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Structural Changes and Policy Shifts Reshaping Private Equity Opportunities in US Energy

Report from Law Firm Troutman Pepper Locke Identifies Top Five Private Equity Investment Trends in U.S. Energy Sector

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June 10, 2025 – With landmark deals and new federal policies reshaping the market, private equity investors are navigating a briskly evolving landscape rich with opportunity and complexity, a new report from law firm Troutman Pepper Locke has found.

The report, '[Power Shift: Top Five Private Equity Investment Trends in US Energy](#),' draws insights from leading industry specialists to highlight the private equity investment trends currently reshaping the sector.

The findings provide a picture of where capital is flowing — and why — as investors position themselves to benefit from emerging tailwinds in a sector increasingly defined by both resilience and reinvention.

Top five private equity investment trends in U.S. energy:

1. Data center growth requires many energy sources
2. Using gas to beat coal internationally
3. Trump boosts investor interest in oil industry
4. Solar and storage soar — but wind struggles
5. Nuclear maintenance attracts niche investors

The report notes that data centers are driving enormous electricity demand — rising from 40GW in early 2025 to a projected 81GW by 2028 — fueled by generative AI. Private equity is backing this growth with a broad strategy focused on scalable, reliable baseload solutions, blending renewables and traditional energy, aligning with the Trump administration's focus on reliability over climate subsidies. Investors also see a long-term trend of rising electricity use across sectors, not just from data centers, making 24/7 infrastructure a key investment theme.

Natural gas is increasingly considered vital to the global coal-to-clean transition, with strong export potential and domestic demand, especially in growing states like Texas. Investment is shifting toward midstream assets — storage, LNG, and processing — which offer resilience and relative political stability. Gas is also gaining backing from major tech firms seeking to balance electricity needs alongside renewables, reinforcing its role as a key transitional fuel.

Meanwhile, the oil sector is set to rebound amid political tailwinds. Despite market volatility, private equity sees long-term opportunity in U.S. oil under the Trump administration. Some investors are favoring infrastructure and service companies over drilling, betting on the sector's resilience and demand in developed markets. A shift away from stalled renewable projects is freeing up capital, benefiting oil logistics and infrastructure firms amid a changing policy landscape.

Solar and battery storage have been surging in the U.S., with more than 44GW added in 2024 alone, while wind installations were heading in the opposite direction, hitting a decade-low with less than 5GW installed. Private equity is moving in to support solar developers facing short-term capital gaps, seeing long-term upside. Solar's speed, scalability, and ease of deployment — especially when paired with storage — is making it more attractive than wind in many cases, which faces site, regulatory, and timeline hurdles. Tariffs and policy shifts are also boosting domestic solar manufacturing as a new investment focus.

Investments in nuclear energy are focusing on the longevity of existing assets, not new builds. Rather than funding construction, private equity is investing in services that support the 94 operating U.S. reactors. Firms are acquiring companies that provide engineering, maintenance, and repair services, essential for ensuring continuous and safe operations. The appeal lies in nuclear's emissions-free baseload power, which becomes more valuable as the reliance on and build-out of intermittent sources grows.

[Jennie Simmons](#), a partner in the Energy Practice Group at Troutman Pepper Locke, said: "As leading private equity investors have noted in this report, despite changes in policy and market volatility, the U.S. energy sector is surging. By focusing on some of the strategic considerations highlighted, private equity investors can effectively navigate challenges and capitalize on both immediate and long-term opportunities."

With rising energy demand and a pro-infrastructure administration, private equity is finding value across the energy spectrum — from fossil fuels and nuclear services to solar and gas exports. However, investment strategies and trends appear to be driven more by persistent demand than pure politics, with 2025 shaping up to be a turning point for U.S. energy investors.

To read the full report, [click here](#).

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