

# ASEAN Data Centre Ride The Multi-Year Data Centre Wave

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# **ASEAN Data Centre**

# Ride the Multi-Year Data Centre Wave

# Conflux of positive factors creating a perfect storm

We expect data centre demand in ASEAN to increase at 20% CAGR and a potential data centre TAM of USD11b/year till 2028. Our high expectations is underscored by: 1) ASEAN is 55-70% underpenetrated in data centre supply vs more evolved markets like the US, China, South Korea and Japan; 2) rise of Al adding another leg of data centre demand growth, which also helps ASEAN companies in the global supply chain; 3) geopolitics, conducive upstream supply and favourable unit economics as tailwinds for ASEAN to emerge as a global data-centre hub. Risk of overbuild/supply is overhyped as actual capital commitment is just 40% of the theoretical new capacity announcements. Drawing insights from our analysts across sectors, economics and ESG teams, we highlight key opportunities and stock picks across the entire data centre value chain.

# Potential for ASEAN to punch above its weight

Beyond data centre demand for its own need, we see potential for ASEAN to emerge as a hub for meeting broader Asian/global data centre needs. ASEAN is emerging as a favourable destination for data centres and subsea cable builds owing to its neutral geopolitical stance and US-China trade tensions. While power/water remains a major concern globally, ASEAN is placed favourably with higher power-reserve margins and water-stress levels in line with the global average. Renewable-energy-addition targets are ~10x of incremental demand for green data centres. On capex/opex economics, ASEAN (ex SG) is 20% below the global average on the cost to build and 20-30% lower in terms of power cost.

# Oversupply concerns are overhyped

Despite high vacancy rates in some smaller markets, overall ASEAN colocation vacancies stand at 10%, a rate considered healthy and consistent with global norms. New capacity addition announcements of ~6GW, reflects 3.5x supply increase. Such builds mainly reflect theoretical capacities based on land availability, not actual capital commitments. Under-construction supplies is just 24% of the live supply while committed is 116%. These suggest, 2.4GW or 1.4x supply increase, although we doubt that even 100% of the committed supply goes live. The rest of the announcements are in early stage and we think will hit the ground based on demand development. Granular analysis shows that average data centre capacities in large markets like Kuala Lumpur and Jakarta are modest at just 9MW/facility vs large announcements in 100MW to GWs.

# Key winners in the rising data-centre wave

Among the operators/REITs we prefer Singtel, TM, Globe Tel, MINT, and YTL Power. Among industrials, our preference is for ST Engineering, Sunway, Gamuda and IJM Corp. Utilities beneficiaries would be Sembcorp Ind, YTL Power, Solarvest, Gulf Energy and AC Energy. While Tenaga (HOLD) should see demand surge from data centres, it does not translate to materially higher earnings under the current regulatory framework. In tech, we see CSE Global, Delta Electronics & FPT as potential beneficiaries.

### Analyst

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### ASEAN Data Centre Winners

	BBG Code	Current Price	Target Price	Rating
AC Energy	ACEN PM	PHP5.18	PHP8.00	BUY
CSE Global	CSE SP	SGD0.44	SGD0.60	BUY
Delta Elect.	DELTA TB	THB107	na	NR
FPT	FPT VN	VND135,300	VND160,000	BUY
Gamuda	GAM MK	MYR8.23	MYR8.00	BUY
Globe Tel	GLO PM	PHP2290.0	PHP2750.0	BUY
Gulf Energy	GULF TB	THB56.8	THB57.0	BUY
IJM Corp	IJM MK	MYR3.21	MYR3.70	BUY
Keppel REIT	KREIT SP	SGD0.96	SGD1.05	BUY
Mapletree Ind.Trust	MINT SP	SGD2.45	SGD2.15	HOLD
Sembcorp Ind.	SCI SP	SGD5.44	SGD6.00	BUY
Singtel	ST SP	SGD3.40	SGD3.70	BUY
Solarvest	SOLAR MK	MYR1.57	MYR1.84	BUY
ST Engrg.	STE SP	SGD4.69	SGD4.80	BUY
Sunway	SWB MK	MYR4.39	MYR4.37	BUY
Telekom (M)	Т МК	MYR6.74	MYR7.50	BUY
Tenaga	TNB MK	MYR14.64	MYR14.00	HOLD
YTL Power	YTLP MK	MYR3.83	MYR4.70	BUY

Source: Maybank IBG Research, Bl Note: NR - Not Rated.

Share prices as at 22 Sep closing.

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Abbreviations: PUE - Power Usage Effectiveness DC - Data Center MW/GW - Megawatt/Gigawatt RE - Renewable Energy TAM - Total Addressable Market GPU - Graphics Processing Unit IBR - Incentive-based Regulation

# 1. Key charts driving our thesis

# ASEAN is underpenetrated to begin with; AI provides an additional growth boost

# Fig 1: ASEAN data centre infrastructure is 2-3x below evolved markets like the US, China, Japan and South Korea



Fig 2: Global data centre capacity forecasts - <u>AI to drive 30% of</u> incremental data centre demand growth



# Potential for ASEAN to emerge as a data-centre hub to meet broader Asian and global data centre demand

# Fig 3: Geopolitics and US-China trade tensions favour ASEAN as a desired destination for data storage/processing



Source: Maybank IBG Research, Company, Bloomberg, Media reports

Source: Maybank IBG Research, Moody's

Fig 4: EM ASEAN data centre construction cost is on the lower side of global average. Same is true for electricity tariffs. Power and water supply also remains favourable



Source: Maybank IBG Research, Cushman & Wakefield

Limited risk of oversupply - Reality beneath the surface is different

# Fig 5: Most of the ASEAN new build data centre announcements are in early stage. Real commitments are reasonable



Source: Maybank IBG Research, DCByte, Cushman & Wakefield

# Fig 6: Granular supply analysis suggests small additions vs 100s of MW to GW theoretical announcements



Source: Maybank IBG Research, DCByte

Source: Maybank IBG Research, Company, Bloomberg

Value Capture Funnel

Data centre spend pie captured by <u>ASEAN based</u> <u>companies</u>

ASEAN data centre demand to increase 2.5x by 2028E. TAM of USD11b/year for ASEAN-based companies from: 1) ASEAN data centre construction; 2) running costs; and 3) global opportunity for companies in the data centre supply chain



### Fig 7: ASEAN data centre demand by 2028E



USD2.5bn

#### Fig 8: Data centre TAM for ASEAN-based companies and global data centre build



70%

USD5.8bn

USD11.3bn

Combined annualized ASEAN revenue opportunity

USD3.0bn

#### Key ASEAN winners in the rising data centre wave 2.

	Singapore	Malaysia	Thailand	Indonesia	Philippines	Vietnam
DC Operators	Singtel ST Engineering	TM YTL Power	AIS	Telkom Indonesia DCI Indonesia	PLDT Globe	
Networking	Singtel	TM Time dotCom Vstecs Bhd SNS Network	AIS True Corp Interlink	PT Telkom Indosat XL Axiata		
Industrials	ST Engineering Sembcorp Industries Seatrium	Gamuda Sunway Construction YTL Power IJM Corp	Infraset			PTSC
REITs/Property developers	Keppel DC REIT Mapletree Ind Trust Capitaland Ascendas REIT	Sunway Eco World Crescendo UEM Sunrise AME Elite	AMATA	Puradelta Lestari		
Tech	CSE Global	Inari Amertron Unisen Nationgate Cloudpoint Genetec Tech.	Delta Electronics Hana Electronics Bluebik Beryl8	Mastersystem		FPT CMC Technology & Solutions
Utilities	Sembcorp Industries	Tenaga YTL Power Solarvest Cypark Nestcon Reservoir Link SD Guthrie IOI Genting Plant KL Kepong Citaglobal	Gulf Energy	Medco Energi Power (subsidiary of MEDC) Barito Renewable Energy	AC Energy Meralco	

Fig 9: Key ASEAN-data-centre-demand beneficiaries

Source: Maybank IBG Research

# Fig 10: Maybank key picks on the back of data centre theme

	Code	Rec	(LC)	(LC)	(USDm)	FY1	FY2	FY1	(LC)	FY1	FY2	Analysts
Singtel	ST SP	BUY	3.37	3.70	43,083	21.2	18.3	16.8	16.1	4.7%	5.0%	Hussaini Saifee
Singtel owns 62MW of da 2026 & 400MW over the I tapping the GPUaaS spac	ta centre c LT. Aims to e	apacity in double the	SG. On top e data cent	o, adding re EBITD	58MW in SG A by FY28. S	& alongsid T's Digital I	le its re nfraCo	gional par division is	tners wil looking	l take tot to play a i	al capa role in t	city to 200MW by he AI wave by
Mapletree Ind.Trust	MINT SP	HOLD	2.46	2.15	5,400	18.8	18.5	21.2	20.4	5.4%	5.4%	Li Jialin
Industrial REIT with about this year, has identified of	it 50% of as data centre	sets consis e as a key s	sting of dat sub-sector	ta centre to drive A	s in the US, S AUM growth f	Singapore a	and Japa 7b to SC	an. Sponso 5D100-120	or, while b.	embarkin	g on its	fourth 5-year plan
YTL Power	YTLP MK	BUY	3.89	4.70	7,579	10.1	8.8	8.5	6.8	2.0%	2.1%	Tan Chi Wei
YTL has 2 DCs and is buil Johor. Besides, YTL also & property development	ding a new benefits ov	data cent ving to its	re in Johor interest in	of up to various e	72MW. It is a lements of t	collaborati he DC supp	ng with oly chai	Nvidia to n - power	develop generati	AI in YTLF on, water	o's data and se	centre park in werage, telecom
Sunway	SWB MK	BUY	4.32	4.37	5,822	30.2	26.7	36.0	31.0	1.5%	1.6%	Wong Wei Sum
Sunway has locked in MY secured MYR3.5b worth o house).	R1.3b in pr of jobs as a	operty sal It Aug 2024	es in 6M24 I. Outstand	, or 50% c ing order	of its FY24 pr book was MY	operty sale (R7.4b as a	es targe It end-J	t. its 65%- une 2024	owned S (51% is d	unway Co ata cente	nstruct r contra	ion Group has acts, 27% in-
Gamuda	GAM MK	BUY	8.22	8.00	5,505	23.8	18.4	20.2	15.8	1 <b>.9</b> %	2.0%	Wong Chew Hann
Gamuda recently secured At the same time, it also This represents Gamuda'	d the const clinched t s first majo	ruction of he MEP & or win for	a hypersca fit-out wor data centre	lle data c ks for the e jobs wo	entre in Elm e same data orth >MYR1b	ina Busines centre fror in total.	ss Park i n Pearl	from Sime Computin	Darby Pi g Malays	roperty va ia S/B vali	alued at ued at <i>I</i>	MYR815m. MYR929m.
Sembcorp Ind	SCI SP	BUY	5.41	6.00	7,467	10.2	9.6	9.4	8.8	2.5%	2.6%	Krishna Guha
SCI is the leading power signed a LT PPA with STT system in SG.	provider to GDC (up to	o data cent o 100MW) 8	res in SG v È Equinix (	vith 33% o 75MWp fr	of data centr rom its renev	e energy r vable ener	equiren gy porti	nents supp Folio). It is	lied by S also the	embcorp. largest p	In the layer in	past 12m, it has energy storage
Solarvest So	OLAR MK	BUY	1.57	1.84	263	23.8	18.7	14.9	11.7	0.3%	0.3%	Nur Farah Syifaa
For power hungry data co asset owners like Solarve	enters, ren est (50MW d	ewable po of LSS4 ass	wer requir ets + 90MW	ement re / CGPP).	mains high.	lt benefits	Pure-pl	ay solar E	PCC play	ers, Solar	and wa	ste-to-energy
Gulf Energy	GULF TB	BUY	56.75	57.00	20,223	35.7	30.4	29.8	25.9	1.6%	1 <b>.9</b> %	Natchaphon Rodianarowan
GULF is on an aggressive 20MW). GULF and Google	capacity e e Cloud anr	expansion p nounced a	bhase from multi-year	2.7GW ir agreeme	n 2020 to 8.4 nt to develo	GW in 2025 p sovereigr	5E. GUL n cloud	F has a 40 services ir	% stake i n Thailan	in GSA Dat d	ta Cente	er (first phase of
CSE Global	CSE SP	BUY	0.44	0.60	236	12.2	9.4	6.9	5.5	6.4%	6.4%	Jarick Seet
CSE is serving a major US data centres to be built g	cloud pro globally, we	vider in th e expect o	e data-cen rders for 2	tre space 026 to do	for power n puble. CSE is	nanagemer also in the	nt syster midst o	ns and sol of qualifica	utions. J ation wit	udging fro h other cl	om the loud pro	number of new oviders.

Source: Maybank IBG Research Share prices as at 22 Sep closing.

# ESG: a concern, driver and differentiator of data centre demand and investments

Large tech/cloud companies generally have strong ESG profiles, with most hyperscalers aiming for net-zero emissions by 2030. ASEAN data centres are improving energy efficiency but still lag global standards in PUE.

Green energy sourcing is a significant driver of data centre growth and investment, with evolving regulations and the rise of green financing further shaping the industry's trajectory.

As data centres continue to prioritise sustainability, they are likely to benefit from increased investor interest and potentially lower operating costs due to their use of renewable energy.

# 3. Demand drivers: confluence of multiple factors

# 3.1 ASEAN is already underpenetrated to begin with

Although ASEAN has witnessed strong data centre growth in recent years, its data centre infrastructure relative to its population or GDP size still lags that of more evolved peers such as the US, China, Japan or South Korea.

# ASEAN per unit data centre supply is just 32-46% of evolved markets like the US/China/South Korea/Japan

In a bid to compare how ASEAN is placed vs more evolved markets, we benchmark the current ASEAN data centre infrastructure (supply) on factors such as MW/GDP and MW per capita.

Admittedly, current US data centre infrastructure is not just to meet the local demand but also to meet the global demand as well as to support the evolving technological innovations, such as AI model training. To adjust for non-end-user-demand-linked US data centre infrastructure, we take only 50% of the available supply while comparing on MW per capita assuming that the remaining 50% of the infrastructure is used for meeting global demand and new use cases. For other benchmark markets/regions (China, South Korea, Japan), we assume that the current data centre infrastructure is to meet the end-user demand and very small capacities are used for futuristic projects.

Using these assumptions, we identify:

- On current data centre capacity per capita (MW per million population), installed capacity in ASEAN is just one third or ~32% compared to the evolved markets.
- On current data centre capacity to GDP (adjusted for purchasing power parity), installed capacity in ASEAN is just one half or ~46% compared to the evolved markets.

Fig	; 11:	ASEA	N data	centre	infrastru	ucture	relative	to	the	more	evolved	markets
lik	e the	e US,	China,	Japan a	and Sout	h Kore	a					

	Data center	Population	GDP (USD b)	MW/	MW/
	capacity		PPP adjusted	mn pop	GDP (USD b)
					PPP adj
US - Live	16,066		27,358		0.59
US - Adjusted	8,033	343		23.4	
China+HK	5,138	1,430	33,472	3.6	0.15
Japan	1,454	123	6,507	11.8	0.22
Korea	660	52	2,918	12.7	0.23
ASEAN	1,709	679	11,165	2.5	0.15
ASEAN per un	it data center	capacity as a %	% of:		
US				11%	26%
China+HK		70%	100%		
Japan		21%	<b>69</b> %		
Korea		20%	68%		
ASEAN per	r unit data ce				
as a % of eve	olved markets	5		32%	46%

Source: Maybank IBG Research, IMF, Cushman and Wakefield, CBRE

From the demand standpoint, drivers are equally strong in ASEAN as compared to the evolved markets of the US, China, Japan and South Korea. Moreover, we believe, ASEAN has the potential to be a data-centre hub to meet the global data centre demand (discussed in sections below).

# 4. Al: Once-in-a-generation opportunity for data centres

Al will be the most significant driver of change. Al, which frequently involves processing gigabytes of data, demands far greater computing power than typical workloads. A recent Wired article highlighted that ChatGPT's AI searches require at least 4-5 times more computing power compared to traditional searches. As AI continues to be a major force, the demand for new, customised data centres and upgrades to existing facilities is rising. As AI workloads become larger and more complex, the demand for data storage as well grows exponentially.

Data centre demand growth with AI is evident from the Nvidia (NVDA US, CP USD117.87, Not Rated) data centre GPU sales. In just the past 12 months, Nvidia sold nearly USD66b worth of GPUs to data centres. According to Bloomberg consensus, Nvidia's revenue from data centres is forecasted to grow at a nearly 71% annual rate to top USD221b by FY28. Noteworthy is the data-centre segment remains the key growth and revenue contributor for Nvidia till 2030, underpinning the strong growth for the global data centre demand.









Since the release of ChatGPT, data centre demand has surged due to the increasing computational requirements of Al. Based on various industry forecasts, global data centre demand is expected to grow at a CAGR of 17-21% over the next 5-7 years.

- According to the International Energy Agency, power demand from data centres is forecasted to grow at 21% CAGR to hit >1,000TWh by 2026. This translates to 1.0-1.3% of global electricity demand in 2022 to about 1.5-3.0% by 2026.
- Gartner estimates worldwide public cloud services end-user spending to grow at a CAGR of ~17% to exceed USD1t by 2027E. Cushman & Wakefield Structure Research forecasts annual cloud and AI revenue to increase from USD92b in 2024 to USD212b in 2028, a CAGR of 23%. Of this, AI-demand-linked revenue growth is expected to reach a CAGR of 73% to USD75b in 2028.
- Moody's expects overall global data centre demand to grow at a 2023-28 CAGR of 21%, with a big part driven by AI-linked data centre demand growing at 43% CAGR.
- According to IDC, with the growing demand of AI, data centre storage capacity is expected to grow from 10.1 zettabytes (ZB) in 2023 to 21.0 ZB in 2027, or by a CAGR of 18.5%.

Source: Maybank IBG Research, Company, Bloomberg

Source: Maybank IBG Research, Company, Bloomberg

### Fig 14: IEA's global data centre power demand forecasts (TWh)



Source: Maybank IBG Research, IEA



#### Fig 16: DC Byte's global data centre capacity forecasts (GW)

# Fig 15: Gartner's worldwide public cloud services end-user spending forecast (USD m)



Source: Maybank IBG Research, Gartner





Source: Maybank IBG Research, Moody's

# Beyond abstract commitments to shovels hitting the ground

Here's a summary of new data centre projects announced in the past year, with construction expected to accelerate:

Amazon (AMZN US, CP USD189.87, Not Rated): In 1H24, AWS unveiled USD50b in new data centre projects, including 216 new buildings. Over the next 15 years, Amazon plans to invest USD100-150b in data centres. Recent commitments include an USD11b campus in Indiana, USD10b across two Mississippi campuses, USD5.3b in Saudi Arabia, a new nuclear-powered data centre in Pennsylvania, and a USD15b investment in Japan.

**Microsoft** (MSFT US, USD438.69, **Not Rated**): Microsoft, with 5GW of energy capacity, plans to double its new data centre construction in 2024. Recent investments include USD3.3b in Wisconsin, USD1bn in Indiana and Georgia, USD4.3b in France, and additional projects in Germany, the UK, Sweden, Spain, Malaysia, Indonesia, Kenya, and Mexico. There are also reports of a USD100b stargate data centre, although this is not yet confirmed.

**Google (GOOGL US, CP USD162.14, Not Rated):** Google Cloud Platform (GCP) is investing heavily to attract Al companies, with new data centres including a USD2b facility in Indiana, a USD1b centre in Kansas City, and other significant investments in Finland and Iowa. Google is also scaling its Tensor Processing Units clusters to support growing Al needs.

**Meta** (META US, CP USD559.10, Not Rated): Meta, focusing on internal AI projects like Llama, is expanding its data centre capacity. Recent developments include the acquisition of 350,000 H100 GPUs and the construction of 4 new data centres in the US to support its AI initiatives.

Source: Maybank IBG Research, DC Byte

# 5. Potential for ASEAN to punch above its weight

# 5.1 ASEAN's non-aligned position - a conducive backdrop to building data centres

Southeast Asia has emerged as a top beneficiary of the "China Plus One" strategy where businesses seek to reduce the risks associated with full reliance on China's market or supply chain. On the similar lines, we think Southeast Asia's non-aligned standing from the geopolitical side is also going to help attract data center builds in the region, in our view.

China has been devoting resources into building its own national data center system, based in eight hubs, by 2025. There appears to be an <u>oversupply</u> of data centers in the mainland, after a period of rapid capacity expansion. However, the industry remains dominated by local players and aimed at serving domestic needs. On top of geopolitical concerns, the Chinese authorities' stringent laws governing cybersecurity and cross-border data flows limit its use as an Asian hub.

By contrast, the non-aligned ASEAN region offers a shelter from geopolitical tensions and the tech war between the US and China. Western tech firms are shying away from data center investments in China, due to growing security concerns and the US' tech controls on China. Data centers are reliant on advanced processor chips, an area which the US has imposed export restrictions to China. Moreover, amid intensifying cybersecurity concerns, it is becoming increasingly essential that data is stored in friendly nations, to mitigate the risk of sensitive data falling into the hands of countries considered adversaries.

Besides the reduced risk of getting ensnared in tech and other regulatory restrictions, Southeast Asia offers a friendly business environment for Chinese firms, stemming from warm inter-governmental relations. In contrast, governments in other West-leaning jurisdictions have been wary of receiving investments from Chinese tech firms, given national security risks stemming from alleged links to the Chinese government.

Thus besides factors like cost advantage, power availability, user proximity etc, factors like data sovereignty/sensitivity also play a key role while identifying the location to host data. There are precedents where companies/organisations moved location of their servers to a more neutral location in response to regulatory requirement or as a proactive approach to avoid regulatory scrutiny.

# Fig 18: News flow of data and data centers shifting out of China in the wake of US-China trade tensions

TikTok moves all US traffic to Oracle servers.				
Naver, South Korea's largest internet portal, has confirmed that it moved its overseas data backup centre from Hong Kong to Singapore.				
TikTok rival Bigo shifts servers from Hong Kong to Singapore.				
Multinationals in China accelerate push to decouple data. Financial Times				
Federal bodies struggle to exit Chinese-owned data centre. Financial Review				
Source: Maybank IBG Research Various sources				

From Maybank's macro team -Data centre, China and Geopolitics Geopolitics in submarine cable infrastructure is already visible. Could have a spillover effect on ASEAN data centre demand. Since 2020, US policy has increasingly aimed to exclude Chinese companies from telecom infrastructure, citing security concerns. This shift has led to significant alterations in planned sub-sea cable projects, such as Google's decision to modify a major undersea cable project to exclude China. According to a media article (<u>link</u>), China is projected to have just 3 undersea cables laid after this year, a number that is less than half of the cables planned for Singapore. This reduction in undersea projects is likely to impact the development of data centres in China as well. Meanwhile, demand for data traffic between the US and Asia remains strong, with several new cable projects planned for Japan, Singapore and Guam.

# 5.2 ASEAN utility infrastructure remains an enabler

# Electricity is the new gold in the competition to expand data centre capacity

**Power unavailability is a major inhibitor for data centre development in developed markets.** Globally, particularly in the developed markets, the strong data centre demand is increasingly challenged by inability of power utilities to meet the downstream power demand. Over the past 24 months, data-centre operators have struggled to add the desired capacity in key regions, both in the US and internationally, due to difficulties in accessing power within a reasonable timeframe. For instance, average construction timelines ranged between 1 and 3 years from 2015 to 2020, which according to CBRE, has increased to 2-4 years and in some cases by as many as 6 years, mainly owing to power delays.

As a result, hyperscalers are increasingly considering diversifying their compute capacity to other locations to mitigate future delays.

In the US, 3% of the total power demand is already coming from data centres, which is expected to increase to -8% by 2030. In other words, US power demand is projected to grow by a 2.4% annual rate through 2030, compared to roughly 0% growth over the past decade. Of the incremental power demand, -40% is attributed to data centres. Given the tepid power demand growth of the past and the lack of investments in new supplies, this is leading to a power supply crunch for data centres. Northern Virginia remains the largest market in the world for installed capacity and new absorption, but it still faces long lead times for securing new power.

In Europe, EirGrid, the state-owned power operator, has effectively imposed a moratorium on new data centres by postponing their grid connections until 2028. Similarly, Amsterdam has introduced new regulations that will fine data centres for failing to shut down idle servers to save energy.

In Asia, Singapore imposed a moratorium on new data centre build from 2019-21 mainly owing to power constraints. We estimate ~13% of the Singapore power demand is coming from data centres, (second highest globally after Ireland at ~25%).

We anticipate the emergence of new data-centre markets where land is available and access to affordable, renewable power is better. This will be crucial for operators aiming to develop and build efficient sites more quickly. **Data centres are moving to the power generation source.** Confronted with major difficulties in powering data centres, some data-centre operators are now embracing a novel approach: positioning data centres closer to power generation sites. **Amazon Web Services (AWS)** in Mar 2024 acquired Talen Energy's 960MW data-centre campus next to the Susquehanna nuclear power station in Pennsylvania. As part of the deal, Talen will also supply AWS with energy via a 10-year power purchase agreement (PPA) from the Susquehanna site.

Fig 19: Susquehanna nuclear plant in Salem Township, Pennsylvania, along with the data centre in the foreground



Source: Maybank IBG Research, Talen Energy

# Emerging ASEAN electricity market (including renewables) remains well supplied

Overall, the electricity market in Emerging ASEAN remains well-supplied, with ongoing investments in generation capacity, infrastructure, and technology. Reserve margin of electricity<sup>1</sup> in ASEAN is at a comfortable 30-80% and well above the global average, suggesting the region is well-supplied.

**Green energy generation is also ramping up.** According to a study by Bain and Company, Temasek and GenZero, renewable energy generation share in various Emerging Markets ranged from 18-43% in 2021, which is targeted to increase to 30-47% by 2030 (Singapore is an exception as it depends highly on imported renewable energy/fuel). Assuming the above targets (from Bain and Company, Temasek and GenZero) are met, we estimate ASEAN countries will add 60-70GW in incremental renewable energy generation capacities. This compares to an incremental 4-5GW of power demand from data centres. On the other hand, our ESG team notes that solar and wind is at a nascent stage of development in most ASEAN countries and as such ramp up will take time (solar and wind accounted for 4.4% of the electricity generation). Given that there could be mismatch in terms of renewable energy coming onstream and data center demand and as such in the near term new data centers may still have to rely on conventional energy.

**ASEAN grid infrastructure is new and expanding.** ASEAN grid infrastructure is also relatively young at 20-25 years on average vs 45-50 year in Europe and 35-40 years in the US. While there are localised challenges and disparities in ASEAN, regional grid projects like the Laos-Thailand-Malaysia-Singapore Power Integration Project and the Borneo-Indonesia-Malaysia-Philippines Power Interconnection Project exemplify efforts to enhance electricity connectivity.

<sup>&</sup>lt;sup>1</sup> Reserve margin of electricity - Reserve margin (operating): The amount of unused available capability of an electric power system (at peak load for a utility system) as a percentage of total capability

# Fig 20: ASEAN power infrastructure - installed capacity, peak demand and reserve margins



Source: Maybank IBG Research, Power regulators, Tenaga, Meralco





Source: Maybank IBG Research, Bain and Company, Temasek, GenZero study





Source: Maybank IBG Research, Power regulators, Tenaga, Meralco, Energy and Cleanair,  ${\sf JEPIC}$ 







# What about water?

Besides power, water is also critical for data centre operations needed for crucial operations like cooling, fire suppression and maintenance. According to a study by Lawrence Berkeley National Laboratory, a data centre with a capacity of 100MW uses about 1.1m gallons of water per day for cooling.

While the water demand for data centres is high, we think the pressure on the existing infrastructure is not as high as for power. For instance, in Singapore, data centres take away 13% of the total power demand vs just 4% of the total water consumption, based on our estimates.

On the water-stress ranking, ASEAN countries rank in the middle of the pack. Admittedly, the country level water stress table is less relevant as data centres are concentrated within key markets/cities and thus the local water availability is more relevant.

**In Malaysia,** Johor's water-reserve margins (the difference between production capacity and usage) is at a comfortable 16.9%, which has improved 5ppt points in the past 3 years. According to a media report (<u>link</u>), Ranhill SAJ Sdn Bhd, Johor's water operator, aims to increase its reserve margin to 25% in 2029. On the other hand, Selangor/KL/Putrajaya is also at a comfortable level of 15.3%.

While it's difficult to estimate the water availability in cities such as Jakarta, Bangkok and Kuala Lumpur, we estimate the water requirement of the upcoming pipeline of data centres relative to the cities' overall water needs is -1%, and as such it's not a material strain on these cities' water infrastructure.



Source: Maybank IBG Research, World population review

# 5.3 Another enabler: construction and operation cost at the lower end of global average

From the total cost-of-ownership standpoint, ASEAN data centres also look attractive. On the cost-of-construction standpoint, the Philippines has the lowest cost at USD4.6mn/MW, while other Emerging ASEAN markets are also on the lower side of the global average at <USD9m/MW.

In terms of power cost, which we estimate constitutes ~35-40% of data centre operating cost, Indonesia, Malaysia and Vietnam have the lowest cost of per unit electricity at 40% below that of the US and 70-80% lower than Australia and Japan.

Singapore is on the higher side of the capex and opex equation. A part of it is linked to higher PUE specification demanded by the Singapore regulator.

Admittedly, China/India also look favourable from the total cost-ofownership standpoint. However, as discussed, we think geopolitics remains a factor that in turn can tilt data hosting/processing in favour of ASEAN.

Fig 25: Data centre construction cost index comparison of ASEAN vs major data-centre markets (cost per MW)



Source: Maybank IBG Research, Cushman & Wakefield, Turner & Townsend

Fig 26: Average electricity tariff comparison of ASEAN and major data-centre markets



\* Commercial power tariffs, \*\*Post CREATE MORE implementation, Data centres included in commercial. ^Industrial power tariff, @Estimated PPA agreement range Source: Maybank IBG Research, World Population Review, Tenaga

# Government incentives/favourable regulations to support development of AI and data centre sectors

Local governments in various Emerging ASEAN markets are offering incentives to attract data-centre operators. These incentives may include tax breaks, grants and expedited approvals for development projects.

i ig Z7, Obvernment tax incentives and regulatory support to grow Allada centre sectors
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	Category	Details			
Malaysia	Tax incentive	<ul> <li>Companies under the Digital Infrastructure Providers (DIP) such as data centres and submarine cables category may qualify for an investment tax allowance of 100% on capital expenditure for qualifying activities that can be offset against up to 100% of statutory income for a period of up to 10 years.</li> <li>The Malaysian government's media arm plans to increase the number of Internet Exchange Point (IXP) providers from 12 to 60</li> </ul>			
	Infrastructure	number of Internet Exchange Point (IXP) providers from 12 to 66 by 2025			
Indonesia	Tax incentives and eased regulations	<ul> <li>Tax holiday of up to 10 years</li> <li>Exemption from withholding tax on dividends</li> <li>Easier process for repatriating profits</li> <li>Foreign ownership restrictions lessened</li> <li>Ability for foreign companies to own land for data centre projects</li> </ul>			
Philippines	CREATE MORE bill	<ul> <li>CREATE MORE seeks to attract power-hungry industries by significantly reducing power costs.</li> <li>The bill specifies that RBEs can now use 100% (up from 50%) of their power expense as enhanced deductions to taxes.</li> <li>The bill specifically mentions cyber-security, AI and data centre facilities as part of tier-3 industries that will be granted the maximum period of incentives.</li> </ul>			

Source: Maybank IBG Research, Asian Insiders

#### 6. Risk of over supply is over hyped

# Key ASEAN market DC vacancies look high on the surface....

Data centre vacancies in markets such as Jakarta, Manila and Ho Chi Minh look high at 34-55%. However, we note that those markets are still relatively small in the ASEAN context and had seen a step supply increase in 2023, which we think will be absorbed with a lag. Mature Singapore market only saw a 11% increase in live capacities in 2023 vs 30-60% capacity increases for the other markets owing to their smaller size/low base to begin with.

Johor remains an exception, which witnessed a 7-8x increase in capacity in 2023 but was instantly filled with vacancy rate of just 4% by end-2023.

# ....but at the aggregate level ASEAN vacancy levels are in line with the global averages

While the smaller market vacancies is high as per Cushman and Wakefield report, we note that ASEAN co-location vacancies at an aggregate level is at 10%. We see 10% vacancy rate or 90% utilisation as being guite healthy and is broadly in line with the global averages.

Fig 28: Key ASEAN market data centre vacancies look high on the surface....







Fig 29: ....but at the aggregate level it's in line with the global

Source: Maybank IBG Research, Cushman and Wakefield, DC Byte

# Big announcements, but reasonable commitments

One of the main investor concern has been the risk of overbuild. Such concerns are fueled by large capacity build announcements often in multiples of 100s of MWs or in some instances in GWs. Such large capacity build announcements suggest capacity additions to grow in multiples of existing supply whereas demand is expected to only increase in mid-teens leading to a huge supply-demand imbalance. According to DCByte, live capacity in Asia Pacific is currently ~11GW, whereas under construction and announced builds is ~25GW, leading to >2x increase in supply in the coming years.

While announcing new projects, companies typically announce data centre capacities depending on the theoretical build that can be supported by the land parcel they acquire/lease. However, we note that land is just a 10% of the total capital commitment to build the data centre and as such doesn't reflect the actual commitment. Data centres after all are a highly capexintensive venture and require long-term commitments, such as power purchase agreements etc. So when it comes to actual builds, these are the factors that come into play and as such restrict the speculative buildout.



#### Fig 30: Data centre new build announcements are in 100s of MWs or in GWs

Indonesia's Sinar Mas Group sets ground works budget ahead of 1GW data centre roll out - The Tech Capital

Princeton Digital aiming to build 150MW hyperscale data center in Malaysia - Business times

STT GDC has >500MW of data centre capacity in SEA, both operational and under construction - STT GDC

YTL Power is developing a 500MW data centre park under YTLDC -The Star

The phase 1 of the campus [in Johor] boasts....along with a total IT power capacity of 69.5 MW - GDS

AirTrunk enters Malaysia with new 150+MW hyperscale data centre in Johor Bahru - AirTrunk

Source: Maybank IBG Research, Media reports, Company announcements

Risk of overbuild amplifies in ASEAN. According to DCByte, a large portion of under construction and announced data centre builds are concentrated in ASEAN, particularly in Emerging ASEAN or ex Singapore. Relative to Asia Pacific where under construction/announced data centre build is 2x of the live capacity, same for ASEAN is at 4x and for Emerging ASEAN it's 8x.





Source: Maybank IBG Research, DCByte, Cushman and Wakefield

by market				
MW	Total Live	Total under construction	Total Committed	Tota Early Stage
ASEAN				
Cambodia	17	5	11	-
Indonesia	236	65	541	677
Malaysia	280	159	766	2,016
Philippines	61	50	86	422
Singapore	988	69	387	1

Fig 33: APAC live supply vs under construction/announced data-centre builds

Cambodia	17	5	11	-
Indonesia	236	65	541	677
Malaysia	280	159	766	2,016
Philippines	61	50	86	422
Singapore	988	69	387	1
Thailand	66	44	132	400
Vietnam	46	10	42	45
Other AsiaPac market	S			
Australia	1,054	294	1,449	1,127
China	4,517	919	1,536	324
India	768	568	1,723	3,224
Hong Kong	621	124	454	45
Japan	1,454	357	1,500	972
New Zealand	79	15	57	110
South Korea	660	274	764	1,129
Taiwan	253	47	52	18
Sources Maybank IPC Bos	arch DCPuta			

nk IBG Research, DCByte





Source: Maybank IBG Research, Cushman and Wakefield, DC Byte

# Show who's got what it takes - actual commitments are far below grand announcements

While the actual announcements are big, actual deployment on the ground is small. According to DCByte, capacities under construction in ASEAN are just 24% of the live capacity. Assuming capacities under construction become operational in 18-24 months, this suggests an annualised capacity addition of 11-15%, which is below our estimated demand growth projection.

**Won't committed build hit the supply?** According to DCByte, committed supply (see Glossary for the DCByte definition of committed supply) is 116% of the ASEAN live supply. Assuming 100% of the committed builds come live over a 24-48-month timeframe, this suggests an annualised supply increase of 24%. Admittedly, it is on the higher side vs. expected demand growth of 20%. However, we question whether 100% of the committed builds will hit the ground. Assuming 80% of the committed builds is actually deployed in a timely manner, this would result in an annualised supply increase of 20%, which would broadly mirror the demand growth.

# Granularity of actual supply deployment casts doubt on grand supply increases

A granular analysis of actual capacity deployment as per Cushman and Wakefield's compilation paints a different story. The average capacity per data centre in emerging markets like Kuala Lumpur and Jakarta is about 9MW. This in turn suggests that beyond the hypes of big capacity announcements, actual deployment per project is small and likely to be rationalised by the demand outlook.

# Fig 34: Granular tabulation of capacities under construction

Singapore				Kuala Lumpur				Jakarta 💦			
		POWER	STAGE - EST.			POWER	STAGE - EST.			POWER	STAGE - EST.
Operator	DATA CENTRE	(MW)	RFS	Operator	DATA CENTRE	(MW)	RFS	Operator	DATA CENTRE	(MW)	RFS
AirTruck	SGP1	6.0	U/C	AINAC	Cyberjaya	8.0	U/C- 2024	<b>DD</b> <sub>1</sub>	CKG1	3.0	U/C
AITTUIK	SGP2	23.0	Planned	AIIVIS	Bukit Ceylon	5.0	U/C- 2025	BDX	CGK3A	5.0	U/C
	SG1	20.0	Planned		Miranti Park	8.0	Planned	DCI	E1 DC Campus	8.0	U/C 2024
Equinix	SG4	6.0	Planned	Bridge DC	MY02	5.0	Planned		H1-JK5	3.0	U/C 2024
	SG6	20.0	Planned		MY03	8.0	Planned		H1-JK6	9.0	U/C 2024
GDS	SG1	20.0	Planned		Bukit Jalil	22.4	Planned	DCI Indonesia	E1	4.0	U/C 2024
Keppel DC	Singapore 7	20.0	U/C	Edge Connex	CBD	6.0	Planned		H2-01	5.0	U/C 2024
Racks	RC1	2.0	U/C		Cyberjaya	22.4	Planned		H2-02	10.0	U/C 2024
YTL Data Center	YTL Data Center	1.0	U/C	Equinix	KL1 IBX	2.5	U/C 2024	Digital Edge	Edge2	18.8	Planned
Singtel	Tuas Data Centre	58.0	U/C	Cyberjaya	Cyberjaya	12.0	U/C-2024	Edge Connex	Bekasi	10.0	U/C-2025
ST Engineering		7.5	Planned	Next DC	KL1	7.5	Planned	Equinix	JK1	3.5	U/C-2025
				NTT	CBJ6	7.0	Planned	K2 DC	JKT1	8.4	U/C-2024
				Open DC	CJ1	1.0	Planned	MattaDC	ID01	20	U/C
				ST Tolomodia	Cyberjaya DC.2	2.8	Planned-2024	WIEttaDC	ID02	2.4	Planned
				31 Teleffieula	Kuala Lumpur 1	4.2	Planned-2025		JKT2	12.0	Planned
				VADS	KVDC	7.5	Planned	NTT Data	Jakarta 3	15.2	U/C
					KUL13	5.0	U/C - 2024				
				Vantage	KUL14	16.0	U/C - 2024				
					KUL2	25.6	Planned				
				YTL Data Cente	r Sentul Data Center 1	1.0	Planned				
Under construct	ion	87.0		Under construe	tion	48.5		Under constru	ction	104.1	
Planned		96.5		Planned		128.4		Planned		33.2	
Average build pe	er DC	16.7		Average build p	per DC	8.8		Average build	per DC	8.6	

Source: Maybank IBG Research, Cushman and Wakefield

4,214

2028E

3.632

2027E

# 7. Potential ASEAN TAM of USD11b/year by 2028

**Triangulating ASEAN data centre demand growth potential.** For our ASEAN data centre growth projection, we apply the following assumptions: 1) evolved markets data centre demand growth of 10% over 2023-28E; 2) we assume ASEAN under-penetration vs evolved markets to narrow by 10ppt by 2028E adding an additional 5ppt in growth; 3) ASEAN able to capture 1% of global data centre demand on top of its own requirement, adding an additional 6ppt in growth. Combined, we see ASEAN data centre demand can increase at 20% CAGR over 2023-28E.

Fio	35.	ΔSFΔN	data	centre	demand	growth	drivers
i ig	55.	AJLAN	uata	Centre	uemanu	growth	univers.



EAN DC 2023 2024E 2025E 2026E 2026E

1,694

4,500 4,000

3,500

3,000

2,500

2,000

1,500 1,000

Source: Maybank IBG Research, Company, Bloomberg

Source: Maybank IBG Research, Company, Bloomberg

#### How ASEAN companies will capture the value?

On the back of ASEAN and global data centre demand boom, we think ASEAN-based companies will capture the value under 3 heads:

- 1. Data-centre capex in ASEAN
- 2. Data-centre opex in ASEAN benefitting data-centre operators and upstream service providers, such as REITs and utilities
- 3. Global data-centre capex benefitting ASEAN-based companies in the value chain

**Triangulating the TAM.** We estimate total ASEAN data centre TAM at USD11b/year by 2028.

**USD3b in revenue from data-centre capex.** New builds of around 500MW/year could result in data-centre capex (including server/storage and auxiliary capex) of USD12b. We estimate only 25% of it will be captured by the ASEAN-based companies such as Gamuda, while the rest will be captured by the global tech and E&E names like ABB (ABBN SW, CP CHF 48.57, Not Rated) and IBM (IBM US, CP USD213.89, Not Rated).

**USD6b in revenue from data-centre opex.** In ASEAN, we estimate total data-centre capacity reaching 4.2GW by 2028. At a leasing rate of USD150/kw/month and 80% utilisation rate, we estimate annual data centre leasing + power revenue of USD9b/year. We estimate 70% of it will be captured by ASEAN-based operators like Singtel and power utilities like Tenaga.

**USD3b in revenue from global data-centre capex.** Global data centre build would result in an annualised USD97b in data-centre capex. We think ASEAN-based companies in data-centre upstream segments such as Delta Electronics and CSE Global can capture 2.6% of that by 2028.

Fig 36: ASEAN data centre demand by 2028E

2,101

2.5x

2,564

3,077

#### Detailed analysis in the next section





Source: Maybank IBG Research

#### Fig 38: Data-centre capex composition by infrastructure and Fig 39: Data-centre capex composition by infrastructure servers/storage





Source: Maybank IBG Research, Public Comps

Source: Maybank IBG Research, Public Comps

### Data centre capex in ASEAN - potential revenue opportunity of USD3b/year

We estimate annual new data centre additions of 500~MW/year and per MW capex of USD10m. This would result in the revenue opportunity emanating out of data-centre capex in ASEAN of USD5b/year by 2028.

If we also include the server, storage and interconnect capex (which is installed by the data-centre tenant and not by the data-centre operator), this adds another revenue opportunity of USD10.6b/year.

Finally, data centres will also drive investments in auxiliary capex, such as new power plants, grids and fiber etc. We estimate this capex at ~20% of the data-centre capex. This in turn translates to USD1.2b in add-on revenue opportunity for the companies in the auxiliary capex supply chain.

Notably, not all of these revenues will be captured by the ASEANbased/listed companies, as a major chunk of that opportunity will be captured by the global tech companies. However, we note that the ASEANbased/listed companies in the data centre/tech supply chain in turn would as well benefit from the spurt in global data centre build demand.

On a net basis, we estimate ASEAN-based/listed companies can capture a quarter or USD3b in data centre-capex-linked revenues by 2028.

Fig	40: A	SEAN	data-centre-build	(capex	portion)	revenue	opportunity	/ by	2028
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	Unit	Quantum	Comments
Data center capacity addition	MW	470.1	Capacity addition in 2028
Capex per MW	USD m	10.2	Per MW data center capex in 2028
Annual data center capex	USD m	4,795	
Compute, network and storage			50-60% of data center capex captured by
capex	USD m	5,860	this head
			25% of the core data center capex.
			Auxilliary capex includes Power plants, grids,
Annual auxilliary capex	USD m	1,199	telco network infrastructure etc
Gross data center capex linked			
revenue opportunity (per yr)	USD m	11,853	
ASEAN based company's share			ASEAN based companies capture 30% of the
of data center capex pie	USD m	2,963	capex spend pie

Source: Maybank IBG Research, Dgtl Infra

# Data-centre opex in ASEAN - potential revenue opportunity of USD6b/year

Annual spending by a retail/enterprise tenant to lease data-centre space from a co-location operator such as Singtel or Equinix EQIX US, CP USD870.99, Not Rated) can be broadly put into 3 buckets. Annual leasing cost to the data-centre operator, power cost, which is a passthrough to the data-centre tenant, and other costs, including taxes.

Average leasing cost for a retail co-location in Singapore is over USD300/kw/month, according to CBRE. Based on CBRE data, wholesale colocations are 20-25% cheaper compared to retail co-location pricing while hyperscale co-location (as they rent larger spaces) is ~50% cheaper compared to retail co-location. We also estimate the same pricing in various Emerging Markets could be 20-30% cheaper than Singapore owing to lower data centre opex/capex and a more favourable demand-supply situation. For our analysis, we estimate monthly rental at USD150/kw, assuming a bigger skew towards hyperscalers-leased data centres and a bigger skew (going forward) towards Emerging Market ASEAN data centres. We assume, data centre utilisation of ~80%.

We estimate per unit power cost at USD9.6cents/kwh. We note that power cost in Singapore is much higher at USD10-15cents/kwh, however, we take a lower number by factoring a bigger skew towards Emerging Markets.

Finally, we assume other costs (including taxes) at 9% of the overall data centre leasing rate, in line with CBRE's computation (<u>link</u>).

Based on these assumptions, we estimate annual data centre opex spending in ASEAN of USD8b by 2028.

We estimate that ~70% or USD6bn of the linked opex (revenues for companies Singtel, STT, Tenaga etc) will be captured by ASEAN based companies.

#### Fig 41: ASEAN data centre opex spending per year by 2028

	Unit	Quantum	Comments
Data center capacity (2028 avg)	MW	3,923	Capacity addition in 2028
Utilization	%	80%	Per MW data center capex in 2028
Leased capacity	MW	3,138	
Rental rate per month	USD	150	
Annual leasing spend	USD mn	5,649	
Power cost per kwh	USD c	10	
Annual utility spend	USD mn	1,860	
Other costs	USD m	743	
Gross data center spend			
(per yr)	USD m	8,251	
ASEAN based company's share			ASEAN based companies capture 70% of
of data center opex pie	USD m	5,776	the opex spend pie

Source: Maybank IBG Research, Dgtl Infra

### Potential revenue opportunity of USD2.5b/year for the ASEANbased data-centre/tech-supply-chain companies

On top of the direct data centre capex/opex spending in the region, tech/electronics companies such as Delta Electronics in Thailand and CSE Global in Singapore would also benefit from the global data centre buildout demand. Based on various sources, current global data centre capacity stands at 30-35GW and is expected to expand at a CAGR of 17-21% till 2028 - an annual capacity addition of 10GW.

Assuming a similar per MW capex of USD10m, we estimate total annual capex of USD97b. Further, ~60% of that will be on electrical, cooling and mechanical systems, which we estimate will benefit companies in the global supply chain. Based on industry sources (link, link, link), ASEAN contribution to global electrical and electronics (E&E) is ~15-20%. Assuming that 50% of the E&E capex in data centres is export-dependent, we estimate ASEAN can capture USD5b of the global data-centre capex pie. However, we do qualify that a major chunk would be captured by global E&E companies with operations in ASEAN, like Siemens (SIE GR, CP EUR169.68, Not Rated) and Arista (ANET US, CP USD379.32, Not Rated), etc.

Fig 42: Global data centre build (capex portion) revenue opportunities for ASEAN companies (by 2028)

	Unit	Quantum	Comments
Global per year data center			
capacity addition - ex ASEAN	MW	9,500	Capacity addition in 2028
Capex per MW	USD m	10.2	Per MW data center capex in 2028
Global per year data center capex			
- ex ASEAN	USD m	96,900	
E&Ecomponents in data center			
capex	%	60%	
% dependence of E&E			
componenets on imports	%	50%	
ASEAN contribution to global E&E			
exports	%	15-20%	
Total capex revenue			
opportunity	USD m	2,544	

Source: Maybank IBG Research, Dgtl Infra

### ESG: a concern, driver and differentiator of 8. data centre demand and investments

# Global electricity demand from data centres could double towards 2026

The International Energy Agency (IEA) estimates data centres, cryptocurrencies, and AI consumed about 460 TWh of electricity worldwide in 2022, almost 2% of total global electricity demand. Depending on the pace of deployment, range of efficiency improvements as well as AI and cryptocurrency trends, IEA expects global electricity consumption of data centres, cryptocurrencies and AI to increase to over 800 TWh; 1.4-2.3x over 2023-26. Traditional data centres would be the driver of this growth. However, the bigger driver will be dedicated AI data centres.

### Fig 43: Global data centre electricity consumption forecast to rise to 650-1,050TWh by 2026 from 460TWh in 2022



### Fig 44: Projected data centre-led electricity usage in key evolved markets

- US data centre electricity consumption is projected to rise significantly, from 4% of US electricity demand in 2022 to 6% 2026.

- In China, the State Grid Energy Research Institute predicts that data centre electricity use will double to 400 TWh by 2030 compared to 2020, while the IEA expects it to reach around 300 TWh by 2026.

- In the European Union, data centre electricity consumption was just under 100 TWh in 2022, making up nearly 4% of total EU electricity demand.

Source: Maybank IBG Research, IEA, State Grid Energy Research Institute

Source: Maybank IBG Research, IEA

Green data-centre initiatives on the rise; tightening in energy efficiency regulations for data centres

Tightening in energy efficiency regulations for data centres. Globally, countries and regions are tightening their energy efficiency regulations to reduce energy usage (Fig. 35).

Climate commitments of major cloud companies. Hyperscalers are estimated to drive 30% of the data centre demand globally. All 4 hyperscalers have progressive net-zero commitment between 2030-40. Hyperscalers green credentials in turn will be a driver for green energy, not just for their own captive data centres but also for the third-party data centres they lease from the operators.

i ig 45. Data c	entre energy enriciency regulations (key markets)
Country	Environmental requirement
Netherlands	<ul> <li>New data center to have PUE of 1.2 or less</li> <li>Existing data center must achieve PUE of 1.3 or less</li> </ul>
Germany	- Data centers that begin operations on or after July 1, 2026, must achieve a PUE of less than or equal to 1.2.
	<ul> <li>PUE of newly built largedata centers shall be</li> </ul>

Fig 45: Data centre energy efficiency regulations (key m	arkets
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China	<ul> <li>reduced to below 1.3</li> <li>PUE of data center in severe cold and cold regions shall be reduced to below 1.25.</li> </ul>
Singapore	- Data center moratorium from 2019-21 - New data center to have PUE of 1.3 or less
Source: Maybank II	BG Research, MIIT, EnEfG

# Fig 46: Net-zero commitments of key hyperscalers

Hyperscaler	Data center environmental adherence
Amazon	<ul> <li>In 2023 Amazon matched all of the electricity consumed across its data centers with 100% renewable energy.</li> <li>AWS committed to return more water to communities than it uses in its direct operations by 2030</li> </ul>
Google	- Run on 24/7 carbon-free energy on every grid where we operate by 2030
Microsoft	<ul> <li>100% renewable energy by 2025</li> <li>Water positive by 2030 (replenish more water than it consume)</li> </ul>
Courses Houberly I	PC Desearch Company

Source: Maybank IBG Research, Company

# ASEAN data-centre operators upping green commitments, but behind their hyperscale customers' needs

### Fig 47: Net-zero commitments of key data-centre operators active in ASEAN

	Group sustainability commitment	DC PUE	CDP score
Singtel	<ul> <li>Singtel Group Scope 1 &amp; 2 to reduce by 55% by 2030 vs. FY23 levels</li> <li>Scope 3 target to reduce 40% by 2030 from FY23 baseline</li> </ul>	<ul> <li>Tuas DC will have a PUE of 1.23 at full load</li> <li>DC West designed at PUE of 1.4</li> </ul>	А
Telekom Malaysia	<ul> <li>Net Zero emissions by 2050</li> <li>Target of ISO14001 and Eco-Management and Audit Scheme (eMAS) certifications</li> </ul>	Average PUE: 1.6 to 1.8	В
Keppel DC REIT	<ul> <li>Reduce scope 1 &amp; 2 emissions by halve by 2030 vs. 2019 baseline</li> <li>Introduce renewable energy to at least 50% of the colocation assets</li> <li>by 2030</li> </ul>	1.3	B-
STT GDC	<ul> <li>Exploring more sustainable fuel sources</li> <li>40% reduction in casrbon intensity by 2026</li> <li>60% renewable energy consumption by 2026</li> </ul>	1.5	NIL
NTT Data Centers	<ul> <li>Net zero by 2040 - Reduce Scope 1 and 2 by 68%</li> <li>Reduce Scope 3 by 42%</li> </ul>	1.72 PUE	А
Bridge Data Centers	<ul> <li>Reduce greenhouse gas emissions in the operational and value chain domain by 90%;</li> <li>By 2040, all global self-owned data center computing parks will use 100% green energy</li> </ul>	Average PUE of group: 1.21	A-
AirTrunk	- Net zero by 2030 for Scope 1 and 2; - 100% of electricity used at AirTrunk sites is sourced or matched with renewable by 2030	Operating PUE of 1.32 and long-term target of 1.23-1.28	В
Equinix	<ul> <li>Reduce scopes 1 &amp; 2 GHG emissions by 50% compared to 2019</li> <li>baseline by 2030</li> <li>Reduce scope 3 GHG emissions vs. 2019 baseline by 2030</li> </ul>	Annual average of 1.42	A

Source: Maybank IBG Research, Company

# Do green data centres lead to better returns?

As can be seen in the tables below, data-centre companies have aggressive decarbonisation targets and due to their proactive use of renewable energy their ESG risk rating is medium to low.

As such, it is not possible to quantify if green data centres command any pricing premium or other specific advantage over their peers that use fossil energy. However, several data centres are coming under the REIT structure and they would use green/sustainable bond financing as a source, which tends to be slightly lower in cost than traditional financing instruments.

Moreover, if the data centre is directly powered by renewable energy then the operational cost will be less than for a thermal-powered centre, resulting in higher profitability.

#### Fig 48: Net-zero targets of data-centre companies

Company	Net zero	Remarks
Telehouse (KDDI Group)	2026	As a group by 2030
GDS Holdings	2030	5 1 7
CyrusOne	2030	
NTT Global Data centers	2030	Group (Scope 1+2) by 2035
Digital Realty	2030	Eurozone carbon neutral by 2030
Equinix	2030	Global carbon neutral by 2030
Meta	2020	all data centres matched with RE
Google Cloud	2030	100% RE by 2030
Microsoft Azure	2030	Group net zero target
AWS	2040	Group net zero target
Vantage Data Centers Management Co. LLC	2030	
Aligned Data Centers LLC	2040	

Source: Maybank IBG Research, Company documents, news reports

# Fig 49: ESG risk and carbon risk score of data-centre companies is low/medium

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Data centre companies	ESG risk score	ESG risk rating	YoY change	Carbon risk score	Carbon risk rating	Country
GDS Holdings	20.6	Medium	-0.4	21.1	Medium	China (HKG)
CyrusOne	16.5	Low	NA	NA	NA	USA
Digital Realty	12.6	Low	0	9.1	Low	USA
Equinix	13.0	Low	-0.8	7.3	Low	USA
Vantage DC Management	20.6	Medium	0	NA	NA	USA
Aligned Data Centers LLC	23.2	Medium	NA	NA	NA	USA

Source: Maybank IBG Research, Sustainalytics

#### Green financing is already on the rise

- Singtel has secured a SGD535m (USD401m) five-year green loan for its data centre developments. As part of the green loan criteria, its upcoming data centres must maintain at least a Green Mark GoldPlus certification from Singapore's Building and Construction Authority.
- Princeton Digital Group recently secured its first MYR1.276b (USD280m) green loan for its 150MW AI-ready JH1 campus, in Sedenak Tech Park (STeP) Johor, Malaysia.
- Developer and operator of data centres, STACK Infrastructure, received an additional GBP2.3b (USD3b) in green financing for 4 major datacentre campuses. These campuses will be built with a strong focus on sustainability, incorporating key features like zero potable water usage for cooling, the use of low-carbon construction materials including recycled content in concrete, and high-performance design elements aimed at optimizing Power Usage Effectiveness (PUE).
- GDS (GDS US, CP USD19.18, Not Rated) has raised MYR1.27b (USD270m) in green financing for its Nusajaya Tech Park data centre in Malaysia. The data centre uses liquid cooling technology, which facilitates a substantial reduction in PUE. The company would strive for the Gold LEED certification for all buildings within the campus.

# 9. Sectors/stocks to benefit from data-centredemand boom

Even outside the leading chip and cloud companies, the list of sectors that can benefit from the data centre demand and construction boom is long (Fig 50). However, we identify 5 sectors where ASEAN-based companies could meaningfully benefit.

Sector	Sub sectors	Potential beneficiaries
Data center operators	Data center operators/colocation REITs	Singtel, DCI Indonesia, Globe Tel, PLDT, TM, AIS, PT Telkom, YTL Power, Keppel DC REIT, Mapletree Ind Trust, Capitaland Ascendas REIT
Computing	Cloud Service Providers Software as a Service GPU as a Service	Singtel, YTL Power, Indosat
Telecommunications	Network Infrastructure Providers Fiber Optic and Connectivity Services	Singtel, Starhub, PT Telkom, TM, Time dotCom, PLDT, Globe, AIS, True Corp, Vstecs Bhd, SNS Network, Interlink
Semicon & Hardware Manufacturing	Chip Makers, Servers, Hardware Vendors	
Utilities	Power Utilities Renewable Energy Providers	Sembcorp Industries, Tenaga, YTL Power, Powerwell, Gulf Energy, AC Energy, Meralco
Cooling and HVAC	Power Management Cooling Solutions Providers	CSE Global, Delta Electronics, Hana Electronics
Construction and Engineering	Data Center Construction Engineering Services	CSE Global, ST Engineering, Sembcorp Industries, Gamuda, Sunway, YTL, IJM Corp, Infraset
Security and Compliance	Cybersecurity Firms Compliance and Auditing	Starhub, Bluebik, Beryl8
Facility Management	Operations and Maintenance Services	
Real Estate	Data Center REITs	Kepper DC REIT, Mapletree Ind Trust, Capitaland Ascendas REIT, Sunway, Eco World, Crescendo, UEM Sunrise, AME Elite
Consulting and Advisory Services	IT Consulting	FPT

Source: Maybank IBG Research

# 9.1 Data-centre operators: direct beneficiaries of data centre/Al demand rage

Data-centre operators are the most direct winners of the spurt in data centre demand. We estimate data-centre capacity to double in ASEAN from 1.6GW currently to 3.7GW by 2028. Notably, 3 sets of operators are going to tap the demand growth: ASEAN-based data-centre operators, regional and global data-centre operators and self-builds by cloud companies.

As per structure research, ~30% of the global data centres are self-builds by hyperscalers like AWS, Microsoft Azure, Google Cloud and Meta. The rest are built by data-centre operators under retail configuration, or/and wholesale structures for hyperscalers and build-to-suit configuration. This suggests data-centre operators currently own ~1.1GW of ASEAN data centre capacity, which can rise to 2.6GW by 2028. These growth would be tapped by global (Equinix, Digital Reality (DLR US, CP USD158.87, Not Rated)), regional (GDS, Bridge DC) and ASEAN-based data-centre operators (Singtel, DCI Indonesia (DCII IJ, CP IDR57575, Not Rated), STT GDC etc).

### EM know-how gives ASEAN-based data-centre operators an edge

Unlike developed markets, Emerging Markets often lack ready-to-use infrastructure services, such as fiber connectivity and reliable power supply. Additionally, the regulatory environment can be unpredictable. These challenges are driving cloud and content providers to increasingly partner with local and regional data centre operators with experience managing there issues. Conglomerates like Ayala Corp (AC PM, CP PHP691, TP PHP1050, BUY), YTL and Gulf Energy with presence across multiple upstream infrastructure like power utilities, real-estate and construction have an edge, in our view.

#### 9.2 Telcos have multiple growth drivers to tap in to

ASEAN telcos, known for running infrastructure heavy and highly regulated businesses alongside connectivity infrastructure, can play a bigger role in ASEAN's data centre space. Within Asia, in the more advanced Chinese data centre market, local telcos dominate, controlling around 50% of the market capacity and revenue. Japan's NTT (9422 JT, CP JPY149.70, Not Rated) is a global data centre operator with 1.1GW of capacity across continents and is looking to double it in the coming years. In India, Bharti Airtel is one of the largest data-centre operator.

Besides data centre operations, telcos can benefit on multiple fronts. In the upstream, telcos can play a role in data centre connectivity on the back of their terrestrial and submarine cable infrastructure. In the downstream segments, multiple telcos in ASEAN are providing in-house and third-party cloud services to their enterprise customers. Edge computing remains an evolving area, especially once 5G/lag sensitive use cases evolve. Telcos can be a natural partner in the space.

### Fig 51: Singtel's interplay in the various stages of data centre and AI value chain

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Fig 52: YTL Power's interplay in the various elements of the



Digital InfraCo Capabilities & Technology Stack



data centre value chain

## Key beneficiaries

Paragon AI Cloud

Nxera DC

Network Fabric

Within the ASEAN-listed space we see Singtel, YTL and Telekom Malaysia as the key beneficiaries of data centre demand. Within the listed space, other names that are active in the space include Telkom Indo (TLKM IJ, TP IDR:5,000, BUY), ISAT (ISAT IJ, TP IDR11,500 ,BUY), AIS (ADVANC BK, TP THB280 ,BUY), PLDT (TEL PM, TP PHP1,978 ,BUY), Globe Tel, DCI Indonesia.

Singtel (ST SP, TP SGD3.70, BUY). Singtel owns 62MW of data centre capacity in Singapore and is looking to double it to 120MW by 2025. On top of this, alongside its regional partnerships with leading telcos in Malaysia, Thailand and the Philippines, it is looking to take total data centre capacity to 200MW by 2026 and 400MW over the longer term. On the back of new capacity additions, pre-sales and customer demand visibility, it aims to double the data centre EBITDA by FY28. On top of this, Digital InfraCo is looking to play a role in the AI wave by tapping the GPUaaS space, backed by its technology stake, Nvidia partnership and its position as the national sovereign AI Cloud provider for the government and large local enterprises. We raise our Singtel SoTP from SGD3.45 to SGD3.70 as we explicitly model its data center business (imputing an EV of SGD8.7bn, 24x EV/EBITDA for the Singapore DC business) and higher Bharti valuation (to reflect recent increase in Bharti share price).

**Telekom Malaysia (T MK, TP MYR7.50, BUY).** TM owns 8 tier-3 data centres in Malaysia and one in Hong Kong, with a combined capacity of 46MW, although current operational capacity could be lower. On top of this, the company is building a 64MW facility in Johor in partnership with Singtel. TM is the main owner of on-land fibre and offshore submarine cable systems in Malaysia, and thus are beneficiaries of the data-centre boom. Conceptually, the higher traffic brought about by hyperscale data centres should result in an accretion in telcos' wholesale revenue.

YTL Power (YTLP MK, TP MYR4.70, BUY). YTL has 2 operational data centres with a combined capacity of 16MW and is in the process of building a new data centre in Johor of up to 72MW, of which 8MW is expected to come on stream in 2024. YTL Power is collaborating with Nvidia to develop AI in YTLP's data centre park in Kulai, Johor. Besides, we see YTL Power benefits owing to its interest in various elements of the data centre supply chain - power generation, water and sewerage, telecommunications and property development.

# 9.3 REITs:

Previously regarded as a niche segment within the real estate sector, data centres are now emerging as a mainstream growth industry within the broader real estate market.

In the context of high interest rates and the fact that data centres are capex intensive, our preference is for service providers/operators to ride the theme. Further, while data-centre REITs will benefit from the thematic, data centres within the listed REITs are mostly of older specification and not equipped yet for AI workload. They will need substantial investment to upgrade capabilities and compete with new builds.

# Key beneficiaries:

### Singapore

## Keppel DC REIT (KDCREIT SP, Not Rated)

Current exposure to data-centre value chain. KDC is a data centre pure play with SGD3.5b worth of data centres spanning across Asia Pacific and Europe. In ASEAN, KDC has 6 data centres in Singapore and 1 in Cyberjaya, with Malaysia comprising slightly more than half of the portfolio. Five of the Singapore data centres and the Cyberjaya data centre are co-location assets while the remaining one in Singapore is on master-lease. Occupancy trend has been relatively stable, barring a couple of co-location assets in Singapore and the one in Malaysia. Sponsor - Keppel Data Centers - is a developer, owner and operator of data centres with a long execution track record. Including assets in the REIT, it has 32 data centres in 10 countries with more than 2m sq. ft. of net leasable area. Apart from its listed REIT, it has two private funds exposed to data centres. The sponsor in ASEAN owns data centres in Johor in Malaysia, Bogor in Greater Jakarta and two data centres in Singapore. Outside ASEAN, it has 3 data centres in Hong Kong and mainland China. In Apr'23, it received regulatory approval to proceed with the building of first-of-its-kind near-shore Floating Data Centre (1GW Datapark+) powered by liquid hydrogen while alleviating demand on land and water.

**Benefit from rising DC wave.** Rising demand for data centres in ASEAN should benefit a player like Keppel Group (KEP SP, CP SGD 6.57, Not Rated) with existing assets, in-house technical knowhow and supply chain partners in Malaysia and Indonesia. The benefits may come via higher occupancy, leasing rates, interconnection fees as well as overall lower discount rate. This will further help to seed more data-centre focused funds in the private space or on its own balance sheet, which can create a pipeline for REITs or third-party sale. KDC REIT's management prefers stabilised assets in its portfolio and is taking a measured approach to grow in Malaysia.

### Mapletree Industrial REIT (MINT SP, TP SGD2.15, HOLD)

Current exposure to data-centre value chain. MINT is an industrial REIT with about 50% of assets consisting of data centres in the US, Singapore and Japan. In Singapore, it has 4 data centres - master leased to 4 single tenants - Equinix, AWS, StarHub (STH SP, CP SGD1.27, TP SGD1.44, BUY) and ST Telemedia. Starting from being an industrial landlord solely focused in Singapore, MINT has successfully made the digital pivot by acquiring 3 datacentre platforms in the US. More crucially, sponsor, while embarking on its fourth 5-year plan this year, has identified data centre as a key sub-sector to drive AUM growth from SGD77b to SGD100-120b. Other sub-sectors include logistics, offices and student housing. Indeed, the group's AUM of data centres grew from just 2% (SGD1.1b) in FY18/19 to 8% (SGD6.1b) in FY23/24 with acquisitions in the US and Japan, as well as the first data center development in Hong Kong. Currently, MINT's US data-centre portfolio constitutes the bulk of data centre exposure, but plans are afoot to grow in the region. MINT's former CEO is currently spearheading the sponsor's effort to boost the group's data centre exposure.

**Benefit from rising DC wave.** MINT and its sponsor has successfully built its data centre presence. The maiden data centre development project in Hong Kong should give valuable green field experience. This should help further to source development and or stabilised assets in the region and expand its data-centre footprint in line with the group's 5-year plan. In addition, the rising data-centre wave should benefit in terms of rent reversions, higher occupancy, valuation upside and lower cost of capital.

### CapitaLand Ascendas REIT (CLAR SP, TP SGD3.10, BUY)

<u>Current exposure to data-centre value chain</u>. CLAR is the largest diversified industrial landlord in Singapore with about 8% of assets exposed to data centres in Singapore, Europe and the UK. It significantly expanded its data-centre footprint by acquiring a platform of data centre assets in Europe and the UK back in 2021. Its 3 data centres in Singapore are leased to SingTel. Sponsor CLI (CLI SP, CP SGD 2.98, TP SGD3.05. BUY) has a global data-centre footprint spanning across 8 countries, 27 data centres with more than 800MW of gross power. This constitutes about USD4.5b of AUM or about 6% of overall AUM. Out of 27 data centres, 19 are in the REITs while the rest are on the balance sheet or in private funds. The data centre private funds include 2 funds in South Korea and 1 data centre development fund in China. Data centre is one of the preferred sub-sector as the sponsor targets to double its AUM from currently to SGD100B over the next 5 years.

**Benefit from rising data-centre wave.** While the group currently does not have data centre presence in the ASEAN region other than Singapore, it plans to diversify geographically and ASEAN is one of the chosen regions. The rising data-centre wave should lend ample opportunities for the sponsor and its REITs to grow its data-centre footprint.

Malaysia. The rise of data centres create monetisation opportunities for land owners. The initial beneficiaries were government-affiliated landowners - Cyberview for Cyberjaya, UEM Group (Khazanah) for Nusajaya, and Johor Corp for Sedenak. In recent years, data-centre developers have started moving outside traditional hubs, by purchasing land from private property players. Public-listed companies that have sold land to develop data centres include Eco World (ECW MK BUY, TP MYR1.96), Crescendo (CCDO MK, Not Rated), UEM Sunrise (UEMS MK, SELL, TP MYR1.0), Sunway (SWB MK, HOLD, TP MYR3.78), AME Elite (AME MK, Not Rated) and Boustead Plantation (Not Listed), among others. The likes of Mah Sing (MSGB MK, Not Rated) and Sime Property (SDPR MK, BUY, TP MYR1.40) have diversified into data centre ownership by taking on equity stakes in their respective data-centre entities (in partnership with the land buyer).

### 9.4 Power utilities:

Fueled by AI advancements, increasing demand, and a slowdown in energy efficiency improvements, global data centre power demand is set to more than double by 2030.

While the AI revolution has attracted investor interest, we believe downstream investment opportunities in utilities, renewable energy, and industrial sectors - key to supporting this growth - are still underappreciated.

Technology companies are likely to increase their involvement in power purchase agreements, where they contract to buy electricity from utilities or independent power producers for renewable energy.

# Microsoft signs USD10bn, 10GW energy framework deal with Brookfield – Datacenter Dynamics (May 2024)

Microsoft has signed a significant renewable energy framework deal with Brookfield Asset Management, committing an estimated USD10bn to develop renewable electricity projects. This agreement aims to bring 10.5 gigawatts of generating capacity online through new wind and solar farms in the U.S. and Europe by 2030. The deal is reportedly eight times larger than the previous largest corporate renewable electricity purchase agreement. Brookfield's director noted the importance of this partnership in expanding their global renewable capacity, while Microsoft aims to leverage its influence to create a positive impact for electricity consumers. Additionally, Spanish renewable firm X-Elio is involved in the deal. Microsoft, already a major corporate buyer of renewable energy, expects to significantly increase its data center capacity in the coming years.

# Microsoft and Abu Dhabi's MGX to back USD30bn BlackRock AI infrastructure fund – FT (Sept 2024)

BlackRock and Microsoft have announced plans to launch a fund exceeding USD30bn to invest in artificial intelligence infrastructure, specifically targeting data centers and energy projects. This initiative, called the Global AI Infrastructure Investment Partnership, aims to enhance AI supply chains and energy sourcing due to the high computational and energy demands of AI models. The fund will be co-managed by MGX, an Abu Dhabi-backed investment company, with expertise from AI chip firm Nvidia. The total investment potential could reach up to USD100 bn when including debt financing. In the US, which hosts one-third of the world's data centers, electricity demand is rising rapidly for the fist time in two decades, driven partly by these energy –intensive facilities. A repot from Grid Strategies indicates that five year projections for electricity demand growth in the US have nearly doubled over the past year, increasing from 2.6% to 4.7%

#### Demand for green energy is high, but supply ramp-up will take a while

Solar and wind at a nascent stage of development in most ASEAN countries. For 2023, solar and wind accounted for 4.4% of the electricity generation. The large part of the renewable energy portfolio of the ASEAN region is made up of hydro energy. Within ASEAN countries, Vietnam has the largest solar and wind portfolio at 13.2% of electricity generation, whereas Indonesia has the smallest at 0.2%.

Most ASEAN countries in the region already have a general framework for renewable energy in place, which would allow renewable energy to scale up as it becomes more cost-competitive and fossil subsidies come down. Malaysia has set a solar capacity target of 12% by 2025, going up to 39% by 2040 and 58% by 2050, as per its National Energy Transition Roadmap. This would mean that solar capacity will increase from 5.5GW in 2025 to 56.3GW by 2050.

# Fig 53: Solar + wind made up 4.4% of electricity generation in ASEAN in 2023...

Fig 54: ...varies from 0.2-13.2% in ASEAN, the least in Indonesia and the highest in Vietnam





Source: Maybank IBG Research, Ember

Source: Maybank IBG Research, Ember

# ASEAN green economy revenue pool at USD300b annually; The power sector has the largest potential along with energy efficiency

According to a recent study by Bain and Co, ASEAN has a potential green economy new revenue pool of USD300b annually by 2030. This would make up 5% of Southeast Asia's GDP. The power sector revenue pool would be the largest at USD90b annually. This would be driven by the transition to renewable energy, energy storage and transmission-distribution infrastructure. Buildings could drive another USD40b of revenue annually. The key themes in the building segment are energy efficiency improvements for data centres and buildings. Private green investments in Southeast Asia have increased from USD5.2b in 2022 to about USD6.3b in 2023.

# Fig 55: Southeast Asia's green economy could be worth USD300b annually



Source: Maybank IBG Research, Bain and Company - South East Asia Green Economy Report 2024

Fig 56: Private green investments in Southeast Asian countries (USDb)



Source: Maybank IBG Research, Bain and Company - South East Asia Green Economy Report 2024

### Key beneficiaries of power demand growth

**Tenaga (TNB MK, HOLD, TP MYR14.0).** Among the ASEAN emerging Markets, Malaysia is best placed to get the lion's share of new data centre development. This in turn develops new demand opportunities for Tenaga. However, Chi Wei Tan, Maybank's Malaysian utilities analyst, caution that higher demand does not translate to materially higher earnings under the current regulatory framework. Elevated grid capex and possibly new generation projects are more tangible earnings drivers for Tenaga. **Gulf Energy (GULF TB, BUY, TP THB57.0).** GULF is on an aggressive capacity expansion phase from 2.7 GW in 2020 to 8.4 GW in 2025E. GULF has a 40% stake in GSA Data Center Company. The first phase of 20MW implies THB80m/year profit sharing for GULF (0.42% upside to GULF's core profit in FY25E). In a separate development on 27 Jun 2024, GULF and Google Cloud announced a multi-year agreement to develop sovereign cloud services in Thailand that meet the country's data residency, security, and privacy requirements. No revenue or profit guidance has been given.

AC Energy (ACEN PM, BUY, TP PHP8.0). ACEN has a fast-growing presence in the Philippines, Australia, Vietnam, India, Indonesia, Lao PDR and the U.S.A. With about 4.8 GW of attributable renewables capacity in operation and under construction of over 1 GW, the company has already effectively surpassed its original goal of reaching 5GW of renewables by 2025. ACEN aims to provide clean, reliable and affordable energy in the Asia Pacific and grow its renewables capacity to 20 GW by 2030.

### Key beneficiaries of green energy demand growth

**In Malaysia**, our utilities team earlier put the likely beneficiaries of this renewable energy thematic under 3 buckets:

- <u>Solar and waste-to-energy asset owners</u> like Solarvest (50MW of LSS4 assets + 90MW CGPP), Cypark (90MW of LSS2 & 3 assets + 20MW of WTE plant), Uzma (UZMA MK, Not Rated; 12MW of CGPP), Mega First (MFCB MK, HOLD; 30MW of CGPP), Sunview (60MW of CGPP), Pekat (30MW of CGPP) and Samaiden (43MW of CGPP);
- 2) <u>Grid owner Tenaga</u>, where under the IBR model, a higher regulatory asset base (which includes grid investments), would translate to increased earnings, all else being equal.
- 3) Plantation players with suitably located landbank for LSS farms. We view SD Guthrie (SDG MK, BUY, TP MYR4.96), KL Kepong (KLK MK, HOLD, TP MYR22.60), IOI (IOI MK, HOLD, TP MYR3.95), Genting Plant (GENP MK, HOLD, TP MYR6.21), TH Plant (THP MK, SELL, TP MYR0.58) and United Plant (UPL MK, Not Rated) are potential beneficiaries given their estate locations. So far, only SD Guthrie has made public its renewable energy ambitions with a 1GW capacity target (see our report, MY Plantation: The magnifying power of solar is a game changer for earnings, 3 Jun 2024). Specifically on LSS5, Citaglobal (CITAGLB MK, Not Rated), which signed a Joint Development Framework Agreement with MASDAR (of Abu Dhabi) in Dec 2023 to develop up to 2GW of renewable energy (solar) projects (e.USD2b) in Pahang state could be vying for the LSS5 Package 4 for floating solar projects. In addition, Citaglobal, in a 50:50 JV with Genetec Technology (GENE MK, Not Rated), which developed Malaysia's first locally produced Battery Energy Storage System (BESS) called "MYBESS", is looking to scale up on its offering for BESS technology solutions. As of end-May 2024, MYBESS's management guided that it had tendered for contracts worth c.700MWh. We estimate there is c.1.5GWh of domestic capacity available for tender in 2024.

# 9.5 Industrials:

As data centres expand and new facilities are built to meet increasing data needs, these sectors will see increased opportunities.

**Industrial companies** can benefit by supplying the specialised equipment and materials required for data centre construction and operation, such as cooling systems, power management solutions, and advanced infrastructure components. For instance, ST Engineering's upcoming data centre will be cooled by various cooling systems, including proprietary Airbitat DC Cooling System. **Construction companies** will see growth from the physical building of data centres, including site preparation, structural work, and specialised installations. The expansion of data centres will drive demand for both industrial products and construction services, contributing to their business growth.





Source: Maybank IBG Research, Public Comps

**New power plants create EPCC opportunities for contractors.** We estimate about 2.5GW of incremental power generation capacity will be required to support ASEAN data centre power demand growth by 2028. While ASEAN Emerging Markets are not power-deficient, incremental demand on the back of data centres will drive capital in investments in ASEAN power generation capacity. In addition, infrastructure contractors and industrial firms that produce equipment for transmission, generation, and distribution are expected to benefit from this trend.

# Key beneficiaries

### ST Engineering (STE SP, BUY, TP SGD4.80)

<u>Current exposure to data-centre value chain</u>. STE has 4 data centres in Singapore with installed IT capacity of >30MW and a cumulative investment of SGD400m. Its latest data centre build with installed IT capacity of 7.5MW (capex of SGD16m per MW spread over three years) is green, secure and Already. It is designed with PUE of 1.25 and will be able to accommodate high power density AI and GPU-based workloads in excess of 20KW per rack. In addition, the data centre will be cooled by various cooling systems, including proprietary Airbitat DC Cooling System and will have 2700 sq. m of solar panels to offset energy requirements.

Benefiting from rising data-centre wave. STE's data-centre footprint will help to strengthen STE's digital business offerings. These offerings encompass areas such as cybersecurity, data science, analytics and Al; Cloud and Data Orchestration as well as Advanced Connectivity are the thrust areas for corporates embracing digitalisation and Singapore's National Al Strategy 2.0. Management has mentioned that there is strong interest from customers for its latest hi-tech data centre facility. STE's experience in building such a data centre will come in handy to tap growing customer demand. Further, STE may also roll out its proprietary data centre cooling system to third-party data-centre vendors and expand the revenue stream.

#### Sembcorp Industries (SCI SP, BUY, TP SGD6.00)

<u>Current exposure to data centre value chain.</u> SCI is the leading power provider to data centres in Singapore with 33% of data centre energy

requirements supplied by Sembcorp. This includes renewable power and assumes total installed data-centre capacity of 1.4GW. As of 1H24, data centres account for 6% of its contracted power from conventional energy sources. SCI counts data-centre players like SingTel, ST Telemedia Global DCs and Equinix as its key customers. Over the past 12 months, it has signed a long-term power purchase agreement (PPA) with STT GDC to supply up to 100MW over a contracted period of 8-10 years. Recently, it signed a long-term PPA with Equinix to supply a maximum capacity of 75MWp from its renewable energy portfolio and 30MW from its power generation portfolio for up to 18 years. This is Equinix's first renewable energy PPA in Singapore.

Benefiting from rising data centre wave. Power-hungry data centres should provide good revenue source for utilities providers like SCI. Further, with growing demand for green power, SCI is attractively positioned to cater to this demand as it successfully executes its energy transition roadmap. Currently, in Singapore, SCI is the largest solar energy provider with a portfolio of 727MWp (562MW gross) power. It is also the largest player in energy storage system in Singapore with 289MW of gross capacity. Its energy transition roadmap targets 25GW of gross installed renewables capacity by 2028. As of Jun'24, it has gross installed capacity of 9.9GW and another 4.5GW is under construction. In ASEAN, SCI has 400MW of installed renewable capacity in Vietnam and another 60MW capacity is under construction in Vietnam and Indonesia. Further, SCI's energy transition aligns with Singapore's recent launch of the Green Data Centre Roadmap, where one of the goals is to develop sustainable data centres with a greater use of green energy. The roadmap aims to provide at least 300 MW of additional capacity in the near term, with much more through green energy deployments.

In Malaysia, potential beneficiaries on the RE side includes, <u>pure-play solar</u> <u>EPCC players</u> like Solarvest (SOLAR MK, BUY, TP MYR1.84), Cypark (CYP MK, HOLD, TP MYR1.80), Sunview (SUNVIEW MK, Not Rated), Pekat (PEKAT MK, Not Rated) and Samaiden (SAMAIDEN MK, Not Rated), and <u>constructionbased EPCC players</u> like Sunway Construction (SCGB MK, SELL, TP MYR1), which is completing two LSS4 projects in Gopeng and Klang, Nestcon (NESTCON MK, Not Rated), Reservoir Link (RLEB MK, Not Rated) and Advancecon (ADVC MK, Not Rated).

# 9.6 Tech:

As demand for data centres and Al increases, there is a corresponding need for advanced technology solutions, including hardware components, electronic systems, and manufacturing services. While ASEAN contributes ~10-15% of the global electronics and electrical exports, we only find limited companies in the listed space with direct exposure to the data-centre supply chain.

#### Key beneficiaries:

**Delta Electronics (DELTA TB, Not Rated).** DELTA will benefit from the overall growth of the global data centre trend in two ways: 1) the growth of both existing and new data centres (which means more power supply solutions and rack infrastructure will be required); and 2) the shift towards liquid-cooling solutions, especially from hyperscalers looking to incorporate AI as part of their offering or underlying processing systems (air-cooling solutions are becoming ineffective and costly in terms of electricity consumption). Currently, DELTA's main data-centre + AI-related product would be from GPU power supplies (used mainly in data centres), mostly for certain models of Nvidia. However, DELTA Taiwan has already developed a variety of AI-server liquid cooling solutions; some of the orders may be transferred over to DELTA Thailand to manufacture and ship instead (as was the case for some of DELTA Thailand's US EV customers), depending on customer requirements.

**CSE Global (CSE SP, CP SGD0.44, TP SGD0.60, BUY).** CSE will be a key beneficiary of the increase in data centres. Currently, CSE is serving a major US cloud provider in the data-centre space for power management systems and solutions with an extension worth SGD49.2m to be executed from 1Q24 to 4Q25. We understand that its 40,000 sqf facility in Tetris Hockley is likely to be expanded to about 75,000 sqf in 2025. Judging from the number of new data centres to be built globally, we expect orders for 2026 to double, suggesting further expansion may be needed in 2026. CSE is also in the midst of qualification with other cloud providers, which could further boost its growth. In addition to what's shown in Figure 42 below, the scope of work for CSE is huge for data centres and they are only scratching the surface of what it has done for its first data-centre customer. We have a BUY with a TP of SGD0.60, based on 13x FY25E P/E.





Fig 59: CSE Power's motor control centres and switch gears



Source: Maybank IBG Research, Company

Source: Maybank IBG Research, Company

**Nationgate Bhd.** Nationgate's (NATGATE MK, CP MYR1.82, Not Rated) growth could be bolstered by the rising demand for optical transceivers, driven by increasing bandwidth needs. This trend is leading to upgrades to higher-end optical transceivers, which contribute to 67% of the company's revenue from the networking and telecommunication sector. According to Yole Développement, a prominent market research firm specializing in technology, many cloud data centres are moving towards 400G and 800G optical transceivers, with this shift expected to accelerate over the next 3 years. This will enhance low-latency experiences for end-users, spur the development of new applications, and drive a 14% CAGR for optical transceivers from 2022 to 2026.

**FPT (FPT VN, BUY, TP VND160,000): strategic focus on AI and automotive** On 23 Apr'24, FPT and NVIDIA inked a comprehensive partnership. Specifically, NVIDIA agreed to cross-sell FPT's products and services to its clients and vice-versa. NVIDIA will also sell its latest technologies, including its over-subscribed H100 Tensor Core GPUs, to FPT to enhance FPT's AI and cloud capabilities. Currently, cloud and AI & big data-related services are contributing to 21% and 4% of technology division sales, respectively. FPT plans to spend USD200m over 5 years for the upgrade, bolstering its ambition in the digital-transformation era, especially in the AI and automotive industries. FPT targets c.26% overseas IT services sales CAGR for the next 7 years to reach USD5b by FY30E.

Tech-service companies: Bluebik (BBIK TB, BUY, TP THB46) and Beryl8 (BE8 TB, BUY, TP THB20.5) can benefit indirectly from rising data centre investment. Rising data-centre capacity could lead to cheaper costs of cloud adoption and potentially higher demand for big data and Al services.

# 10. Appendix I

# EM ASEAN to drive the next leg of growth. Malaysia stands out

# Singapore: land/power tightness and high PUE specification remain constraining factors to building data centres

Although Singapore has lifted the moratorium on new data centre builds, capacity approvals are still rationed (at 60MW/yr or ~6% per year capacity growth) owing to constraints on land and power supply. Data centres in Singapore are already consuming 13% of the island's power supply, second highest globally after Ireland. PUE requirement of 1.3x or below as well pushes up costs to build the data centres in Singapore. According to Cushman & Wakefield, the data-centre cost index in Singapore is 31-145% higher compared to in ASEAN Emerging Markets (refer to Figure 24).

Building data centres in Singapore is a constraint, but not for the companies operating out of Singapore. Singapore-based companies like Singtel and STT GDC have ventured out of Singapore to tap data centre demand growth. Companies like CSE Global are in the data-centre supply chain and thus are benefitting from the global data centre demand growth, particularly in the wake of the Al boom.

# EM ASEAN to do the heavy lifting

Given Singapore's new-capacity-build constraints, data-centre operators are increasingly flocking to ASEAN Emerging Markets. We see both pull and push factors at play over here.

- **Pull factors:** cheaper costs, data demand emanating out of local markets, improving subsea cable connectivity and data residency regulations;
- **Push factors:** geopolitics (encouraging companies to reside data in neutral markets such as ASEAN) and Singapore new-capacity-addition constraints.

Singapore's market share of live capacity is 58%. However, for the live and committed builds, it is just 19%. Whereas for the early stage development, it is all led by ASEAN Emerging Markets.

# Fig 60: Data centre capex - composition by infrastructure and servers/storage



Source: Maybank IBG Research, Cushman and Wakefield

# Johor Bahru stands out; Batam following

Johor and Batam are indeed emerging as key beneficiaries of the growing demand for data centres in the region. Several factors contribute to this trend:



Source: Maybank IBG Research, Cushman & Wakefield, DCByte

Source: Maybank IBG Research, Cushman & Wakefield

Strategic location: Johor, located just across the causeway from Singapore, offers a strategic advantage due to its proximity to a major financial and technological hub. Batam, an Indonesian island near Singapore, also benefits from its close proximity to Singapore.

### Fig 63: Johor Bahru and Batam strategically located from Singapore



Source: Maybank IBG Research, DC Byte, Cushman & Wakefield

**Cost advantages:** Both Johor and Batam offer lower operating costs compared to Singapore. This includes lower land prices, lower labour costs, and often lower energy tariffs, which are crucial for data-centre operations.





Source: Maybank IBG Research, DC Byte, Cushman & Wakefield

**Infrastructure development:** Both regions have been investing heavily in infrastructure to support data centres. This includes improvements in power supply, cooling solutions, and high-speed internet connectivity, which are essential for data-centre operations.





Source: Maybank IBG Research, Telegeography

**Government incentives:** Local governments in Johor and Batam are offering incentives to attract data-centre operators. These incentives may include tax breaks, grants and expedited approvals for development projects.

### Fig 66: Government tax incentives

	Category	Details
Malaysia	Tax incentive	- Companies under the Digital Infrastructure Providers (DIP) such as data centres and submarine cables category may qualify for an investment tax allowance of 100% on capital expenditure for qualifying activities that can be offset against up to 100% of statutory income for a period of up to 10 years.
	Infrastructure	- The Malaysian government's media arm plans to increase the number of Internet Exchange Point (IXP) providers from 12 to 66 by 2025
Indonesia	Tax incentives and eased regulations	<ul> <li>Tax holiday of up to 10 years</li> <li>Exemption from withholding tax on dividends</li> <li>Easier process for repatriating profits</li> <li>Foreign ownership restrictions lessened</li> <li>Ability for foreign companies to own land for data centre projects</li> </ul>

Source: Maybank IBG Research, Asian Insiders

**Regulatory environment:** Both regions are working on creating regulatory environments that are supportive of data centre growth. This includes streamlining approval processes and ensuring regulatory frameworks are conducive to data-centre operations.

# 11. Glossary

DcByte definition of various stages of data center capacity

# Under Construction (U/C) Capacity

Under construction capacity is the estimated IT power that is currently having the mechanical and electrical plant installed to support it.

# **Committed Capacity**

Committed Capacity or Supply is the estimated IT Load that we are highly confident will be added to a market's overall supply. To the best of our knowledge, this supply has the required elements (government, land, power, etc.) secured, or will be developed by an operator with a strong and reliable track record. Committed Supply could take the form of a data centre scheme which has yet to start construction, or it may refer to shell space in an existing data centre. The difference being that shell space can be fitted out normally in a matter of 3-6 months, while a data centre scheme that has yet to start construction might take 1-2 years. Committed supply does not mean sold space.

# Early Stage Capacity

Early Stage Capacity or Supply is the IT Load that has been announced or speculated, but has yet to secure all of the required elements (government, land, power, etc.) for development. We do not hold full confidence in the development potential of this supply and it may require a major client precommitment for development to take place. Committed supply does not mean sold space.

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