager of Schroders Capital. Founded as Greencoat Capital in 2009, it is one of the most established and largest pure-play renewables and energy transition managers globally.

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