Goldman Sachs Research

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ASEAN DATA CENTER PRIMER

Mapping the ecosystem

Driven by durable sovereign/enterprise demand, cloud migration, and AI expansion, ASEAN is emerging as one of the key data center hotspots globally. Our primer evaluates six key regional hubs – Johor, Bangkok, Jakarta, Singapore, Kuala Lumpur, and Batam – and quantifies the capacity opportunity the region can capture using a combined bottom-up and top-down approach. Furthermore, we profile the operators and enablers that dictate project execution, while assessing critical growth bottlenecks such as power and cooling.

Sizing the opportunity. Drawing on our proprietary model, we expect live capacity across the six hubs to grow from c.3GW today to 13GW by 2030E in our base case (a 33% 5-year CAGR). We identify Johor as the largest hub at one-third of regional capacity by 2030E, with Bangkok and Batam as the fastest compounders. Singapore remains the premium connectivity and enterprise anchor, but structural land and power caps may limit growth.

Mapping the ecosystem of operators and enablers. ASEAN is contested by US/Chinese hyperscalers that provide both self-build supply and lease demand, and regional players such as Singtel's Nxera with footprint across the region, as well as the lower-cost Chinese data center operators that are aggressively expanding capacity vs. global colocation platforms. Listed real estate beneficiaries are KDCREIT with 2/3rd exposure in Singapore, Keppel with an integrated digital infrastructure ecosystem, and WHA as provider of land and power. We present the regional data center operators in terms of capacity scale, regional exposure, and business models, which could be indicative of their wallet share potential, and set them alongside the upstream enablers that gate delivery.

Deliverable power, not secured power. The binding power bottleneck varies by market in terms of fuel availability, generation economics, transmission capacity, grid stability, etc. As signed PPAs increasingly represent intent rather than energized capacity, execution on power delivery – including willingness to co-fund infrastructure – is critical to capacity expansion. **Cooling equally strategic in a tropical region.** Infrastructure strategy is shifting toward optimizing the trade-offs between electricity, water, and cooling. The true footprint increasingly depends on both cooling architecture and generation mix, as more power-intensive cooling may shift water consumption upstream to power generation.

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ASEAN Data Center Ecosystem

1. Enabling inputs

POWER & LAND

EGAT, MEA, PEA
Keppel Ltd (KPLM.SI)
Medco Power
PLN
Sarawak Energy
Sembcorp (SCIL.SI)
SP Group
TNB (TNB.KL)
WHA Corp. (WHA.BK)

CONNECTIVITY / CABLE

Keppel Ltd (KPLM.SI)
Moratelindo
Singtel (STEL.SI)
Telin
Telkom (TLKM.JK)



M&E, COOLING

ABB (ABBN.S)
Eaton (ETN)
Envicool Technology (002837.SZ)
Faratronic (600563.SS)
Hongfa Technology (600885.SS)
Huaming (002270.SZ)
Kehua (002335.SZ)
Kstar Science & Tech (002518.SZ)
Schneider Electric (SCHN.PA)
Sieyuan Electric (002028.SZ)
Vertiv (VRT)
Weichai Power (000338.SZ, 2338.HK)
Yingliu (603308.SS)

2. DC Operators

PUBLIC

Digital Realty (DLR, DIGT.SI)
Equinix (EQIX)
Indosat (ISAT.JK)
Keppel DC REIT (KEPE.SI)
Keppel Ltd. (KPLM.SI)
NeutraDC (TLKM.JK)
NextDC (NXT.AX)
NTT (9432.T, NTTD.SI)
Nxera (STEL.SI)
Range Intelligent (300442.SZ)
Sinnet (300383.SZ)
True Corp. (TRUE.BK)
VNET (VNET)

PRIVATE

AirTrunk
BDx Data Centers
Bridge Data Centers
DayOne
Digital Edge
Empyrion Digital
Princeton Digital Group
STT GDT

3. Demand

HYPERSCALERS

Alibaba (BABA, 9988.HK)
AWS (AMZN)
Azure (MSFT)
ByteDance
Google Cloud (GOOGL)
Meta (META)
Oracle (ORCL)
Tencent (0700.HK)

NEOCLOUDS

Bitdeer (BTDR)
CoreWeave (CRWV)
Crusoe
SIAM AI Cloud

ENTERPRISE & GOV

Domestic tech
Financial service institutions
Government

List is not exhaustive

Source: Company data, Data compiled by Goldman Sachs Global Investment Research

Exhibit 1: GS covered stocks with exposure to the theme

Company	Ticker	Analyst	Rating	FX	Last Price	Target Price	+/- Side	Mkt Cap (US$mn)
Power & Land								
Keppel Ltd	KPLM.SI	Xuan Tan, CFA	**Buy**	SGD	11.35	13.61	19.9%	15,743
Sembcorp	SCIL.SI	Nikhil Bhandari	Not Rated	SGD	5.99			8,406
WHA Corp.	WHA.BK	Xuan Tan, CFA	**Sell**	THB	4.84	3.80	-21.5%	2,213
Connectivity / Cable								
Keppel Ltd	KPLM.SI	Xuan Tan, CFA	**Buy**	SGD	11.35	13.61	19.9%	15,743
Singtel	STEL.SI	Pang Vittayaamnuaykoon	Coverage Suspended	SGD	4.42			56,851
Telkom	TLKM.JK	Pang Vittayaamnuaykoon	Coverage Suspended	IDR	2,620.00			14,524
M&E, Cooling								
ABB	ABBN.S	Daniela Costa	Neutral	USD	78.18	82.00	4.9%	209,526
Eaton	ETN	Joe Ritchie	Not Rated	USD	408.67			159,177
Envicool Technology	002837.SZ	Jacqueline Du	**Buy**	CNY	54.75	84.62	54.5%	10,347
Faratronic	600563.SS	Jacqueline Du	**Buy**	CNY	126.27	154.80	22.6%	4,224
Hongfa Technology	600885.SS	Jacqueline Du	**Buy**	CNY	34.06	45.50	33.6%	7,840
Huaming	002270.SZ	Zhou Li	**Buy**	CNY	19.52	23.90	22.4%	2,581
Kehua	002335.SZ	Hao Chen	Neutral	CNY	29.72	35.00	17.8%	3,303
Kstar Science & Technology	002518.SZ	Hao Chen	**Buy**	CNY	34.45	67.00	94.5%	2,983
Schneider Electric	SCHN.PA	Daniela Costa	**Buy**	EUR	291.80	352.00	20.6%	190,684
Sieyuan Electric	002028.SZ	Zhou Li	**Buy**	CNY	175.20	204.50	16.7%	20,166
Vertiv	VRT	Mark Delaney, CFA	**Buy**	USD	254.97	301.00	18.1%	100,139
Weichai Power	000338.SZ	Nick Zheng, CFA	**Buy**	CNY	26.99	48.00	77.8%	35,030
Yingliu	603308.SS	Zhou Li	**Buy**	CNY	42.60	82.40	93.4%	4,302
DC operators								
Digital Realty	DLR	Michael Ng, CFA	**Buy**	USD	188.55	223.00	18.3%	68,000
Equinix	EQIX	Michael Ng, CFA	Neutral	USD	1,055.20	1,060.00	0.5%	104,608
GDS Holdings	GDS	Timothy Zhao	**Buy**	CNY	31.75	49.00	54.3%	6,172
Keppel Data Center	KPLM.SI	Xuan Tan, CFA	**Buy**	SGD	11.35	13.61	19.9%	15,743
Keppel DC REIT	KEPE.SI	Xuan Tan, CFA	**Buy**	SGD	2.26	2.93	29.8%	4,341
NeutraDC (Telkom)	TLKM.JK	Pang Vittayaamnuaykoon	Coverage Suspended	IDR	2,620.00			14,524
NTT	9432.T	Chikai Tanaka, CFA	**Buy**	JPY	166.50	179.00	7.5%	85,160
Nxera (Singtel)	STEL.SI	Pang Vittayaamnuaykoon	Coverage Suspended	SGD	4.42			56,851
Range Intelligent	300442.SZ	Timothy Zhao	**Buy**	CNY	62.45	117.00	87.3%	15,180
Sinnet	300383.SZ	Timothy Zhao	**Sell**	CNY	12.12	12.40	2.3%	3,240
True Corp.	TRUE.BK	Pang Vittayaamnuaykoon	Coverage Suspended	THB	13.10			13,846
VNET	VNET	Timothy Zhao	**Buy**	CNY	6.47	14.00	116.4%	1,774
Demand								
Alibaba	BABA	Ronald Keung, CFA	**Buy**	CNY	118.47	186.00	57.0%	284,336
AWS (Amazon)	AMZN	Eric Sheridan	**Buy**	USD	262.07	375.00	43.1%	2,857,349
Azure (Microsoft)	MSFT	Gabriela Borges, CFA	**Buy**	USD	487.31	640.00	31.3%	3,640,895
CoreWeave	CRWV	Gabriela Borges, CFA	Neutral	USD	86.25	139.00	61.2%	52,454
Google Cloud (Alphabet)	GOOGL	Eric Sheridan	**Buy**	USD	348.06	435.00	25.0%	4,284,271
Meta	META	Eric Sheridan	**Buy**	USD	559.02	725.00	29.7%	1,434,445
Oracle	ORCL	Gabriela Borges, CFA	**Buy**	USD	142.45	239.00	67.8%	430,674
Tencent	0700.HK	Ronald Keung, CFA	**Buy**	CNY	440.00	670.00	52.3%	544,340

Target prices are on a 12-month timeframe. Note MSFT is on the Americas Conviction List. Companies in brackets indicate parent company.

Source: Bloomberg, Company data, Goldman Sachs Global Investment Research

1. How large is the opportunity?

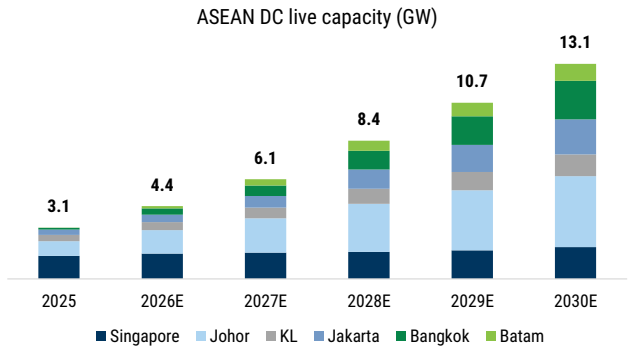
13GW live capacity by 2030E in our base case

Despite its small base (ASEAN live capacity across 6 key hubs at c.3GW as of 2025 vs. US/China at c.30GW per GSe), ASEAN is becoming **one of the fastest-growing data center markets globally**. We expect the emergence of multiple 1GW+ hubs in the coming years vs. in only Singapore today.

We expect ASEAN live capacity to grow 4x from 3GW in 2025 to 13GW by 2030E in our base case (33% 5Y CAGR), or **7x to 21GW in our bull case** (47% 5Y CAGR). The base-to-bull gap widens from 18% in 2026E to 61% by 2030E, as unannounced future capacity accumulates in our bull case. We see Johor poised to become the largest hub by 2030E (33% mix) and the principal driver of growth with Singapore the slowest-growing (7% CAGR), given its structural supply cap. We expect the fastest growth rates in Bangkok and Batam, but these are off very low 2025 bases (113MW and 8MW respectively). ASEAN reaches **10%/25% of the US/China capacity by 2030E** (vs. 6%/11% in 2025) on our estimates.

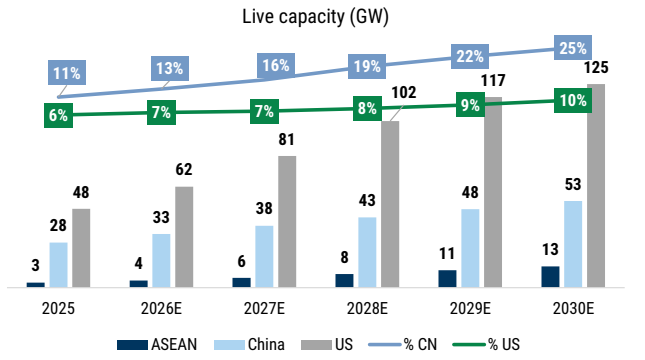
Converting our ASEAN live capacity forecast, with IT load MW converted to TWh at 1.45 PUE (our GS SUSTAIN team's estimate for APAC) and 24h x 365d, assuming 70% blended utilization (in line with our US Power Commodities team's assumption) to estimate **DC share of overall power consumption**: this implies **ASEAN is closer to China today at c.4% but is expected to converge closer to the US, reaching c.12% by 2030E**. Our forecast is in line with Ember's (3rd party) estimate of DC power consumption – Exhibit 4.

Exhibit 2: We expect ASEAN live capacity to grow 4x in the next 5y



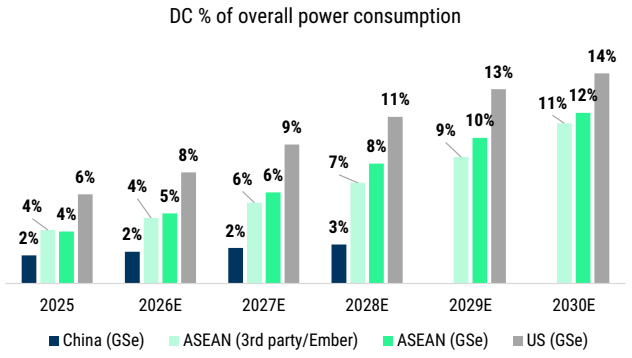
Source: Goldman Sachs Global Investment Research, Cushman & Wakefield, DC Byte, JLL

Exhibit 3: Reaching 10%/25% of the US/China by 2030E



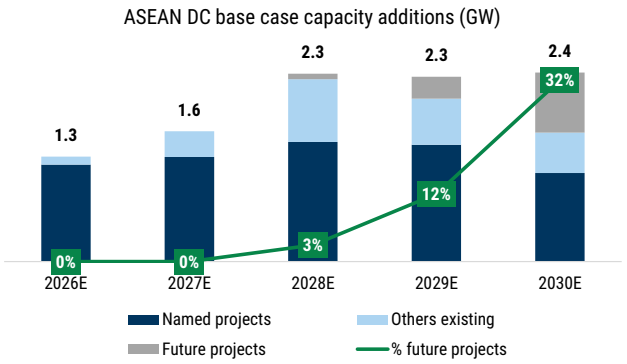
Source: Goldman Sachs Global Investment Research, Cushman & Wakefield, DC Byte, JLL

Exhibit 4: ASEAN DC power consumption close to China today, but to converge closer to the US



Source: Ember, Goldman Sachs Global Investment Research

Exhibit 5: Near-term additions from existing supply; unannounced capacity flows into outer years



Source: Goldman Sachs Global Investment Research

Exhibit 6: ASEAN within the global context



Source: Cushman & Wakefield, DC Byte, JLL, IMDA, Goldman Sachs Global Investment Research

Forecast methodology

We size **live (operational) data center capacity measured in IT load (MW)** across six ASEAN hubs: Singapore, Johor, Kuala Lumpur, Bangkok, Jakarta and Batam (refer to appendix for details on geographical scope). We take 3rd party supply data as the 2025 base year, with forward capacity additions for each hub consisting of 3 layers:

1. **Named projects (bottom-up)**: project-level data compiled from company disclosures, regulatory approvals and media reports. We take the total announced target MW spread using target RFS (ready for service) date if disclosed / build curve assumptions - applying a longer, more back-weighted curve to larger (100MW+) campuses to reflect the slower phased fill of multi-phase hyperscale sites, and a

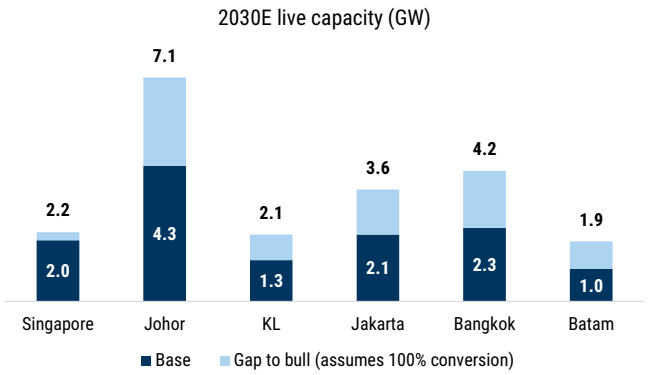
shorter curve to smaller facilities.

2. **Other existing supply**: **top-down anchor** (varies depending on disclosure availability for each hub) **subtracting named projects**. This second layer captures capacity not visible in the bottom-up approach, e.g. hyperscaler self-builds and projects without public announcements.
    - For Singapore, where supply is strictly rationed, we use government targets as the anchor: DC-CFA 2 (200MW total allocation announced on 21 Aug 2026) and the government's Jurong DC Park long-term plan (700MW).
    - For Bangkok, we use the BOI investment application value disclosure between 2024-26, converted at US$7.1mn/MW build cost (capacity-weighted average from named projects), to derive the implied existing supply.
    - For the other hubs, we use 3P total supply data in our calculations - we note differing definitions across providers, with DC Byte being the widest (live + under construction + committed + early stage), C&W and JLL narrower (live + UC + planned).
    - For Malaysia (Johor + KL), we compare our live capacity outputs against utility disclosures as additional reference. TNB in its 1Q26 briefing disclosed secured DC secured maximum demand (contracted peak entitlement across all signed supply agreements) at c.8.3GW which roughly imply c.5.7GW IT load (assuming 1.45 PUE, in line with our GS SUSTAIN team's estimate for APAC - we note MIDA requires PUE of 1.4/1.6 for new hyperscale/colocation facilities). For context, in a prior interview, TNB mentioned that it expects to deliver up to c.5GW DC demand by 2035. This compares against our 5.6GW live capacity (supply) forecast for Johor + KL combined in 2030E.
3. **Future projects (not yet announced)**: GSe based on new capacity announcement trends in recent years, normalised lower in the outer years as each hub matures.

We present two scenarios:

- **Base case (probability-weighted pipeline conversion)**: We assume **60%/50%/40%** conversion for named/other existing/future projects (except **100%/70%/50%** for Singapore). We reference the US as a benchmark, where our US Power Commodities team estimates historical conversion at 70% and is forecasting 50-60% in their forward view. We also include a **sensitivity analysis** (Exhibit 8) to illustrate the potential impact of these conversion assumptions, with **total 2030E ASEAN live capacity ranging from c.10-16GW (growing 3-5x vs. 2025)**.
- **Bull case (assuming 100% pipeline conversion)**: We assume full conversion for all 3 layers to come up with a theoretical ceiling.
- Breakdown of our live capacity build-up by hub can be found in the appendix (refer to Exhibit 26).

Exhibit 7: Gap between our base & bull cases reflects pipeline conversion risk



Source: Goldman Sachs Global Investment Research

Exhibit 8: Sensitivity analysis on base case conversion assumptions

2030E ASEAN live capacity (GW)

Conversion:		Named projects (bottom-up)				
		40%	50%	60%	70%	80%
Others (top-down)	30%	10.1	11.1	12.2	13.3	14.3
	40%	10.5	11.6	12.6	13.7	14.8
	50%	11.0	12.0	**13.1**	14.1	15.2
	60%	11.4	12.5	13.5	14.6	15.6
	70%	11.8	12.9	13.9	15.0	16.1

2025-2030E ASEAN live capacity growth (x)

Conversion:		Named projects (bottom-up)				
		40%	50%	60%	70%	80%
Others (top-down)	30%	3.2	3.6	3.9	4.3	4.6
	40%	3.4	3.7	4.1	4.4	4.7
	50%	3.5	3.9	**4.2**	4.5	4.9
	60%	3.7	4.0	4.3	4.7	5.0
	70%	3.8	4.1	4.5	4.8	5.2

Source: Goldman Sachs Global Investment Research

Risks to our forecasts:

- **Power, water and community constraints that bind harder**: this would push conversion rates below our base case or extend time-to-energization, meaning less supply goes live within our forecast window even where projects ultimately complete.
- **Speculative pipeline**: secured capacity can overstate genuine delivery where operators reserve power ahead of/beyond what they will draw. To the extent hoarding is more prevalent than our conversion haircuts capture, affected projects would not merely slip but never materialize, overstating future supply. However, new regulations to mitigate speculative capacity may improve the quality of the surviving pipeline, raising conversion among projects that clear the new screens.
- We go deeper into these 2 areas in Part 4 where we discuss how ASEAN data centers

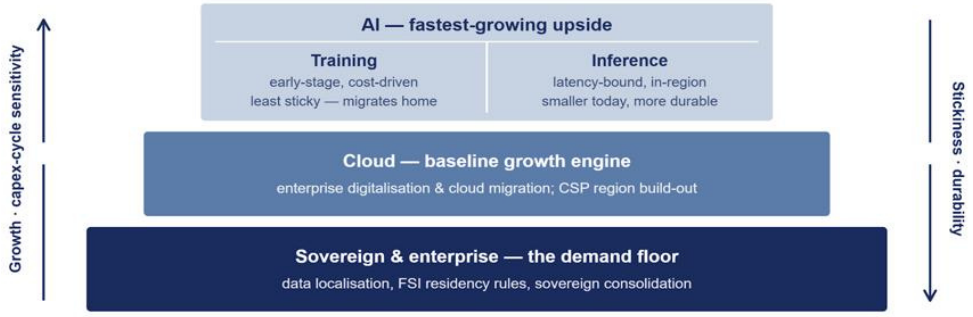
are powered.

Separately, we also note press reports on potential regulations from Western countries on ASEAN-based data centers that provide computing power to Chinese entities, though pending further details on actual legislative measures, export control expansions, and supply chain curbs.

2. Demand drivers: A three-layer structural case

As global hubs such as Northern Virginia, and increasingly Singapore, hit capacity limits, demand is being redirected across the ASEAN region. While that spillover is meaningful, we believe the more important **driver is structural - which can be split into three layers that differ in growth and sensitivity to the hyperscaler capex cycle**.

Exhibit 9: 3 layers of ASEAN data center demand



Source: Goldman Sachs Global Investment Research

1. Sovereign & traditional demand floor

Indonesia's Pusat Data Nasional program is consolidating data from over 2,700 fragmented government data centers into a unified sovereign infrastructure, with PDN 1 in Cikarang already operational (20MW Tier 4) and PDN 2-3 planned for Batam and Nusantara. In Malaysia, Oracle's US$6.5bn cloud and AI infrastructure investment anchors a public cloud region serving its Malaysian customer base, which has historically included government, state-owned enterprises, and regulated industries. Thailand's Personal Data Protection Act, effective from June 2022 with subsequent cross-border transfer regulations through 2024, creates a regulatory environment that supports domestic cloud and colocation demand through compliance and data governance requirements. Across the region, financial services data residency rules add a further layer of sovereign-style demand that cannot easily migrate offshore.

This layer is slow-growing in absolute terms but provides a durable demand floor. It is not directly tied to AI capex cycles, and it is additive to (not a substitute for) the cloud or AI demand layers.

2. Cloud as the baseline growth driver

ASEAN's cloud adoption is still in the early stages, leaving meaningful runway to drive steady DC absorption, supported by underlying digitalization trends. Google, Bain & Temasek's e-Conomy sized ASEAN's internet economy at US$300bn GMV in 2025 (c.15% YoY) and flagged the region as a new hotspot for global cloud and data center

investment. Mordor Intelligence estimates ASEAN's cloud computing market size at US$24.9bn in 2026 (c.9% of the US) implying US$35 on per capita basis vs US$838/capita for the US (GSe, derived from Mordor market size over population). Both Western and Chinese hyperscalers continue to expand cloud availability zones and step up regional investment (Exhibit 10), building an ecosystem that anchors enterprise adoption.

Among our major internet platforms, Sea is the anchor tenant for the first phase of the 500MW YTL Green Data Center Park in Johor, while Grab runs primarily on AWS with data hosted in Singapore.

This layer is **less volatile than AI demand, tied to the region's structural digitalization, though still modestly sensitive to global hyperscaler capex cycles**.

3. AI as the fastest growing but uncertain upside

As **tier-1 markets** hit power and grid constraints, hyperscalers are **redirecting incremental builds to ASEAN**, where power, land, and regulatory friction are generally lower. A second pull is export-control arbitrage: unable to deploy NVIDIA H100, H200, or Blackwell GPUs in mainland China, Chinese players can use ASEAN as a platform for US-chip-enabled AI infrastructure targeting non-China markets, and increasingly for model training (e.g., Alibaba and ByteDance, per Reuters).

On training vs. inference, our operator conversations suggest that **ASEAN's AI load is currently still dominated by training** - concentrated in Malaysia and Thailand, with global players running large-scale, early-stage LLM training leveraging ASEAN's lower-cost environment, before migrating back to the customer's home location in the later stages of training (or where training involves more sensitive data). **Inference is the more durable layer** - latency requirements pull AI-embedded applications serving ASEAN users in-region, and rising compute intensity from reasoning and agentic workloads lifts DC demand per inference server - but it is smaller than training today, and is the layer operators are actively trying to capture. We also flag **agentic enterprise adoption as further upside with uncertain timing**: ASEAN's lower labor costs weaken the near-term economics of replacing labor with agentic AI, so the inflection likely depends on AI cost curves falling further.

We have seen operators adopting **fungible design choices** (e.g. hybrid cooling, variable rack densities) which could serve as a potential hedge against the uncertainty of AI demand durability.

While we currently lack the data to size demand across ASEAN hubs to a point estimate, several indicators can serve as a proxy for market tightness:

Assuming c.50% of capex flows to physical build, converted at country-level DC build costs (C&W), our compiled **hyperscaler commitments** in Exhibit 10 **imply an aggregate c.4.6GW of IT capacity** (GSe), which we interpret **only as the floor for hyperscaler AI/cloud demand**, given sparse investment value disclosure especially among Chinese players.

Operators we spoke with report high contracting ahead of delivery: Singtel management shared that its Singapore facilities are at >90% utilization, with its new Thailand and Malaysia facilities 60-68% pre-leased ahead of launch; also noting that **ramp-up timeline (from launch to stabilized utilization) is compressing from up to c.5 years**

before the AI surge to c.2-3 years now, gated by customer fit-out and migration rather than difficulty selling. Some operators also deliberately hold back capacity to optimize pricing once a facility is live, so reported pre-let percentages typically understate true demand. Additionally, our DC panel shared that **at current demand levels available supply would sell out within 3-6 months if it existed**.

Overall, our checks indicate **demand running ahead of deliverable supply and market tightness is likely to persist over the medium term**. Longer-term, we see uncertainty from whether AI demand proves durable as more supply comes online.

Exhibit 10: Hyperscaler investment announcements into ASEAN

Company	Country	Date	Investment (US$bn)	Investment period (yr)	Remarks
AWS	Singapore	Apr-10	–	–	First AWS APAC region
AWS	Singapore	May-24	9	4	Additional cloud infra (2024–28); >SG$11bn invested prior
AWS	Indonesia	Dec-21	5	15	Region launch (Jakarta) + US$5bn commitment
AWS	Malaysia	Mar-23	6.2	15	Investment pledge through 2038
AWS	Malaysia	Aug-24	–	–	Region launch (ap-southeast-5), Cyberjaya
AWS	Thailand	Oct-22	5	15	Investment announcement
AWS	Thailand	Jan-25	–	–	Region launch (14th APAC region)
Microsoft	Singapore	Jul-05	–	–	Azure Southeast Asia region (3 AZs)
Microsoft	Singapore	Apr-26	5.5	5	Cloud + AI infra & operations, 2025–29
Microsoft	Indonesia	Apr-24	1.7	4	Investment announcement
Microsoft	Indonesia	May-25	–	–	Region launch (Indonesia Central)
Microsoft	Malaysia	May-24	2.2	4	Largest investment in Microsoft's MY history
Microsoft	Malaysia	Jul-05	–	–	Region launch (Malaysia West, KL); 2nd region (SEA 3) Johor
Microsoft	Thailand	Mar-26	1	2	>US$1bn cloud + AI infra; partners Gulf, AIS, CP Group, True, True IDC (region intent flagged May 2024; partnerships Oct–Nov 2025)
Google	Singapore	Jun-17	–	–	Cloud region launch (asia-southeast1)
Google	Singapore	Jun-24	5	–	Cumulative SG investment reached US$5bn (campus expansion)
Google	Indonesia	Jun-20	–	–	Cloud region launch (Jakarta, asia-southeast2)
Google	Malaysia	May-24	2	–	First Google DC + cloud region (Selangor); groundbreaking Oct 2024
Google	Thailand	Sep-24	1	5	Bangkok + Chonburi DC/cloud investment, 2025–29
Google	Thailand	Jan-26	–	–	Region launch (Bangkok, 3 AZs); part of the US$1bn
Oracle	Singapore	Nov-21	–	–	First SG cloud region
Oracle	Singapore	Jul-24	–	–	Second SG cloud region
Oracle	Malaysia	Oct-24	6.5	–	First MY public cloud region (sovereign-cloud play)
YTL–Nvidia	Malaysia	Dec-23	4.3	–	RM20bn AI cloud/supercomputer, Kulai (Johor); 1st DC live Oct 2025 (local operator + Nvidia, not a CSP)
Alibaba Cloud	Singapore	Aug-15	–	–	First DC; international HQ
Alibaba Cloud	Malaysia	Oct-17	–	–	First DC
Alibaba Cloud	Indonesia	Mar-18	–	–	First DC
Alibaba Cloud	Thailand	May-22	–	–	First DC
Alibaba Cloud	Thailand	Feb-25	–	–	Second DC (GenAI / industry solutions focus)
Alibaba Cloud	Regional (SEA)	Jul-05	1	3	"Project AsiaForward" region-wide
Tencent Cloud	Thailand	Apr-19	–	–	Market entry via TrueIDC partnership; 2 AZs built out subsequently
Tencent Cloud	Indonesia	Apr-21	–	–	First DC (Jakarta); 2 AZs
Tencent Cloud	Singapore	–	–	–	Regional hub presence (no dated launch); c.8 DCs across SEA
Huawei Cloud	Thailand	Sep-18	–	–	Public cloud services launch (first Chinese cloud in TH)
Huawei Cloud	Singapore	Feb-19	–	–	Huawei Cloud Singapore launch
Huawei Cloud	Indonesia	Nov-22	0.3	5	Region launch; US$300m/5yr commitment to upgrade local cloud infra
ByteDance	Malaysia	Jun-24	2.45	–	RM10bn AI hub + RM1.5bn Johor DC; anchors capacity at BDC MY06
ByteDance	Thailand	Feb-25	8.8	5	DC commitment over 5yrs; supersedes/includes Jan-25 US$3.8bn BOI disclosure
ByteDance	Thailand	May-26	25	–	BOI-approved DC expansion (Chachoengsao); unclear if overlap with prior US$8.8bn
TOTAL			**92.0**		

Source: Company data, CNBC, CIO Dive, DCD, Light Reading, BusinessWire, The Diplomat, DealStreetAsia, w.Media, SCMP, Techsauce, Malay Mail, TechNode, Computer Weekly, CIW, Reuters, Bangkok Post

3. Introducing ASEAN's 6 key hubs

Exhibit 11: ASEAN's data center opportunity is concentrated across 6 key hubs

ASEAN hubs:	Singapore	Johor	KL	Bangkok	Jakarta	Batam
Key metrics:						
Live capacity (MW):						
2025	1,400	897	378	322	113	8
2030E	1,929	4,322	1,314	2,133	2,346	1,032
Latency to Singapore (ms)	NA	<5	7.7	26.7	13.2	<5
Power cost (US$/MWh)	178	133	133	108	60	60
Subsea cables landing:	44	7	11	14	9	20
Current	32	5	10	13	7	14
Upcoming	12	2	1	1	2	6
ASEAN DC operator presence:						
AirTrunk	✓	✓				
BDx Data Centers	✓				✓	✓
Bridge Data Centers		✓	✓	✓		
DayOne	✓	✓		✓		✓
Digital Edge				✓	✓	
Empyrion Digital	✓		✓	✓		
Keppel Data Centers	✓	✓	✓		✓	
NeutraDC	✓				✓	✓
Nxera	✓	✓		✓		✓
Princeton Digital Group	✓	✓			✓	✓
STT GDC	✓	✓	✓	✓	✓	
Hyperscaler cloud regions:						
AWS	✓		✓	✓	✓	
Azure	✓		✓	✓	✓	
Google Cloud	✓			✓	✓	
Oracle	✓	✓				✓
Alibaba Cloud	✓		✓	✓	✓	
Tencent Cloud	✓			✓	✓	

*Refer to appendix for details on geographic definition/scope.

Source: DC Byte, JLL, Cushman & Wakefield, WonderNetwork, TeleGeography, Wood Mackenzie, Company data, Goldman Sachs Global Investment Research

Singapore remains the regional anchor and the most established hub, with the densest concentration of operators and live hyperscaler cloud regions, the deepest submarine-cable connectivity, and the highest power cost. Supply is structurally constrained with new capacity released only through the government's Data Centre Call for Application (DC-CFA) - a hard regulatory ceiling that allocates capacity to selected operators, with 80MW allocated in 2023, 200MW in the latest DC-CFA2 with four winners announced on 21 Aug 2026: Digital Realty, Equinix, Keppel DC, STT GDC. Singapore's demand sits on the least cyclical layers: critical sovereign/enterprise workloads that need in-country, low-latency hosting, and the latency-sensitive inference that has to sit at the regional core.

Johor and Batam's <5ms latency to Singapore makes them genuine extensions for any Singapore workload that does not strictly require in-country hosting. Johor carries the largest pipeline in the region and is where most of the cloud and AI-inference spillover from Singapore is landing; Batam plays a similar role off a much smaller base, supported by relatively cheap power and emerging cable-landing infrastructure.

The other three hubs are more domestically anchored. **KL/Cyberjaya** serve enterprise and connectivity demand alongside spillover that does not need Johor's tighter latency. **Bangkok** serves domestic cloud and inference, but stands out in its ability to draw a

wave of fresh commitments from both Western hyperscalers and Chinese players within a short 18-month window, headlined by ByteDance's c.US$8.8bn investment (with a urther US$25bn BOI-approved expansion in May-26, though overlap with the prior commitment is unclear), through the BOI's aggressive incentives andast-track approvals. **Jakarta** anchors the sovereign/FSI floor most heavily, underpinned by Indonesia's data localization regime, with local leaders such as NeutraDC.

Build cost & timeline

Exhibit 12: ASEAN sits between US & China on build cost…
DC build cost by market

Exhibit 13: …with Singapore & Malaysia above the regional average
DC build cost by market

- **Permitting** (6-24 months) includes zoning and land use, environmental assessments,

interconnection studies (usually the slowest, and one that effectively sets the project's achievable scale), and community consultation.

- **Construction and procurement** (12–18 months) covers the physical build (grading and foundations, shell, core install), but the critical aspect is procurement of electrical parts which has to start before construction: transformers can carry 2–4 year lead times, with switchgear, generators and cooling close behind, which is why operators increasingly lean on prefabricated and standardized designs to compress schedules.
- **Commissioning** (2–6 months) is the validation gate with equipment checks, system and integrated load testing (subject to hyperscalers' operational standards).

A facility only earns revenue once it energizes, which may extend beyond the headline build period. In the following section, we take a closer look into the power constraint.

4. How are ASEAN data centers powered?

ASEAN data centers draw on different power systems. The generation mix, market structure, and who is allowed to sell electricity to whom vary materially by country – and it is these structural differences, more than headline reserve margins, that determine how much announced capacity actually energizes. We start with how power reaches a data center, then work through each market in turn.

Several operators we spoke with shared that they have not historically had projects delayed/cancelled on power grounds, but they emphasized that the constraint is tightening as the new build-out wave arrives. The US – the largest and most mature DC market, where power is already a serious bottleneck – shows where the path may lead: over 2,000 GW is sitting in interconnection queues, c.2x the US installed base (LBNL, Queued Up) with multi-year waits to energize.

Secured is not the same as delivered power

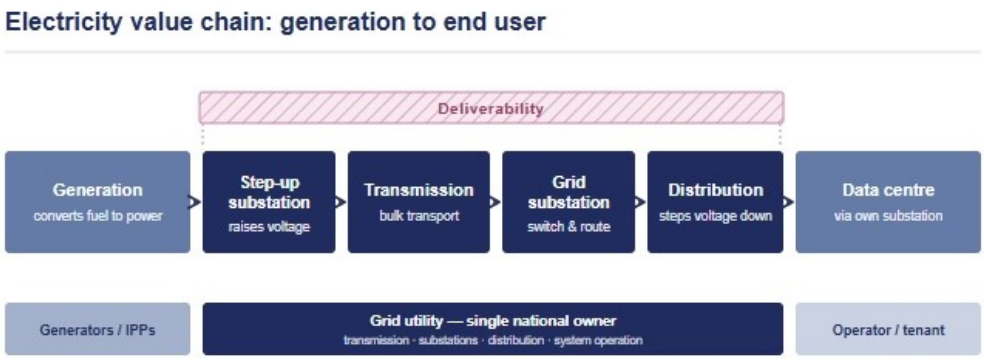
A signed PPA represents intent, not energized capacity, and the gap arises through two distinct channels:

1. **Speculative allocation hoarding**: as operators lock in allocations ahead of/beyond what they will draw (drawing similarities to queue-spamming in the US). The scale of the gap is visible in Malaysia: As of May 2026, TNB reported c.8.3GW of secured cumulative maximum demand under data center supply agreements – of which c.4.5GW sits with the 36 projects already in operation – against actual load utilization of just 1.1GW (TNB, 1Q26). Tighter regulations have emerged to prevent "phantom" power demand, with Malaysia now requiring data centers to declare annual rather than maximum demand and must achieve 85% of demanded utilization in the first 4 years (penalty of RM8.50/kW, or c.US$2/kW, calculated on monthly basis applied on any shortfall). Thailand's new data center regulation requires a bank guarantee of Bt4.5mn/MW, or c.US$136k/MW of reserved capacity, released against actual utilization milestones and explicitly intended to prevent

operators from hoarding and reselling allocations.

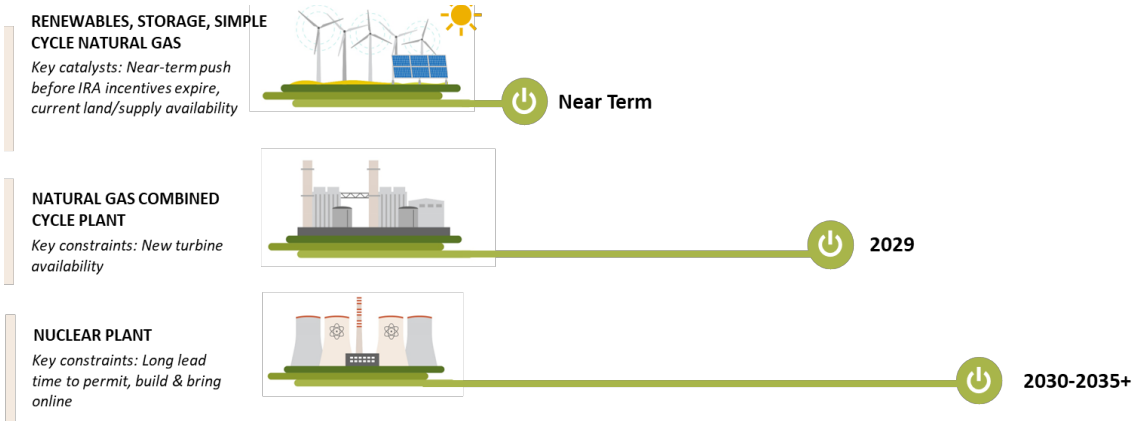
2. **Physical bottlenecks**: Electricity reaches a data center through a chain (Exhibit 15), and a break at any link strands the capacity sitting upstream. While we observe adequate system-level reserve margin across ASEAN on paper, usable generation also depends on the primary fuel secured (gas/coal/renewables), generation that is economic to dispatch, physical deliverability (transmission corridors, substation and transformer capacity), and a grid stable enough to carry an intermittent-heavy mix. As our GS SUSTAIN team has argued through its "7 Ps" framework, **power availability is increasingly becoming a "Parts" problem**. The critical question is often not whether megawatts exist in the system, but whether the supporting infrastructure can be built fast enough to convert theoretical capacity into deliverable power (Exhibit 16). For data centers, **infrastructure readiness is increasingly emerging as the true gating factor**.

Exhibit 15: Overview of a typical electricity value chain



Source: Goldman Sachs Global Investment Research

Exhibit 16: How long would it take to build and bring new power generation online?
A look across power sources



Source: Goldman Sachs Global Investment Research

How do power constraints and regulatory responses differ across ASEAN?
The 4 countries face different structural challenges and are at differing stages of regulatory response: Singapore is pre-empting the constraint by design, Malaysia and Thailand are tightening regulations to close a gap already opened, while Indonesia is still at the earlier stages.

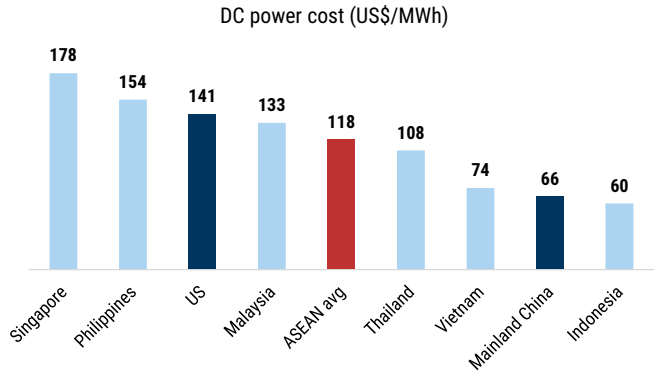
Exhibit 17: State of power differs across ASEAN

Market	Key constraint / watch item	Direct PPA, power wheeling?	Reserve margin (current / target)	Generation mix
Singapore	Land, water scarcity cap system expansion	Yes	27% floor (EMA); RFP now open to add 2031 capacity to stay within it	Gas ~95%, RE ~3%, other ~2%
Malaysia	Water, gap between secured-utilized power	Yes	30% current; 28–36% projected to 2030	Coal ~45%, gas ~32%, RE ~22%[1]
Thailand	Deliverability into EEC, regulatory reforms	Pending	41%; historically above 15% target	Gas ~60%, coal ~17%, RE ~20%[2]
Indonesia	PLN monopoly	No	26% current; >30% target (RUPTL 2025–34)	Coal ~67%, gas ~17%, RE ~13%

[1] National but RE is largely Sarawak hydro (Borneo), which Peninsular data centers cannot yet access. [2] Includes imported hydro (mainly Laos); domestic solar+wind c.6%.

Source: EMA, TNB, EGAT, PLN, Ember, IEA, Goldman Sachs Global Investment Research

Exhibit 18: Wide range of power costs across ASEAN with the average sitting between the US and China



ASEAN refers to on-grid costs for data centres (Wood Mackenzie); China takes the GSe average between East, West, and North clusters.

Source: Goldman Sachs Global Investment Research, Wood Mackenzie

Singapore: the most physically constrained, but the best managed. Given its limited land and natural resources, Singapore's constraint is a structural ceiling with the least room in the region to add generation, and **capacity is rationed administratively through the Data Center Call for Application** (with little scope for speculative reservation, and awards carry earmarked grid allocation). Additionally, it runs the region's most liberalized power market, has deployed utility-scale battery storage to stabilize an intermittent-heavy system, and is addressing the ceiling through imports, targeting c.6 GW of low-carbon electricity by 2035 alongside an active intra-ASEAN power-trade agenda. DC utilization rates sit at 90%+, reflecting the market tightness.

Malaysia: the least power-constrained, water as the physical bottleneck. TNB has the region's strongest delivery track record: its Green Lane fast-track has compressed grid-connection timelines from the usual 36-48 months to 12, with 29 projects (3.8GW) energized as of Sep-2025 and c.33 by Mar-2026 (TNB), and operators we spoke with cited TNB as their best utility experience in the region. **Direct and virtual PPAs are available** through the Corporate Green Power Programme (CGPP) and Corporate

Renewable Energy Supply Scheme (CRESS), allowing data centers to access green electricity supply through third-party arrangements.

- Instead, the challenge is the gap between reserved and utilised power - **tighter regulations have emerged to mitigate "phantom" demand**, with the Ministry of Investment, Trade and Industry (Miti) and the Energy Commission (ST) now requiring **data centers to declare annual rather than maximum demand** (since data centres typically phase their energy consumption over several years) and **to achieve 85% of declared annual demand in the first 4 years** (a **penalty of RM8.50/kW, or c.US$2/kW**, calculated on monthly basis and applied on any shortfall). Going into years 5-6, the utilization requirement will be lowered to 75%, but applied to total declared demand instead of annual demand. This ensures that power forecasts are based on validated data, strengthening grid reliability.
- **Water has become the key physical constraint** - since Nov 2025 Johor has stopped approving new Tier 1-2 data centers, which the state categorizes as high water users (consuming c.200x more water than Tier 3-4 facilities) - and has asked **operators to defer water-cooled expansions by at least 18 months, to around mid-2027**. As water becomes a more visible permitting issue, developers may increasingly optimize for water minimization, effectively shifting the binding constraint from water toward power and reinforcing demand for both grid investment and higher-efficiency cooling architectures. We provide further discussion on water/cooling choices in the next section.

Thailand: deliverability into the EEC, regulatory reform the watch items. The pinch point is the Eastern Economic Corridor, where development concentrates but the existing network was built for conventional industrial loads rather than dense campuses. The energy ministry stated that over **90% of data center requests concentrate in the EEC, explicitly citing insufficient transmission lines and substations as the primary problem**, not a lack of power generation - with EGAT spending Bt31bn (c.US$936mn) to upgrade the power transmission system in the EEC, aiming to lift corridor transfer capacity from 600MW to 1,150MW. We also highlight several ongoing regulatory changes:

- As reported in August 2026, **the Prime Minister's Office is drafting a new regulation on data centers and will establish a new committee** overseeing data center approvals, monitoring, and impact assessment, with requirements tiered across existing operators (audits on water, temperature, and noise), approved projects under construction, and future applicants (which will face the fullest regulatory requirements).
- **BOI is tightening its screening of data center investments and will assess new projects across 4 dimensions**: energy readiness including clean-energy transition, water-resource management, environmental and pollution controls including noise, and tangible national benefit such as AI talent development or shared computing capacity - with authorities explicitly shifting from investment volume toward project quality. The government is also planning a Power and Water Map to **identify other areas with sufficient electricity and water to encourage new projects outside the EEC**.

- In July 2026, **the National Energy Policy Council** approved a new requirement for **data centers to provide a bank guarantee of Bt4.5mn/MW, or c.US$136k/MW of reserved capacity,** to prevent companies from hoarding power allocations and reselling them, providing greater certainty before the utility invests in additional transmission infrastructure. Half of the guarantee will be returned when a project's actual electricity use reaches 50% of its proposed capacity, with the remainder refunded once utilization reaches 70%. The council also **approved the principle of establishing a separate electricity tariff for data centres** to reflect the cost of additional power supplies and grid investment without shifting the burden to ordinary users, alongside a requirement to **submit water-management plans**. While the final tariff is yet to be determined, an initial tariff of Bt5-6/kWh (vs. a general electricity rate of Bt3.95/kWh) is being considered.
- A 2,000MW pilot **direct PPA framework** for BOI-promoted data centers with at least 50MW of IT load had its principle approved in June 2024, and draft ERC regulations were published in October 2025, but wheeling charges and commercial terms remain unfinalized.

Indonesia: where power binds hardest, and is least understood. The following draws on our on-the-ground conversations with power industry stakeholders. **Regulations place PLN as the sole offtaker**, with generators (IPPs) selling to PLN under long-term contracts (25-30y). Direct offtake by a data center is normally restricted unless the developer holds an electricity business concession or the site sits inside an industrial estate with its own license. PPAs between DC operators and PLN are initial agreements (registering them as a PLN customer), but converting them into energized capacity requires fuel security, equipment procurement, transmission and substation work, and PLN's own tender and execution.

- Within Indonesia, **both generation and deliverability bind, with Batam facing more constraints than Jakarta despite its SEZ (special economic zone) status and PLN Batam operating as a separate entity** (allowing more flexibility). This is given Jakarta sits on a strong backbone (Java grid with 500 kV corridors, c.45GW of capacity, many bulk plants) with stable, relatively low tariffs; where PLN can supply at those tariffs, building independent generation is often economically unnecessary. Batam operates a weaker grid (150 kV) with limited primary resources (mainly gas), and system capacity currently <1GW implies significant expansion needs against surging DC demand. Delivering large capacity to Batam would depend on new transmission, such as a subsea link from Sumatra, which has abundant hydro, geothermal, and coal resources that could be tapped if the transmission is built. This is worth highlighting as it **cuts against the common read of Batam as the easy, cheap option**.
- **Usable generation depends on securing primary energy** - LNG or gas allocation, coal supply - which is constrained by domestic market obligations and prior contracts, so paper excess capacity may not be dispatchable. This is exacerbated by equipment lead times: turbine and engine OEMs are booked out to c.2029, and from the experience of an expert we spoke with, even a c.50MW solar project took c.1 year to move through significant parts of the process.

- **A deeper structural issue stems from PLN's tariff-subsidy**, which makes it expensive for PLN to invest in new technology (e.g., storage systems) and increase its renewable mix. Coal is the cheapest marginal power at c.3-4 US cents per kWh; CCGT and most alternatives are far more expensive at c.12 cents, vs. PLN's retail ceiling at c.6-8 cents. That structure leaves little room to integrate higher-cost renewable or gas capacity, because PLN cannot price retail high enough to cover it - so the low-cost, coal-heavy mix is economically self-reinforcing. **Industry participants have pushed for power wheeling, but the current government has resisted**, citing concerns that it could challenge PLN's role in the market. Contrary to common assumption that wheeling (letting a third party move its own or contracted generation over PLN's transmission for a fee) is primarily a cost play, its advantage is speed and flexibility, not cost (given PLN's subsidized tariffs).

Who pays for grid upgrades?
China funds grid expansion centrally and socially, which is part of why **power is not its binding constraint (chips are)**. In contrast, **the US has shifted toward a user-pays approach**, e.g., Ohio has required data centers to pay for c.85% of projected demand for up to 12 years regardless of actual usage, and Virginia has set a 14-year minimum-take class for loads above 25 MW.

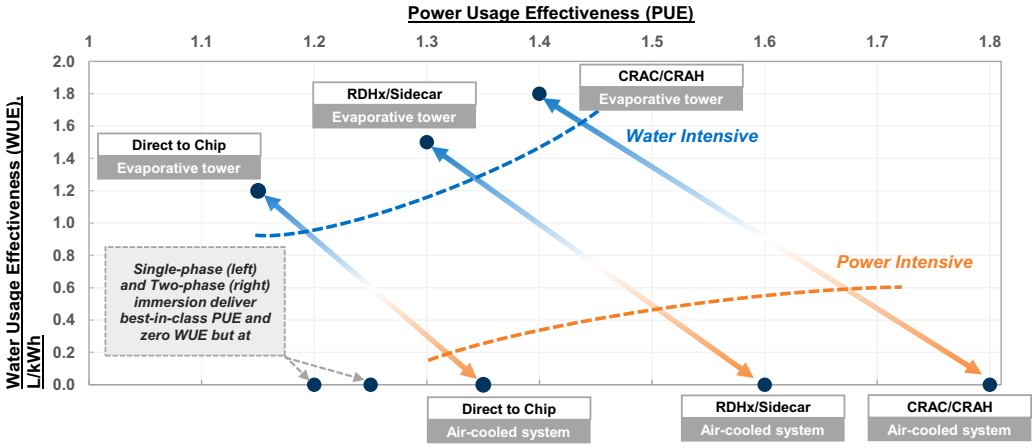
ASEAN has historically sat closer to China's utility-led model, but is starting to move toward the co-funded model. Malaysia's RP4 tariff overhaul has introduced a dedicated ultra-high-voltage category for the largest users, alongside Thailand's proposed new tariffs for data centers. The emerging structure is a two-layer arrangement in which thegovernment and the utility lead backbone transmission while operators and hyperscalers co-fund at the site level. **Operators we spoke with expressed willingness to co-fund grid infrastructure only where doing so secures advantaged power access, raises the barrier for competitors, and is underwritten to protect returns** - with upfront grid capex recovered through higher recurring service fees rather than absorbed into margin.

Deliverability as the moat: it is no longer about securing deliverable power, but the whole stack - fuel, equipment, grid access, and execution - ahead of the build. The operator that locks in those inputs early owns the scarcest factor in the value chain. **Balance sheet depth also becomes a competitive edge** in its own right, enabling operators to co-fund grid delivery and absorb the wait to energization.

5. How are ASEAN data centers cooled?

The debate is shifting beyond securing power alone toward how power, water, and cooling are optimized together. As discussed by our GS SUSTAIN team, data center cooling increasingly represents a trade-off between power efficiency and water consumption (Exhibit 19). Traditional evaporative cooling systems can lower facility power usage, but require meaningful ongoing water input. By contrast, air-cooled and dry cooling solutions can substantially reduce direct water consumption but typically require greater electricity use to maintain thermal performance. As communities and regulators place greater scrutiny on industrial water use, particularly in water-stressed regions, cooling design is increasingly becoming a strategic infrastructure decision rather than just an engineering choice.

Exhibit 19: Gray space cooling options to reject heat from the data center into the ambient environment come with a power versus water trade-off
Power usage effectiveness (PUE) and water usage effectiveness (WUE) of different white/gray-space cooling solution combinations



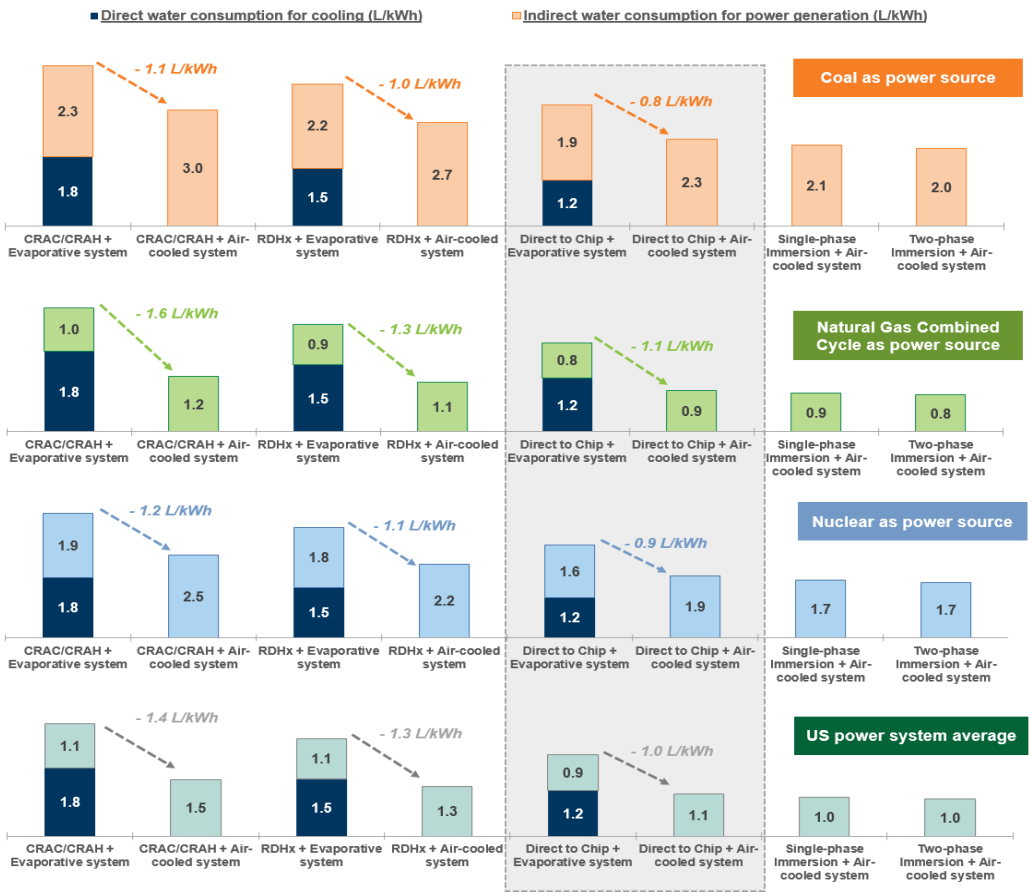
*Immersion cooling enables higher outlet temperatures (~50°C-60°C or above), allowing dry coolers to reject heat directly to ambient air without the need for chillers or evaporative towers.

Source: University of Texas Energy Institute, Goldman Sachs Global Investment Research

We also note that looking only at direct water consumption can understate the resource intensity of a data center. Our GS SUSTAIN work highlights that cooling choices can shift water usage upstream into the power system itself (Exhibit 20). This is particularly relevant in ASEAN, where coal remains a major source of generation in several markets, yet represents the most water intensive generation source. Thermal power generation requires water for cooling and steam-cycle operations, meaning that reducing on-site data center water consumption through more power-intensive cooling solutions may simply relocate part of the water footprint to the electricity supply chain. As a result, the ultimate water intensity of a data center increasingly depends not only on its cooling system, but also on the generation mix supplying marginal power.



Exhibit 20: Trading lower water footprint for higher energy usage could potentially shift data center water consumption from onsite cooling to upstream power generation facilities indirectly



Source: EIA, University of Texas Energy Institute, Goldman Sachs Global Investment Research

ASEAN's tropical climate further complicates this optimization. High ambient temperatures and humidity reduce the effectiveness of many heat-rejection pathways and increase reliance on mechanical cooling equipment to maintain performance. Our GS SUSTAIN team estimates that hot and humid regions are more likely to require cooling solutions that consume additional power relative to temperate markets, particularly as rack densities rise with AI deployment. In practice, this means ASEAN data centers face not only the challenge of securing power, but also the challenge of using that power efficiently enough to manage heat under demanding tropical conditions, reinforcing the importance of cooling infrastructure within the broader power constraint discussion.

6. The ASEAN operator landscape

We provide an overview of the major data center operators in ASEAN based on their **scale** (live capacity, and total committed capacity including under construction and pipeline), **regional exposure** (ASEAN vs. developed markets), and **business model** (hyperscale wholesale vs. mixed hyperscale + enterprise/colocation).

We flag the **wallet share** of key hyperscale customers' leasing demand as an area of investor focus, though this is not directly observable given limited disclosure on client mix and contract terms (especially across our mostly private operator universe), though the dimensions we present could be indicative: live capacity evidences a delivered track record with anchor customers; committed pipeline indicates the ability to absorb future allocations; regional exposure maps an operator's footprint against where hyperscaler demand is landing; and business model identifies which demand pool an operator competes for.

Exhibit 21: Overview of ASEAN data center operators
*list is non-exhaustive

				Pureplay DC operator				Sponsor/REIT	Telco-backed		
Company:	**AirTrunk**	**BDx Data Centers**	**Bridge Data Centers**	**DayOne**	**Digital Edge**	**Empyrion Digital**	**Princeton Digital Group**	**Keppel Data Center**	**NeutraDC**	**Nxera**	**STT GDC**
Owner / Sponsor	Blackstone + CPP Investments (acquired Sep '24)	I Squared Capital	Bain Capital (controlling); Keppel, SK Group	GDS (~20%); Coatue, SoftBank, Hillhouse, Boyu, Ken Griffin, Baupost, INA, Tekne	Stonepeak	Seraya Partners (100%)	Warburg (lead); Ontario Teachers' Pension Plan; Mubadala; Stonepeak	Keppel Corp (sponsor); Keppel DC REIT (SGX-listed) ~20% Keppel-held; private funds	Listed parent IDX: Telkom Indonesia (TLKM)	Singtel (~80%); KKR (20%, since Sep '23)	KKR + Singtel (acquiring from ST Telemedia, Feb '26)
Business model	Hyperscale wholesale	Mixed (hyperscale + enterprise)	Hyperscale wholesale	Hyperscale wholesale	Mixed (hyperscale + enterprise)	Mixed (hyperscale + enterprise)	Mixed (hyperscale + enterprise)	Mixed (hyperscale + enterprise)	Mixed (hyperscale + enterprise)	Mixed (hyperscale + enterprise)	Mixed (hyperscale + enterprise)
Total # of countries	7	5	3	7	7	6	7	11	2	5	12
ASEAN hub presence	Singapore, Johor	Singapore, Jakarta	Johor, KL, Bangkok	Singapore, Johor, Batam, Bangkok	Jakarta, Bangkok, Manila	Singapore, Bangkok, Johor	SG, Johor, Jakarta, Batam	Singapore, Johor, KL, Jakarta	Jakarta, Batam (Nxera-Medco JV), Singapore; edge facilities across Indonesia	Singapore, Johor (TM JV), Batam (NeutraDC/Medco JV), Bangkok (Gulf/AIS JV)	Singapore, Johor, KL, Jakarta, Bangkok, HCM, Calabarzon, Davao, Manila

Source: Company data, Bloomberg, Reuters, Data Center Dynamics, Mingtiandi, Data compiled by Goldman Sachs Global Investment Research

Scale & Growth

Exhibit 22: ASEAN's 6 key hubs: Live capacity (MW) by operator

	Singapore	Johor	KL	Bangkok	Jakarta	Batam	Total
AirTrunk	78	150					228
BDx	10				100		110
BDC		110		5			115
DayOne		478				72	550
Digital Edge					29		29
Empyrion	13						13
Keppel DC	200	*	*		*		200
NeutraDC	17				16		33
Nxera	62						62
PDG	20	104			28		152
STT GDC	110		14	25	18		167
Total	**510**	**842**	**14**	**30**	**191**	**72**	**1658**

* indicates capacity disclosure not available.

Source: Company data, Data compiled by Goldman Sachs Global Investment Research

Exhibit 23: ASEAN's 6 key hubs: UC + pipeline capacity (MW) by operator

	Singapore	Johor	KL	Bangkok	Jakarta	Batam	Total
AirTrunk	70	550					620
BDx					540		540
BDC		400	*	200			600
DayOne	20			1000		346	1366
Digital Edge				100	500		600
Empyrion		200		16			216
Keppel DC	75						75
NeutraDC					105	54	159
Nxera	58	280		155		54	547
PDG		396			360	96	852
STT GDC	50	120	14	24	342		550
Total	**273**	**1946**	**14**	**1495**	**1847**	**550**	**6125**

* indicates capacity disclosure not available.

Source: Company data, Data compiled by Goldman Sachs Global Investment Research

Exhibit 24: ASEAN's 6 key hubs: Total (live + UC + pipeline) capacity (MW) by operator

	Singapore	Johor	KL	Bangkok	Jakarta	Batam	Total
AirTrunk	148	700					848
BDx	10				640		650
BDC		510		205			715
DayOne	20	478		1000		418	1916
Digital Edge				100	529		629
Empyrion	13	200		16			229
Keppel DC	275	*	*		*		275
NeutraDC	17				120	54	191
Nxera	120	280		155		54	609
PDG	20	500			388	96	1004
STT GDC	160	120	28	49	360		717
Total	**783**	**2788**	**28**	**1525**	**2037**	**622**	**7783**

* indicates capacity disclosure not available.

Source: Company data, Data compiled by Goldman Sachs Global Investment Research

The operators we identified already account for the large majority of the region's build-out, with **aggregate committed capacity (live, UC + pipeline) of c.7.8GW (Exhibit 24) equivalent to c.60% of our 13GW projected ASEAN live capacity in 2030E**.

Geographic Exposure

Exhibit 25: ASEAN vs. developed market (DM) exposure

Operator	Total Capacity (MW)			% of group MW		
	ASEAN	DM	Group	ASEAN	DM	Developed markets (DM):
AirTrunk	848	1368	3300	26%	41%	SG, AU, HK, JP
BDx	650	48	693	94%	7%	SG, HK, TW
BDC	715	0	735	97%	0%	-
DayOne	1916	447	2343	82%	19%	SG, HK, JP, FL
Digital Edge	639	161	1400	46%	12%	JP, KR
Empyrion	229	74	314	73%	24%	SG, JP, TW, KR
Keppel DC	N/A	N/A	850	N/A	N/A	Hub-level disclosure N/A
NeutraDC	200	17	200	100%	9%	SG
Nxera	609	120	609	100%	20%	SG
PDG	1004	164	1800	56%	9%	SG, JP, KR
STT GDC	932	862	2300	41%	37%	SG, JP, KR, UK, Germany, Italy

ASEAN includes 6 key hubs + others for: Digital Edge (PH), NeutraDC (regional edge facilities), STT (PH, VN)

Source: Company data, Data compiled by Goldman Sachs Global Investment Research

Refer to Exhibit 32 in the appendix for operator capacity definitions.

Funding

The funding lens captures both **cost of capital** and **exit pathway** - two related but distinct questions that increasingly determine which operators can sustain the build-out and which face refinancing or monetization friction.

Equity / ownership model

Cost of equity varies materially by ownership structure, and an operator's position on this spectrum tracks where it sits in the public-to-private lifecycle.

- **Public / listed REIT**: Lowest cost of capital, given access to public equity markets and investment-grade debt, and the most permanent capital base. Keppel DC is the clearest example in our coverage universe.
- **Strategic / corporate balance sheet**: Telco-backed platforms funded off a listed parent - NeutraDC (Telkom), Nxera (Singtel, with KKR as minority) and STT GDC (KKR-Singtel consortium). Access to a strategic parent's balance sheet lowers cost and lengthens duration, at the cost of some capital-allocation competition within the group.
- **PE / infrastructure funds**: Hurdle rates are typically targeted at 15-20%+ IRR depending on fund mandate (infra vs. growth vs. buyout). This is the most expensive equity and where the most aggressive forward builders sit.

This spectrum explains why several operators are actively trying to access public markets now (we take no view on any transaction outcome). As portfolios lease up and stabilize, the natural migration runs toward cheaper capital - public equity for the operator-platform, and REITs for the stabilized asset pool.

Debt instruments

Debt layers across every ownership model, with differing cost and is gated by bankability (the quality and contracted duration of the underlying cash flows). From cheapest:

- **Bank loans / project finance**: The cheapest financing in the stack, pricing inside private credit and well below equity hurdles. Lenders underwrite contracted,

long-dated cash flows, so access is supported by investment-grade offtake and secured power. E.g., BDx's US$320mn facility from a syndicate led by Bank Permata, BCA, and KB Bank.

- **Private credit**: Asset-level debt from non-bank lenders - pricier than bank debt (typical hurdle rates in the high-single to low-double digits) but faster and more flexible, and available against development-stage or transitional assets banks will not underwrite. E.g., PDG's US$400mn loan which includes private credit lenders Allianz GI and Keppel.
- **ABS / investment-grade bonds**: Securitized and public debt formats that become available once cash flows stabilize, offering the lowest all-in debt cost at scale for the most mature portfolios.

Because debt sits senior to the equity that bears development risk, it lowers a platform's blended cost of capital to the extent that stabilized, energized cash flows support leverage.

Appendix

GSe live capacity build-up by hub:

Exhibit 26: DC live capacity build: Singapore

Singapore: live capacity (IT load MW)	2025	2026E	2027E	2028E	2029E	2030E
Total additions:						
Named projects (bottom-up)		136	60	25	0	0
Others (top-down residual)		0	0	80	120	0
Future projects		0	0	35	105	245
Conversion assumption (base):						
Named projects (bottom-up)		100%	100%	100%	100%	100%
Others (top-down residual)		70%	70%	70%	70%	70%
Future projects		50%	50%	50%	50%	50%
Base case additions:						
Named projects (bottom-up)		136	60	25	0	0
Others (top-down residual)		0	0	56	84	0
Future projects		0	0	18	53	123
Additions (base)		**136**	**60**	**99**	**137**	**123**
% existing projects (named, others)		100%	100%	82%	62%	0%
% future projects		0%	0%	18%	38%	100%
Live capacity (base)	**1,400**	**1,536**	**1,596**	**1,694**	**1,831**	**1,953**
Incremental additions (100% conversion)		0	0	42	89	123
Additions (bull)		**136**	**60**	**140**	**225**	**245**
Live capacity (bull)	**1,400**	**1,536**	**1,596**	**1,736**	**1,961**	**2,206**
Bull vs base live capacity		0%	0%	2%	7%	13%

Source: Company data, Goldman Sachs Global Investment Research, EMA, DC Byte

Exhibit 27: DC live capacity build: Johor

Johor: live capacity (IT load MW)	2025	2026E	2027E	2028E	2029E	2030E
Total additions:						
Named projects (bottom-up)		818	859	796	733	497
Others (top-down residual)		95	284	662	473	379
Future projects		0	0	35	157	453
Conversion assumption (base):						
Named projects (bottom-up)		60%	60%	60%	60%	60%
Others (top-down residual)		50%	50%	50%	50%	50%
Future projects		40%	40%	40%	40%	40%
Base case additions:						
Named projects (bottom-up)		491	515	477	440	298
Others (top-down residual)		47	142	331	237	189
Future projects		0	0	14	63	181
Additions (base)		**538**	**657**	**822**	**739**	**668**
% existing projects (named, others)		100%	100%	98%	92%	73%
% future projects		0%	0%	2%	8%	27%
Live capacity (base)	**897**	**1,435**	**2,092**	**2,915**	**3,654**	**4,322**
Incremental additions (100% conversion)		375	485	670	624	660
Additions (bull)		**913**	**1,142**	**1,493**	**1,363**	**1,328**
Live capacity (bull)	**897**	**1,810**	**2,952**	**4,445**	**5,808**	**7,136**
Bull vs base live capacity		26%	41%	52%	59%	65%

Source: Company data, Goldman Sachs Global Investment Research, TNB, DC Byte, Cushman & Wakefield

Exhibit 28: DC live capacity build: Kuala Lumpur

Kuala Lumpur: live capacity (IT load MW)	2025	2026E	2027E	2028E	2029E	2030E
Total additions:						
Named projects (bottom-up)		137	187	218	144	112
Others (top-down residual)		37	112	260	186	149
Future projects		0	0	13	53	146
Conversion assumption (base):						
Named projects (bottom-up)		60%	60%	60%	60%	60%
Others (top-down residual)		50%	50%	50%	50%	50%
Future projects		40%	40%	40%	40%	40%
Base case additions:						
Named projects (bottom-up)		82	112	131	86	67
Others (top-down residual)		19	56	130	93	74
Future projects		0	0	5	21	58
Additions (base)		**101**	**168**	**266**	**201**	**200**
% existing projects (named, others)		100%	100%	98%	89%	71%
% future projects		0%	0%	2%	11%	29%
Live capacity (base)	**378**	**479**	**647**	**913**	**1,114**	**1,314**
Incremental additions (100% conversion)		73	131	225	183	207
Additions (bull)		**174**	**299**	**491**	**383**	**407**
Live capacity (bull)	**378**	**552**	**851**	**1,342**	**1,726**	**2,133**
Bull vs base live capacity		15%	32%	47%	55%	62%

Source: Company data, Goldman Sachs Global Investment Research, JLL, DC Byte

Exhibit 29: DC live capacity build: Jakarta

Jakarta: live capacity (IT load MW)	2025	2026E	2027E	2028E	2029E	2030E
Total additions:						
Named projects (bottom-up)		204	384	679	620	520
Others (top-down residual)		16	47	109	78	62
Future projects		0	0	32	132	365
Conversion assumption (base):						
Named projects (bottom-up)		60%	60%	60%	60%	60%
Others (top-down residual)		50%	50%	50%	50%	50%
Future projects		40%	40%	40%	40%	40%
Base case additions:						
Named projects (bottom-up)		122	230	408	372	312
Others (top-down residual)		8	23	55	39	31
Future projects		0	0	13	53	146
Additions (base)		**130**	**254**	**475**	**464**	**489**
% existing projects (named, others)		100%	100%	97%	89%	70%
% future projects		0%	0%	3%	11%	30%
Live capacity (base)	**322**	**452**	**706**	**1,181**	**1,644**	**2,133**
Incremental additions (100% conversion)		89	177	345	366	458
Additions (bull)		**219**	**430**	**820**	**830**	**947**
Live capacity (bull)	**322**	**541**	**972**	**1,792**	**2,622**	**3,569**
Bull vs base live capacity		20%	38%	52%	59%	67%

Source: Company data, Goldman Sachs Global Investment Research, DC Byte, PLN, Cushman & Wakefield

Exhibit 30: DC live capacity build: Bangkok

Bangkok: live capacity (IT load MW)	2025	2026E	2027E	2028E	2029E	2030E
Total additions:						
Named projects (bottom-up)		425	322	560	753	611
Others (top-down residual)		41	123	286	204	163
Future projects		0	0	29	135	391
Conversion assumption (base):						
Named projects (bottom-up)		60%	60%	60%	60%	60%
Others (top-down residual)		50%	50%	50%	50%	50%
Future projects		40%	40%	40%	40%	40%
Base case additions:						
Named projects (bottom-up)		255	193	336	452	366
Others (top-down residual)		20	61	143	102	82
Future projects		0	0	12	54	156
Additions (base)		**275**	**255**	**491**	**608**	**605**
% existing projects (named, others)		100%	100%	98%	91%	74%
% future projects		0%	0%	2%	9%	26%
Live capacity (base)	**113**	**388**	**643**	**1,134**	**1,742**	**2,346**
Incremental additions (100% conversion)		190	190	385	484	561
Additions (bull)		**465**	**445**	**876**	**1,092**	**1,165**
Live capacity (bull)	**113**	**578**	**1,023**	**1,899**	**2,991**	**4,156**
Bull vs base live capacity		49%	59%	67%	72%	77%

Source: Company data, Goldman Sachs Global Investment Research, BOI, Cushman & Wakefield

Exhibit 31: DC live capacity build: Batam

Batam: live capacity (IT load MW)	2025	2026E	2027E	2028E	2029E	2030E
Total additions:						
Named projects (bottom-up)		211	327	196	181	105
Others (top-down residual)		10	80	230	150	110
Future projects		0	0	17	74	212
Conversion assumption (base):						
Named projects (bottom-up)		60%	60%	60%	60%	60%
Others (top-down residual)		50%	50%	50%	50%	50%
Future projects		40%	40%	40%	40%	40%
Base case additions:						
Named projects (bottom-up)		127	196	118	109	63
Others (top-down residual)		5	40	115	75	55
Future projects		0	0	7	30	85
Additions (base)		**132**	**236**	**239**	**213**	**203**
% existing projects (named, others)		100%	100%	97%	86%	58%
% future projects		0%	0%	3%	14%	42%
Live capacity (base)	**8**	**140**	**376**	**615**	**829**	**1,032**
Incremental additions (100% conversion)		90	171	203	192	224
Additions (bull)		**221**	**407**	**443**	**405**	**427**
Live capacity (bull)	**8**	**229**	**636**	**1,079**	**1,485**	**1,912**
Bull vs base live capacity		64%	69%	75%	79%	85%

Source: Company data, Goldman Sachs Global Investment Research, PLN, BP Batam

Operator capacity definitions:

Exhibit 32: Group total capacity definitions by operator

Group total definitions used in mix calculations (disclosure varies):	
AirTrunk	3.3 GW of operating and planned capacity (Apr-26 PR)
BDx	ASEAN + 26MW HK + 6MW China + 12MW Taiwan (website)
BDC	ASEAN + 20MW India (website)
DayOne	ASEAN + 66MW HK + 80MW Japan + 281MW Finland (website)
Digital Edge	1.4GW of secured IT power (Jan-26 PR)
Empyrion	ASEAN + 40MW Korea + 35MW Japan + 10MW Taipei (website)
Keppel DC	800MW+ gross power capacity (Jun-26 PR) + 50MW CFA2 (Aug-26)
NeutraDC	Sum of ASEAN (website)
Nxera	Sum of ASEAN (website)
PDG	1.8 GW+ portfolio (Mar-26 PR)
STT GDC	2.7GW IT load (website)

Source: Company data, Data compiled by Goldman Sachs Global Investment Research

Geographic definitions of the 6 key hubs:

- **Singapore**: The entire city-state (nationwide). All cable landing stations and DC clusters fall within national jurisdiction; capacity is governed by IMDA's Data Center Call for Application (DC-CFA).
- **Johor**: Refers to the southern Johor state cluster centered on Iskandar Malaysia, including Sedenak Tech Park (STeP), Kulai, Nusajaya Tech Park, and Pengerang. Cable landing stations include Mersing, Sedili, and Rengit. Proximity to Singapore (<5ms latency) underpins its role as the primary spillover hub.
- **Kuala Lumpur (KL)**: Refers to the Klang Valley region, encompassing Kuala Lumpur, Cyberjaya, Selangor (including Bukit Jalil, Shah Alam), and surrounding areas of the Greater KL metropolitan zone. Cable landing stations include Morib (Selangor), Cherating (Kuantan), and Melaka.

- **Bangkok (incl. Eastern Economic Corridor / EEC)**: Refers to the Greater Bangkok metropolitan area plus the EEC, which spans the three eastern provinces of Chonburi, Rayong, and Chachoengsao. Key DC sub-clusters include Amata City Chonburi Industrial Estate, Navanakorn Industrial Estate (Pathum Thani), and Sriracha. Cable landing stations include Sriracha (Chonburi), Songkhla, Satun, and Rayong. The EEC is Thailand's flagship special economic zone with BOI fast-track incentives that drive most new hyperscale commitments.
- **Jakarta (Greater Jakarta / Jabodetabek)**: Refers to the Greater Jakarta metropolitan area, spanning Jakarta, Bogor, Depok, Tangerang, and Bekasi (Jabodetabek), plus Karawang in West Java where larger hyperscale campuses (e.g., DCI H2 Karawang) are sited due to land and power availability outside the urban core. It is anchored by Indonesia's data localization regime.
- **Batam**: Refers to Batam Island within Indonesia's Riau Islands Province, including Nongsa Digital Park and Kabil Industrial Estate. It operates under a special economic zone framework with PLN Batam as a standalone utility (separate from the Java-Bali grid), enabling more commercially flexible power procurement. A <5ms latency to Singapore positions it as a Singapore-adjacent extension hub.

Disclosure Appendix

Reg AC

We, Ronald Keung, CFA, Kelsey Santoso, Timothy Zhao, Xuan Tan, CFA, Eunice Liu, Brian Singer, CFA, Xavier Zhang and Brendan Corbett, hereby certify that all of the views expressed in this report accurately reflect our personal views about the subject company or companies and its or their securities. We also certify that no part of our compensation was, is or will be, directly or indirectly, related to the specific recommendations or views expressed in this report.

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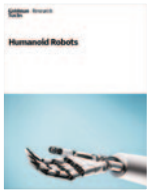
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Artificial Intelligence



Humanoid Robots



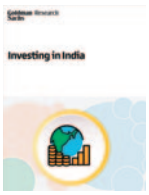
China going global



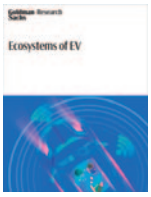
Space



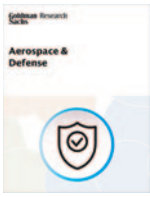
Investing in India



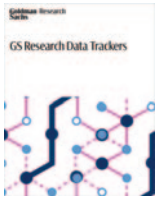
Electric vehicles



Defense



GS Research Data Trackers



Autonomous driving



China Biopharma



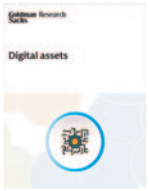
China Consumer



CHIPS Act Impact



Digital Assets



Resurgent Japan



China Grid Tech



China Property



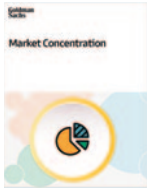
Suppy Chain Shifts



Trade and tariffs



Market Concentration



Top of Mind



Carbonomics



Market Cycles



Tracking the Consumer



Korea Value in Action



Cybersecurity and Defense



Computing Advances



Magnificent 7



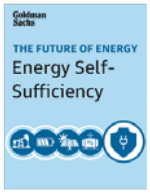
Top Projects



China Going Global



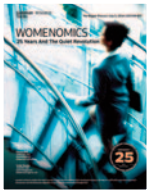
Future of Energy



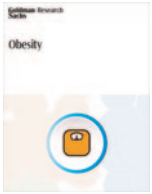
Power Demand



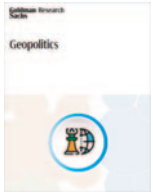
Black Womenomics



Obesity



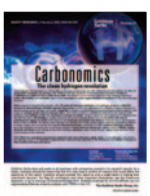
Geopolitics



Understanding China's Statistics



Clean Hydrogen



Green Capex



ESG



