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Investor Presentation | Asia Pacific

Asia Summer School: Powering AI

From power transformers to energy storage to power grid and to power generation- the powering AI and energy security thematics has multiple facets and they get diffused with each other. We integrate views on China/Korea equipment supply chain, battery supply chain and Japan/India datacenters.

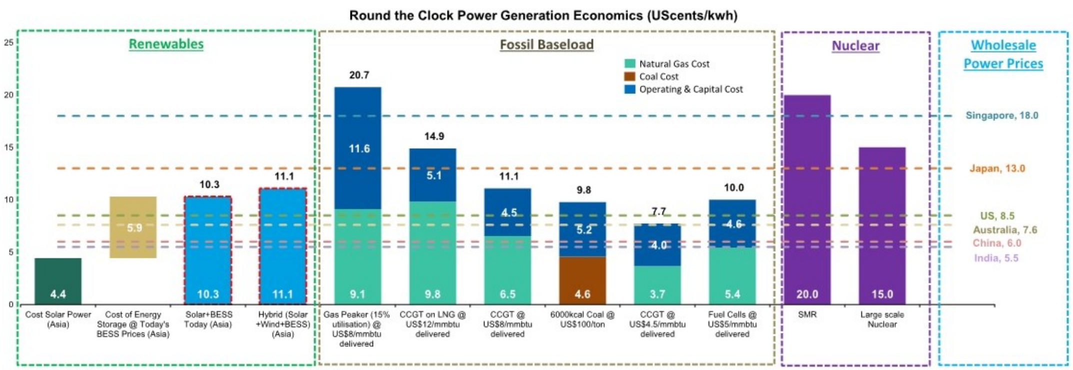
Key Takeaways

- Energy shocks have become frequent making energy and economic security critical in an AI world. US$5 trillion-plus investment in dependable energy are ahead.
- Value chains from transformers to batteries to powergrids to fuel refiners and traders are going to chip in.
- The nexus of Powering AI with energy security gets stronger.

See our notes:

- **Energy Security and AI: Energy Meets Compute: Supercycle Recharges**
- **Global Refining: The 'Golden Age' goes Global**
- **Batteries and AI: Salt – The New Oil**

Exhibit 1: The Economics of power



Source: Morgan Stanley Research estimates.

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ASEAN UTILITIES AND INFRASTRUCTURE

Asia Pacific

Industry View **In-Line**


Asia Summer
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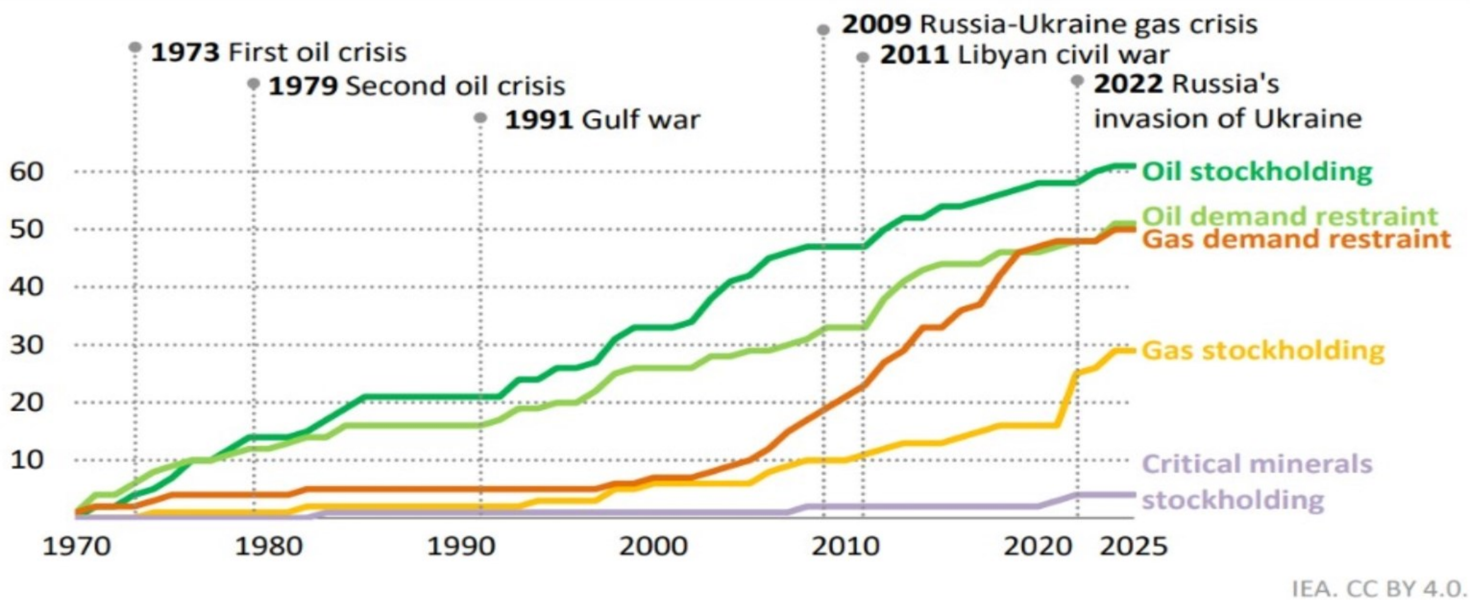
Asia: Powering AI

Energy Security + Powering AI= Future of Energy

Structural themes and challenges will drive a paradigm shift in energy consumption and require a co-existence of oil, gas, renewables, nuclear and coal.

Source: Morgan Stanley Research.

Energy Shocks Become More Frequent

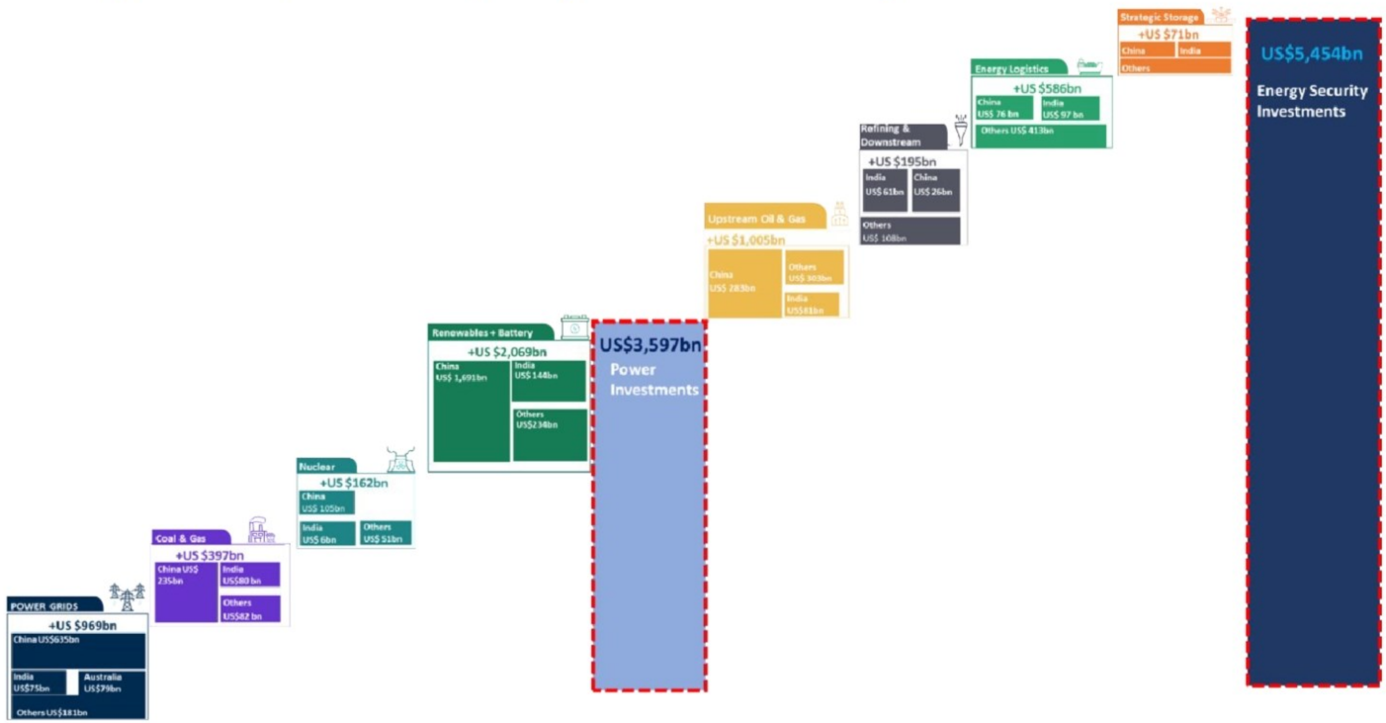


Since the 1970s, global events and energy crises have triggered a rise in emergency response and energy security policies worldwide

Note: The analysis focuses on 85 countries, covering 93% of global primary energy demand, 87% of global oil demand and 95% of global natural gas demand.

Source: IEA Energy Outlook 2025.

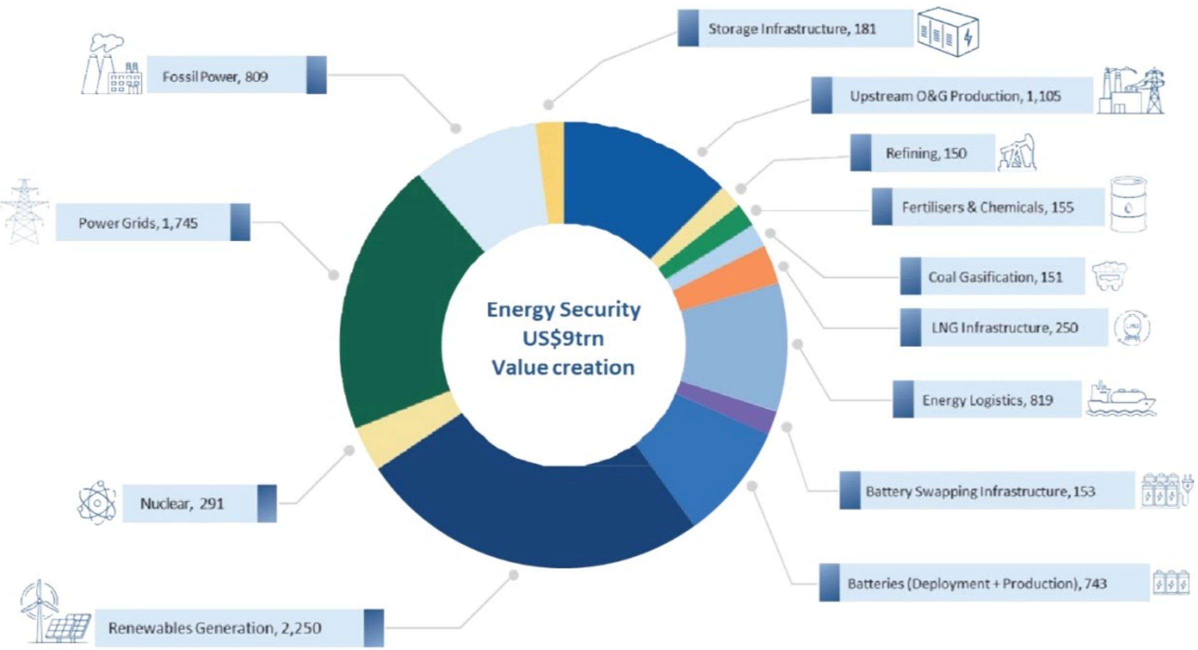
What's Driving the US$5+trn Supercycle? Power Play



We estimate power will make up ~65% of Asia's energy security investment needs

Source: Morgan Stanley Research estimates.

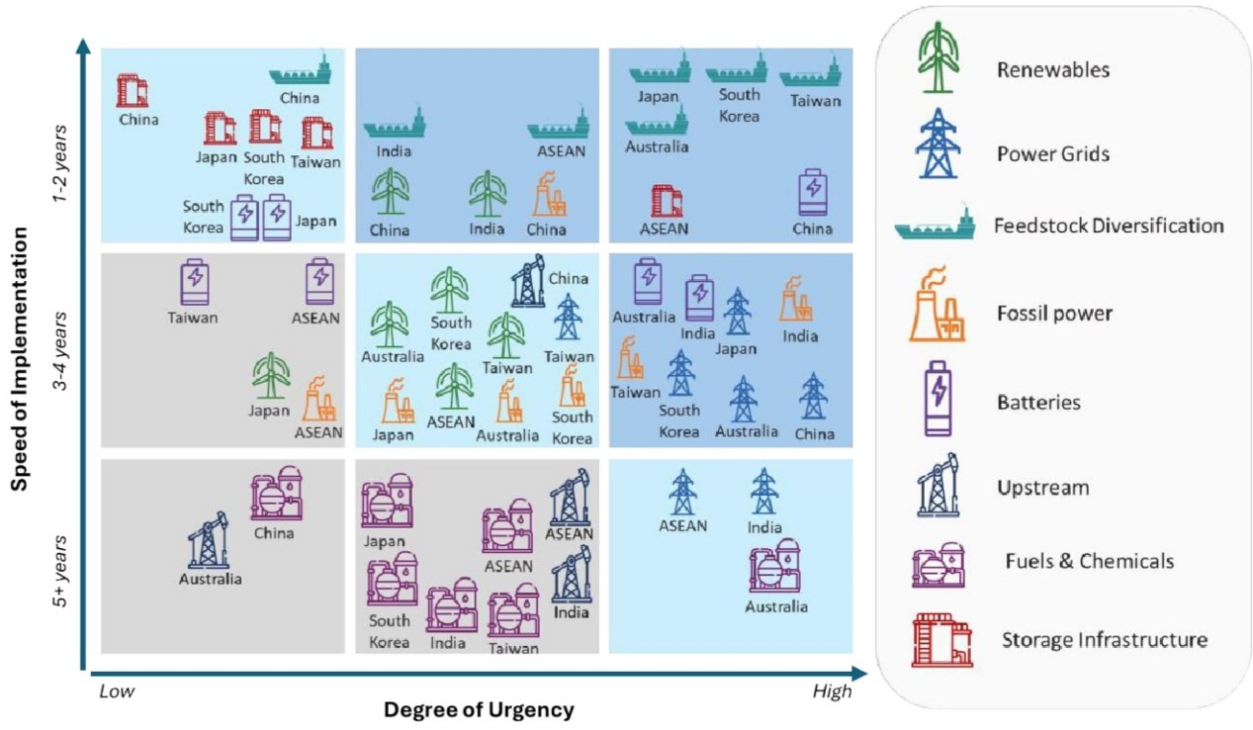
Energy Security & AI: The US$9trn Value Creation Opportunity in Asia



We see a nearly 1.6x torque to value creation, as US$5trn+ in investments across the region ensure security of tech, AI, food, and energy supply chains, unlocking US$9trn in value.

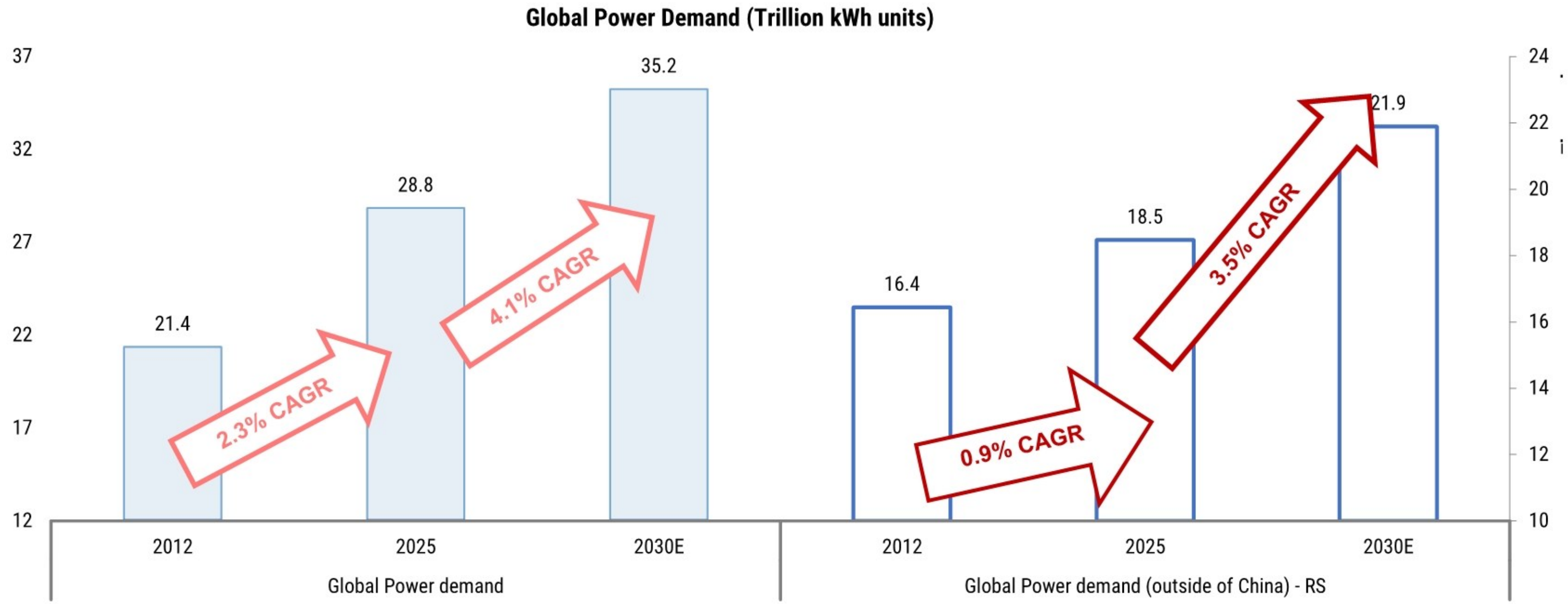
Source: Morgan Stanley Research estimates.

Asia's Energy Security Implementation vs Urgency Matrix



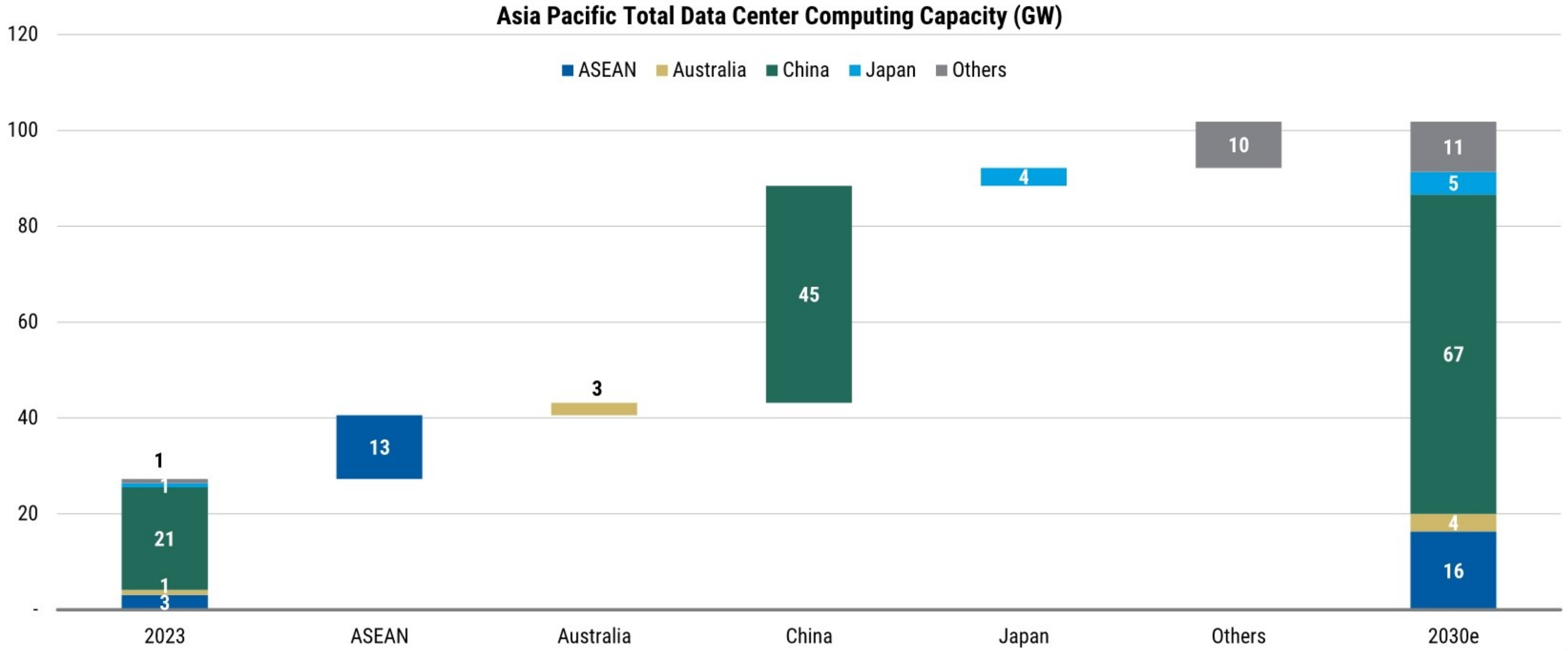
Source: Statistical Review of World Energy, Morgan Stanley Research estimates.

Global Power Demand is Inflecting



Source: IEA Energy Outlook 2025.

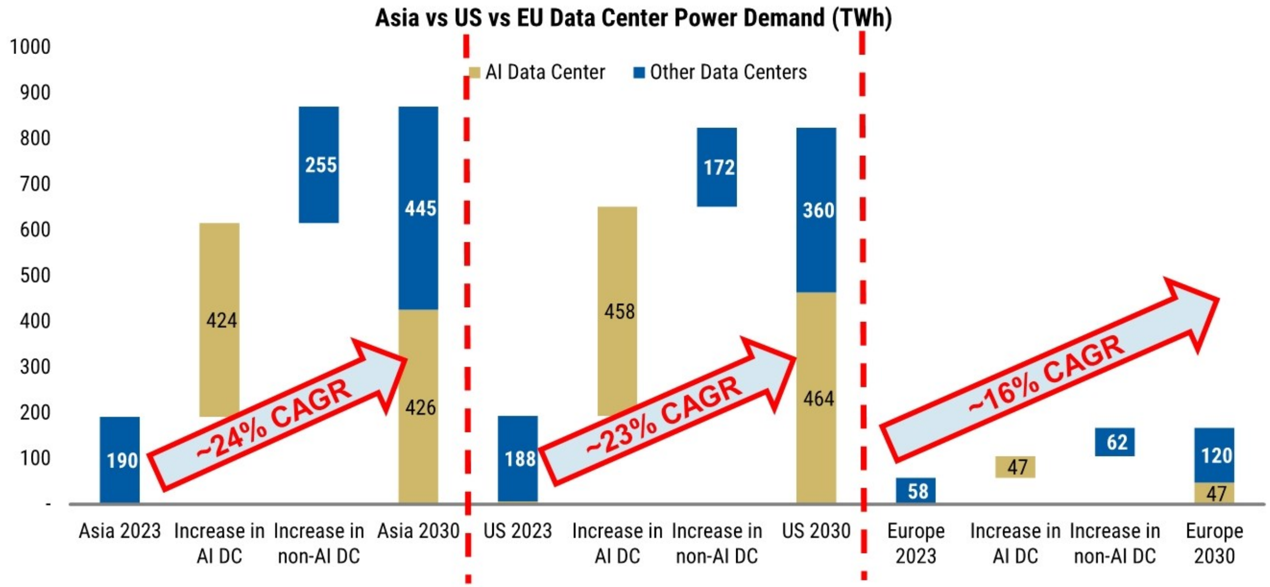
Data centers are the new swing load



China will drive a significant portion of data center growth in Asia, as inference demand and chip self sufficiency drive commoditization and faster commercialization

Source: Morgan Stanley Research estimates

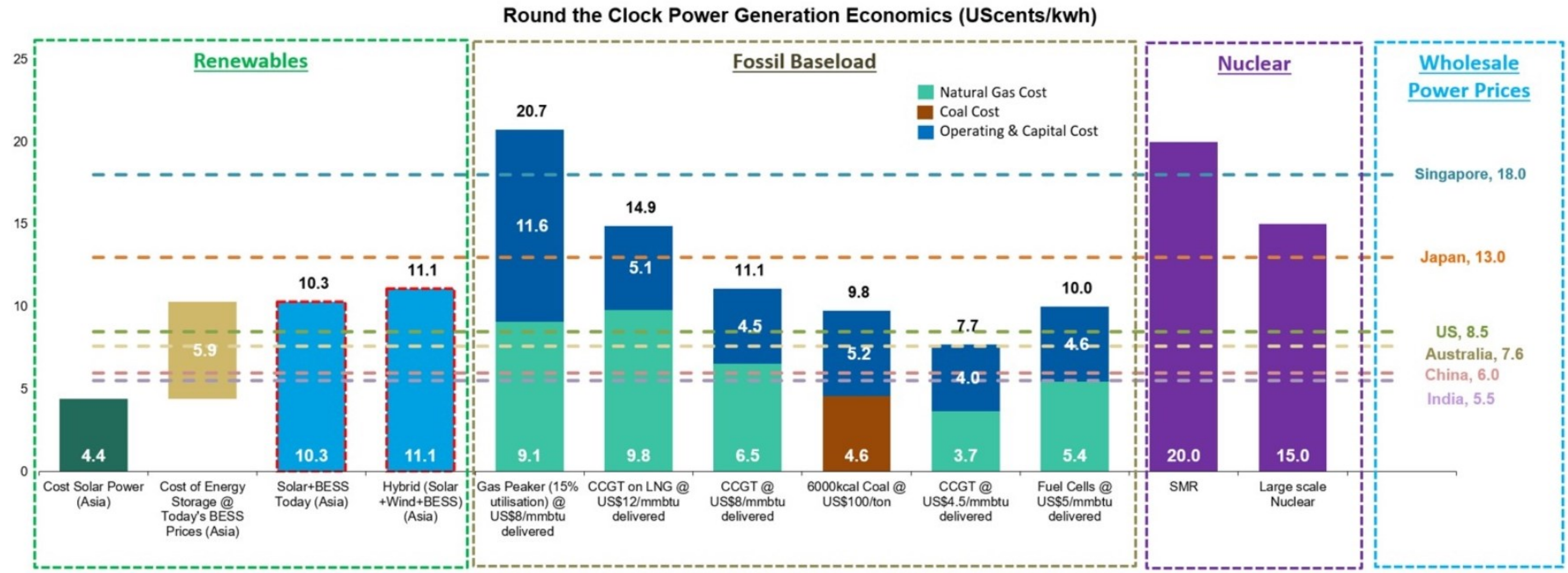
Powering AI: Asia vs US vs Europe Data Center Power Demand



We estimate Asia's DC power demand CAGR to be ~24% over 2023-30, exceeding that of the US and Europe, driven by faster AI inference demand and more investments committed to the region

Source: Morgan Stanley Research estimates.

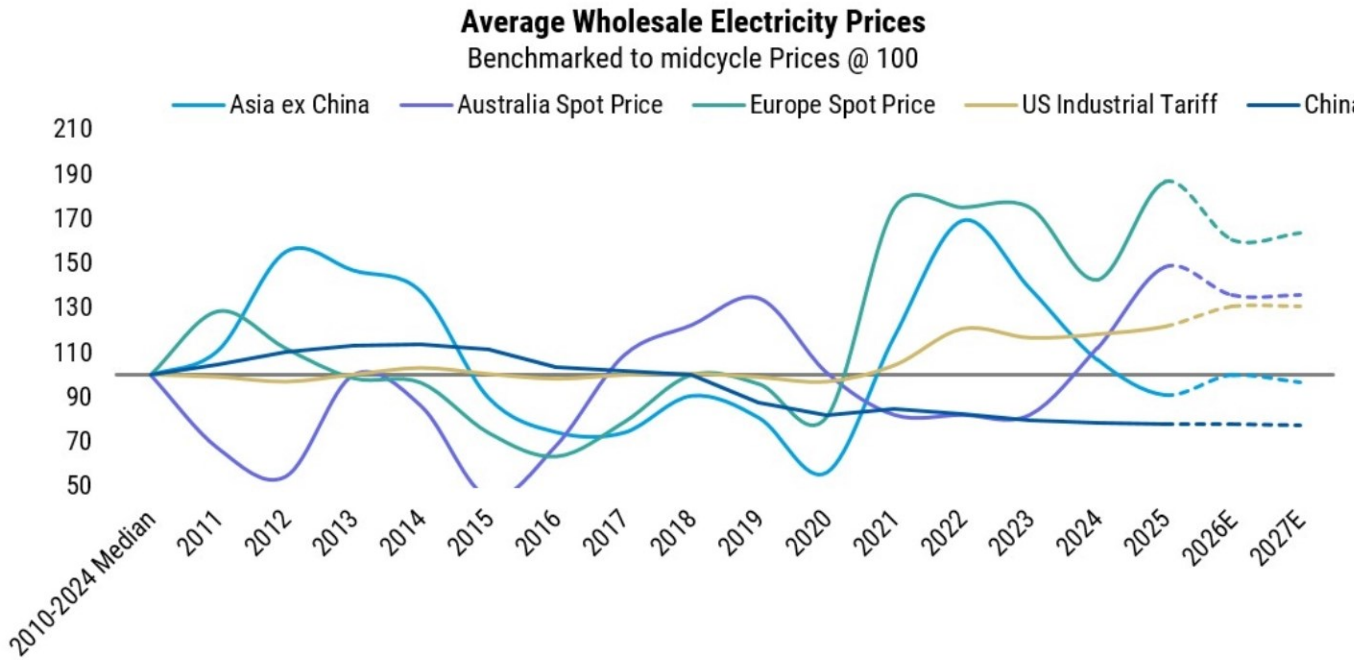
Comparing Power Generation Economics



US shale revolution will be exported to Asia for the first time at scale in 2027e, with repercussions across the powering AI and energy security thematics

Source: Morgan Stanley Research estimates.

Tightness is already visible in power prices

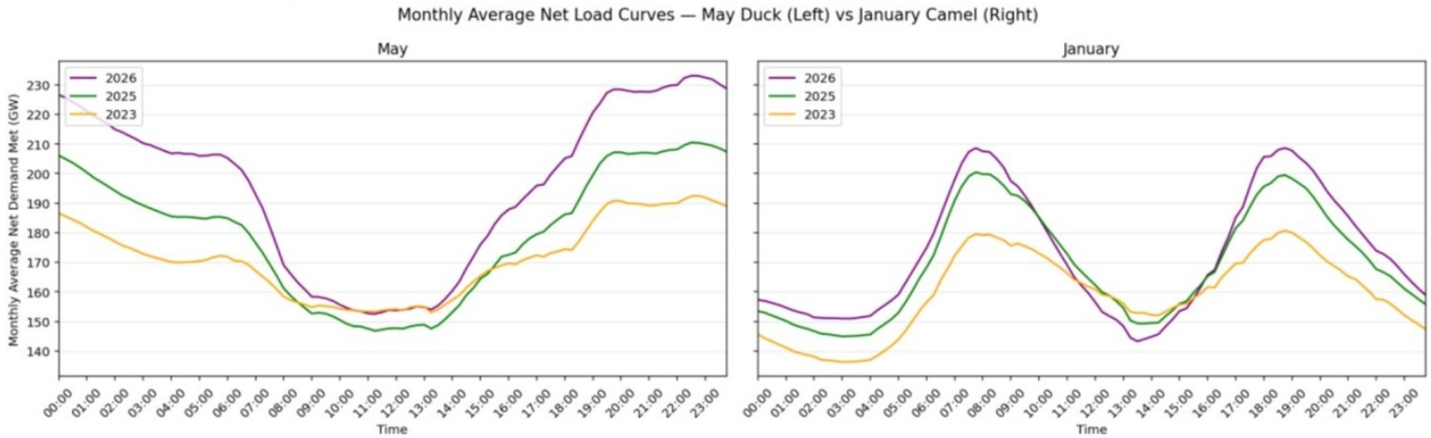


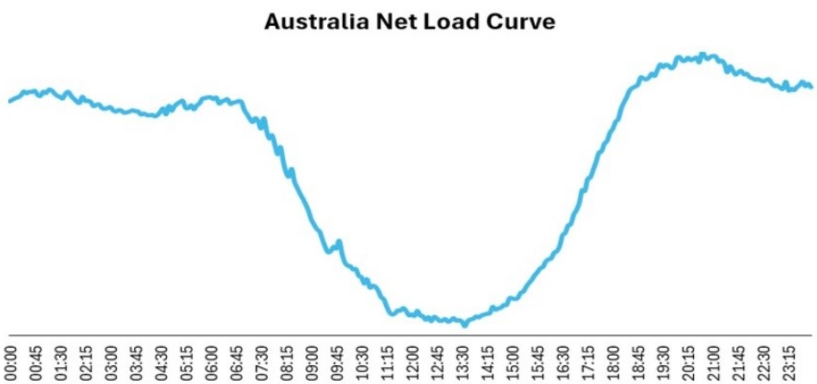
Power prices have inflected globally as power markets tighten on AI, supply chain reshoring, and electrification, coupled with insufficient baseload investments

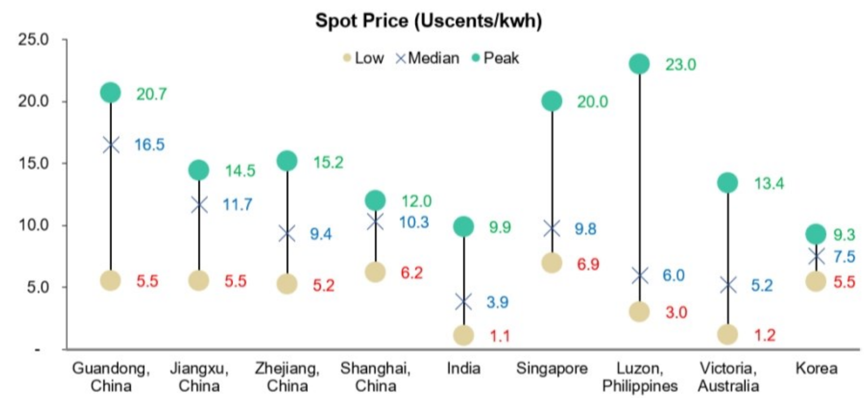
Source: Company data, Bloomberg, PLN Indonesia, EPPO Thailand, ST Suruhanjaya Malaysia, DOE Philippines, EMA Singapore, Morgan Stanley Research; e = Morgan Stanley Research estimates

Renewables deepen the duck curve, widening intraday spreads and rewarding flexibility

India's duck curves are getting deeper but the shape keeps evolving

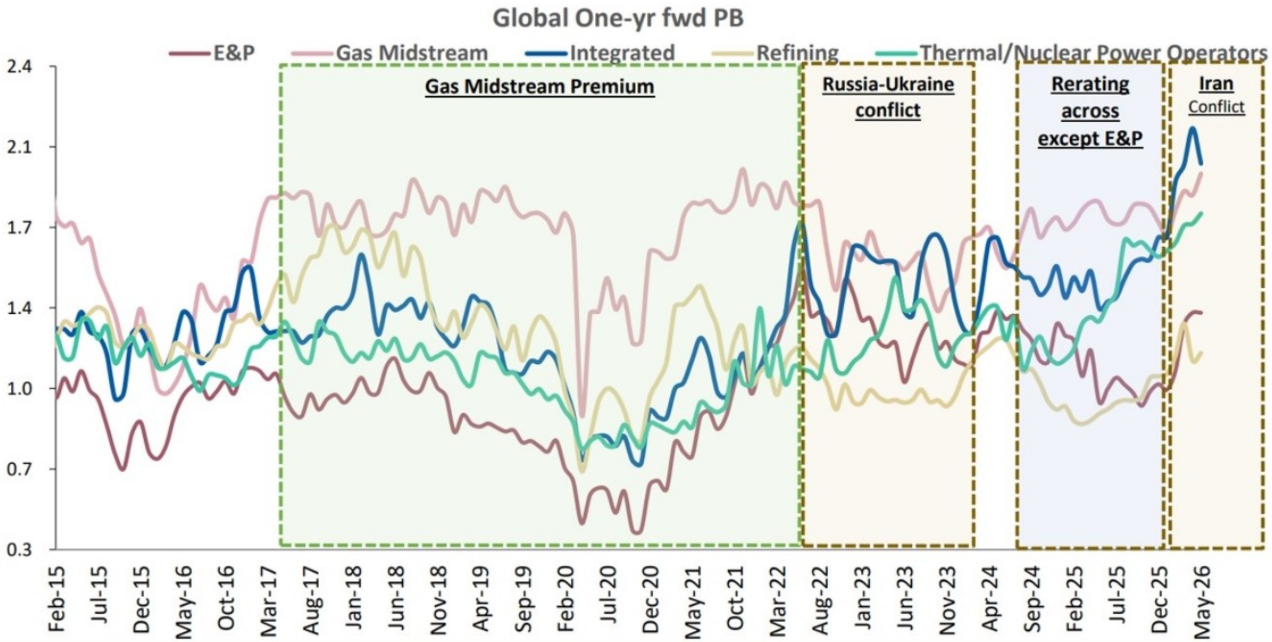






Source: Grid India, IEX, AEMO, EIA, Morgan Stanley Research

Learnings From Power Supply Chain Re-rating: Getting Broader Across Energy



Power supply chain has re-rated 20-50% in the past two years, as the consumption growth outlook has changed. The story widens to all dependable energy.

Source: Refinitiv, Morgan Stanley Research

Key Surprises Ahead: Stacking up Energy Security and Power Supply Chain Exposure

Key Surprises	USA	CHINA	EMEA	INDIA	JAPAN	SOUTH KOREA	TAIWAN	ASEAN	AUSTRALIA
Surprise #1: Asia's energy capex will double by 2030.	QUANTA SERVICES, INC.; HALLIBURTON; slb; Honeywell	招商局; COSCO SHIPPING; COSL; 扬子江船业集团	TEN Technip Energies; SAIPEM; SBM OFFSHORE; Transocean	LARSEN & TOUBRO; adani Energy Solutions; POLYCAB	MITSUBISHI HEAVY INDUSTRIES, LTD.			Seatrium	
Surprise #2: The Return of fossil to Secure AI energy needs	Cummins; CATERPILLAR; GE VERNOVA	兖矿能源集团股份有限公司; SANY; WEICHAI	metso; Epiroc; SANDVIK	Coal India; BHEL	KOMATSU; HITACHI			UNITED TRACTORS member of ASTRA; AlamTri	Whitehaven; YANCOAL; BHP
Surprise #3: Diversification of energy sourcing to the US, LatAm	ExxonMobil; Williams; Chevron; Valero; Marathon; TARGA; CHENIERE; VENTURE GLOBAL		bp; TotalEnergies		MODEC; MITSUI&CO.; ITOCHU; Mitsubishi Corporation; MOL 商船三井	SAMSUNG E&A; 주식회사 성광벤드; Hanwha Aerospace; TK; HD HYUNDAI HEAVY INDUSTRIES; SAMSUNG C&T; SAMSUNG HEAVY INDUSTRIES			
Surprise #4: Domestic O&G production & refining picks up		CNOOC; PetroChina		ONGC; Reliance Industries Limited; OIL INDIA; HP; IndianOil; Bharat Petroleum	INPEX; JAPEX; COSMO	S-OIL; SK innovation		PTTEP; bangchak; Thaioil; SPRC	Woodside Energy; AMPOL; Santos; VIVA Energy
Surprise #5: Energy storage expands rapidly		CATL; LEAD 先导; SUNGROW; GanfengLithium; EVE Energy; TIANQI LITHIUM		EXIDE		SAMSUNG SDI; LG Energy Solution			PLS; igo
Surprise #6: Accelerated nuclear and power grid deployment	CURTISS-WRIGHT; GE VERNOVA	NARI; 中国电气装备; 平高集团有限公司; Sieyuan; 中广核 CGN	Schneider Electric; prysmian; ABB; SIEMENS energy	adani; POLYCAB; LARSEN & TOUBRO; पावरग्रिड POWERGRID	HITACHI	HD HYUNDAI ELECTRIC; LS ELECTRIC; DOOSAN Enerbility	華城電機 FORTUNE	TENAGA NASIONAL	PALADIN
Surprise #7: Corporate balance sheets can support 75% of investment		CNOOC; PetroChina		Coal India; Reliance Industries Limited; पावरग्रिड POWERGRID	INPEX; JAPEX			TENAGA NASIONAL; PETRONAS; Keppel; GULF	Woodside Energy; Santos

Source: Morgan Stanley Research

India

Energy Security: Demand growth requires a diversified generation build-out

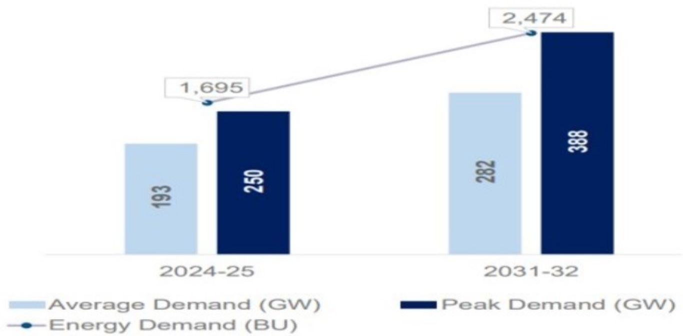
India's Vision 2047

Energy demand	6400 BU
Peak demand	708 GW
Installed Capacity	2,100 GW

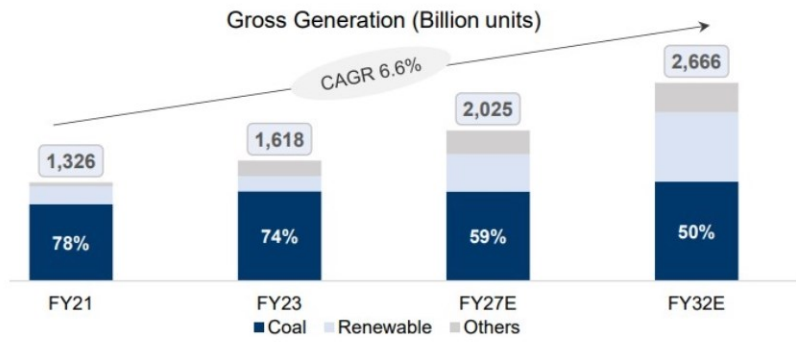
Demand Drivers

- Growing Incomes
- Rapid Urbanisation
- Push for Industrialisation
- Electrical Vehicles and Data Centers

Power Demand Growth Projections



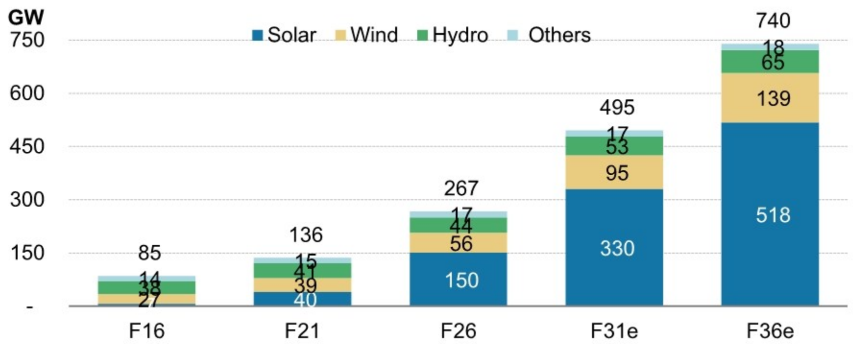
Gross Generation (BU)



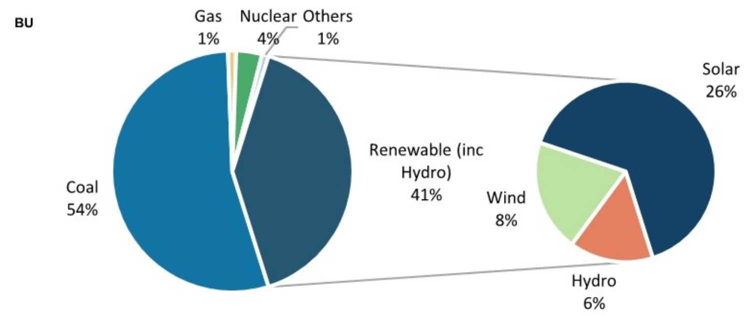
Source: Adani Power; Adani Power forecasts

Energy Security: Large renewable aspirations in long term

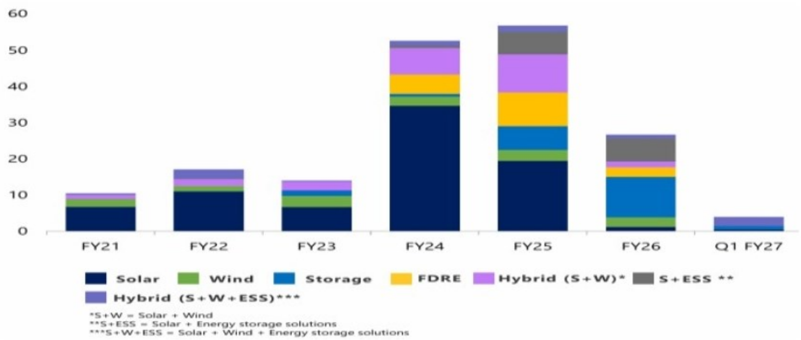
Steep increase in RE capacity likely



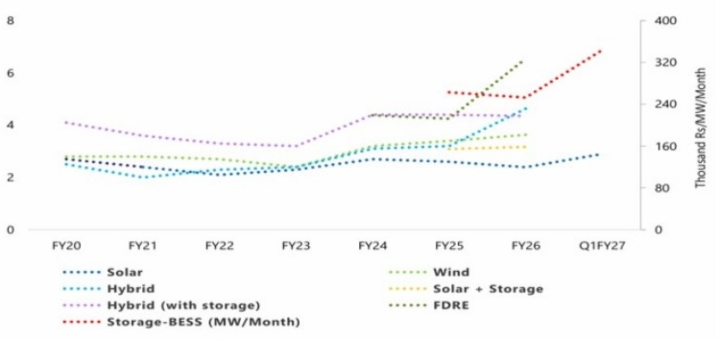
RE: 41% of generation by F36e



Renewable energy auction volumes



Minimum e-reverse auction tariffs in Q1 FY27



Source: Tata Power PPT, Morgan Stanley Research estimates.

Energy Security: Firm capacity remains indispensable as variability rises

Seasonality implies heavy dependence on thermal coal, which continues especially during evening peak hours

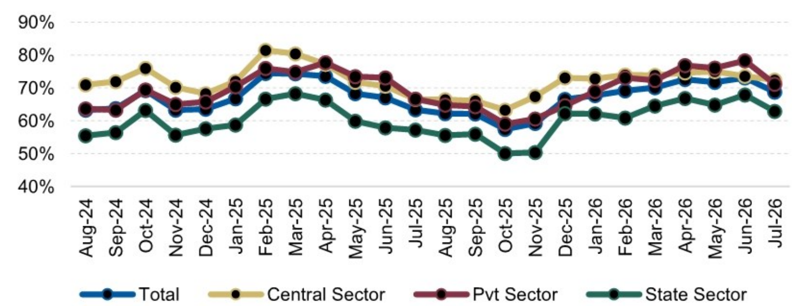
Months	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Lowest
2016	14.2%	15.0%	15.6%	15.7%	19.5%	22.6%	27.7%	30.4%	24.8%	19.6%	15.5%	14.6%	14.2%
2017	15.2%	16.3%	16.4%	18.7%	20.9%	25.6%	28.7%	26.1%	22.9%	19.6%	17.6%	18.2%	15.2%
2018	16.6%	16.7%	16.5%	17.2%	19.5%	25.8%	30.5%	31.7%	26.6%	19.6%	18.0%	18.2%	16.5%
2019	18.1%	19.0%	18.8%	20.5%	23.7%	25.7%	29.9%	33.3%	31.9%	25.7%	22.2%	21.4%	18.1%
2020	20.1%	20.4%	22.9%	27.2%	29.2%	31.5%	29.7%	33.5%	29.3%	24.4%	22.0%	20.8%	20.1%
2021	19.0%	18.8%	18.6%	18.4%	26.1%	30.8%	31.5%	30.2%	30.5%	26.3%	23.5%	21.4%	18.4%
2022	20.4%	20.9%	22.1%	21.5%	25.8%	26.6%	31.7%	33.3%	31.9%	28.7%	22.5%	21.5%	20.4%
2023	22.0%	21.8%	21.1%	20.6%	24.3%	27.2%	30.8%	31.7%	27.7%	21.3%	19.5%	20.5%	19.5%
2024	18.4%	20.1%	20.3%	20.2%	23.7%	25.8%	30.8%	32.8%	32.4%	24.9%	22.5%	23.2%	18.4%
2025	22.7%	22.1%	23.5%	24.5%	28.5%	32.4%	36.3%	35.3%	34.5%	30.9%	26.1%	24.3%	22.1%

India coal power plants: Large thermal build-out evident

Status	Capacity
Under construction	~39.5 GW
Contracts awarded, pending construction	22.9 GW
Identified / under planning	24.0 GW
Commissioned since Apr-23	~17.4 GW

RE has idiosyncratic limitations: RE dependence (incl. hydro and nuclear) peaks in July-August, but intermittency, weather, and seasonality drive high day-to-day variability - which, against volatile demand, makes grid stability a complex task and requires higher grid investment. NTPC notes the grid saw above-normal variability in ~20% of days in the last six months of the year.

Private sector coal PLFs have been improving



Source: National Power Portal, Morgan Stanley Research

Energy Security: Significant transmission capex

Transmission capex pipeline: CEA + Brahmaputra

Combined estimated cost: Rs14.4tn

CEA F36 plan: Rs7.9tn	Brahmaputra plan: Rs6.4tn

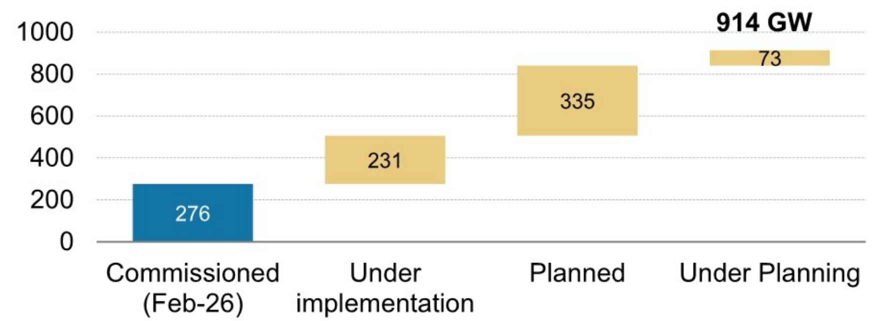
Excludes thermal evacuation capex; upside from data centres and green hydrogen hubs (~71GW)

~169k
Transmission lines (ckm)

~938k
Substation + HVDC capacity (MVA)

~120GW
HVDC capacity within plan

CEA F36 plan: 914GW non-fossil evacuation backbone



Combined infrastructure needed

Metric	CEA Plan	Brahmaputra Plan	Combined
Transmission lines (ckm)	1,37,500	31,397	~1,69,000
Substation + HVDC capacity (MVA)	8,27,600	1,09,935	~9,37,500
Estimated cost (Rs bn)	7,933	6,429	14,362
HVDC capacity (within above) (GW)	~78	42	~120

Why the grid needs to scale

1. **RE geography mismatch** — Rajasthan, Gujarat and South India supply pools are far from industrial / urban load centres.
2. **Hydro evacuation** — North-East hydro potential creates a long-distance evacuation requirement.
3. **New point loads** — Data centres and green hydrogen hubs require dedicated power evacuation.
4. **Grid complexity** — Variable RE, bidirectional flows and duck-curve swings need HVDC, STATCOMs and digital grids.

Transmission is not a narrow T&D line item; it is the core system constraint for energy security, RE integration, hydro evacuation and new digital / industrial loads.

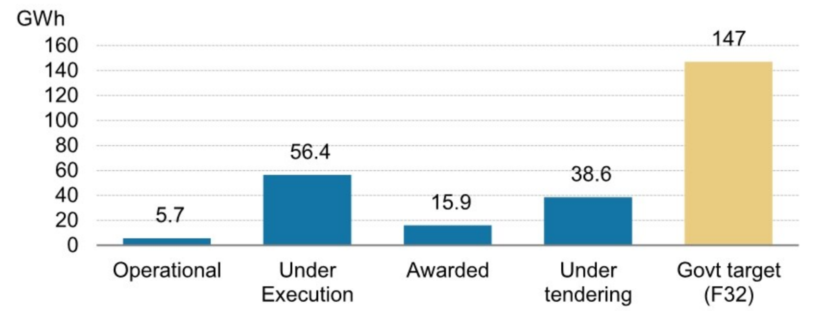
Source: CEA, Morgan Stanley Research.

Energy Security: Storage is moving from tenders to deployment

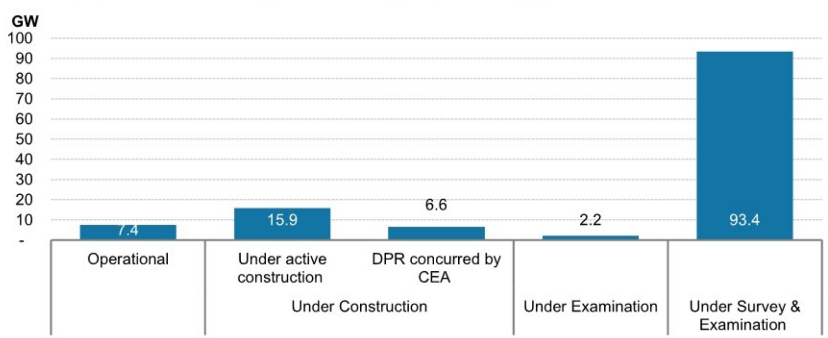
Storage roles: BESS is modular and fast; PSP is longer duration

Parameters	BESS	PSP
Energy storage technology	Battery	Pumped hydro
Energy storage duration	2-4 hours	6-8 hours
Operation cycle per day	1-2	1
Gestation period	6-12 months	6-8 years
VGF support	Yes	No
PPA period	8-12 years	25-40 years

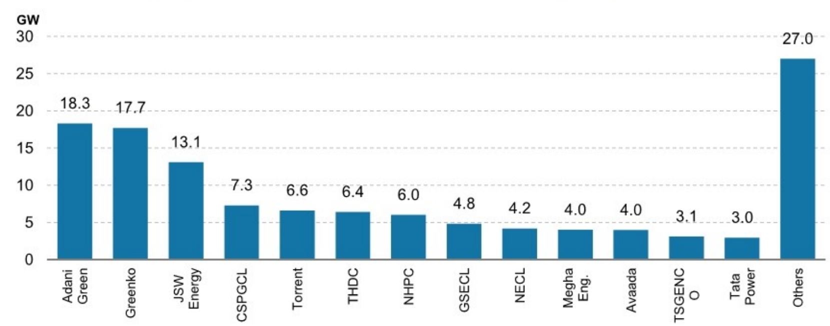
BESS pipeline: large tendering, commissioning yet to pickup



PSP pipeline: Long gestation projects (approval + construction)



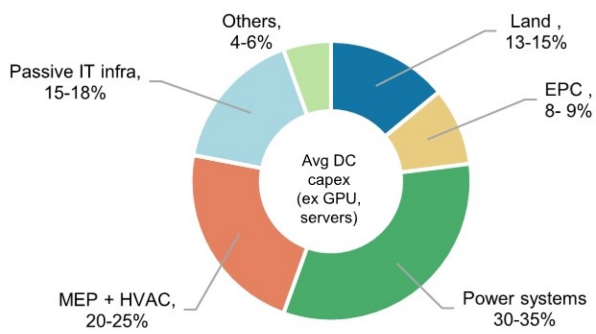
PSP pipeline is concentrated among large utilities



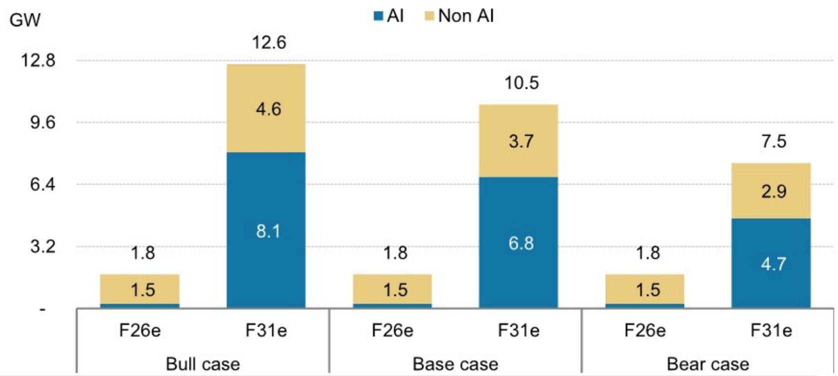
Source: Morgan Stanley Research, MoP, MNRE, CEA

Data Centers: Capacity to increase ~6x by F31e, creating US$80bn opportunity

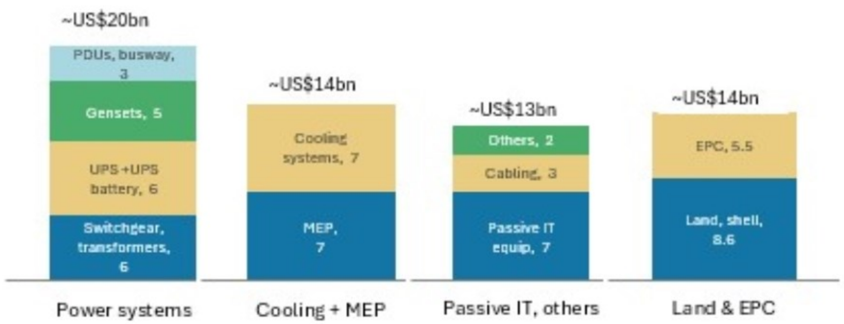
We expect average capex of US$7mn/MW



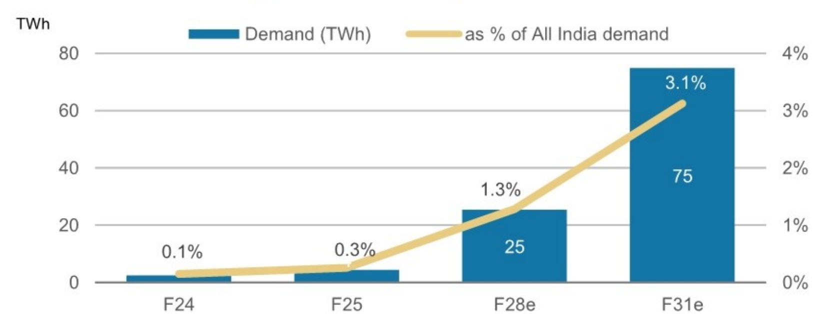
Capacity to 10.5GW by F31e; ~75% AI DCs in base case



Industrial opportunity: ~US$60bn by F31e; need for high uptime & cooling to drive TAM for capital goods players



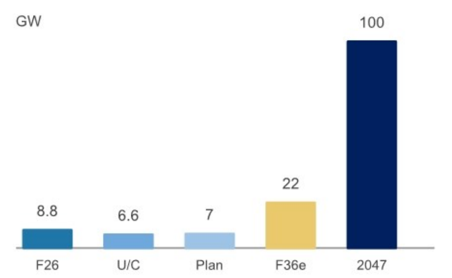
We expect datacenters to consume 75TWh of power by F31, forming 3% of India's power demand



Source: Morgan Stanley Research estimates

Energy Security: Nuclear policy to unlock a new clean-baseload cycle

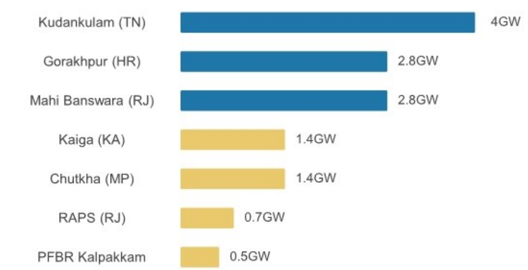
India's Nuclear Ambition by 2047



Policy ambition: nuclear capacity from 8.8GW today to 100GW by 2047; implied investment opportunity ~US$200bn.

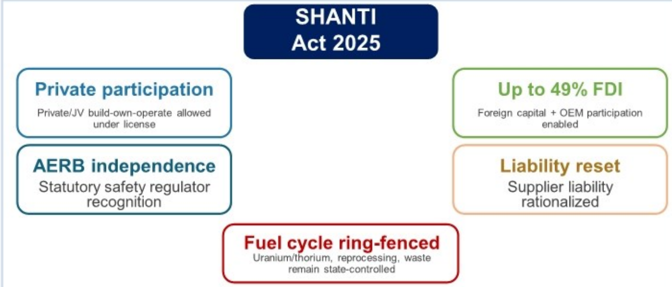
Nuclear additions by FY36e

13.6GW planned / under construction additions



Tamil Nadu + Rajasthan account for ~59% of the FY36 visible pipeline.

SHANTI Act: the policy unlock



Why it matters: opens a sector that had been state-dominated for six decades; removes liability/FDI bottlenecks that constrained private and foreign OEM participation.

Corporate ground developments: pipeline forming across utilities, captive users and suppliers

NTPC / NPCIL

ASHVINI JV targeting 30GW by 2047; Chhattisgarh MoU for 4.2GW nuclear capacity.

Tata Power

SMR foray with NPCIL; land identified across three states, water allocation and DPRs underway.

Adani Power

Adani Atomic Energy created; group targets 10GW nuclear by 2035; Maharashtra MoU for 6GW.

Maharashtra nuclear hub

Rs6.5tn MoUs for 25.4GW with NTPC, Adani Power, Reliance and Lalitpur Power.

Captive BSR model

Hindalco reportedly (*The Economic Times*, July 28, 2026) got sole proposal to NPCIL for 220MW Bharat Small Reactors; several others initially explored documents.

Capital goods beneficiaries

L&T and BHEL positioned in nuclear-grade equipment; BHEL can supply 30-40% of nuclear plant BoM.

Key monitorables: SHANTI implementation rules, private licensing model, first SMR approvals, site/water clearances, tariff competitiveness vs storage-backed renewables, and domestic supply-chain readiness.

Source: Morgan Stanley Research, CEA, DAE, NTPC, company disclosures and press reports, CEA forecasts

Japan

Japanese Government's 7th Strategic Energy Plan: F3/41 Outlook

Outlook on energy supply and demand in F3/41

	F3/24 (Preliminary figures)	F3/41e
Energy self-sufficiency rate	15.2%	Approx. 30-40%
Electricity output	985.4bn kWh	Approx. 1.1-1.2trn kWh
Final energy consumption	300mn kl	Approx. 260-270mn kl
GHG emission reduction (vs F3/14)	22.9% (F3/23 actual)	73.0%

Outlook on breakdown of electricity output

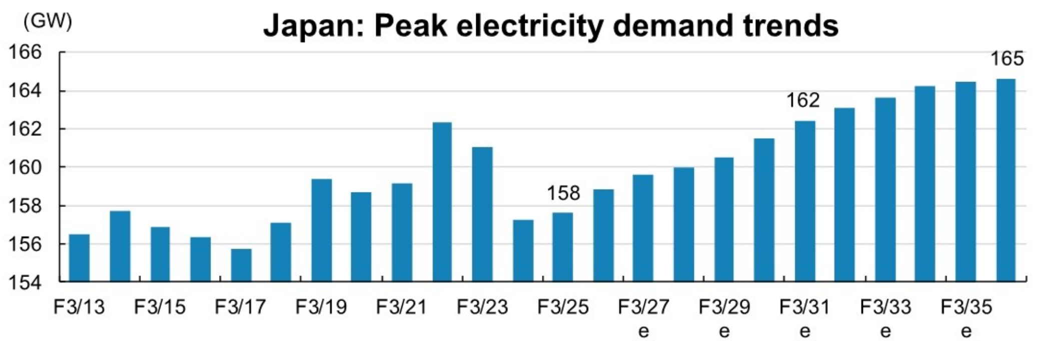
	F3/24 (Preliminary figures)	F3/41e
Renewables	22.9%	Approx. 40-50%
Nuclear	8.5%	Approx. 20%
Thermal	68.6%	Approx. 30-40%

Outlook on breakdown of renewables in energy mix

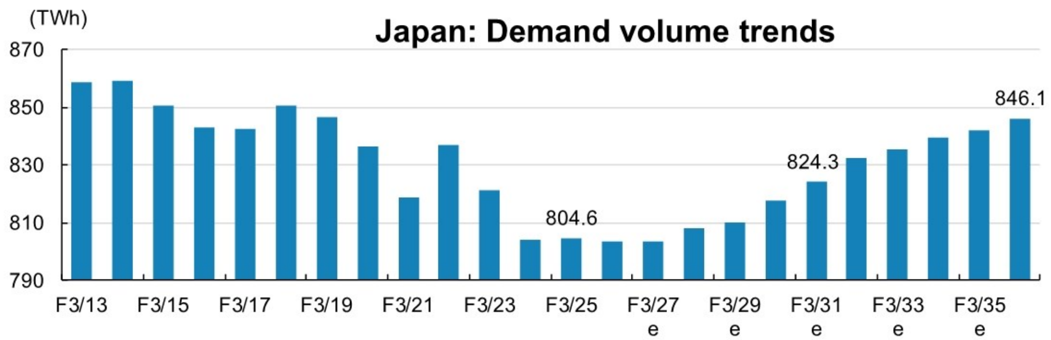
	F3/24 (Preliminary figures)	F3/41e
Renewables	**22.9%**	**Approx. 40-50%**
Solar power	9.8%	Approx. 23-29%
Wind power	1.1%	Approx. 4-8%
Hydro	7.6%	Approx. 8-10%
Geothermal	0.3%	Approx. 1-2%
Biomass	4.1%	Approx. 5-6%

Source: METI, Morgan Stanley Research; e = METI outlook

Japan: Projected Electricity Demand (10-yr)

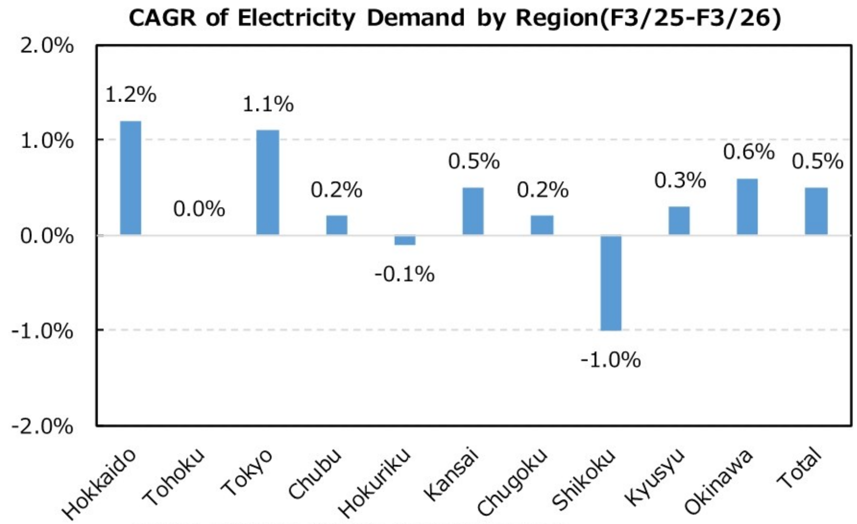


Source: OCCTO, Morgan Stanley Research; e = OCCTO estimates



Source: OCCTO, Morgan Stanley Research; e = OCCTO estimates.

Japan: Outlook of Electricity Demand by Region



Source : OCCTO、Morgan Stanley Research
Note: e=OCCTO estimates

Outlook of Electricity Demand by Region

(TWh)

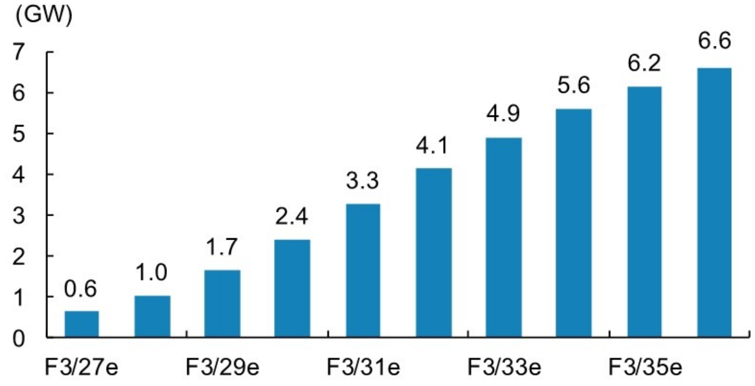
	F3/26e	F3/36e	CAGR (F3/25-F3/36)
Hokkaido	27.8	31.2	1.2%
Tohoku	74.0	73.7	0.0%
Tokyo	257.6	287.1	1.1%
Chubu	121.8	124.6	0.2%
Hokuriku	25.7	25.3	-0.1%
Kansai	130.9	137.0	0.5%
Chugoku	53.1	54.2	0.2%
Shikoku	23.7	21.4	-1.0%
Kyusyu	80.9	83.2	0.3%
Okinawa	7.9	8.4	0.6%
Total	803.4	846.1	0.5%

Source : OCCTO、Morgan Stanley Research
Note : e=OCCTO estimates

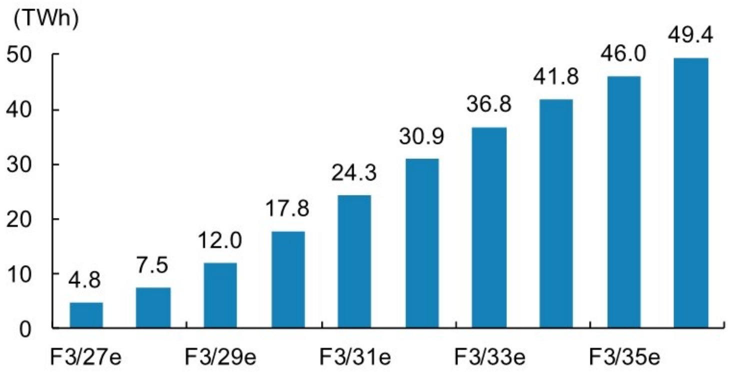
Source: OCCTO, Morgan Stanley Research; e = OCCTO estimates.

Japan: Projected Electricity Demand for Construction of New Data Centers

Projected rise in peak electricity demand from construction of new data centers (vs. F3/26)



Projected rise in demand volume from construction of new data centers (vs. F3/26)



Source: OCCTO, Morgan Stanley Research; e = OCCTO estimates.

Japan: Power Generation by Energy Source

Power generation by energy source

(TWh)	F3/14		F3/23	F3/24	F3/25			
		% of total				YoY	vs F3/14	% of total
Total	**1,084.5**	**100%**	**1,001.7**	**987.6**	**991.1**	**0%**	**-9%**	**100%**
Coal	357.1	33%	304.2	281.2	278.5	-1%	-22%	28%
Natural gas	443.5	41%	338.5	323.2	319.4	-1%	-28%	32%
Oil, etc.	156.7	14%	84.1	73.1	71.1	-3%	-55%	7%
Nuclear	9.3	1%	56.1	84.1	93.5	11%	905%	9%
Renewable energy	117.9	11%	218.7	226.1	228.6	1%	94%	23%
Hydroelectric power	79.4	7%	76.7	74.9	73.5	-2%	-7%	7%
Solar power	12.9	1%	92.6	96.5	98.1	2%	660%	10%
Wind power	5.2	0%	9.3	10.5	11.7	11%	125%	1%
Geothermal power	2.6	0%	3.0	34.0	3.9	-89%	50%	0%
Biomass power	17.8	2%	37.2	40.8	41.4	1%	133%	4%

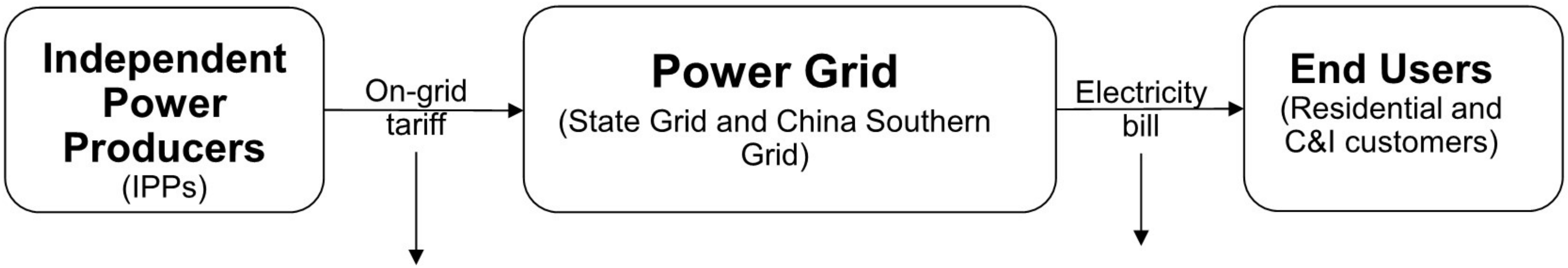
Source: MoE, Morgan Stanley Research

Source: MoE, Morgan Stanley Research

China

Power Utilities: China's Power System and Tariff Structure

Electricity transmission and distribution



Electricity market mechanism

- Long-term contract
- Spot market

Tariff structure

1. Generation tariff
2. Capacity tariff
3. Ancillary services
4. Green power tariff

Commercial and industrial (C&I) users subsidize residential users

- Introducing peak-valley hours in residential tariff systems to guide a more reasonable residential power load
- Revisiting the tiered tariff pricing structure to better account for consumption patterns of wealthy households

Additional system costs (load adjustment cost, green power tariff, etc) will all eventually be passed through to C&I users

Source: Morgan Stanley Research

Document 136: Solar and Wind To Fully Enter Power Market Trading

Mechanism tariff: to be bided by different types of projects in each province

Example of mechanism tariff bidding for a certain province

	Power volume (mn kwh)	Bidding price (Rmb/kwh)	Tariff upper limit set by the government (Rmb/kwh)	Total power volume for the province set by government (mn kwh)
Project A	10	0.25	0.34	50
Project B	15	0.26		
Project C	10	0.29		
Project D	20	**0.32**		
Project E	5	0.33		
More projects	...	Higher than 0.33		

Example of how mechanism tariff works for each participating project

		Market tariff (Rmb/kwh)	Average market tariff (Rmb/kwh)	Mechnism tariff (Rmb/kwh)	Mechnism tariff - average market tariff	Actual tariff realized (Rmb/kwh)
Scenario 1	Project A	0.15	0.26	0.32	0.06	0.15+0.06=0.21
	Project B	0.20				0.20+0.06=0.26
	Project C	0.25				0.25+0.06=0.31
	Project D	0.28				0.28+0.06=0.34
Scenario 2	Project A	0.34	0.33	0.32	-0.01	0.34-0.01=0.33
	Project B	0.30				0.30-0.01=0.29
	Project C	0.34				0.34-0.01=0.33
	Project D	0.36				0.36-0.01=0.35

- Provincial policy: so far 13 provinces have issued corresponding policy, June 1st as the boundary of existing projects and incremental projects.
- **Mechanism tariff**, **volume,** and **lifespan** are three major elements affecting renewable power investment.
- First mechanism tariff bidding is likely to happen in August in Shandong.

Source: National Development and Reform Commission (NDRC), National Energy Administration (NEA), Morgan Stanley Research

Coal Power: Capacity Tariff Set To Rise In 2026

NDRC Policy in November 2023 set the capacity tariff at Rmb330/KW based on fixed costs of coal IPPs

2024-25: Henan, Hunan, Chongqing, Sichuan, Qinghai, Yunnan, Guangxi have Rmb165/KW (50% coverage ratio of Rmb330/KW), other provinces grant 30% of the full capacity tariff (Rmb100/KW).

2026: The charged tariff will be raised to at least 50% for all provinces; for those provinces already at 50%, the capacity tariff will be raised to at least 70% in 2026.

- **Guangdong** provincial DRC announced on July 24 that it will raise the coal IPP capacity tariff on coal power to Rmb165/KW from January 2026, up 65% YoY.
- **Gansu** (with spot power market in place) announced on July 14 that it will increase the capacity tariff directly to Rmb330/KW (100%) from 2026 for two years, subject to a capacity supply/demand ratio

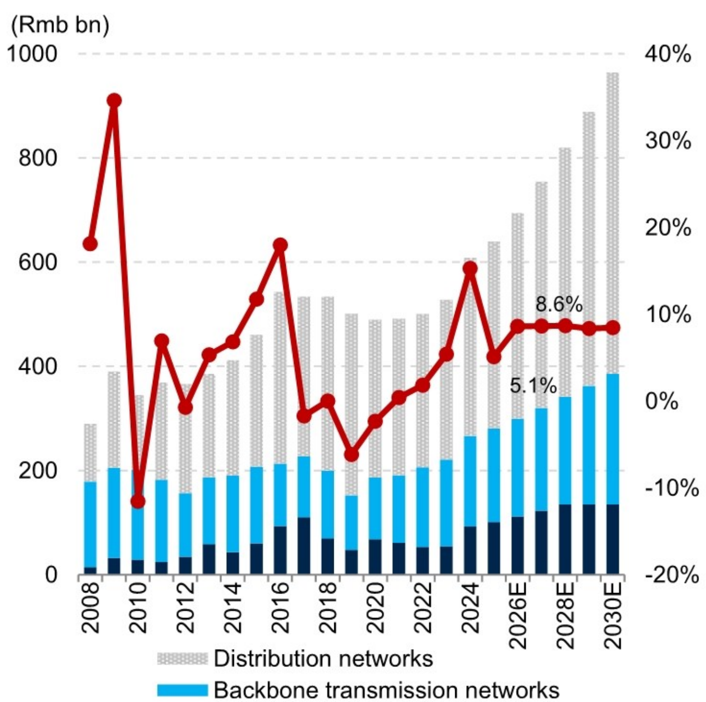
Power spot market to expand to nearly all provinces in 2026

Coal power tariff would benefit from (1) higher capacity tariff (but lower utilization), and (2) spot market trading with fast response time

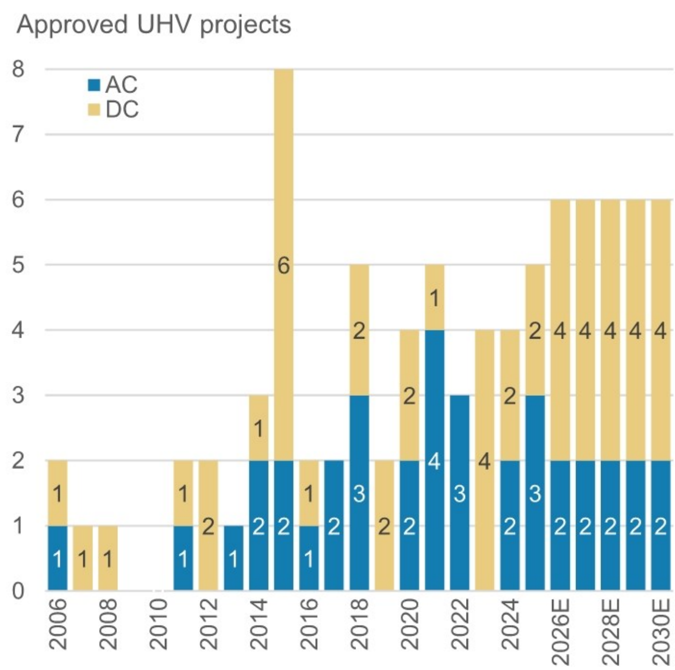
Source: Morgan Stanley Research

Domestic Grid Capex To Be Robust During The 15th FYP

China grid capex forecasts



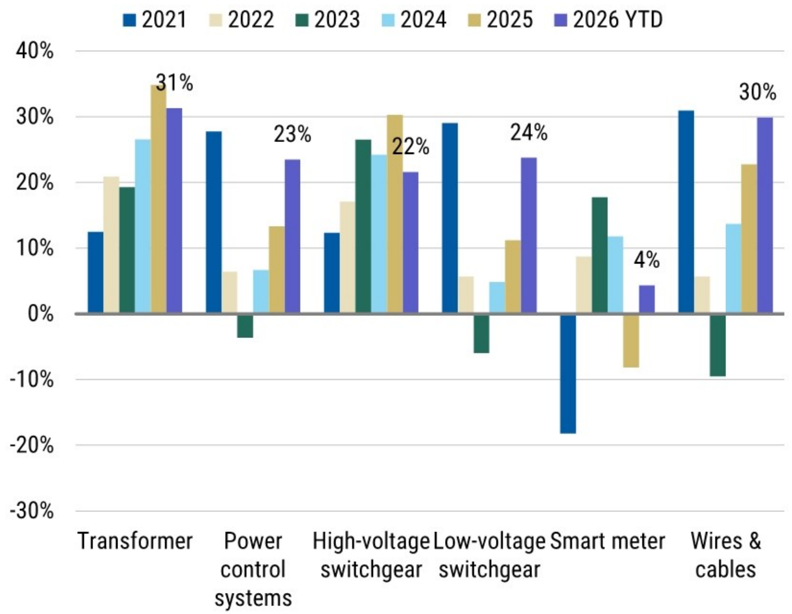
Sufficient UHV pipeline



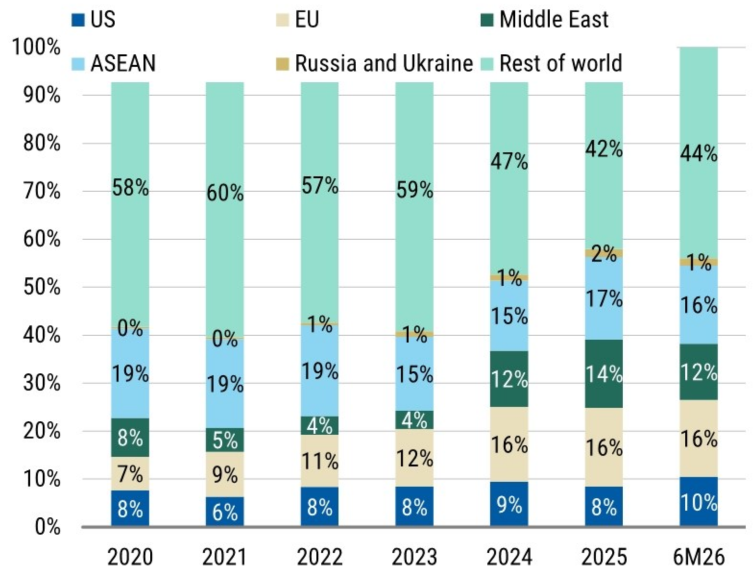
Source: Company data, State Grid, Morgan Stanley Research. E=Morgan Stanley Research estimates

More Opportunities For Chinese Grid Equipment In Overseas Markets

Export value growth by product



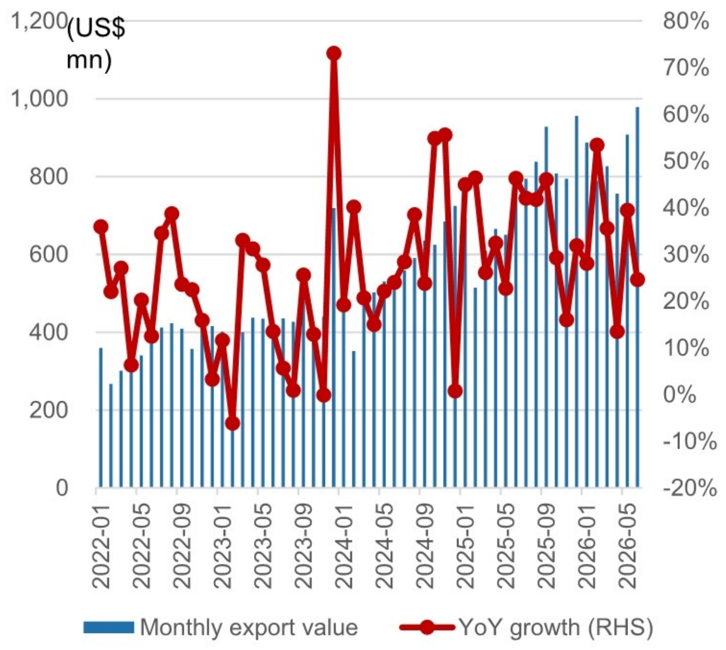
Mix improvement continued for transformers



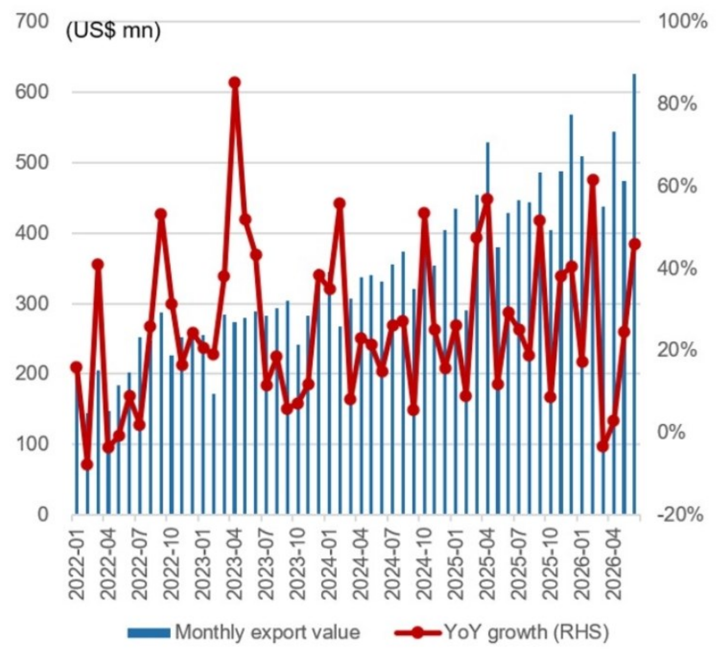
Source: China Customs, Morgan Stanley Research.

Monthly Trend For Transformers and High-voltage Switchgear

Transformers: Solid growth



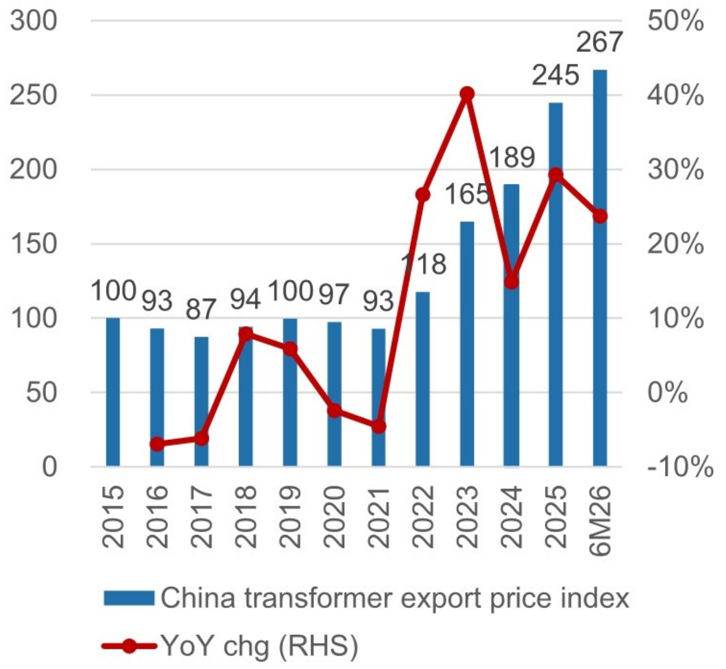
Switchgear: Significant growth catch-up



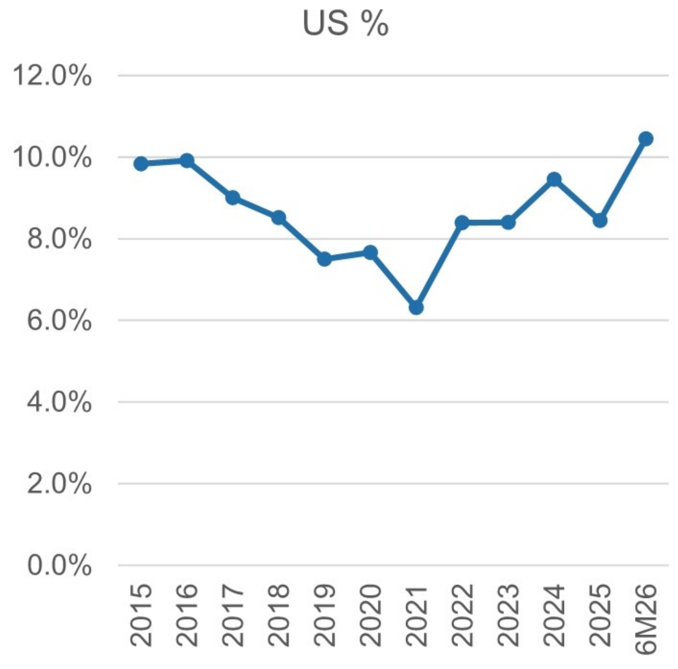
Source: China Customs, Morgan Stanley Research.

Strong Export Growth Comes With Rising ASP

Transformer export price index



Higher US contribution +ve to future ASP

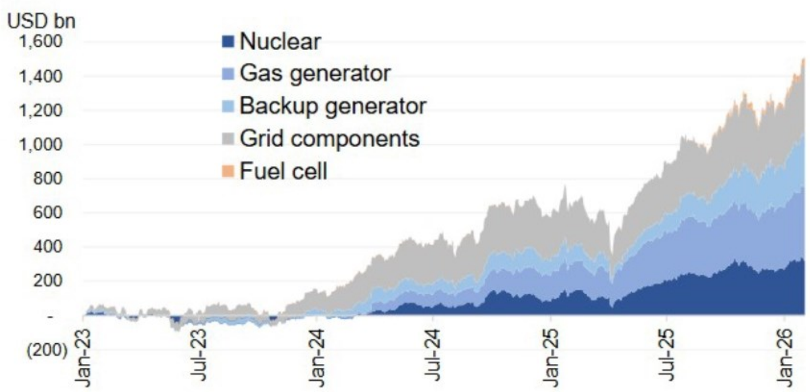


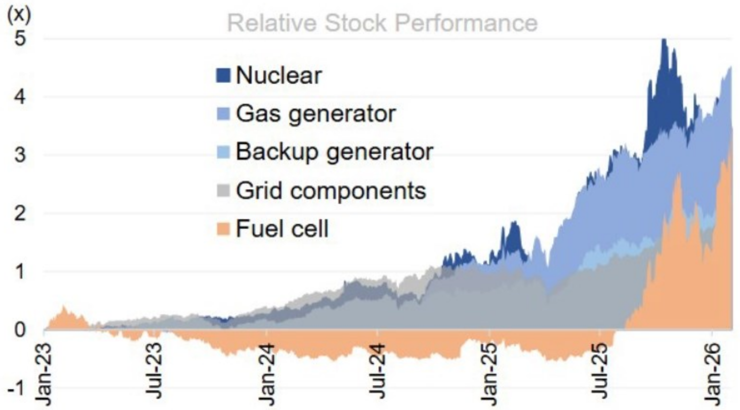
Source: China Customs, Morgan Stanley Research. Note: Set 2015 as 100

China Energy and Batteries

Global Power for AI Theme: >US$1.5tr market value accretion

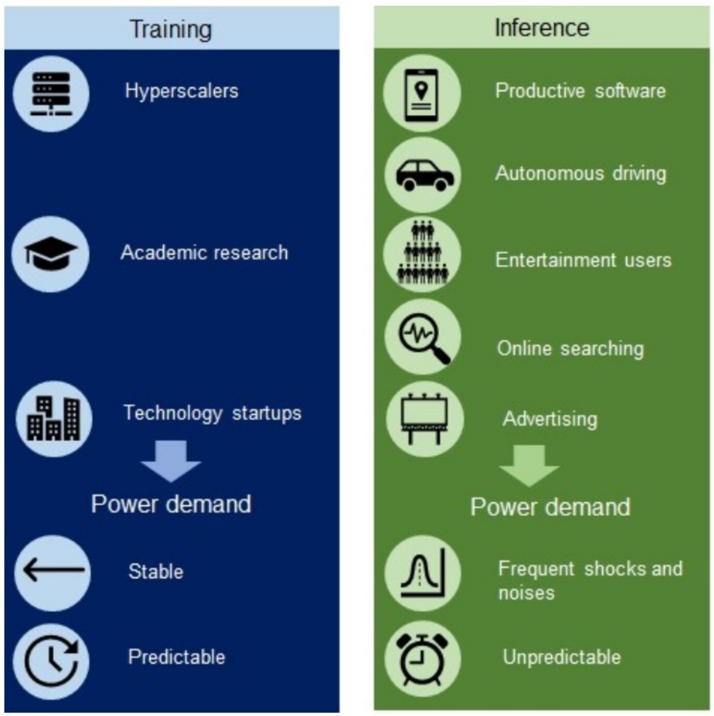
Segment rotations from nuclear, gas/backup generators to fuel cells; the next opportunity should be energy storage

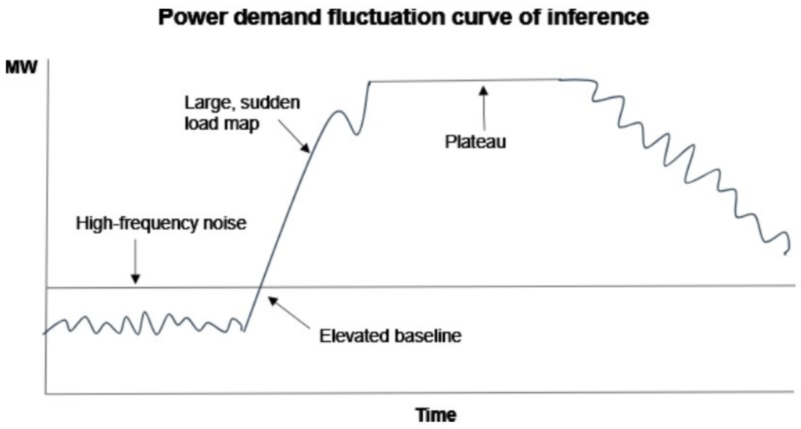




Source: Factset, Morgan Stanley Research

Inference Is Challenging Power System Flexibility

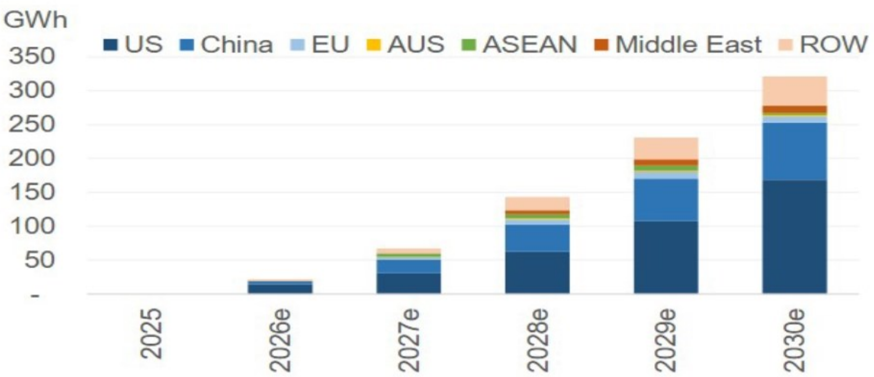




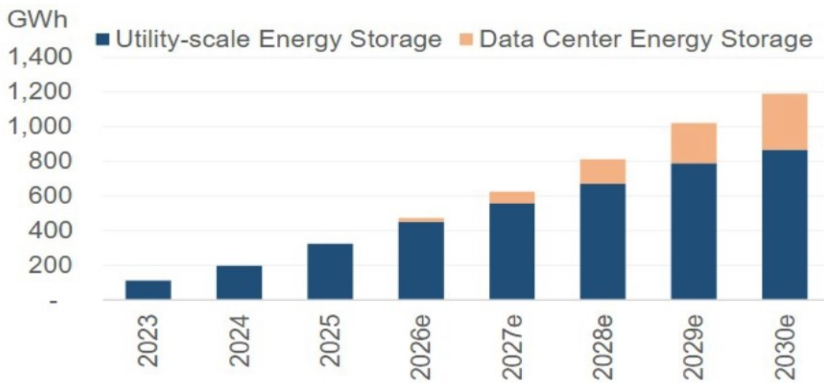
Source: Morgan Stanley Research

ESS Forecasts

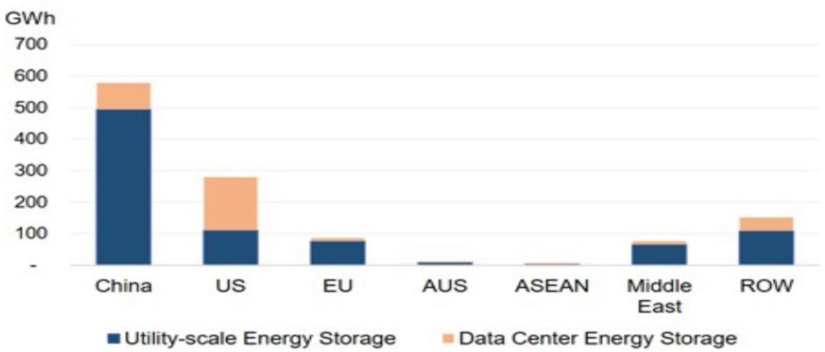
Global ESS annual incremental deployment forecast for data centers



...including utility-scale ESS in power market



Global ESS battery sales forecast for 2030 and geographic breakdown

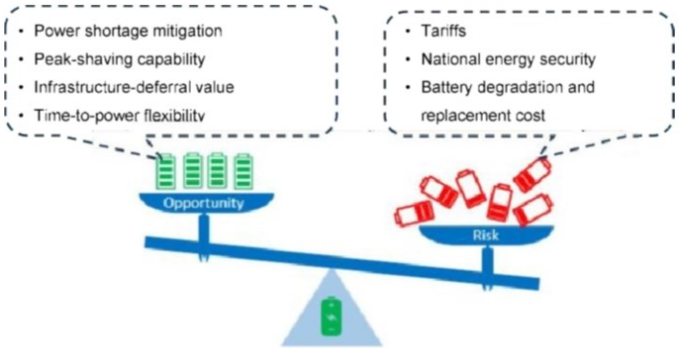


Source: Rystad, Morgan Stanley Research(e) estimates

Energy Storage – the next leg of power for AI theme

Company name	Business model	Why it benefits?
Tier 1: Direct, High-Conviction Beneficiaries		
CATL	World-leading battery cell manufacturer with growing system-level ESS integration (data center dominance)	CATL captures value across cell manufacturing, system design, and increasingly software-enabled storage solutions. Its scale, cost leadership and readiness to commercialize sodium-ion batteries position it to drive ESS LCOE materially lower, expanding adoption across AI data centers and grids.
TESLA	Vertically integrated ESS system provider (Megapack) with rapid deployment capability	Tesla is a leading AC side integrator for grid scale and data center storage, capturing full system economics and benefiting from time to power urgency in AI infrastructure.
LG Energy Solution	Tier-1 global battery cell supplier with strong exposure to stationary storage and long-term utility contracts	LGES monetizes ESS growth through long-duration cell supply and stable OEM relationships, offering leveraged but lower-risk exposure to ESS volume expansion.
FLUENCE A Siemens and AES Company	Pure-play ESS system integrator and software platform (hardware-agnostic)	Fluence monetizes ESS adoption through turnkey deployment, digital optimization, and long-term services—well aligned with AI data centers' need for reliability, flexibility, and fast response
BYD	Vertically integrated battery and ESS manufacturer with strong DC-side presence	BYD captures cell-to-system margins and benefits from large-scale ESS rollout in China and emerging markets tied to AI and grid stabilitY
Tier 2: Enablers & Upstream Leverage		
SAMSUNG SDI	Advanced battery cell manufacturers with optionality in stationary storage	Participation in ESS expansion via high-performance chemistries, though capital allocation remains partially anchored to EV cycles
GanfengLithium	Upstream lithium resource and processing supplier	ESS growth diversifies lithium demand away from EV cyclicality, improving long-term volume visibility
TINCI 璞泰来 PUTAILAI SEMCORP 恩捷股份	Electrolyte, cathode, and anode material suppliers	ESS deployment supports incremental materials demand, but value capture remains indirect and chemistry-dependent
Tier 3: Grid & Electrical Components		
ABB	Global electrical equipment and grid automation provider	Incremental demand from ESS-related substations, converters, and grid reinforcement, but exposure is diluted across a broad industrial portfolio
Sieyuan EATON	Transmission, distribution and control equipment	ESS deployment drives incremental grid capex, though AI-linked ESS is not yet a dominant revenue driver

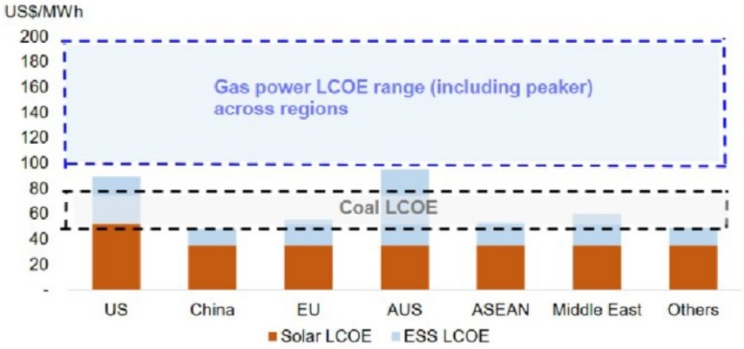
Opportunities and risks of ESS in Power for AI



Source: Morgan Stanley Research

Economies

Solar integrated ESS LCOE across regions vs. gas power LCOE across regions



China solar integrated ESS LCOE

China standalone ESS LCOE

Source: Morgan Stanley Research estimates, NDRC for historical data

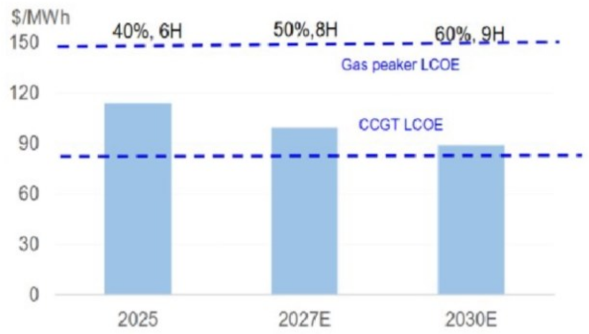
Economies (Con't)

US solar integrated ESS LCOE

US standalone ESS LCOE

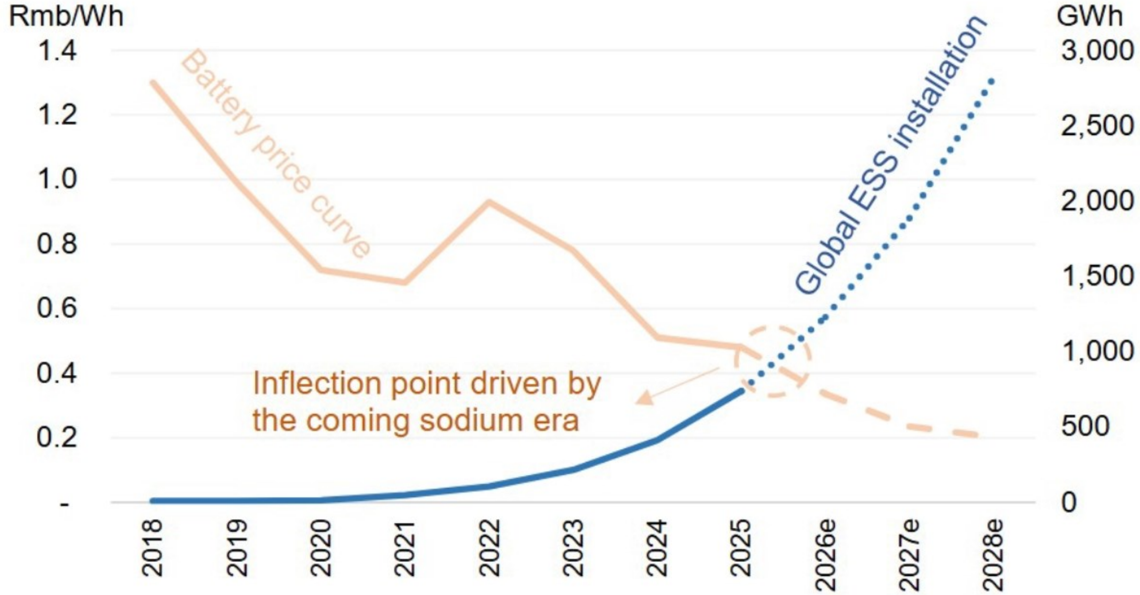
Australia solar integrated ESS LCOE

Australia standalone ESS LCOE



Source: Morgan Stanley Research estimates; EIA for historical data

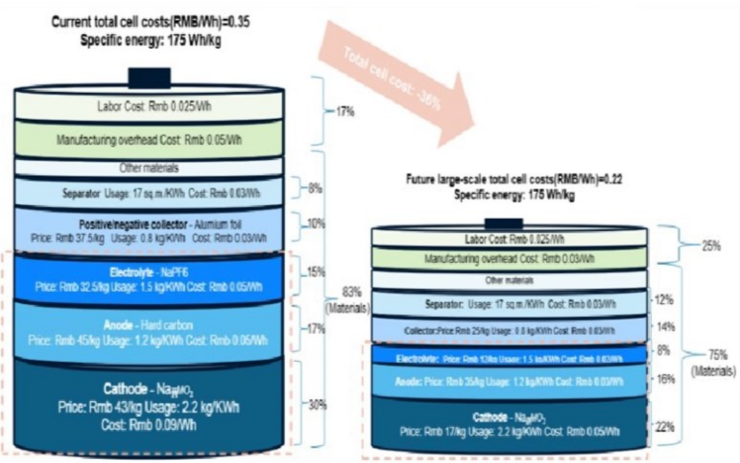
Battery cost evolution materializing "inventory for electricity"

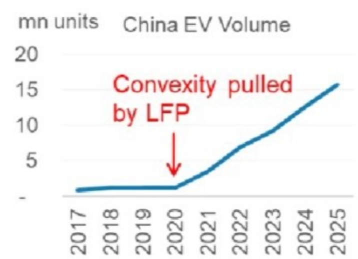


Source: Wind, Morgan Stanley Research estimates

The Sodium Era Is Coming

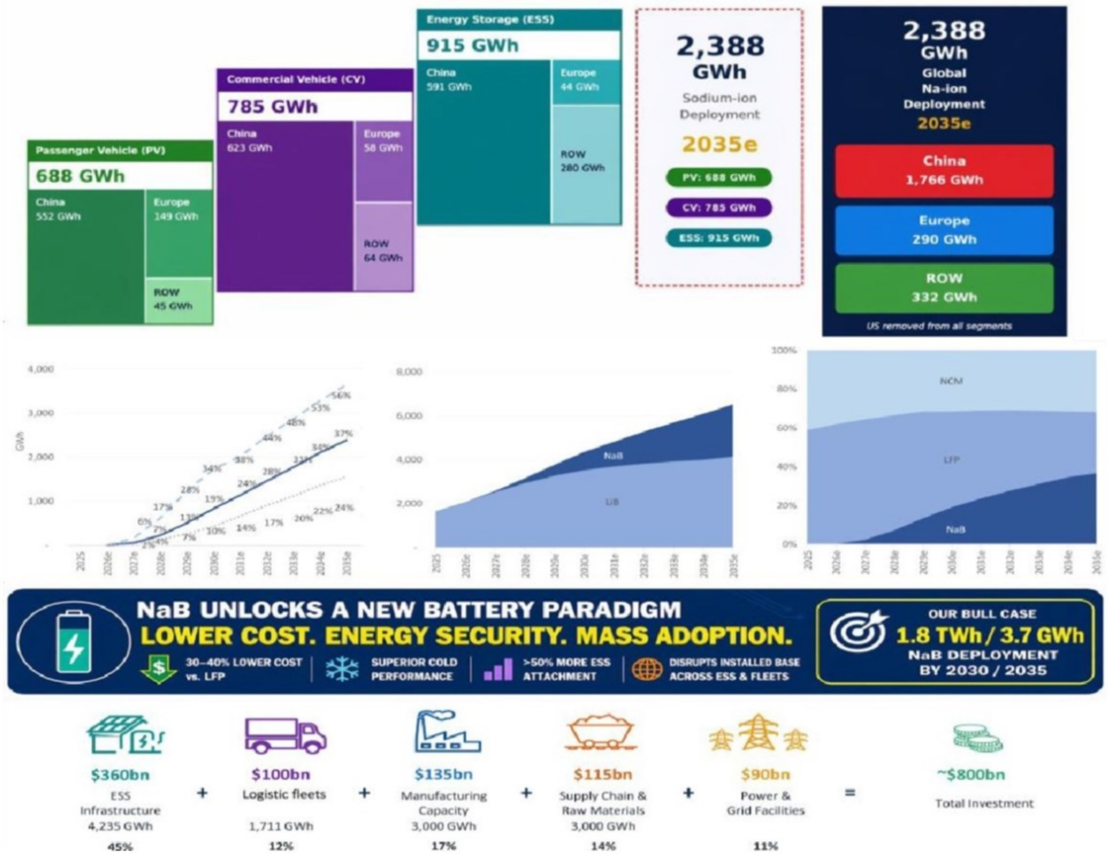
Sodium-ion cell cost: current vs. future





Source: SMM, Company data, Morgan Stanley Research estimates

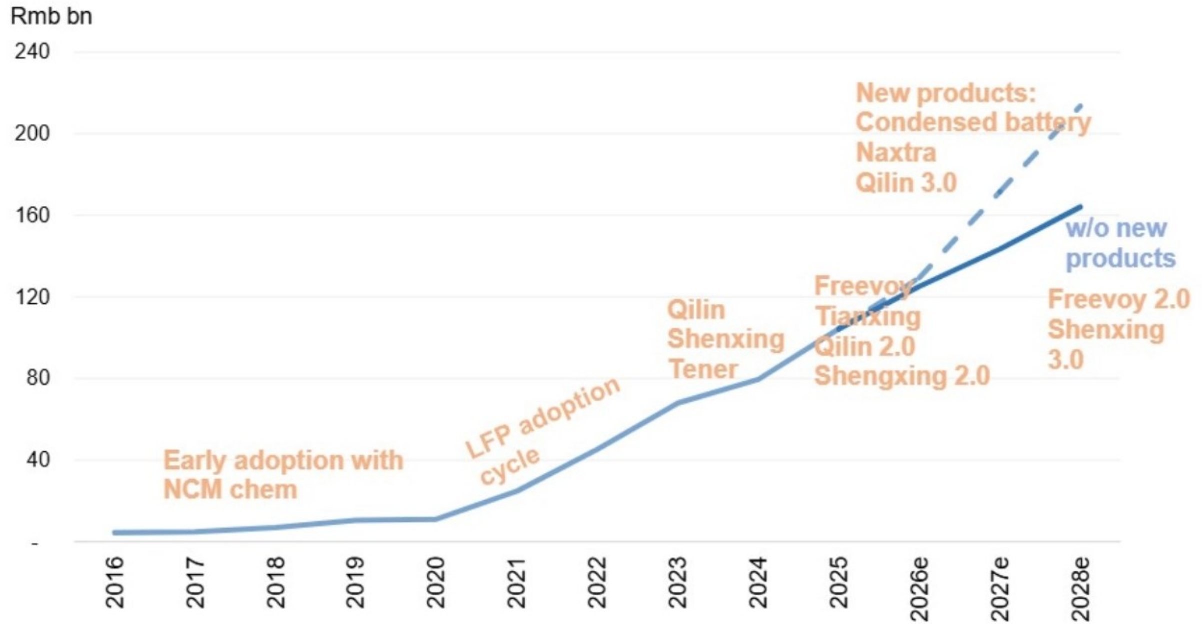
Sodium battery TAM by 2035e



Source: Morgan Stanley Research estimates

CATL is entering a new strong product cycle

CATL's product-innovation cycles, strengthening EV model cycle, and development of energy storage market solutions, help support EBITDA growth



Source: CATL, Morgan Stanley Research estimates

Power Transformers

Power Transformers: Global power equipment/grid houses

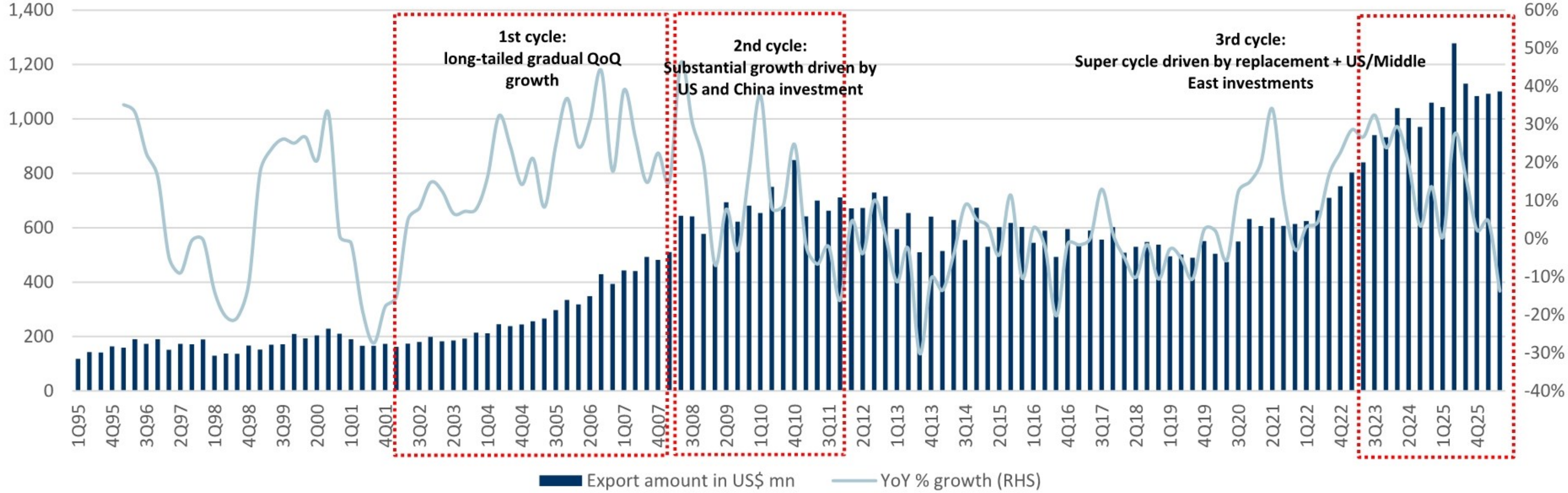
Comprehensive table of global power transformer suppliers

	Core product categories	Major manufacturing & production sites	Revenue exposure by region	Revenue exposure by product	Key segment focus
HD Hyundai Electric	Power & distribution transformers, high-voltage GIC & switchgear; low/medium-voltage breakers	South Korea (Ulsan); US (Montgomery, Alabama). Sales and service offices globally.	North America 30%, Domestic and others: 45%, Middle East 24%	Power: 48%, Distribution 26%, Rotating 16%, Subsidiaries: 10%	Primarily utility grid equipment (UHV transformers, substations) and industrial power systems.
LS Electric	Comprehensive T&D and automation range: HV/MV/LV switchgear and circuit breakers, power transformers (inc. HV transformers).	South Korea (Cheongju smart factory for LV components, Busan for HV transformers), China (Dalian, Wuxi for manufacturing subsidiaries), Vietnam and regional offices in Middle East and the US.	Domestic: 50%, North America 17%, Asia (ex-China): 14%, China: 9%, Europe 8%	Electric Infra: 32%, Electric equipment: 21%, Renewables: 8%, Automation: 7%, Subsidiaries: 32%	Dual focus on utilities (power transmission & distribution equipment) and industrials (factory automation and smart energy solutions).
Hyosung Heavy Industries	HV/MV power equipment, power system solutions, rotating machinery & industrial equipment	Primary production complex in Changwon, South Korea, while having local factories in Nantong, China, and Memphis, USA.	Korea: 65%, Asia (ex-Korea): 15%, North America: 10%, Europe: 5%, Others 5%	Heavy industries: 63%, construction 37%	Primarily serves electric utilities and transmission grid operators, industrial and commercial sectors, and renewable energy projects.
GE Vernova	Broad energy portfolio: Gas and steam turbines, gas engines, and power plant equipment; Wind turbines; Grid solutions (HV transformers)	Worldwide manufacturing footprint - North America (Greenville, SC & Schenectady, NY & Pensacola, FL), Europe (Belfort, France & Birr, Switzerland &, Stafford, UK & Cuxhaven, Germany)	America: ~30%, Europe/Middle East/Africa: ~40%, Asia: ~30%	Power: 51%, Wind: 28%, Electrification: 21%	Utility power generation, renewables developers, grid operators, and industrial & commercial
Hitachi Energy	HV electrical equipment, power and distribution transformers (including UHV and HVDC converter transformers)	Strong global manufacturing base inherited from ABB; Europe (Ludvika, Sweden & Zurich, Switzerland & staff and factories across Germany, Italy, Poland. Asia: Major sites in China and India. North America: Crystal Springs, Mississippi & Jefferson City, Missouri.	Diversified across regions: Europe and North America form large revenue shares, Asia and Middle East are growth areas. Overall, sales roughly split among EMEA, Americas, and Asia, reflecting its global utility client base.	Utilities & Renewables: 58%, Industries: 18%, Transport & Infrastructure 24%	Pure-play power grid focus - serving utilities as a core market, plus industrial and infrastructure clients.
Siemens Energy	Full-spectrum energy technology: Gas turbines, steam turbines, and generators for power plants; Electrical transmission system (HV switchgear up to 800 kV, power transformers)	Manufacturing hubs on multiple continents. Europe: Germany (Berlin, Nuremberg, Erlangen), Denmark, Spain, Austria. North America: Charlotte, NC & Orlando, FL. Asia: China, India, Egypt, and Indonesia.	Broad global revenue mix: ~53% from Europe/Middle East/Africa, ~30% Americas, ~17% Asia and Australia. Significant European base and a growing footprint in North America and Asia.	Power: 30%, Grid 27%, TI: 15%, Wind 28%	Serves utilities and grid operators, renewable energy developers, and industrial clients.

Source: Company data, Morgan Stanley Research.

Power Transformers: Where are we in the cycle?

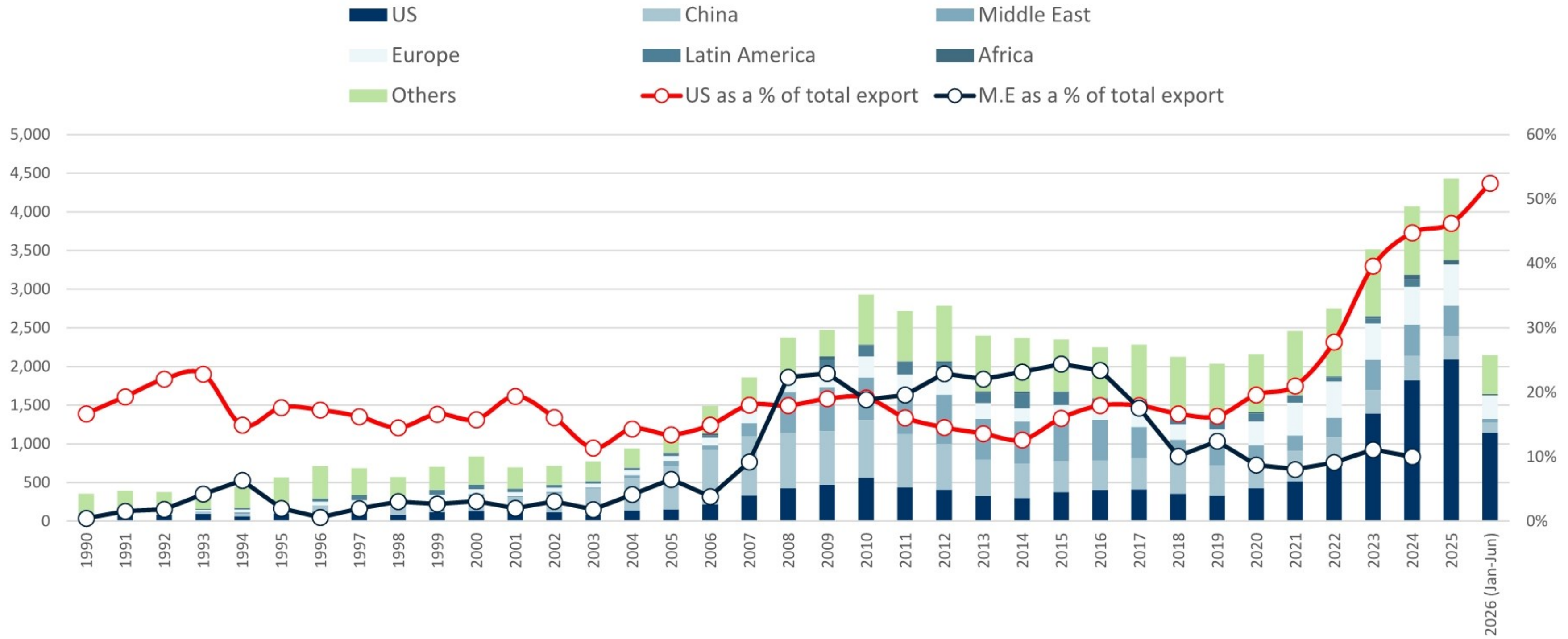
Korea's historical power transformer cycle – 1st steady and lengthy cycle was in 2004-07, driven by higher infrastructure spending in the Middle East and China, 2nd cycle was in 2007-10, on China and Europe upcycle, and 3rd or current supercycle is based chiefly on US infra investments, post anti-dumping to Korean companies in early 2010s.



Source: KITA, Morgan Stanley Research.

Power Transformers: Historical power transformer export trend by region

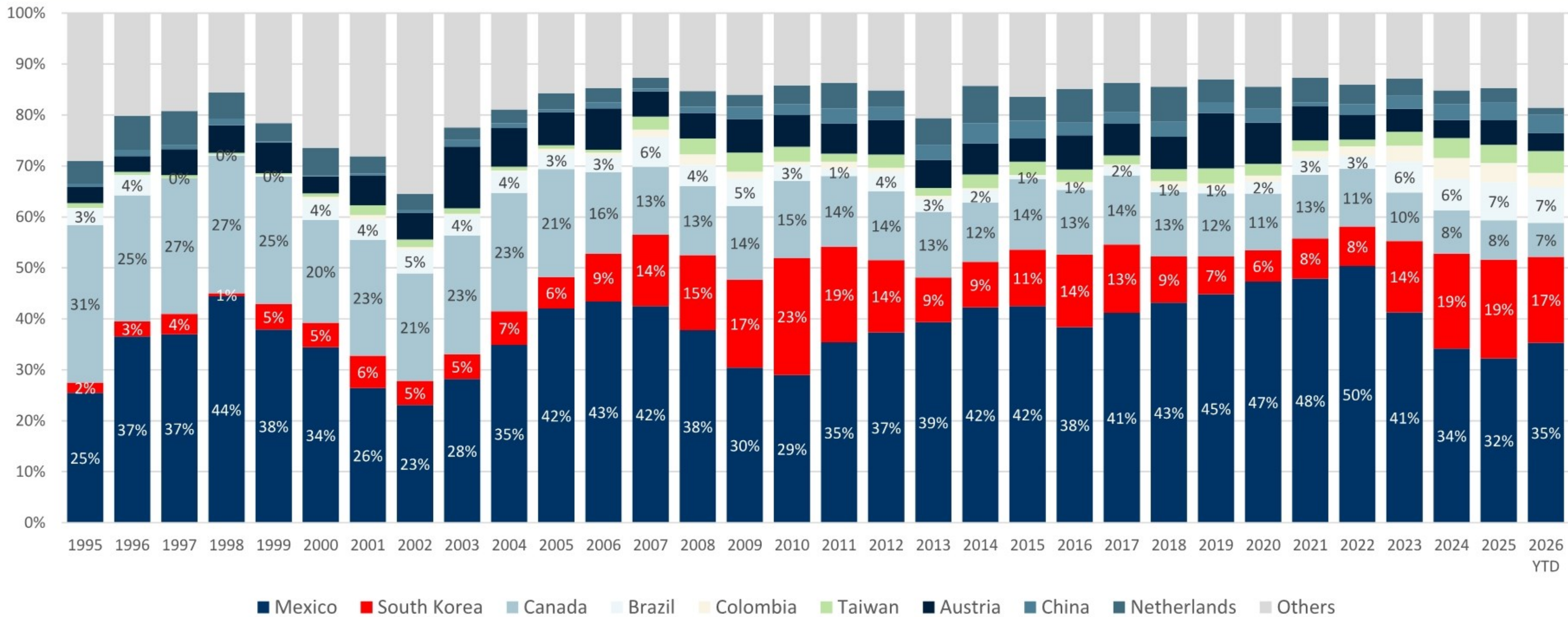
Korea's transformer exports as of 2026 YTD (Jan-Jun), the US is the largest destination with 52% of the total mix; Europe and the Middle East account for 14% and 2%, respectively.



Source: KITA, Morgan Stanley Research.

Power Transformers: South Korea gains shares in US power transformers

US power transformer import market share by key location from 1995 – South Korea has been adding wallet share significantly since 2023 on the back of aging infra replacement demand and timely capacity expansion



Source: United States International Trade Commission (USITC). Note: HTS codes include 850421, 850422, 850423, 850433, 850434

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(as of July 31, 2026)

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	Coverage Universe		Investment Banking Clients (IBC)			Other Material Investment Services Clients (MISC)	
Stock Rating Category	Count	% of Total	Count	% of Total IBC	% of Rating Category	Count	% of Total Other MISC
Overweight/Buy	1529	42%	442	47%	29%	750	43%
Equal-weight/Hold	1582	43%	396	42%	25%	773	44%
Not-Rated/Hold	3	0%	1	0%	33%	1	0%
Underweight/Sell	560	15%	97	10%	17%	217	12%
Total	3,674		936			1741	

Data include common stock and ADRs currently assigned ratings. Investment Banking Clients are companies from whom Morgan Stanley received investment banking compensation in the last 12 months. Due to rounding off of decimals, the percentages provided in the "% of total" column may not add up to exactly 100 percent.

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Mayank Maheshwari		
Global Power Synergy PCL (GPSC.BK)	U (09/12/2025)	Bt50.50
Gulf Development PCL (GULF.BK)	O (03/26/2025)	Bt66.00

Manila Electric Company (MER.PS)	O (06/20/2022)	PP483.40
Perusahaan Gas Negara (PGAS.JK)	E (06/18/2026)	Rp1,490
SembCorp Industries Ltd (SCIL.SI)	O (03/23/2026)	S$5.66
Tenaga Nasional (TENA.KL)	O (09/12/2023)	RM14.34
Ryan M Heng		
Airports of Thailand (AOT.BK)	O (08/25/2021)	Bt63.25
International Container Terminal Service (ICT.PS)	O (03/04/2024)	PP996.00
Maynilad Water Services, Inc. (MYNLD.PS)	E (06/30/2026)	PP18.14

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