



Investing in Asia's Decarbonisation Economy: Where are the attractive returns in cleantech, energy transition and the circular economy?

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The decarbonisation economy has entered a major investment cycle. Global energy investment is expected to reach US\$3.4 trillion in 2026, with around US\$2.2 trillion directed towards clean energy — almost twice the amount going to fossil fuels. The transition is increasingly being driven not only by climate policy, but also by energy security, industrial policy, electrification and the rapidly improving economics of several clean technologies.

For investors, however, scale does not make every part of the opportunity attractive. Large capital flows can create intense competition, commoditisation and low returns alongside areas of rapid growth. The more relevant question is therefore where in the decarbonisation value chain investors can capture sustainable and defensible economics.

This is particularly relevant in Asia. The region combines the world's largest clean-technology manufacturing base with some of its fastest-growing energy markets, while many markets remain

fragmented and underpenetrated. For private equity and other private-market investors, this creates an opportunity to look beyond the headline technologies and identify the business models that can convert structural transition demand into recurring revenues, operating leverage and scalable platforms.

A large opportunity but different return pools

The decarbonisation economy is not a single investment category. It contains fundamentally different businesses with very different capital requirements, revenue characteristics and risk profiles.

The decarbonization opportunity contains fundamentally different return pools; investors need to select the business model not just the high-level theme

At one end are **infrastructure assets** such as renewable generation, electricity networks and utility-scale storage. These can provide long-duration, contracted or regulated revenues, but require substantial capital and are highly sensitive to financing costs, regulation and asset utilisation.

The second pool comprises **technology and equipment**: batteries, power electronics, energy-management systems, specialist industrial equipment and other technologies that enable electrification and efficiency. These businesses can grow rapidly and generate attractive margins, but investors face technology risk, manufacturing competition, price pressure and potentially short product cycles.

Exhibit 1: Three Return Pools in the Decarbonisation Economy

Return pool	Examples	Capital intensity	Revenue characteristics	Typical investor
Infrastructure assets	Renewables, grids, storage	High–very high	Long-term / contracted	Infrastructure
Technology & equipment	Batteries, power electronics, specialist equipment	Medium–high	Product + aftermarket	Growth / PE / strategic
Platforms & services	Energy services, industrial efficiency, environmental services, recycling, software	Low–medium	Recurring / service-based	PE / growth PE

The third pool consists of **platforms and services**: energy-as-a-service, industrial efficiency, environmental services, recycling, resource recovery and software. These businesses can require less

capital to scale and may generate recurring customer relationships. Fragmented markets can also create opportunities for consolidation and operational improvement.

Follow the value, not simply the technology

A common mistake in thematic investing is to start with the technology expected to grow fastest. A more useful approach is to follow the economics through the value chain.

Consider batteries. Value can accrue to the companies developing the underlying technology, manufacturers producing cells and systems, companies integrating them into energy infrastructure, service providers operating and maintaining those systems, software businesses optimising their utilisation, and eventually companies recovering valuable materials from batteries at end of life.

The investment opportunity often shifts downstream as technologies mature

As technologies mature, some of the economics can migrate downstream. Technology itself becomes more standardised, manufacturing becomes more competitive and margins are competed away, while installed bases create opportunities for aftermarket services, optimisation and replacement.

The same pattern can be seen across energy efficiency, distributed generation and industrial decarbonisation. The opportunity is therefore not necessarily to identify the technology that will grow most quickly, but to understand **where the customer relationship and economic value will ultimately reside.**

Exhibit 2: Where value accrues across the value chain

	Technology	Equipment	Infrastructure	Services	Software & data
Capital intensity	Medium	Medium-high	High	Low-medium	Low
Revenue visibility	Medium	Medium	High	High	High
Recurring revenue	Low-medium	Medium	High	High	High
Scalability	High	High	Medium	High	Very high
Consolidation potential	Medium	Medium	Low	High	Medium-high
Principal risk	Technology	Manufacturing / competition	Financing / regulation	Execution	Adoption / competition

Business model can matter more than technology

The distinction becomes even clearer when the underlying business models are compared. Owning a renewable asset is fundamentally different from developing projects, selling equipment to those projects, providing ongoing maintenance, or offering customers energy as a service. Each participates in the same transition but captures value in a different way.

Recurring revenues and lower capital intensity can shift a decarbonisation business towards PE-style economics

For private equity, recurring service revenues can be particularly interesting because they can combine visibility with opportunities for operational improvement and consolidation. A fragmented market of specialist contractors, for example, may offer opportunities to create a larger platform with broader geographic coverage, greater purchasing power and the ability to serve larger customers.

This is already visible in adjacent markets. HVAC services, for example, combine energy-efficiency drivers with recurring maintenance and replacement demand. Recent US transaction data show that HVAC services businesses have continued to attract significant M&A interest, although valuation multiples have moderated from the exceptionally strong 2021–23 market. The relevance for decarbonisation investors is less the precise multiple than the underlying model: **a large installed base, recurring service requirements and fragmentation can create a platform for consolidation.**

Exhibit 3: Business-model economics

Business model	Capital intensity	Revenue visibility	Margin potential	Scalability	Principal investor issue
Asset ownership	Very high	High	Medium	Medium	Financing / regulation
Project development	High	Medium	Medium	High	Development / execution
Energy-as-a-service	Medium	High	Medium-high	High	Customer acquisition / financing
Specialist equipment	Medium	Medium	Medium-high	High	Technology / competition
Recurring services	Low-medium	High	Medium-high	High	Fragmentation / execution
Circular platforms	Medium	Medium-high	Medium-high	High	Feedstock / commodity economics
Software & data	Low	High	High	Very high	Adoption / competition

Where can private equity play?

The distinction between infrastructure, technology and services becomes particularly important when viewed through a private-equity lens.

Large renewable projects, transmission networks and utility-scale storage can offer attractive long-duration investment characteristics, but they are capital intensive and generally require infrastructure-style financing. At the other end of the spectrum, battery technologies, power electronics and other specialist equipment can offer faster growth and greater operational upside, but investors are exposed to technology cycles, manufacturing competition and potentially rapid changes in cost curves.

***PE Sweet Spot:
Businesses that ride
the decarbonisation
economy without
having to finance the
underlying
infrastructure***

This creates an interesting space between the two: businesses that benefit from the growth of the decarbonisation economy without having to finance the underlying infrastructure themselves. These can include specialist equipment and aftermarket services, industrial energy-efficiency businesses, energy-as-a-service platforms, environmental services, recycling and resource-recovery businesses, and software that helps customers manage increasingly complex energy and resource systems.

The attraction is not simply that these markets are growing. It is that some combine several characteristics that are valuable to private equity: recurring or contracted revenues, fragmented customer or supplier bases, opportunities for operational improvement, relatively manageable capital requirements and the potential to build scale through consolidation.

The opportunity therefore often lies not in owning the transition asset itself, but in owning the business that helps customers **adopt, operate, maintain, optimise or recover value from it.**

Asia is not one investment market

Asia is particularly interesting because these different investment propositions coexist within a single region. China is already a clean-technology powerhouse; India combines rapid demand growth with localisation; Southeast Asia is becoming an important manufacturing and resource hub while its energy infrastructure remains underdeveloped; and Japan and South Korea bring mature industrial capabilities, sophisticated customers and strong demand

for energy security and decarbonisation. The investment implications are therefore different by market.

Exhibit 4: Asia's decarbonisation markets: different starting points, different investment propositions

Market	Starting point	Where the transition is creating demand	Investment characteristics	Potential areas of interest
China	World's largest clean-energy investor and manufacturing base; very large domestic market	Grid, storage, electrification, industrial decarbonisation, clean-tech supply chains	Scale, technology depth and manufacturing competitiveness; intense competition and policy influence	Specialist equipment, grid & storage technologies, industrial efficiency, services, recycling, selected technology platforms
India	Rapidly rising electricity demand; strong renewable deployment and localisation agenda	Renewables, transmission, storage, cooling, industrial electrification, domestic manufacturing	High growth and large market; financing, grid and off-taker constraints remain important	Distributed energy, grid-related services, efficiency, cooling, equipment, industrial services
Southeast Asia	Fast-growing energy demand; only ~3% of global energy investment despite 9% of population	Electrification, renewables, grids, storage, cooling, EVs and clean-energy manufacturing	Fragmented markets, different regulatory regimes and relatively high cost of capital	Energy-as-a-service, distributed energy, industrial efficiency, environmental services, recycling, regional platforms
Japan	Mature economy with very high energy-import dependence	Energy security, efficiency, renewables, nuclear, hydrogen, industrial decarbonisation	Sophisticated customers and industrial capabilities; mature domestic market	Industrial technology, efficiency, specialist equipment, services and corporate carve-outs
South Korea	Advanced industrial economy with high energy-import dependence	Semiconductors, batteries, data centres, industrial electrification, clean power	Strong industrial champions and technology capabilities; concentrated corporate landscape	Battery ecosystem, power electronics, industrial efficiency, specialised technology and services

The differences are material. China invested more than US\$625 billion in clean energy in 2024 and had already reached its 2030 wind and solar capacity target six years early. Its opportunity is therefore increasingly about the next layers of the ecosystem — grids, storage, smart infrastructure, industrial efficiency and services — rather than simply adding more generation.

India presents a different proposition. Electricity demand is rising rapidly and 83% of power-sector investment went into clean energy in 2024. Government policy is also encouraging domestic manufacturing of batteries, solar modules and other components. At the same time, transmission constraints, financing costs and the financial position of distribution companies remain relevant considerations.

Southeast Asia is earlier in the transition and consequently presents a different combination of growth and fragmentation. The region accounts for 9% of global population but only around 3% of global energy investment, while it is expected to contribute nearly 20% of global energy-demand growth to 2035 under current policy settings. Investment in grids, storage, electrification and efficiency therefore needs to expand substantially.

***Asia's diversity creates
different routes to
value creation in the
decarbonisation
economy***

Japan and South Korea are more mature markets, but that does not make the opportunity smaller. Both have very high energy-import dependence and already direct around 92% of energy investment towards clean energy. Rising electricity requirements from advanced industries, including semiconductors, batteries and data centres, are creating additional demand for reliable low-carbon power and efficiency solutions.

The important point is that Asia's diversity creates different routes to value creation. China may offer technology and manufacturing scale; India offers growth and localisation; Southeast Asia offers infrastructure gaps and fragmentation; and Japan and Korea offer sophisticated industrial ecosystems and customers. A pan-Asian investment strategy therefore needs to match the business model to the characteristics of each market rather than applying a common sector thesis.

PE sweet spot: structural growth plus fragmentation

This leads to a more useful way of looking across the opportunity set. Two dimensions are particularly important for private equity investors: capital intensity and the potential to build a scalable platform in a fragmented market. Together, they help distinguish between businesses that can support smaller, operationally focused buy-and-build strategies and larger platforms capable of absorbing substantial amounts of capital while generating relatively stable returns.

Exhibit 5: Decarbonisation opportunity meets PE economics

	Low Fragmentation/ Low Platform Opportunity	High Fragmentation/ High Platform Opportunity
High Capital Intensity	Capital-intensive infrastructure: Large-scale renewables, grids, utility-scale storage	Infrastructure platforms: Distributed energy platforms, selected infrastructure roll-ups
Low Capital Intensity	Technology/ specialist solutions: Technology champions, specialist equipment	Scalable services/ circular platforms: Energy services, industrial efficiency, environmental services, recycling

The matrix highlights two particularly interesting areas, although their relative attractiveness depends on the investor's strategy and fund size.

Smaller funds may find their best opportunities in fragmented, lower-capital-intensity services businesses

For smaller and mid-market funds, the bottom-right quadrant — **scalable services and circular platforms** — can be especially attractive. Businesses in industrial efficiency, energy services, environmental management and recycling are often fragmented, with opportunities to consolidate smaller operators, professionalise management, improve operating performance and expand geographically. These businesses may require less capital to establish a platform and can offer multiple avenues for value creation beyond market growth alone. The challenge is to ensure that consolidation produces genuine operating advantages rather than simply adding revenue through acquisitions.

For larger funds, the top-right quadrant — **infrastructure platform opportunities** — can offer a different but equally compelling proposition. Distributed energy, integrated energy services and selected infrastructure roll-ups can require substantial investment to build scale, but may also benefit from contracted or recurring revenues, long-lived customer relationships and relatively predictable demand. These characteristics can suit investors seeking to deploy larger amounts of capital while building businesses with more stable cash flows. The trade-off is greater exposure to financing costs, regulatory frameworks, asset utilisation and the execution risks of integrating infrastructure across multiple markets.

The distinction is not absolute. A successful services platform can grow to become a large institutional investment, while a distributed energy business can begin with a relatively small portfolio of assets.

Nor does greater capital intensity automatically mean lower risk or more stable returns. The investment case depends on the specific business model, contract structure, financing arrangements and ability to manage operational complexity.

The bottom-left quadrant — **technology and specialist solutions** — can also offer attractive opportunities, particularly where a business has defensible intellectual property, specialist engineering capabilities or a growing installed base that generates aftermarket revenues. However, investors need to assess carefully whether growth translates into durable margins, given the potential for technological change, manufacturing competition and price pressure.

Larger funds may be better positioned to build or acquire capital-intensive platforms with more predictable cash flows

The top-left quadrant — **capital-intensive infrastructure** — is more naturally suited to infrastructure investors when the opportunity centres on owning individual assets such as large-scale renewable generation, grids or utility-scale storage. Private equity may still participate, particularly where there is scope for development, operational improvement or consolidation, but the capital requirements and return drivers differ from those of a conventional services-led buy-and-build strategy.

The matrix therefore does not identify a single winning quadrant. Instead, it provides a framework for matching the investment opportunity to the fund's mandate. Smaller funds may find their best opportunities in fragmented, lower-capital-intensity services businesses; larger funds may be better positioned to build or acquire capital-intensive platforms with more predictable cash flows. In both cases, the underlying investment thesis must connect structural demand to defensible economics and a credible path to scale.

Two examples from Southeast Asia

Two recent examples illustrate how the investment opportunities identified above are emerging in practice.

- 1. Energy-as-a-service.** In 2025, PIDG and August Energy launched a platform covering the Philippines, Vietnam and Thailand, backed by an initial US\$30 million equity investment. The platform aims to deploy around 135 MW of decentralised renewable generation and storage, mobilising up to US\$100 million in blended capital. Rather than investing solely in individual energy assets, the model

combines distributed infrastructure with ongoing customer relationships. For investors, the opportunity lies in building a portfolio of solutions across customers and markets, although financing requirements and local regulatory conditions remain important determinants of returns.

2. **Environmental services and circularity.** In March 2026, Actis acquired a 90% stake in Singapore-based 800 Super, which operates across waste management, treatment, public cleaning and recycling. A majority of its revenues come from multi-year government contracts. Meanwhile, Circulate Capital's Asia Fund II reached a US\$220 million first close in 2026, targeting businesses in recycling and circular supply chains across India and Southeast Asia. Together, these examples illustrate two related opportunities: scaling established environmental-services businesses with relatively visible revenues, and financing the growth of businesses recovering value from waste streams and secondary materials.

The models differ, but both illustrate how investors can participate in the transition through businesses that solve concrete customer or resource-management problems, rather than relying solely on the economics of underlying technologies. Their attractiveness ultimately depends on execution, contract quality, capital requirements and the ability to expand beyond an initial market.

Conclusion: invest in the economics of the transition

Asia's decarbonisation economy offers opportunities across infrastructure, technology, equipment and services, but the most attractive entry point will depend on the investor's mandate and capabilities.

The common thread is not a particular technology or subsector. It is the ability to capture a defensible share of the economic value created by the transition. For investors, the question is not simply where decarbonisation spending will grow fastest, but which businesses can turn that spending into attractive, sustainable returns — at a scale and risk profile that fits their investment strategy.

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