Strategic Data Centre Location Planning in Southeast Asia

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Data centres have evolved from conventional real estate developments into strategic infrastructure systems, comparable in complexity and long term impact to power generation or transport networks. Across Southeast Asia (SEA), rapid digitalisation, cloud adoption, artificial intelligence workloads, and data sovereignty requirements are driving unprecedented growth in hyperscale and colocation facilities. As a result, decisions about where data centres are located now carry implications that extend well beyond capital cost, shaping energy systems, regulatory risk, and sustainability outcomes for decades.

This growth has emerged alongside increasing constraints on power availability, carbon intensity, land use, and regulatory acceptance, particularly in mature markets such as Singapore and Malaysia. Location selection has therefore become a multidisciplinary infrastructure decision, integrating power systems planning, network performance, regulatory frameworks, environmental and social considerations, and long term economic risk. Traditional site selection approaches have focused primarily on land cost or proximity and are no longer sufficient for modern, energy intensive digital infrastructure.

1.0 General Principles of Data Centre Location

Unlike conventional industrial facilities, data centres benefit from a high degree of locational flexibility. They are not dependent on proximity to raw materials, large labour pools, or outbound logistics. Instead, their critical inputs are electric power, water, digital connectivity, and cooling, which can be engineered, optimised, and increasingly sourced across borders. This flexibility allows data centres to prioritise reliability, resilience, and regulatory certainty over traditional cost driven criteria.

The fundamental objective of a data centre location study is to minimise lifecycle cost and risk while maximising availability, scalability, and compliance over an operating horizon of 20 to 30 years.

Unlike traditional manufacturing plants, data centres:

- Consume very large and continuous electrical loads
- Depend on reliable and sustainable water resources where liquid based cooling technologies are deployed
- Have near zero tolerance for outage or latency
- Are subject to regulatory, environmental, and reputational scrutiny
- Are increasingly assessed against ESG and carbon reduction targets

Accordingly, location selection is governed by four overriding principles:

1. Security and reliability of power and water supply
2. Network connectivity and latency performance
3. Regulatory stability and policy transparency
4. Long term scalability under environmental and social constraints

Together, these principles define the minimum strategic and technical conditions for viable data centre development.

2.0 Area Concentration and Regional Clustering

The Asia Pacific data centre market continues to exhibit strongly clustered development patterns driven by rapid capacity expansion and sustained investment interest. According to Cushman & Wakefield's APAC Data Centre Update H1 2025, the region added nearly 2,300 MW to its development pipeline in the first half of 2025, bringing operational capacity to around 12.7 GW, with 3.2 GW under construction and a further 13.3 GW in planning stages. These figures underscore the ongoing momentum of data centre development across the region.

Cushman & Wakefield categorises markets within Asia Pacific into primary and secondary clusters based on the size of existing operational capacity and development activity.

Primary clusters include major global hubs such as Tokyo, Singapore, Sydney, Mumbai, and Hong Kong, which collectively attract the bulk of investment and maintain strong demand fundamentals.

Secondary clusters, including Johor (Malaysia), Jakarta (Indonesia), Bangkok (Thailand), Delhi (India), Taipei (Taiwan), Auckland (New Zealand), Manila (Philippines), and Ho Chi Minh City (Vietnam) are also experiencing growth, reflecting rising regional demand for cloud, enterprise, and hyperscale infrastructure.

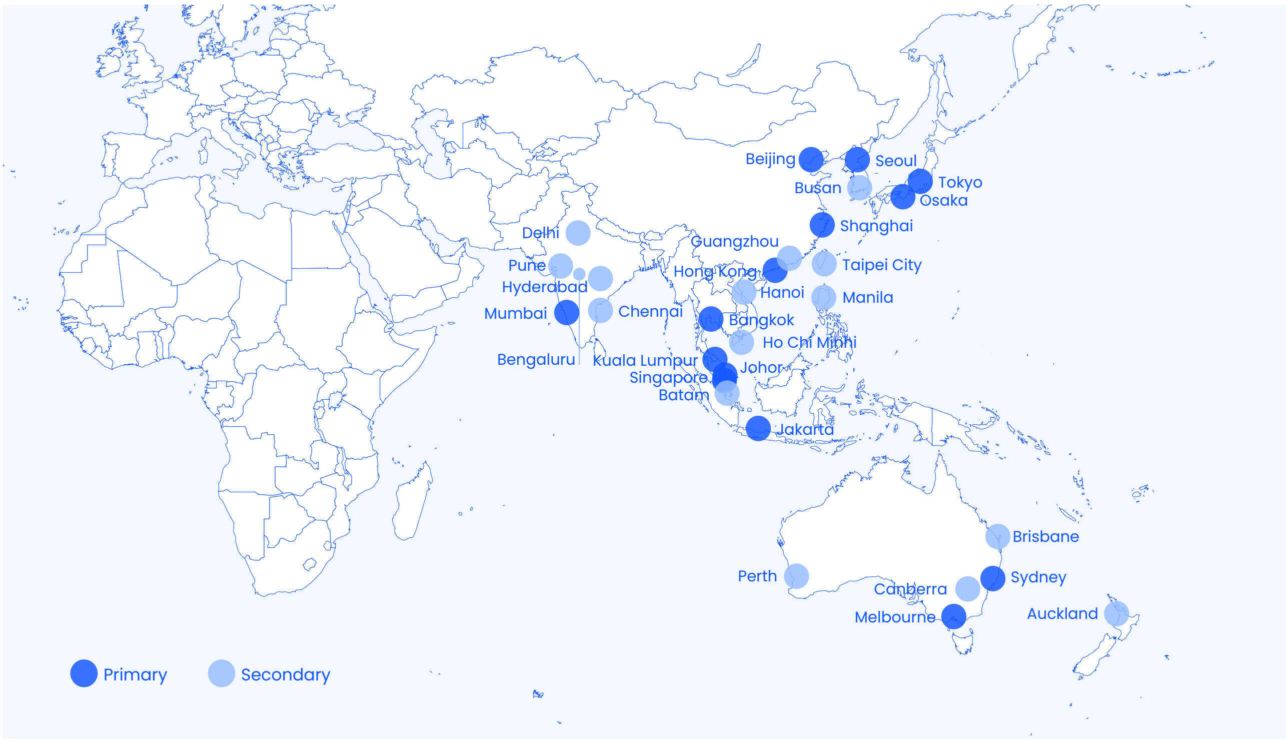

Figure 1. Asia Pacific Data Centre Markets | Data Source: Cushman & Wakefield – APAC Data Centre Update

APAC reflects both strong demand side drivers such as cloud adoption, artificial intelligence workloads, and enterprise digitalisation, and supply side enablers including local policy support, connectivity infrastructure, and strategic positioning within global data flows. The clustering of data centre capacity continues to influence investment decisions, network planning, and regional development strategies across the region.

2.1 Area Concentration in SEA

In Southeast Asia, data centre development exhibits a clear hub and satellite concentration pattern. Development activity is anchored around a limited number of core markets where power infrastructure, connectivity, and regulatory maturity converge, supported by adjacent satellite locations that provide scale and cost efficiency.

Singapore functions as the primary regional hub, underpinned by robust and reliable grid infrastructure, dense subsea fibre connectivity, strong institutional governance, and direct access to global markets. Despite land and power constraints, Singapore continues to attract high value, latency sensitive, and control plane workloads, reinforcing its role as the digital and operational centre of gravity for Southeast Asia.

The clusters that have emerged in Johor (Malaysia) and Batam (Indonesia) are a spill over from Singapore and benefit from greater land availability and scalable power capacity, enabling the deployment of large scale compute facilities while maintaining close physical and network proximity to Singapore.

This pattern of geographic concentration delivers several structural advantages:

- Infrastructure pooling, including shared substations, grid reinforcements, and fibre landing systems
- Reduced permitting and execution risk, supported by established development precedents and regulatory familiarity
- Economies of scale in construction, operations, and maintenance across clustered facilities
- Enhanced availability and resilience through geographic redundancy and cross border interconnection

Overall, the observed area concentration in Southeast Asia reflects a deliberate, infrastructure led development logic, shaped by power availability, network connectivity, regulatory certainty, and long term scalability requirements specific to digital infrastructure. The future growth in the region is expected to continue reinforcing this hub and satellite model, with Singapore at its core and neighbouring markets enabling expansion at scale.

3.0 Location Study Techniques and Analytical Framework

Effective data centre location planning is structured as a three level evaluation framework, progressing from regional screening to site specific assessment. This approach ensures that strategic constraints are addressed early, while detailed engineering and economic analysis is applied only to viable candidates.

3.1 Macro Level Analysis (Regional / Country Screening)

The macro level analysis establishes the strategic suitability of a country or region for data centre development. At this stage, the objective is to eliminate locations that fail to meet fundamental requirements related to political stability, energy market maturity, regulatory frameworks, and long term investment security.

Key considerations include national energy policy, grid reliability, access to renewable power, data sovereignty regulations, climate risk exposure, and geopolitical stability.

The outcome of the macro analysis is a shortlist of viable regions where data centre development is feasible in principle.

3.2 Meso Level Analysis (Metropolitan / Zone Screening)

The meso level analysis focuses on specific metropolitan areas, industrial corridors, or development zones within the shortlisted regions. The objective is to identify locations where infrastructure, land use, and institutional readiness align with data centre requirements.

This level evaluates grid connection capacity, proximity to substations and fibre routes, zoning compatibility, environmental constraints, cooling feasibility, and the experience of local authorities in managing data centre developments. Comparative assessment methods, such as weighted factor rating, are commonly applied.

The meso analysis results in the identification of preferred development zones, narrowing the search from regions to specific urban or industrial areas.

3.3 Micro Level Analysis (Site Selection)

The micro level analysis addresses individual site suitability within selected zones. At this stage, the focus shifts to site specific engineering feasibility, permitting certainty, constructability, and long term operational resilience.

Critical factor analysis is applied to confirm that mandatory requirements, such as power redundancy, flood resilience, access logistics, and expansion potential, are fully satisfied. Economic trade offs between alternative sites are assessed using lifecycle cost considerations rather than initial capital cost alone.

The outcome of the micro analysis is the selection of a preferred site and, where appropriate, one or more alternative sites to support resilience and development flexibility.

Together, the macro, meso, and micro analyses form a logical and defensible location study methodology, ensuring that data centre siting decisions are strategic, technically sound, and economically robust. This tiered approach reflects established plant location strategy while accommodating the unique power intensive and risk sensitive nature of modern data centres.

4.0 Main Requirements for Data Centre Location

In data centre location studies, requirements may be systematically divided into mandatory (critical) and conditional (optimisable) categories to ensure a structured, defensible decision making process. This distinction is driven by a risk based decision framework that acknowledges the high availability and resilience requirements of data centre operations.

Mandatory requirements are non negotiable conditions that determine whether a location is fundamentally suitable for data centre development. These requirements relate primarily to operational continuity, regulatory compliance, safety, and long term reliability.

Typical mandatory requirements include secure and redundant power supply, reliable network connectivity, regulatory and zoning compliance, sustainable water supply, environmental and climate resilience, and the ability to obtain permits within acceptable timeframes. Failure to satisfy any mandatory requirement results in immediate rejection of the location, regardless of cost or other advantages.

Conditional requirements, by contrast, influence the economic efficiency and operational optimisation of a data centre but do not determine basic feasibility.

These include land acquisition cost, construction cost, cooling efficiency, local taxation, incentives, and development logistics. Conditional requirements are assessed comparatively and are used to differentiate between locations that have already satisfied all mandatory criteria.

By separating requirements into mandatory and conditional categories, the location study ensures that risk and reliability are addressed before cost optimisation, producing location decisions that are resilient, transparent, and aligned with long term operational objectives.

Mandatory requirements	Conditional requirements
• High-reliability grid power with redundancy (N-1 or N-2)	• Land acquisition cost
• Multiple, diverse fiber connectivity routes	• Cooling technology and efficiency from water strategy
• Compliance with zoning, environmental, and data regulations	• Local taxation and incentives
• Flood-free and climate-resilient location*	• Flood-free and climate-resilient location*
• Sustainable water resources	• Secure long-term power sourcing strategy*
• Secure long-term power sourcing strategy*	

Table 1. Mandatory Location Requirements for Data Centre Development, these factors constitute pass/fail criteria. Failure to a single item renders the site unsuitable. Conditional or optimal requirement These factors influence cost and efficiency but do not determine feasibility.

* These factors act both as baseline screening criteria and as optimisation considerations during final site selection.

4.1 Critical Factor Analysis

Following the classification of requirements into mandatory and conditional categories, Critical Factor Analysis is applied as a decision-making filter to assess whether candidate locations meet essential thresholds related to operational continuity, regulatory compliance, and risk exposure. This analysis identifies factors whose failure would render a location unacceptable, regardless of potential economic or strategic advantages, and therefore functions as a pass/fail gate within the overall location selection process.

Critical factor analysis is central to data centre location decisions.

Critical factors
• Availability of sufficient grid capacity within acceptable distance
• Ability to procure low-carbon or imported renewable power
• Regulatory approval certainty within required timelines
• Exposure to flooding, seismic risk, or extreme weather

Table 2. Key critical factors in data centre location viability analysis

4.2 Tangible and Intangible Factors

Following the application of Critical Factor Analysis, location alternatives that satisfy all non-negotiable requirements are further evaluated using a combination of tangible and intangible factors.

Tangible factors represent quantifiable parameters, such as power cost, land value, construction cost, and operational efficiency, that can be directly incorporated into economic and lifecycle cost assessments.

Intangible factors, while less readily measurable, capture strategic, regulatory, institutional, and reputational considerations that materially influence the long term viability and acceptance of a data centre development.

Together, tangible and intangible factors provide a balanced basis for differentiating between otherwise feasible locations, ensuring that location selection reflects not only economic optimisation but also risk perception, governance quality, and long term strategic alignment.

Tangible factors	Intangible factors
Quantifiable and directly feed into economic models. • Power cost (USD/MWh) • Land and development cost • Construction cost per MW • Power usage effectiveness (PUE) _ • Network connection and lease costs	**Harder to quantify but often dominate final decisions.** • Regulatory predictability and institutional trust • Sovereignty and geopolitical risk • ESG perception and investor confidence • Public and stakeholder acceptance

Table 3. Quantifiable and Strategic Factors Influencing Data Centre Location

In Singapore, intangible factors frequently outweigh tangible cost disadvantages, reinforcing its role as a premium data centre hub.

5.0 Economic Analysis and Lifecycle Considerations

Economic evaluation of data centre locations increasingly extends beyond capital and operating cost comparisons to incorporate carbon related costs and policy driven compliance obligations. Given the long operational lifespan of data centres, exposure to carbon pricing mechanisms, renewable energy mandates, and sustainability reporting requirements can materially affect lifecycle cost and investment risk.

Country specific due diligence is essential to assess the stability and credibility of decarbonisation policies, the maturity of renewable energy markets, and the practical availability of low carbon power at scale. Locations with clear policy frameworks, bankable green power procurement mechanisms, and reliable renewable energy supply offer greater cost predictability and reduced long term risk, even where initial power tariffs may be higher. Conversely, locations with limited renewable energy availability or uncertain policy implementation may present lower short term costs but higher exposure to future regulatory, reputational, and transition risks.

Incorporating carbon related considerations into economic evaluation therefore ensures that location selection reflects true lifecycle cost and risk, rather than short term cost advantages, and aligns data centre developments with evolving national policies, investor expectations, and long term sustainability objectives.

Community and site considerations form an essential component of data centre location evaluation, as data centres increasingly operate within highly visible social, environmental, and regulatory contexts. Beyond technical feasibility and economic performance, long term project viability depends on alignment with community expectations, socio economic objectives, and site-specific physical constraints.

6.0 Community and Socio Economic Considerations

Community and socioeconomic considerations ensure that a data centre location is not only technically and economically sound, but also socially acceptable and aligned with long term development objectives. Addressing these factors early reduces permitting risk, enhances stakeholder confidence, and supports sustainable infrastructure deployment.

Although data centres are not labour intensive during operations, they generate significant employment during construction and create indirect jobs across engineering, maintenance, security, logistics, and supporting services. The quality of employment, opportunities for workforce upskilling, and alignment with national or regional economic development strategies are therefore important evaluation criteria.

Socioeconomic assessment also examines how the project contributes to digital infrastructure resilience, supports local industry, and integrates with broader economic transformation initiatives such as digitalisation and green growth.

Community acceptance is closely linked to perceptions of electricity and water use, environmental responsibility, and contribution to public sustainability goals. In jurisdictions with strong governance frameworks, social license to operate depends on demonstrable energy efficiency, low carbon sourcing strategies, and transparent stakeholder engagement.

Effective engagement with local authorities, communities, and industry stakeholders is therefore essential to mitigate reputational and regulatory risks and to ensure long term compatibility between the data centre and its host environment.

7.0 Decarbonised Power and the Future of Data Centres

Energy has become a defining determinant in modern data centre development, shifting from a purely operational input to a strategic driver of location, investment, and long term competitiveness. Access to reliable and scalable green electrons through renewable procurement, cross border power imports, and corporate power purchase agreements, is increasingly central to meeting ESG commitments and carbon reduction targets.

Hybrid power supply architectures that integrate grid power, on site renewables, battery energy storage systems, and resilient backup generation are emerging as standard practice to enhance reliability and flexibility. At the same time, new energy technologies such as Solid Oxide Fuel Cells (SOFC), hydrogen-based systems, advanced storage solutions, and Small Modular Reactors (SMRs) are being explored as future pathways for delivering low carbon, high availability power. As computing intensity grows and sustainability scrutiny deepens, energy strategy has evolved into the primary enabler of resilient, scalable, and environmentally responsible data centre infrastructure.

8.0 Role of Integrated Consultancy in Data Centre Location Strategy

In this context, data centre location selection has evolved into a multidisciplinary infrastructure decision, requiring the integration of power systems planning, regulatory and policy assessment, environmental and social considerations, network connectivity, and long term economic evaluation.

Application of a structured, risk based location evaluation framework to modern data centres demonstrates that current development patterns across Southeast Asia are deliberate and structurally driven, rather than accidental or opportunistic. These patterns reflect the interaction between power availability, regulatory maturity, network connectivity, and long term risk management considerations.

Within this regional context, Singapore differentiates itself through strong intangible advantages, including regulatory certainty, institutional governance, and its role as a regional hub for network connectivity and latency sensitive workloads.

Johor and Batam play a complementary role by offering cost efficiency, land availability, and scalable power capacity, enabling the deployment of large scale compute workloads while maintaining close functional integration with Singapore. Cross border power and fibre infrastructure are also emerging as primary enablers of data centre location strategies, allowing operational integration across jurisdictions and redefining traditional notions of proximity and site dependence.

Modern data centre location should therefore be understood as a power centric, risk optimised infrastructure decision, where energy systems, resilience, and long term policy alignment outweigh conventional real estate considerations. This approach requires integrated planning approaches that bridge energy, digital infrastructure, and regulatory domains in order to support sustainable and resilient data centre development across the region.

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