Next Phase of Asia Infrastructure: The High Energy Convergence

Driven by AI demand and power constraints, the convergence of digital infrastructure and energy systems is shaping Asia's next investment cycle.

2026

Table of Contents

Executive Summary

Artificial intelligence is rapidly increasing global demand for compute, digital connectivity, and electricity. As AI models scale and digital workloads intensify, the physical infrastructure supporting the digital economy must expand alongside it. Across Asia Pacific, data center and AI infrastructure development is accelerating: compute density is rising, sovereign AI initiatives are expanding, and digital load growth in several markets is already outpacing grid modernization.

This is no longer only a technology story; it is increasingly an infrastructure story. AI is bringing together three historically independent systems:

- **Compute infrastructure** – GPUs and AI servers performing computational workloads
- **Digital infrastructure –** data centers and fiber networks hosting and connecting computing systems
- **Energy infrastructure –** power generation and electrical systems supplying electricity to the digital ecosystem

These layers must now scale in parallel.

However, they are not scaling at the pace or in the locations required. AI driven demand is colliding with structural infrastructure limitations, creating what we describe as the **High Energy Convergence, a phase in which digital infrastructure demand and energy system capacity are becoming structurally intertwined.** At this stage of the AI infrastructure build out, the ability to deliver power in the right locations is emerging as a key constraint shaping digital infrastructure expansion.

This dynamic is expected to drive a new infrastructure investment cycle. In capacity constrained markets, power availability is becoming a defining factor in where and how infrastructure can be developed.

Electricity demand from hyperscale data centers and AI workloads is growing faster than grid capacity and new power generation in many markets. As the largest market outside the United States for both compute and energy demand, Asia sits at the center of this shift.

At the same time, the energy transition environment has become more complex, with geopolitical uncertainty, policy shifts, and higher capital costs introducing volatility into energy markets. As returns come under greater scrutiny and subsidy frameworks evolve, the ability to deliver reliable, cost effective power, particularly in proximity to digital infrastructure, is becoming increasingly critical.

Meeting this demand will require a more integrated approach to infrastructure development.

Despite these challenges, Asia Pacific's underlying fundamentals remain strong.
The region is structurally underinvested relative to the United States and Europe, particularly across transmission, distribution, and digital infrastructure. Policy stability in markets such as Japan, Australia, South Korea, and selectively in Southeast Asia supports long term visibility. Structural GDP growth, industrial expansion, accelerating electrification, and continued capital reallocation toward Asia reinforce the region's infrastructure investment outlook.

Capital deployment across Asia's digital and energy infrastructure sectors remains active, as institutional investors continue to scale platforms serving hyperscale compute and energy demand.

“

AI-driven demand and power constraints are converging to reshape Asia's next infrastructure cycle. The ability to secure and deliver power at scale is fast becoming the defining constraint and opportunity across digital infrastructure.”

— James Chern,
Managing Partner & CIO of Seraya Partners

Large transactions across the region reflect sustained appetite for digital infrastructure platforms and renewable energy developers positioned to support this growth. Seraya's recent equity commitment to South Korean renewables developer G&B illustrates the type of platform investments emerging as investors seek to build long term infrastructure capacity.

In the sections that follow, we examine how AI driven demand is reshaping Asia's infrastructure landscape.

We first explore the scale of demand emerging from hyperscale and AI workloads, then assess the structural bottlenecks forming across compute, connectivity, and power systems. Finally, we examine how infrastructure platforms are evolving to address these constraints and where investors may capture value within this evolving digital and energy ecosystem.

G&B Infratech's Choonchun Solar Farm, South Korea

Asia's Transition to a High-Energy Economy

Historically, infrastructure demand largely tracked population growth and human consumption patterns. Increasingly, however, infrastructure demand is being driven by machines rather than people. Artificial intelligence represents the most powerful manifestation of this shift, with digital systems operating continuously and generating persistent demand for compute capacity, connectivity, and electricity.

This trend is particularly evident across the Asia-Pacific. Data center capacity is projected to grow from approximately 32 GW in 2025 to 57 GW by 2030[1], representing the fastest expansion of electricity-intensive infrastructure in the region's history. This growth is predominantly driven by a significant uptick in demand from AI workloads (see Figure 1).

Figure 1: **AI-Driven Power Demand Growth Far Exceeds Non-AI Demand**

Estimated CAGR (%) | 2024–2030
(U.S. absolute, Asia relative comparison)

Region	AI Demand	Non-AI Demand
US	50-70%	5-10%
Asia	~1.5-2.0x vs. U.S.	

AI-driven power demand is expected to grow significantly faster than non-AI demand, with Asia leading across both segments. This reflects the increasing concentration of AI infrastructure build-out and the acceleration of digital and energy demand across key markets in the region.

Source: Seraya analysis based on publicly available data

Across Southeast Asia, in markets and locations such as Johor, data center power demand could expand several-fold by 2035. Hyperscale operators are increasingly seeking 100 MW-plus campuses with firm, continuous power. This is no longer optional backup capacity, but a secured, always-on supply capable of supporting high-density AI training clusters.

This is structural demand, not cyclical expansion.

AI infrastructure must be supported by a multilayered physical system. Compute infrastructure, including GPUs and AI servers, performs the computational workload. Digital infrastructure, such as data centers and fiber networks, hosts and connects these systems. Energy infrastructure provides the electricity required to power them. These layers must scale together, creating an integrated infrastructure ecosystem rather than separate industry sectors.

In addition, AI training and inference workloads, hyperscale cloud growth, electrification across transport and industry, and sovereign compute initiatives are materially reshaping regional electricity demand. Japan's accelerating generative AI programs, Korea's industrial AI push, and Singapore's data localization requirements are reinforcing the need for domestic compute capacity. The global GPU-as-a-Service market is projected to exceed USD 135 billion by 2035[2], with Asia-Pacific leading as the fastest-growing region.

At the same time, AI workloads dramatically increase infrastructure intensity. Traditional data center racks typically consume 10-15 kW of power, whereas AI racks can require approximately 100 kW[3], nearly ten times greater power density. At the campus level, large AI facilities may require 100–300 MW of electricity capacity, placing significant pressure on local power systems and grid infrastructure.

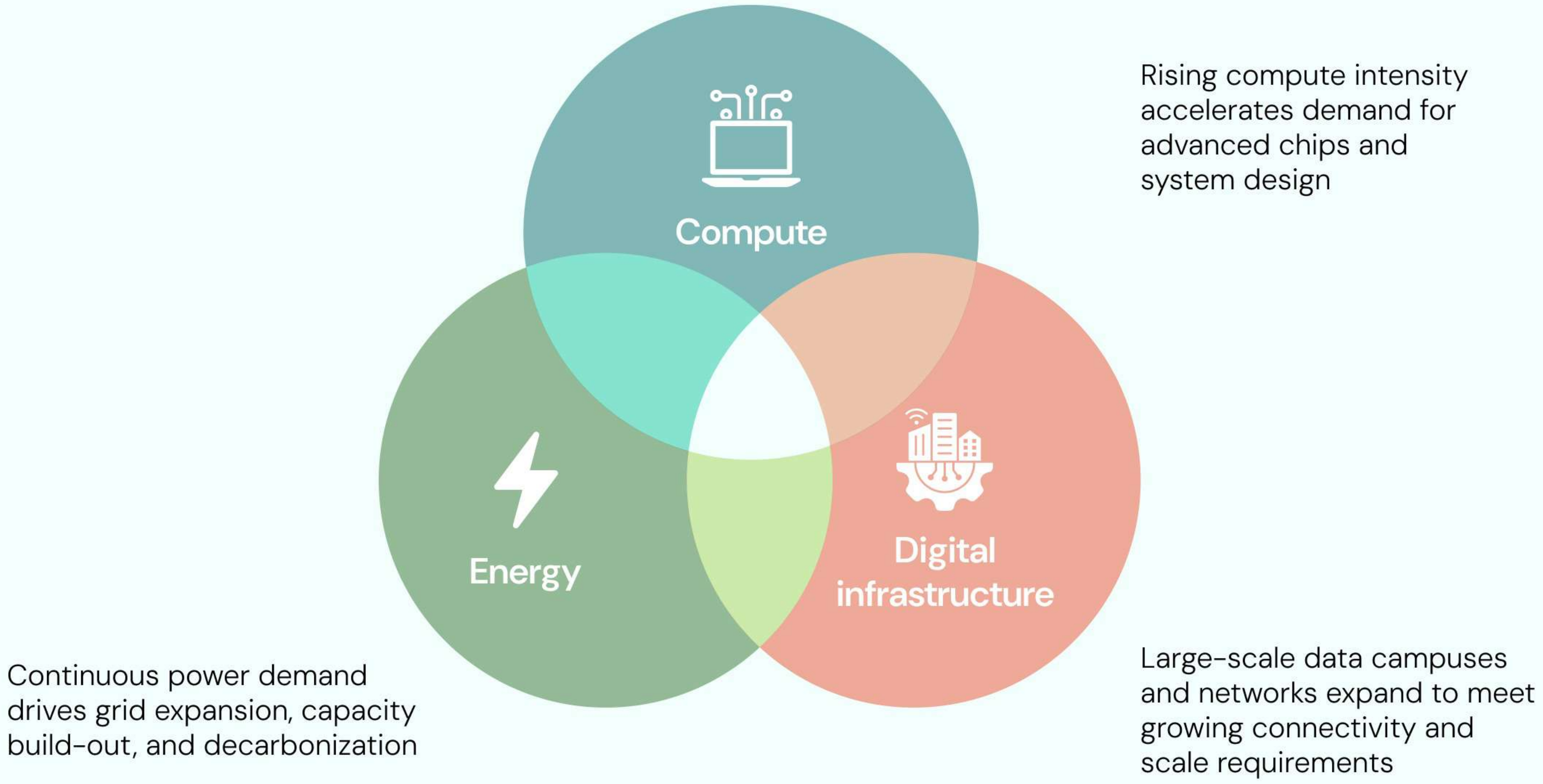
Yet Asia's energy markets remain fragmented and are progressing at different speeds. South Korea's renewable penetration remains in the low teens but is targeted to rise significantly by 2038 under supportive policy frameworks.

Australia has already surpassed 40%[4] renewable penetration, but now faces grid stability challenges, the need for long-duration storage, and the need for further transmission build-out. Across the region, electricity demand is rising rapidly, increasingly outpacing growth in the United States.

A structural mismatch is therefore emerging. AI-driven electricity demand is expanding rapidly, while energy infrastructure, including power generation, transmission networks, and grid upgrades, typically requires many years to build.

At the same time, the global transition toward renewable energy introduces additional variability, as solar and wind generation are intermittent. Together, these dynamics are creating simultaneous pressures from rising electricity demand, slow infrastructure expansion, and greater system variability.

Figure 2: **AI-Driven Demand Across Infrastructure Systems**
AI demand is simultaneously increasing requirements across compute, digital infrastructure, and energy systems.



As demand accelerates unevenly across jurisdictions, infrastructure systems are struggling to adapt at the pace required. Transmission upgrades lag load growth, and interconnection timelines extend multiple years in certain markets. In response, solutions, including distributed and behind-the-meter energy systems in constrained hubs, are emerging as necessary approaches to support growth while maintaining reliability and advancing decarbonization objectives.

Structural Bottlenecks in the AI Infrastructure System

As AI infrastructure scales rapidly across the region, the physical systems that support it are struggling to keep pace. Structural bottlenecks are emerging across compute, connectivity, and energy infrastructure.

These constraints are not solely the result of rising demand, but of where and how that demand is concentrated. AI workloads require large, continuous power in specific locations, often near major digital and population centers. Infrastructure systems were not originally designed for this level of localized intensity.

Compute density is rising, and power requirements are becoming more concentrated, location-specific, and continuous. This acceleration is colliding with infrastructure systems that were not built to support this growth. In several Asian markets, interconnection timelines now extend multiple years. Transmission upgrades lag demand. Generation capacity may exist nationally, yet not in proximity to digital demand centers.

In dense hubs such as Tokyo, Seoul, Singapore, and Johor, hyperscalers are competing for limited grid capacity allocations. Power in the wrong location has limited value. This dynamic is increasingly creating a "power race" for digital infrastructure development sites with secured grid access.

In the United States, hyperscalers have built extensive private dark fiber networks with high fiber-count cables to support large-scale AI data center interconnections. In contrast, many Asia-Pacific markets remain in a catch-up phase, relying more on dense, carrier-neutral interconnect hubs rather than widespread private network builds. Upgrading terrestrial and subsea connectivity is becoming critical to sustaining AI-era compute clusters.

These constraints are not temporary dislocations, but structural features of the next phase of digital infrastructure development. As AI demand scales, value will increasingly concentrate in platforms that can secure power at scale, enable high performance connectivity, and deliver integrated infrastructure solutions close to demand centers.

Integration of rooftop solar and building-integrated photovoltaics at Empyrion Digital's KR1 Gangnam Data Centre campus, South Korea

Figure 3: **Infrastructure Constraints and Platform Responses**

Together, these constraints are beginning to reshape infrastructure investment dynamics across Asia. As AI-driven demand accelerates, the ability to deliver reliable power, connectivity, and digital infrastructure in the right locations is becoming a key determinant of where capacity can be deployed and capital invested.

> *"As digital infrastructure scales, the constraint is no longer just capacity, but access to deliverable power. This is driving a structural shift toward a more integrated energy and digital solutions."*
>
> *— Kim Junwook,*
> *CEO of G&B Infratech*

Digital Infrastructure: Capturing Value Under Constraint

Within digital infrastructure, three segments are emerging as structurally advantaged under constraint: hyperscale data centers, GPU-as-a-Service platforms, and connectivity infrastructure.

1. Hyperscale and AI-Ready Data Centers

Hyperscale campuses are becoming increasingly prevalent across Asia-Pacific, driven by cloud expansion, sovereign AI initiatives, and localized large language model development in markets such as Japan, South Korea, Singapore, and Australia.

In major hubs such as Tokyo, Seoul, Singapore, and Johor, hyperscalers are increasingly competing for limited grid capacity and long interconnection timelines. Land without secured power is increasingly difficult to monetize.

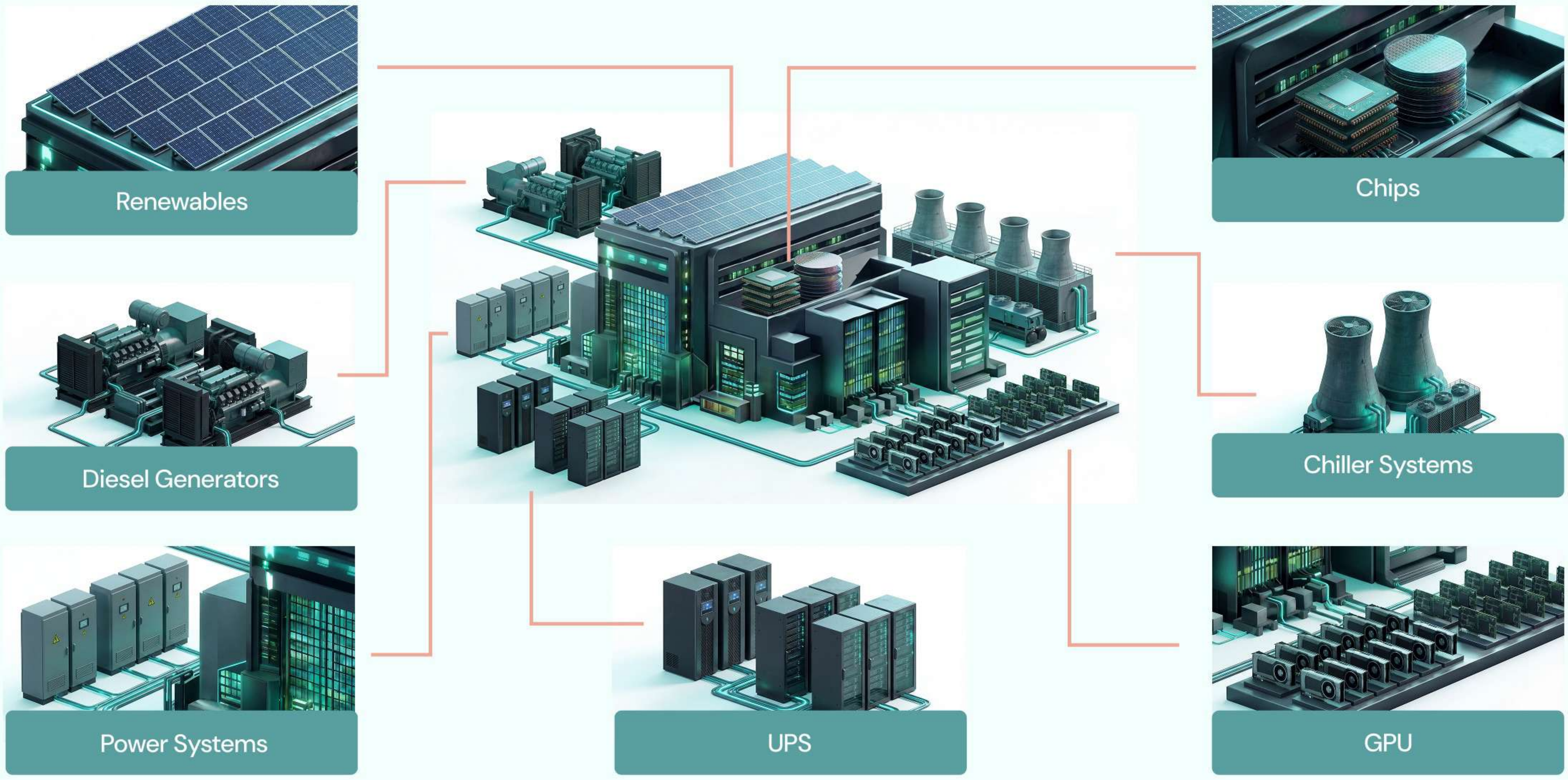
In constrained corridors such as Johor, Seoul, and Tokyo, hyperscale development is increasingly defined by the certainty of deliverable megawatts rather than projected tenant absorption.

This environment elevates the value of:

- Sites with confirmed and deliverable power allocation
- Campuses integrated with onsite generation and storage
- Platforms capable of accelerating permitting and grid integration

Aerial view of Empyrion Digital's KR1 Gangnam Data Centre campus, South Korea

Figure 4: **AI Data Centers as Integrated Infrastructure Systems**
AI data centers require tightly integrated power, cooling, and digital systems, creating multiple entry points for infrastructure investment across the stack.



AI Data Center Requirements:

Power: 100 MW

Grid: Dedicated 500 kV lines with 2–4 substations

Backup: 4–8 generators with 50–100 MWh storage

Compute: 20,000–100,000 GPUs

Land: 20–100 acres

Cooling: 2,000–10,000 tons; 30–40% of power usage

Water: 2.5–5 billion liters per year

Network: 20–40 km cabling; 100 Gbps+

2. GPU-as-a-Service and Localized Compute

AI infrastructure is also expanding beyond traditional hyperscale models.

GPU-as-a-Service markets in APAC is the fastest growing region globally and driven primarily by demand for access to advanced GPUs and greater flexibility in deploying compute resources.

These platforms are highly power-intensive and require a stable, high-density electricity supply. Their economics depend directly on reliability and cooling efficiency. Governments and enterprises are also increasingly prioritizing domestic AI capacity to support industrial policy and data sovereignty objectives.

Compute is no longer purely a digital asset class. It is deeply embedded within energy infrastructure.

3. Fiber and Connectivity Upgrades

As compute density rises, connectivity is becoming a critical constraint, particularly at the backbone level. Subsea cable infrastructure underpins Asia's digital economy, carrying approximately 95%[5] of international data traffic.

However, this infrastructure is not scaling in line with the new wave of demand driven by AI. Large-scale data center clusters are rapidly emerging across Southeast Asia, including approximately 2 GW in Johor[6], 1.4 GW in Singapore[7], and around 1 GW in Thailand[8], significantly increasing cross-border data flows.

At the same time, cable supply is struggling to keep pace. Intra-Asian bandwidth demand has been growing at approximately 35–40% CAGR[8] and is beginning to exceed available capacity in certain corridors, creating a widening supply–demand gap.

This mismatch between rapidly scaling compute clusters and constrained cross border connectivity is emerging as a key bottleneck in the development of AI infrastructure across the region.

Energy Infrastructure: Scaling Capacity for Digital Demand

On the energy side, Asia's transition opportunity remains immense. Approximately USD 2 trillion[9] in energy transition investment will be required by 2030 to stay on track with a net zero scenario in the region, reflecting both decarbonization objectives and structural demand growth.

However, in a constrained, repriced capital environment, deployment is becoming more selective, focusing on scalable capacity.

Behind-the-Meter and Distributed Energy Platforms

In markets where transmission upgrades lag digital demand, behind-the-meter solutions are emerging as structural responses.

Integrated distributed energy platforms, combining onsite solar generation, battery energy storage systems (BESS), and energy management software, allow data centers and industrial users to partially decouple from grid bottlenecks. Structured as Energy-as-a-Service or microgrid models, these platforms can reduce exposure to multi-year interconnection delays and enhance operational stability, while monetizing peak shaving, demand response, and grid services.

By integrating generation, storage, and efficiency measures under long-term service agreements, these models provide customers with reliable power without requiring upfront capital expenditure.

In constrained hubs, the ability to secure onsite or hybrid power pathways carries measurable economic value.

Selective Front-of-Meter Renewables

Front-of-meter renewables remain essential to Asia's decarbonization pathway, particularly in markets with strong policy support and credible corporate offtakers.

South Korea, for example, is advancing renewable penetration targets under a supportive policy framework. Disciplined development platforms aligned with long-term corporate PPAs can offer contracted visibility in higher-quality credit environments.

However, under higher capital costs and stricter underwriting, merchant exposure and transmission dependency are evaluated more conservatively. The shift is not away from renewables, but toward execution certainty and balance sheet quality.

Solar PV and battery storage asset in South Korea

The Rise of the High Energy Convergence

The most compelling opportunities no longer sit purely within digital or energy infrastructure independently, but increasingly at their intersection.

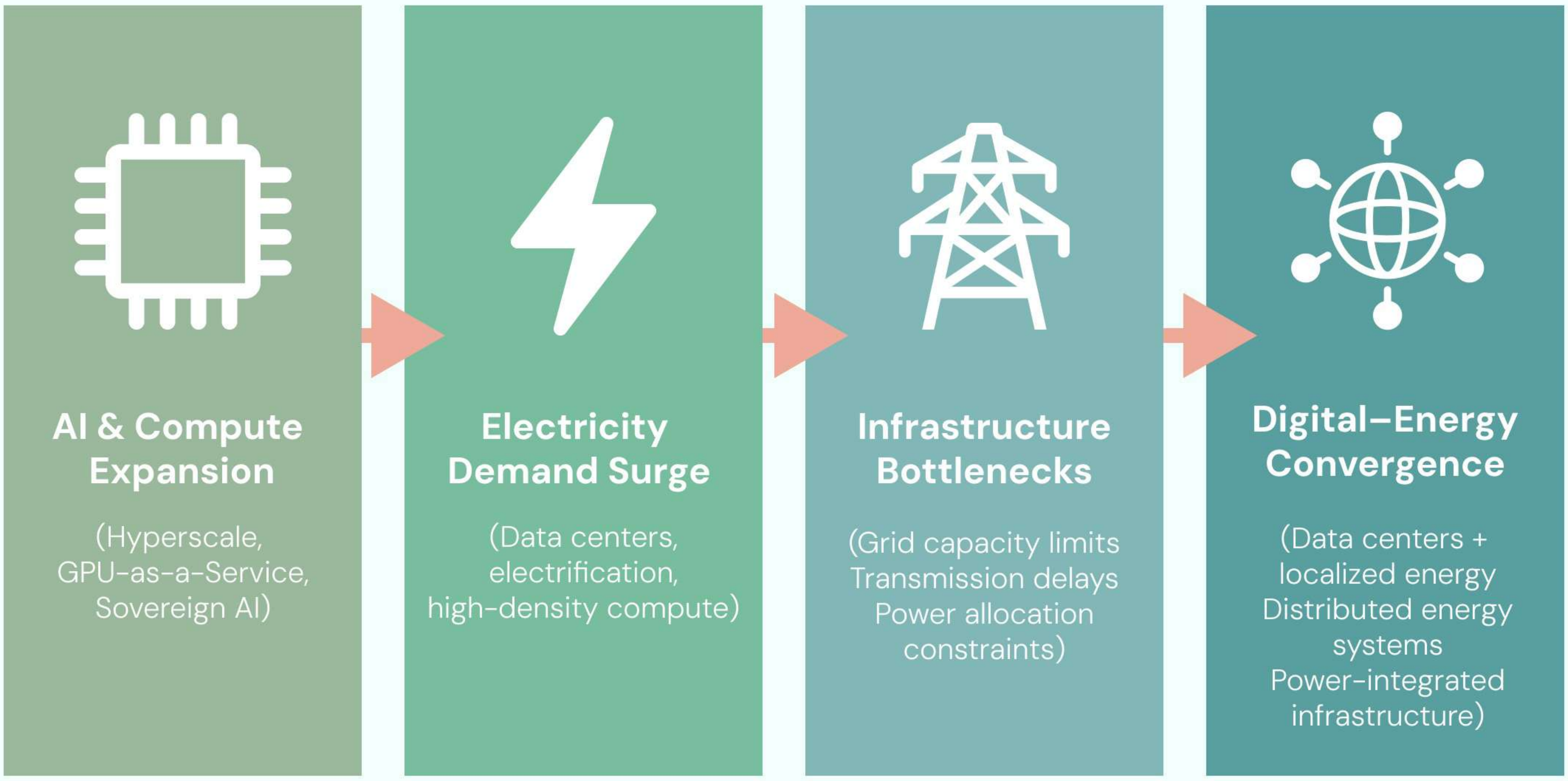
AI-driven data center growth, sovereign compute initiatives, and electrification trends are converging on a shared constraint: the availability of deliverable power. As compute density rises and workloads become more energy intensive, digital infrastructure development is becoming inseparable from energy system capacity. As a result, infrastructure platforms that can integrate compute demand with localized power solutions are emerging as the most defensible assets within the next generation of infrastructure investment.

This dynamic is reshaping how infrastructure platforms are developed. Data center operators are increasingly integrating energy procurement strategies directly into campus design, through secured grid allocations, long-term power purchase agreements, onsite generation, and battery storage systems. At the same time, energy infrastructure platforms are evolving to serve digital demand centers more directly, through distributed energy systems, microgrids, and hybrid power solutions located near compute clusters.

These integrated platforms occupy structurally advantaged positions in constrained markets. By combining digital demand with localized energy delivery, they reduce exposure to interconnection delays, transmission bottlenecks, and power price volatility.

In this cycle, scarcity is not measured by announced capacity pipelines. It is measured by deliverable megawatts in the right location, under reliable conditions.

Figure 5: **The High Energy Convergence: From AI Demand to Infrastructure Opportunity**



Positioning for Asia's Next Infrastructure Phase

The convergence of digital infrastructure demand and energy system capacity, which we describe as the High Energy Convergence, is expected to drive one of the largest infrastructure investment cycles in modern history. Artificial intelligence is reshaping global infrastructure demand, requiring compute infrastructure, connectivity networks, and power systems to scale together in ways that were previously more independent of one another.

Across Asia, this demand is increasingly colliding with structural system constraints. Rapid expansion of AI infrastructure, alongside broader electrification and digital localization, is accelerating electricity demand across the region. At the same time, grid bottlenecks, transmission limitations, and permitting delays are slowing the pace at which new capacity can be delivered.

As a result, Asia's infrastructure gap is increasingly defined not only by the need for capital, but by the ability to deliver capacity where demand is growing most rapidly.

Power availability, interconnection timelines, and execution complexity are becoming central considerations in infrastructure development. Platforms with secured capacity allocations, integrated power pathways, and distributed energy solutions located near demand centers may be better positioned to support the next phase of digital and energy infrastructure expansion.

These dynamics are particularly pronounced in Asia, where structural underinvestment across transmission, distribution, and next-generation digital infrastructure continues to constrain capacity growth. Combined with supportive policy frameworks in developed OECD markets and selected Southeast Asian markets such as Malaysia and Thailand, these conditions create opportunities for selective value capture. Representative digital and renewable platforms in Developed Asia have exhibited expected 10-year exit IRRs of approximately 13–15%, compared with 11–13% in the U.S. and 9–11% in Europe[10], reflecting supply-demand imbalances and faster demand growth in mid-market segments.

For institutional portfolios, these dynamics translate into a differentiated allocation opportunity within global infrastructure. Exposure to integrated digital–energy platforms in Asia-Pacific provides access to structural demand growth while capturing inefficiencies in fragmented, capacity-constrained markets.

Solar PV asset in South Korea

Figure 6: **Sector Prioritization Across Asia-Pacific**

In a capital-constrained environment, sector selection is increasingly critical. Platforms with secured power, contracted demand, and execution certainty command structural premiums. Across Asia-Pacific, digital infrastructure and select energy platforms rank highest on a risk-adjusted basis, while more capital-intensive or policy-dependent segments screen less favorably under current market conditions.

SECTOR	JAPAN	KOREA	AUSTRALIA	SINGAPORE	MALAYSIA
Data Centers	Most Attractive	Most Attractive	Most Attractive	Most Attractive	Most Attractive
Fiber / Connectivity	Most Attractive	Most Attractive	Most Attractive	Most Attractive	Selective
Energy Storage	Most Attractive	Selective	Most Attractive	Selective	Most Attractive
Renewables (Solar / Wind)	Selective	Most Attractive	Selective	Selective	Selective
Transport (Road / Rail / Airport)	Less Attractive	Less Attractive	Less Attractive	Less Attractive	Less Attractive

LEGEND

- Most Attractive - Strong risk-adjusted return profile
- Selective - Market-dependent, requires disciplined underwriting
- Less Attractive - Lower relative risk-adjusted return under current capital conditions

Source: Seraya Partners, Country and Sector Selection Framework

As digital infrastructure demand accelerates alongside rising electricity consumption, Asia's infrastructure systems are entering a phase in which compute capacity and energy availability are increasingly interdependent.

Platform-building strategies that combine sector specialization, local operating partnerships, and early positioning in capacity-constrained markets are becoming increasingly important for investors seeking to capture long-term infrastructure growth.

Seraya's investment strategy reflects this approach, focusing on building scalable platforms across digital infrastructure and energy transition sectors in Asia.

Key Takeaways

1. AI-driven demand is reshaping Asia's infrastructure equation.

The rapid acceleration of hyperscale and AI workloads is exposing structural grid constraints, altering regional power curves, and elevating the importance of location-specific, always-on electricity supply.

2. Deliverable capacity commands a structural premium.

Power availability, not generation volume alone, has become the central bottleneck. Assets that can secure and integrate localized power are advantaged in constrained markets.

3. Convergence defines the next cycle.

The combination of digital infrastructure and distributed energy, particularly behind-the-meter solutions, is emerging as one of the most attractive areas of Asia's infrastructure market. This is driving what we describe as high energy convergence, where power and compute are becoming increasingly interconnected.

4. Fragmentation creates opportunities for focused execution.

Asia's diverse regulatory and grid environments require localized expertise. In mid-market segments, disciplined, regionally embedded strategies are positioned to capture differentiated outcomes.

5. Infrastructure value is increasingly defined by deliverable capacity.

In capacity-constrained markets, the ability to secure power, connectivity, and permitting pathways is becoming a key determinant of where digital infrastructure can be deployed and where investment capital can be effectively scaled.

6. Platform-scale execution is becoming increasingly important.

As infrastructure systems become more interconnected, investors capable of integrating digital demand with localized energy and connectivity infrastructure may capture differentiated opportunities.

Endnotes

1. JLL, 2026 Global Data Center Outlook, January 6, 2026.
2. Aggregated estimates from market research providers including Global Insight Services and others (2024–2025)
3. JLL, 2026 Global Data Center Outlook, January 6, 2026.
4. Clean Energy Regulator (CER)
5. CSIS (Center for Strategic and International Studies), 2024.
6. JLL Malaysia, 2026.
7. Infocomm Media Development Authority (IMDA), cited in Data Center Dynamics, 2024.
8. TeleGeography, State of the Network 2025.
9. BloombergNEF (BNEF)
10. Seraya analysis of comparable transactions and industry benchmarks.

About Seraya Partners

Seraya Partners is the first Asia-based independent private equity fund for next-generation infrastructure investing, headquartered in Singapore. With US$2.5 billion in assets under management (AUM), Seraya Partners targets control-oriented, middle-market platform investments in next-generation infrastructure, focusing on the digital infrastructure and energy transition sectors, primarily within the developed Asia-Pacific region and Southeast Asia. Seraya has offices in Singapore, Kuala Lumpur, Seoul, and Tokyo.

www.serayapartners.com

SERAYA
PARTNERS