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SINGAPORE THEMATIC | DECEMBER 2025

Singapore's Energy Transition

Four Switches, One Market

19 December 2025

Thematic | Energy Transition

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- **Singapore's energy transition is centred on rewiring a gas-dominated power system through the "Four Switches":** i) More efficient, hydrogen-ready gas power plants; ii) maximum feasible solar paired with storage; iii) large-scale regional electricity imports; and iv) longer-dated low-carbon alternatives such as hydrogen. It targets to have 2GWp of solar power generation by 2030 and 6GW of low-carbon imports by 2035, with gas still accounting for >50% of the mix in 2035. It sets up investable capex and regulatory catalysts across utilities, REITs, data centres (DCs), aviation and banks, while keeping options available via ammonia-to-power and exploratory nuclear capability-building.
- **Singapore's energy transition is anchored by its commitment to net-zero GHG emissions by 2050**, and is framed around balancing decarbonisation with energy security and competitiveness in an energy import-dependent economy. High exposure to physical climate risk, external fuel price and supply disruptions reinforce national risks. Policy traction comes from carbon pricing: The carbon tax will rise from SGD5 per tonne of CO_2e (2019-2023) to SGD50-80 by 2030, with eligible international credits allowed for up to 5% offsets.
- **The energy transition roadmap** is built on Energy Market Authority's (EMA) Energy 2050 Committee view that achieving net zero by 2050 from the power sector is technically feasible while maintaining security and affordability, but requires early, coordinated action and scenario-based planning. The "Four Switches" are the core supply levers: More efficient, hydrogen-ready gas power plants; maximum feasible solar paired with storage; regional electricity imports; and longer-dated low-carbon alternatives. Roadmap targets include 2GWp in solar by 2030 and 6GW of low-carbon imports by 2035, with gas still representing more than 50% of the mix in 2035 (from c.95% currently).
- **Hydrogen is a strategic long-term pillar**, potentially supplying up to ~50% of power by 2050 in net-zero scenarios (reliant on technology and cost breakthroughs). Near-term economics and import constraints push it beyond 2035. Ammonia is the near-term carrier focus: EMA and Maritime and Port Authority of Singapore (MPA) shortlisted consortia in Jul 2024 and, in Oct 2025, appointed a Keppel-led consortium for front-end engineering design (FEED) on a Jurong Island project targeting 55-65 MW of ammonia-fired power and at least 0.1mtpa in bunkering. Nuclear remains exploratory and option-preserving, and capability building is anchored by Singapore Nuclear Research and Safety Initiative (national institute from July, with >SGD150m invested).
- **Sector impact is investable via capex and regulation.** Utilities and integrated players are shifting from merchant gas to decarbonising portfolios anchored by hydrogen-ready combined cycle gas turbines, storage, regional imports and carbon capture, utilisation and storage on Jurong Island. Real estate and REITs face retrofit and rooftop-solar capex, partly offset by Green Mark Incentive Scheme for Existing Buildings 2.0 grants. DC-led telco growth is constrained by the Green Data Centre Roadmap and tighter power usage effectiveness benchmarks. Aviation transition costs are formalised via a sustainable aviation fuel levy from 1 Apr 2026 (departures from 1 Oct 2026). Banks remain key transition financiers, with expanding sustainable finance opportunities.

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Mapping of sectors and stocks

Sectors	Stocks
Energy infrastructure	Keppel Infrastructure Trust
Financials	DBS
Industrial and manufacturing	Frencken, UMS Holdings, Venture Corp
Land transport, and aviation	ComfortDelGro, Singapore Airlines
Real estate and REITs	AIMS APAC REIT, CapitaLand Ascendas REIT, City Development, Suntec REIT
Telecoms	Singtel
Utilities	Sembcorp, Keppel

Source: Company data, RHB

Company Name	Rating	Target (SGD)	% Upside (Downside)	P/E (x) Dec-26F	P/B (x) Dec-26F	ROAE (%) Dec-26F	Yield (%) Dec-26F
CapitaLand Ascendas REIT	Buy	3.20	15.6	15.1	1.2	8.1	5.8
City Developments	Buy	8.50	13.3	20.2	0.7	3.6	2.0
ComfortDelGro	Buy	1.75	20.7	10.8	1.1	10.4	6.5
DBS	Buy	59.00	6.3	14.1	2.1	15.4	5.8
Frencken Group	Buy	1.66	24.5	12.8	1.1	9.2	2.1
Keppel Infrastructure Trust	Buy	0.55	16.0	44.2	5.2	10.1	8.4
Singtel	Buy	5.20	14.0	23.1	2.8	12.6	4.4
UMS Integration	Buy	1.86	42.0	17.3	2.0	11.7	2.3

Source: Company data, RHB

Macroeconomic And Policy Backdrop

Climate commitments and why Singapore matters

Singapore's "net zero by 2050" commitment and updated NDC for 2030.

Singapore's climate framework is anchored by its commitment to achieve net-zero greenhouse gas emissions by 2050. This was formally announced in 2022 and underpinned by a whole-of-economy approach spanning power, transport, industry and buildings. As a small, open and energy import-dependent economy, Singapore has explicitly framed its net-zero ambition around balancing decarbonisation with energy security and competitiveness, relying on technology, regional integration and market mechanisms rather than domestic renewables alone. The Government has emphasised that early action is critical to avoid higher transition costs later, positioning climate policy as both a risk management imperative and a source of long-term economic resilience, particularly for trade- and energy-intensive sectors.

In parallel, Singapore has updated its Nationally Determined Contribution (NDC) under the Paris Agreement, committing to reduce emissions to around 60m tonnes of CO_2e by 2030, with a view to peaking emissions earlier, if feasible. This represents a tightening of ambition relative to earlier targets and is supported by concrete policy instruments, most notably a rising carbon tax, sectoral efficiency mandates, and the targeted use of international carbon credits.

Vulnerability to climate change and supply chain disruption, and the strategic need to stay an energy-competitive hub

Singapore's energy transition is shaped by its high vulnerability to climate change and external supply disruptions, reflecting its geography and economic structure. As a low-lying island city-state, Singapore faces heightened physical climate risks, including sea-level rise, higher temperatures and more intense rainfall, which necessitate sustained investment in coastal protection, infrastructure resilience and cooling demand. At the same time, Singapore imports almost all of its energy, leaving it exposed to global fuel price volatility, geopolitical shocks and supply chain disruptions, as seen during recent energy market dislocations. These vulnerabilities reinforce the urgency of decarbonisation, diversification of energy sources and stronger system resilience, not as abstract climate goals but as core national risk management priorities.

Against this backdrop, maintaining Singapore's position as an energy-competitive and reliable business hub is strategically critical. Energy affordability and security underpin Singapore's role as a manufacturing base, data centre hub, aviation and maritime node, and regional headquarters for multinational firms. The transition strategy therefore prioritises solutions that preserve competitiveness, such as efficient gas-based power generation, regional electricity imports, carbon pricing with international offsets, and early investment in future technologies, rather than abrupt cost shocks.

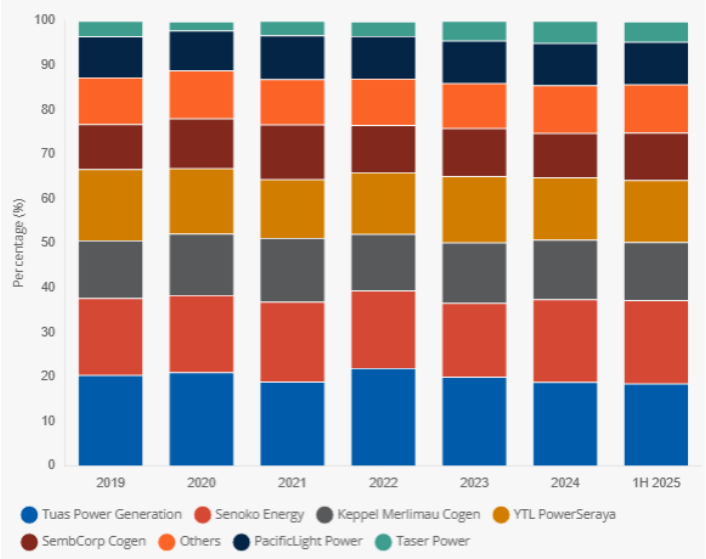
History of Singapore's energy system

Evolution from fuel oil to today's c.95% natural gas generation mix.

Singapore's power system has undergone a structural transformation over the past five decades, shifting from oil-fired generation to one that is now over 95% fuelled by natural gas. In the early years of industrialisation, electricity generation relied heavily on fuel oil, exposing the economy to oil price volatility and higher emissions. From the late 1990s and early 2000s, Singapore made a deliberate policy pivot towards natural gas, supported by the development of gas infrastructure and power market reforms. This significantly improved generation efficiency and reduced carbon intensity, as combined-cycle gas turbines (CCGTs) replaced older oil-fired steam plants, positioning gas as the backbone of Singapore's power system.

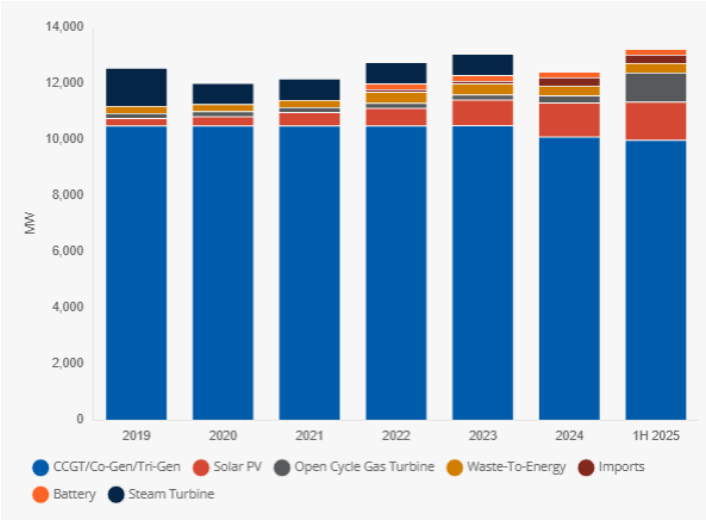
Today's gas-dominated generation mix reflects pragmatic policy choices shaped by land scarcity, a lack of domestic energy resources, and the need for reliable baseload power to support a trade- and manufacturing-led economy. Natural gas offered a cleaner, flexible and scalable alternative to oil, enabling Singapore to meet rising electricity demand while maintaining system reliability and cost competitiveness.

Figure 1: Contributions to total electricity generation by power company, as at Jun 2025



Source: EMA, RHB

Figure 2: Electricity generation capacity by technology type as at Jun 2025



Source: EMA, RHB

Liberalisation of the power market and the emergence of power generation companies (gencos) and retailers.

Singapore's power sector was progressively liberalised from the late 1990s, transforming it from a vertically integrated, state-dominated system into a competitive wholesale and retail electricity market. Key reforms included the unbundling of generation, transmission and retail functions, the establishment of the National Electricity Market of Singapore (NEMS), and the creation of EMA as an independent regulator. Generation assets were corporatised under Singapore Power and subsequently divested by Temasek in the mid-to-late 2000s, introducing private capital and competition into the sector. These sales led to the emergence of major Gencos now owned by strategic and financial investors, while the transmission network remained regulated and centrally operated to preserve system reliability.

Retail competition was introduced in phases, culminating in the Open Electricity Market (OEM), which allowed all consumers to choose their electricity retailer. The liberalised structure separated merchant generation risk from customer-facing retail activities, with gencos exposed to fuel prices, demand cycles and regulatory changes, while retailers focused on hedging and customer acquisition.

Policy architecture for the transition

Singapore Green Plan 2030 and the "Energy Reset" pillar.

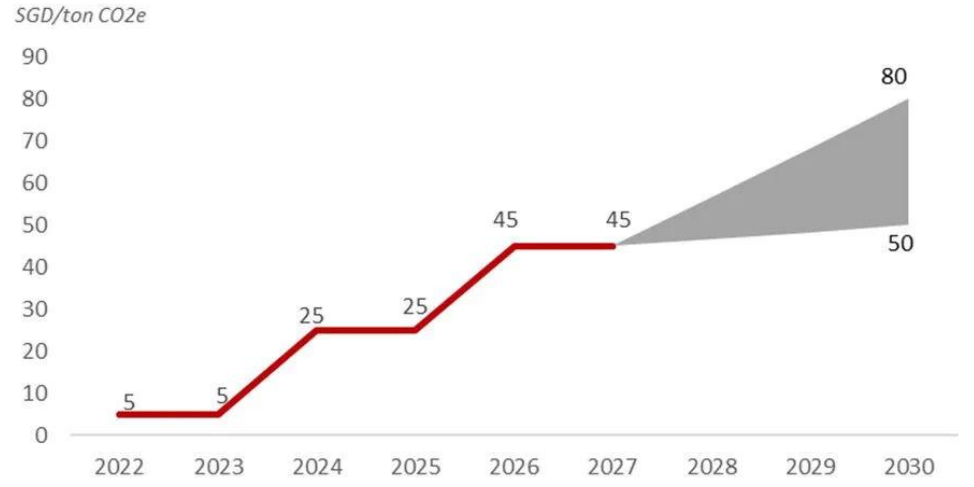
The Singapore Green Plan 2030 provides the over-arching policy framework for the city state's decarbonisation and sustainability agenda, anchoring climate commitments within economic and social development goals. A core pillar of the plan is the "Energy Reset", which focuses on transforming how Singapore produces, consumes and manages energy in a resource-constrained environment. Given Singapore's limited domestic renewable energy generation potential, the Energy Reset emphasises pragmatic, system-level solutions that balance sustainability, security and affordability, while providing clear medium-term targets to guide public and private sector investment.

Key targets under the Energy Reset are directly relevant for investors across multiple sectors. These include deploying at least 2GWp of solar power generation capacity by 2030, greening 80% of buildings by gross floor area through tighter Green Mark standards, and accelerating transport electrification, with all new car and taxi registrations required to be cleaner-energy vehicles by 2030. Supporting measures span energy efficiency mandates, infrastructure rollouts and regulatory reforms, creating a coordinated demand-and-supply transition pathway.

Carbon pricing: Design of the Carbon Pricing Act and the step-up in the carbon tax.

Singapore's carbon pricing framework is anchored by the Carbon Pricing Act (CPA), introduced in 2019, making Singapore the first country in South-East Asia to implement an economy-wide carbon tax. The tax applies to large direct emitters, covering power generation, manufacturing and waste sectors that collectively account for the majority of national emissions. The CPA was deliberately designed to provide early price signals while allowing firms time to adapt, combining mandatory emissions reporting with a clear, legislated tax structure to incentivise efficiency improvements, fuel switching and longer-term decarbonisation investments.

Figure 3: Singapore's carbon tax trajectory



Source: KPMG Singapore

Crucially, Singapore has committed to a stepped increase in the carbon tax, strengthening its effectiveness as a transition tool. After an introductory rate of SGD5 per tonne of CO_2e from 2019 to 2023, the tax rate per tonne of CO_2e rose to SGD25 in 2024-2025, will rise further to SGD45 in 2026-2027, and is set to reach SGD50-80 by 2030, subject to review. To manage competitiveness risks, liable firms are allowed to use high-quality international carbon credits to offset up to 5% of taxable emissions from 2024, subject to strict eligibility criteria.

Leverage international carbon markets to address residual and hard-to-abate carbon

Leveraging international carbon markets is a core pillar of Singapore's transition architecture to address residual and hard-to-abate emissions, particularly in sectors where full abatement is not yet technically or economically viable. Under the carbon tax framework, liable facilities may offset up to 5% of taxable emissions from 2024 using high-quality international carbon credits, providing cost flexibility while preserving competitiveness. Eligibility is governed by a stringent environmental integrity framework aligned with Article 6 of the Paris Agreement, covering additionality, permanence, robust measurement, reporting and verification, and safeguards against double counting, with an approved overall eligibility list and additional integrity requirements applied to specific project types. This design reinforces the primacy of domestic abatement while recognising a complementary role for international credits during the transition.

In parallel, Singapore is positioning itself as a regional hub for high-integrity carbon markets, supported by bilateral implementation agreements with partner countries to enable Article 6-compliant credit transfers and by the development of market infrastructure and standards.

Over time, access to credible offsets and the capability to deploy them within compliant frameworks is likely to become a valuation differentiator for companies exposed to hard-to-abate emissions, while reinforcing Singapore's role as a nexus for capital, governance and carbon market innovation in Asia.

- More information about Singapore's International Carbon Credit (ICC) Framework can be found here

Singapore's Energy Transition Roadmap

Power system vision to 2050

Energy 2050 Committee's insights on net-zero feasible pathways for the power sector.

Singapore's Energy 2050 Committee (E2050), convened by the EMA, concluded in its Mar 2022 report that it is technically feasible for the power sector to achieve net-zero emissions by 2050, while maintaining energy security and affordability. This is a critical consideration, since the sector accounts for around 40% of national greenhouse gas emissions and electricity demand is expected to rise with electrification, DCs and digitalisation.

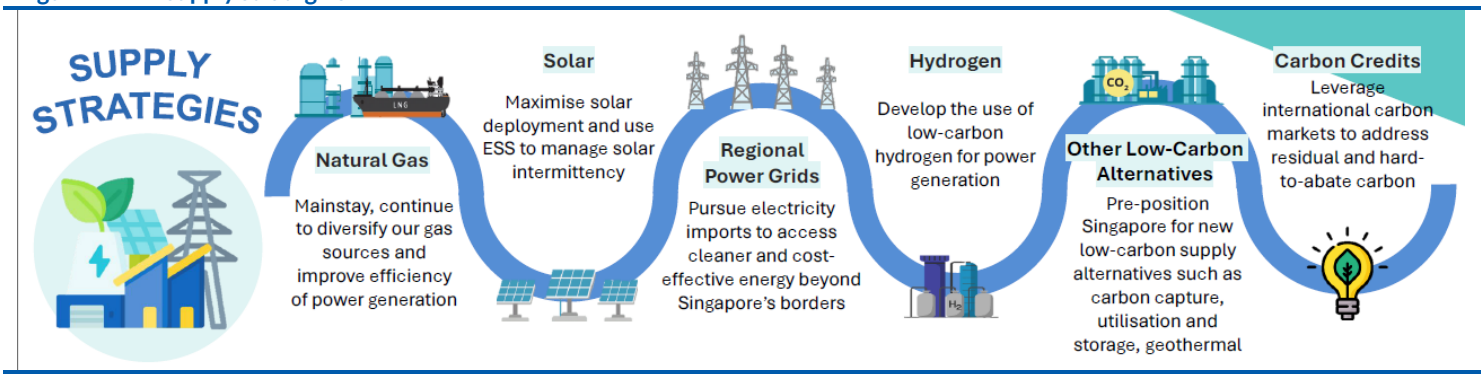
- Report link: Charting the energy transition to 2050

The committee emphasised that net zero is achievable only with early, coordinated and sustained action, as delays would materially raise system costs and transition risks in a tightening global energy and carbon supply environment. Rather than prescribing a single pathway, the committee adopted a scenario-based planning framework – reflecting the uncertainty around technology costs, fuel markets, geopolitics and carbon prices – and highlighted the importance of tracking policy and market "signposts" to recalibrate investment decisions over time. Across scenarios, four structural levers were consistently identified: More efficient and hydrogen-ready natural gas generation; maximum feasible solar deployment supported by energy storage; large-scale regional electricity imports; and longer-term low-carbon alternatives such as hydrogen.

These supply-side measures must be matched by grid flexibility, digitalisation and demand-side response to preserve reliability. Subsequent policy actions, including new energy transition measures introduced in 2024 to strengthen EMA's system planning, security and transition powers, reflect direct implementation of the committee's recommendations and reinforce the transition as a multi-decade, infrastructure-led capex opportunity, underpinned by regulatory certainty and private capital mobilisation across utilities, grid infrastructure and low-carbon technologies.

Supply strategies: The "Four Switches" of Singapore's energy story

Figure 4: The supply strategies



Source: EMA, RHB

Natural gas (more efficient CCGTs, hydrogen-ready plants).

Natural gas remains the cornerstone of Singapore's power system and the first and most critical "switch" in its energy transition. Since the early 2000s, Singapore has shifted almost entirely to gas-fired generation, with c.95% of electricity currently produced using imported natural gas, reflecting land constraints and the need for reliable baseload power.

As the cleanest-burning fossil fuel, gas is positioned by policymakers as a bridging fuel that underpins energy security and system stability while lower-carbon technologies such as large-scale imports, hydrogen and long-duration storage mature.

Policy focus is increasingly on efficiency, emissions reduction and future-proofing, rather than capacity expansion alone. EMA has introduced measures such as the Genco Energy Efficiency Grant Call and, more recently, the Advanced CCGT Incentive Scheme, to accelerate the adoption of higher-efficiency gas generation. Under the incentive scheme, EMA will award up to SGD44m to operators of the first two advanced CCGTs in Singapore, namely Keppel's infrastructure division and Sembcorp Industries (Sembcorp), to offset higher initial reserve costs associated with their larger unit sizes.

These advanced CCGTs, each with capacities of around 600 MW compared with up to ~400 MW for existing units, are expected to be deployed by Dec 2026 and to deliver materially better heat rates, reducing carbon emissions by at least 200,000 tonnes per year, equivalent to the annual emissions of around 80,000 households. As more advanced CCGTs are deployed, reserve costs are expected to normalise, allowing efficiency gains to fully outweigh system costs.

Critically, all new and repowered gas plants are required to be hydrogen-ready, providing a clear transition pathway for gas assets as low-carbon fuels mature. From 2024, new and repowered natural gas power plants must be at least 10% more carbon-efficient than existing benchmarks and capable of operating with a minimum of 30% hydrogen by volume, mitigating stranded asset risk and preserving long-term asset relevance. This policy direction has translated into concrete investment: in Jan 2024, EMA awarded YTL PowerSeraya the right to build, own and operate a hydrogen-ready CCGT of at least 600 MW by end-2027, while hydrogen-ready advanced CCGTs by Keppel and Sembcorp are positioned as critical providers of secure, efficient baseload power.

Energy security and price stability are being reinforced through upstream and midstream reforms. Singapore's LNG import capability, anchored by the Singapore LNG (SLNG) Terminal with c.11 million tonnes per annum (mtpa) of peak send-out capacity, is being expanded via a second offshore LNG terminal at Jurong Port using a floating storage and regasification unit with a further 5mtpa capacity.

To enhance energy security and supply stability, Singapore established Singapore GasCo in April 2025 to centralise natural gas procurement for the power sector and manage future supply risks. GasCo is actively engaging with LNG suppliers for long-term contracts and aims to be operationally ready by Jan 2026, balancing spot, medium- and long-term cargoes with diverse price indexations to secure competitive and reliable supply. It plans to issue LNG bids in 1Q26 for deliveries starting in 2028 to address an emerging supply gap as existing piped and LNG contracts expire, with projected shortfalls of roughly 3 million tonnes (mt) in 2028-29 and potentially 6mt by 2035 if demand continues to grow. Priority considerations for these contracts include price stability, contractual flexibility and reliability of supply, with US LNG expected to be part of the portfolio alongside Brent-linked and other indexed supplies; piped imports from Malaysia and Indonesia remain complementary but may diminish over time.

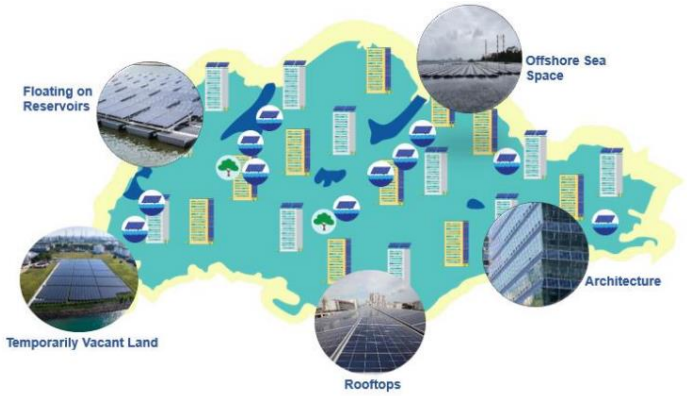
Solar plus storage (rooftops, reservoirs, industrial sites) and the target of at least 2GWp solar by 2030.

Solar energy is positioned as Singapore's most viable domestic RE source, forming the second key "switch" in the national energy transition. Despite severe land constraints, Singapore has pursued an aggressive and innovative solar deployment strategy across rooftops, reservoirs, building façades, industrial estates and temporarily vacant land. Installed solar capacity has more than tripled over the past five years, rising from under 0.4GWp in 2019 to over 1.5GWp by 2024, allowing Singapore to achieve its 2025 target a year ahead of schedule. As of 2H25, 1,775.4MWp of photovoltaic (PV) systems have been deployed nationwide. The Government is now firmly on track to meet its 2030 target of at least 2GWp, equivalent to powering around 350,000 households, reinforcing Singapore's status as one of the most solar-dense cities globally.

However, structural constraints limit solar's contribution to long-term baseload power. Tropical weather patterns, cloud cover and the absence of large land areas introduce intermittency, while daytime generation restricts availability during evening peak demand. Even in a best-case scenario, solar is estimated to meet only around 10% of Singapore's electricity demand by 2050, underscoring why solar is viewed as a critical but partial solution rather than a standalone decarbonisation pathway. Policymakers have therefore focused on maximising yield per square metre through creative siting, including floating solar on reservoirs and modular systems that can be relocated as land use changes.

To address intermittency and support higher solar penetration, energy storage systems (ESS) have become a critical enabling infrastructure. Singapore exceeded its initial 200MWh storage target by late 2022, anchored by Sembcorp's Jurong Island ESS, which was officially launched in Feb 2023. The project was commissioned in approximately six months and was the largest ESS in South-East Asia at 285MWh at launch, providing grid stabilisation and reserve services to support RE integration. Notably, the system was subsequently upgraded to 326MWh by Oct 2025 using a "battery stacking" technique, increasing capacity without additional land use, a key proof point for scalability in a land-scarce environment. Earlier milestones include SP Group's first utility-scale ESS deployment in 2020 (2.4 MW/2.4 MWh).

Figure 5: Creative ways to deploy solar energy sources in land-scarce Singapore



Source: EMA, RHB

Figure 6: 326MWh Sembcorp ESS is South-East Asia's largest ESS

Source: Sembcorp,, EMA, RHB

Regional power grids and electricity imports, including the 6 GW low-carbon import target by 2035 and projects such as LTMS-PIP.

Regional power grids and cross-border electricity imports form a structural pillar of Singapore's long-term decarbonisation strategy, reflecting domestic land and resource constraints. The EMA has set a target to import around 6GW of low-carbon electricity by 2035, equivalent to roughly one-third of projected electricity demand, scaling up from an earlier 4GW ambition. By connecting to regional power grids, Singapore can access abundant renewable resources in neighbouring countries, including hydropower, solar, wind and geothermal, that are unavailable domestically, while diversifying supply sources and enhancing energy security. To this end, EMA has launched multiple requests for proposals and, as of Oct 2025, has granted conditional approvals to 11 projects totalling about 8.35GW from Australia, Cambodia, Indonesia, Sarawak (Malaysia) and Vietnam, with six projects having progressed to conditional licences.

A key proof point for regional integration is the Laos-Thailand-Malaysia-Singapore Power Integration Project (LTMS-PIP), the first multilateral cross-border electricity trade involving four ASEAN countries. Phase 1, launched in Jun 2022, enabled imports of up to 100MW of renewable hydropower from Laos via existing interconnectors. In Sep 2024, Phase 2 doubled trading capacity to 200MW through the introduction of multidirectional power flows, including supply from Malaysia, and EMA extended Keppel's electricity importer licence to 2026. Complementary initiatives include Malaysia's Energy Exchange Malaysia (ENEGEM) pilot, under which Sembcorp began importing 50 MW of RE from Tenaga Nasional from Dec 2024. These projects demonstrate the technical and regulatory feasibility of multilateral power trading while serving as early building blocks for a broader ASEAN Power Grid.

Institutionally, Singapore has strengthened execution capability through the establishment of Singapore Energy Interconnections (SGEI) in Apr 2025, tasked with developing and operating cross-border transmission infrastructure, with SP PowerInterconnect as a technical partner. At the regional level, ASEAN Energy Ministers agreed in Sep 2024 to develop a framework for subsea power cables, targeting realisation of the ASEAN Power Grid by 2045, alongside work on RE certificate recognition for cross-border trade.

- List of Conditional Licences and Conditional Approvals are available at: https://www.ema.gov.sg/our-energy-story/energy-supply/regional-power-grids#accordion-fdc429675a-item-91c088a632

Figure 7: Singapore seeks to import around 6GW of low-carbon electricity by 2035

Source: EMA, RHB

Emerging low-carbon alternatives such as hydrogen, geothermal and carbon capture, utilisation and storage (CCUS).

Emerging low-carbon alternatives form the fourth and longest-dated "switch" in Singapore's energy transition, aimed at decarbonising the power system beyond what gas, solar and imports can deliver on their own. As an energy-disadvantaged city-state, Singapore is investing early in technologies that are not yet commercially mature, to build capabilities, reduce future option risk and secure first-mover advantages should cost curves turn favourable. The EMA is, therefore, advancing parallel workstreams across low-carbon hydrogen (including ammonia), CCUS, geothermal energy, and longer-term assessments of advanced nuclear technologies, while recognising that most of these solutions are unlikely to scale meaningfully before the 2030s.

Low-carbon hydrogen is a central pillar of Singapore's longer-term decarbonisation strategy under the National Hydrogen Strategy launched in 2022. Given the absence of domestic renewable resources, Singapore is focusing on imported hydrogen and hydrogen carriers, with ammonia currently viewed as the most technologically ready option due to its established global supply chain. In Jul 2024, EMA and the Maritime and Port Authority of Singapore shortlisted consortia to study ammonia for power generation and bunkering on Jurong Island, and in Oct 2025 appointed a Keppel-led consortium to proceed with FEED studies. The proposed project aims to generate 55-65 MW of electricity via direct ammonia combustion in a CCGT and enable ammonia bunkering of at least 0.1mtpa, although it has not yet reached the final investment decision.

In parallel, EMA is assessing deep geothermal potential through non-invasive geophysical surveys launched in Apr 2024, exploring resources at depths of up to 10km, enabled by advances in geothermal technologies.

CCUS is being explored as a potential pathway to decarbonise Singapore's gas-dominated power sector while leveraging existing infrastructure. In Oct 2024, EMA launched a power sector carbon capture and storage (CCS) grant call, subsequently in Jul 2025 selecting Keppel's infrastructure division, PacificLight Power and YTL PowerSeraya to conduct five site-specific feasibility studies covering both post-combustion and pre-combustion capture pathways, targeted for completion in 2026.

- Details of the Carbon Capture and Storage Studies are here.

These studies are expected to inform future engineering work and could eventually link to a cross-border CCS project on Jurong Island, which aims to aggregate industrial CO_2 for export and storage overseas with a target operational date of around 2030.

Separately, while Singapore has made no decision to deploy nuclear energy, EMA continues to build assessment capabilities through international cooperation and consultancy studies on advanced nuclear technologies, keeping the option open over the long term. Singapore has formalised civil nuclear energy cooperations and MoUs with countries such as the US, United Arab Emirates (UAE) and France to support scientific research, technical exchanges, and long-term capacity-building in the city state. EMA also recently launched a consultancy study on advanced nuclear fission technologies. The study is part of its efforts to build capabilities to assess the viability of nuclear for Singapore in the longer term.

National Hydrogen Strategy

Role of low-carbon hydrogen and ammonia, which could supply up to half of power needs by 2050.

♦ Watch about Singapore's National Hydrogen Strategy on YouTube

Low-carbon hydrogen is positioned as a strategic long-term pillar of Singapore's energy transition under the National Hydrogen Strategy, with the potential to supply up to around 50% of power needs by 2050 in net-zero scenarios, subject to technology and cost breakthroughs. As a land- and resource-strapped economy, Singapore views hydrogen not as an immediate substitute for natural gas, but as a future baseload fuel that can complement solar, regional electricity imports and other low-carbon solutions. Hydrogen combustion produces no carbon emissions at the point of use, and established technologies such as gas turbines and fuel cells are already capable of operating on hydrogen, making it an attractive candidate for deep decarbonisation of the power sector once supply chains mature.

However, economic and infrastructure constraints remain significant. Clean hydrogen, typically produced via electrolysis using RE, is currently far more expensive than natural gas due to high capital costs, energy intensity and the absence of large-scale global supply chains. For Singapore, these challenges are amplified by the need to import most hydrogen, given limited domestic renewable capacity. Transport and storage also pose hurdles: Hydrogen can be shipped as a gas, liquefied hydrogen, or converted into ammonia, which is easier to transport but requires additional energy-intensive conversion steps. As a result, hydrogen is unlikely to be cost-competitive in the near term, reinforcing its role as a post-2035 to 2050 solution rather than an immediate driver of emissions reduction.

Against this backdrop, Singapore is laying early groundwork to preserve future optionality. EMA has:

i. Required new gas power plants to be hydrogen-compatible;

ii. Initiated studies to develop the regulatory framework for hydrogen use in power generation; and

iii. Ramped up research funding under the Low-Carbon Energy Research initiative, including a SGD43m Directed Hydrogen Programme.

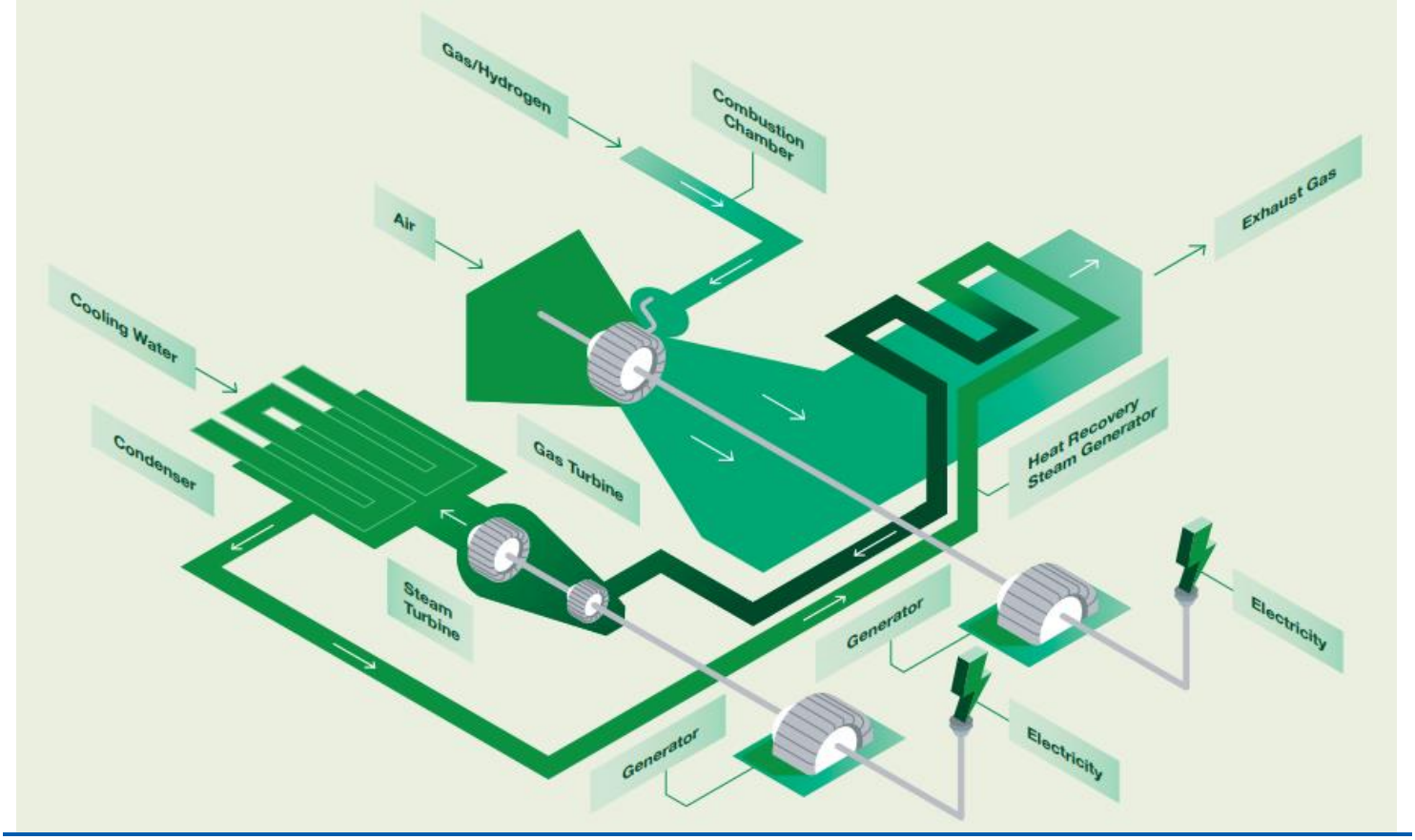
A key near-term focus is ammonia as a hydrogen carrier: EMA and the Maritime and Port Authority of Singapore have shortlisted consortia, and in Oct 2025 appointed a Keppel-led consortium to conduct FEED studies for a low- or zero-carbon ammonia power generation and bunkering project on Jurong Island.

Implications for gas infrastructure, power plants, bunkering, and chemicals on Jurong Island.

Jurong Island sits at the centre of Singapore's hydrogen transition, given its concentration of gas infrastructure, power generation, petrochemicals and energy-intensive industries. Under the National Hydrogen Strategy, existing and new gas assets on Jurong Island are being progressively future-proofed to operate with hydrogen and hydrogen carriers, ensuring system reliability while preserving long-term optionality. Several large hydrogen-ready CCGT projects have been awarded, including new H-class CCGTs by Keppel, Sembcorp, YTL PowerSeraya and PacificLight Power, which are designed to run initially on natural gas but transition to higher hydrogen blends over time. These plants are expected to anchor Singapore's future baseload generation while complementing solar, electricity imports and storage, reinforcing Jurong Island's role as the backbone of the power system.

System resilience on Jurong Island is also being strengthened through fast-start hydrogen-ready back-up generation, which plays a critical role as Singapore integrates more variable energy sources. In Oct 2025, Singapore officially launched a 682 MW open-cycle gas turbine (OCGT) facility operated by Meranti Power, capable of reaching full output within minutes and designed to operate with up to 30% hydrogen by volume when viable. Unlike CCGTs, which require long start-up times, such fast-start assets mitigate supply shocks, support renewable intermittency and enhance grid stability.

Figure 8: Utility-scale natural gas-fired CCGTs that can combust a blend of hydrogen



Source: Singapore's National Hydrogen Strategy, RHB

Beyond power generation, the hydrogen strategy has significant implications for bunkering and the chemicals complex on Jurong Island. Singapore is advancing plans to develop low- or zero-carbon ammonia supply chains for both power generation and maritime bunkering, leveraging Jurong Island's existing storage, handling and logistics ecosystem. Ammonia, a hydrogen carrier with an established global trade network, could support early hydrogen adoption at scale while enabling Singapore to maintain its role as a leading marine fuels hub. In parallel, Jurong Island is being positioned as a test bed for low-carbon solutions, including green energy-powered facilities and digital infrastructure, underscoring its evolution from a traditional hydrocarbons hub into a multi-vector clean energy and chemicals platform.

Nuclear strategy

Building Singapore's capabilities to assess nuclear energy.

Singapore's nuclear strategy is explicitly exploratory and option-preserving, reflecting the city state's severe land constraints, dense urban environment and high safety threshold. While no decision has been made to deploy nuclear energy, the Government has taken a deliberate approach to build the capabilities needed to assess nuclear power as a potential long-term option for a net-zero power system. A pre-feasibility study completed in 2012 concluded that conventional nuclear technologies were not suitable for Singapore at that time, primarily due to safety, emergency planning and waste management considerations. However, given the scale of decarbonisation required beyond 2040, nuclear remains under review as a possible firm, zero-carbon baseload option, should technology risks improve.

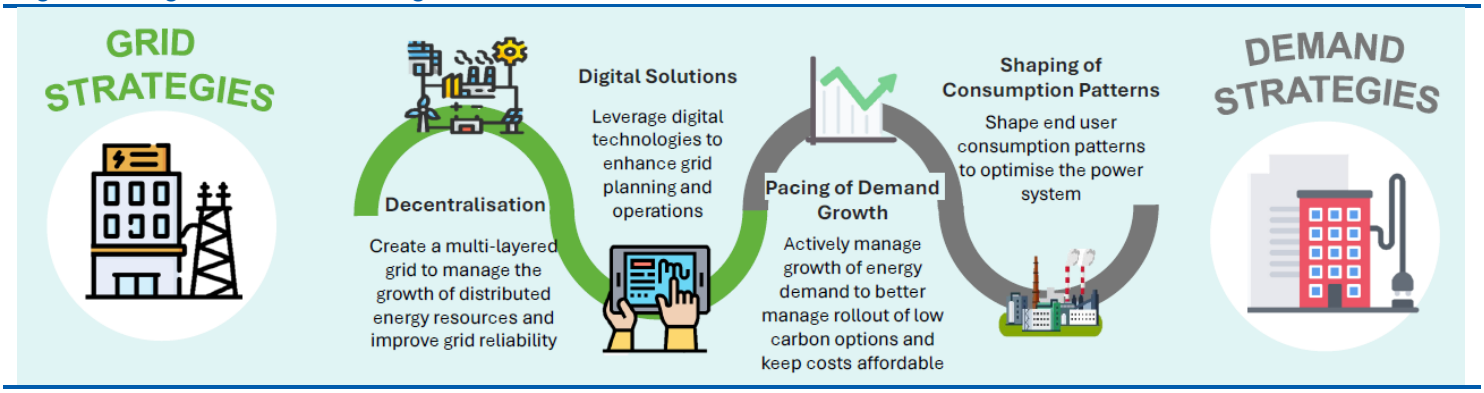
♦ Access the full report here.

Policy attention is now focused on advanced nuclear technologies, particularly small modular reactors (SMRs), which promise enhanced safety features, lower unit sizes, passive cooling systems and potentially more flexible deployment compared with traditional large reactors. Most SMR designs remain in the research, development or early demonstration phase globally, with limited commercial operating history. Singapore is therefore monitoring international developments closely, commissioning consultancy studies and leveraging expertise from countries with established nuclear programmes, including the US, France, the UAE and Sweden, through formal cooperation agreements. These efforts are aimed at strengthening Singapore's ability to independently assess reactor safety, security, waste management and regulatory readiness should nuclear options mature sufficiently.

Capability building is anchored by the Singapore Nuclear Research and Safety Initiative (SNRSI), established in 2014 and designated as a national institute in Jul 2025, with cumulative investment exceeding SGD150m. As an institute, SNRSI partners international laboratories to develop advanced reactor simulation and modelling capabilities, enabling rigorous safety and suitability assessments for Singapore's context.

Grid and demand strategies

Figure 9: The grid and demand strategies



Source: EMA, RHB

Grid strategies: System flexibility and storage

Upgrades to the transmission and distribution grid to accommodate higher solar penetration.

To support higher solar penetration and a more decentralised power system, the EMA is leveraging digital solutions to future-proof Singapore's transmission and distribution grid. Initiatives announced in 2023 focus on deploying advanced digital technologies such as grid sensors, data analytics, artificial intelligence and digital twins to enhance real-time visibility, predictive maintenance and system planning. These tools allow grid operators to better anticipate and manage fluctuations from rooftop solar and other distributed energy resources, optimise asset utilisation, and respond more quickly to faults. Digitalisation is, therefore, a critical enabler of grid resilience, allowing Singapore to integrate higher levels of intermittent solar without proportionate increases in physical infrastructure, while maintaining its high reliability standards.

As solar deployment scales towards at least 2GWp by 2030, Singapore's transmission and distribution grid is undergoing targeted upgrades to manage intermittency, bi-directional power flows and rising system complexity. Higher penetration of rooftop and distributed solar, alongside electricity imports and energy storage systems, introduces volatility that can affect frequency, voltage and system inertia. At the same time, the proliferation of distributed energy resources (DERs) such as solar PV, batteries and electric vehicle (EV) chargers requires the grid to operate in a more decentralised and data-intensive manner. To support this transition, the EMA, working with SP Group, has launched initiatives including the Virtual Power Plant (VPP) Regulatory Sandbox to aggregate and orchestrate DERs, and the Energy Grid Grant Call to co-fund innovative grid solutions, alongside the broader Future Grid Capabilities Roadmap to guide long-term grid development.

- Read about new initiatives to future-proof Singapore's power grid

The roadmap also places stronger emphasis on flexible electricity demand as a reliability tool, alongside physical grid upgrades. In 2025, EMA announced enhancements to the Interruptible Load Programme (ILP), expanding its scope to allow participating consumers to provide faster and more reliable load reduction during system contingencies, with improved compensation structures to reflect the value of responsiveness. This strengthens the role of large electricity users as a form of "virtual reserve", reducing reliance on thermal backup capacity as solar and imports increase.

In parallel, EMA is deepening efforts to harness DERs and highly available loads to support system reliability. This includes aggregating rooftop solar, batteries, EV chargers and flexible industrial or commercial loads so that they can be dispatched or modulated collectively during periods of system stress. Updates to the Demand Response Programme (DRP) aim to lower participation barriers, improve market integration and allow a wider pool of consumers and aggregators to respond to wholesale price signals and grid needs. Together with trials under the Virtual Power Plant Regulatory Sandbox, these initiatives signal a shift towards a more interactive, demand-responsive grid, where flexibility is increasingly sourced from decentralised assets rather than only from generation-side reserves.

Singapore is also piloting vehicle-to-grid (V2G) technologies as part of its grid upgrade strategy to accommodate higher solar penetration and rising electrification. In 2023, EMA launched Singapore's largest V2G test bed, bringing together EV chargers, vehicles and grid operators to assess how EV batteries can provide grid services such as frequency regulation, demand response and peak shaving. By enabling EVs to both draw power from and supply power back to the grid, V2G could unlock a flexible, distributed storage resource that helps manage solar intermittency and reduce the need for additional peaking capacity.

Role of battery energy storage (including stacking solutions on Jurong Island).

Battery energy storage systems (BESS) are increasingly viewed as a core grid flexibility asset in Singapore's energy transition, supporting higher solar penetration, electricity imports and system reliability as conventional thermal inertia declines. Beyond frequency regulation and short-duration balancing, BESS are being deployed to provide fast-response reserves, inertia-like services and contingency support, functions that become more critical as the power mix shifts towards variable and decentralised sources. EMA has explicitly positioned grid-scale storage as a key enabler alongside demand flexibility and digital grid upgrades, rather than a standalone generation technology.

Jurong Island has emerged as Singapore's primary test bed for large-scale and space-efficient BESS deployment. Sembcorp's Jurong Island Energy Storage System, initially commissioned at 285MWh and subsequently expanded to 326MWh through a "battery stacking" solution, demonstrates how vertical and modular designs can increase storage capacity without additional land take, a critical consideration in Singapore's constrained industrial zones.

In parallel, Jurong Island is also hosting integrated trials combining BESS with hydrogen-ready gas generation, including inertia and stability trials alongside advanced CCGTs, underscoring the role of batteries in maintaining system stability as rotating mass from conventional plants declines. PacificLight Power's planned 670MW hydrogen-ready CCGT on Jurong Island, scheduled for operation in 2029, will be the first CCGT in Singapore to be integrated with a BESS, although final BESS sizing and applications are still being developed. While the battery will be procured under a separate contract, the project highlights how large-scale storage is increasingly embedded to enhance grid reliability, manage peak demand and support renewable integration.

Singapore's exploration of distributed battery storage also extends to novel and space-efficient pilots that support grid reliability and clean energy integration. Under an EMA partnership with Seatrium, Singapore's first floating and stacked energy storage system (ESS) was deployed in Oct 2023 at Seatrium's Floating Living Lab and is expected to commence operations in 1Q24, demonstrating how modular, floating storage can overcome land constraints while balancing intermittent solar output. At the same time, Shell Singapore launched its first smart, clean energy-powered service stations in Aug 2023, at Tampines, Pasir Ris and Lakeview, integrating on-site BESS with rooftop solar and smart energy management systems to support high-powered EV charging using renewable energy.

Figure 10: The first stacked ESS in South-East Asia

Source: EMA, RHB

Figure 11: Shell stations offer EV charging using renewable energy

Source: EMA, RHB

Demand strategies: Pacing of growth, shaping consumption and decarbonisation

Transport: Electrification of vehicles, targets for cleaner-energy vehicles by 2030 and 2040, and charging rollout. Transport electrification is a key demand-side pillar of Singapore's energy transition. Under the Singapore Green Plan 2030, all new car and taxi registrations must be cleaner-energy vehicles by 2030, with all vehicles targeted to run on cleaner energy by 2040, effectively phasing out internal combustion engines. This is supported by a nationwide rollout of at least 60,000 EV charging points by 2030, driving structurally higher electricity demand and creating investment opportunities in charging infrastructure, grid upgrades and smart demand management.

Buildings: Building and Construction Authority (BCA) Green Mark standards and Green Plan targets for "greening" 80% of buildings by 2030. Buildings are a core demand-side decarbonisation lever in Singapore's energy transition, as these consume a significant share of electricity. Under the Singapore Green Plan 2030, the Government targets to green 80% of buildings (by gross floor area) by 2030, primarily through the BCA Green Mark certification framework, which tightens standards on energy efficiency, smart energy management and on-site renewables. This includes raising minimum performance requirements for new developments and accelerating retrofit rates for existing commercial and residential stock.

Industry: Efficiency mandates, fuel switching, and the role of carbon tax. Industrial decarbonisation in Singapore is being driven by a combination of energy efficiency mandates, fuel switching and an escalating carbon tax, with direct implications for cost structures and capital allocation. Large energy users are subject to mandatory energy management requirements, including efficiency improvement plans and reporting obligations, while incentives and grants support upgrades to more efficient equipment and processes. The carbon tax – which rose to SGD25/tCO_2e in 2024-2025 and will increase to SGD45 in 2026-2027 and SGD50-80 by 2030 – reinforces the economic case for efficiency investments, electrification and switching from higher-carbon fuels, while allowing limited use of high-quality international carbon credits to manage transition costs.

Digital economy: Green Data Centre Roadmap (GDCR) and new "green DC" capacity allocations. The digital economy is a key driver of electricity demand growth in Singapore, placing data centres at the centre of demand-side decarbonisation policy. Launched on 30 May 2024, the GDCR marks a shift to selective, sustainability-linked capacity allocation, with Singapore committing to provide at least 300MW of new DC capacity, and additional capacity where projects are supported by green energy. The GDCR requires new DCs to meet stringent efficiency standards, targeting Power Usage Effectiveness (PUE) ≤ 1.3 at 100 per cent IT load over the next decade, and promotes improvements at both the facility level (cooling, mechanical and electrical systems, smart energy optimisation) and IT/software level (compute efficiency).

Hard-to-abate sectors such as aviation and maritime, including sustainable aviation fuel (SAF) levy and low/zero-carbon ammonia. Hard-to-abate sectors such as aviation and maritime are being addressed through targeted fuel mandates and transition frameworks, recognising limited near-term abatement options. In aviation, Singapore will introduce a SAF levy from 1 Apr 2026. This will be applied to flights departing from 1 Oct 2026, to support SAF uptake of around 1% by 2026 and 3-5% by 2030. The proceeds of the levy will be used to aggregate demand and narrow the SAF cost premium vs conventional jet fuel.

In maritime, Singapore is advancing low- and zero-carbon ammonia as a scalable marine fuel. Last October, the Government appointed a consortium in order to proceed to the next study phase for ammonia-based power generation and bunkering on Jurong Island, alongside the development of safety standards and supply chains. Details about this consortium have been discussed earlier in this report.

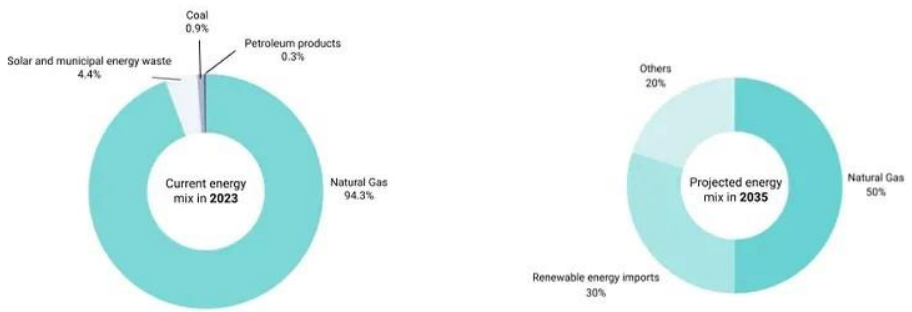
What could Singapore's energy mix look like in 2035?

A report published in early 2024 outlined how Singapore's energy mix could evolve by 2035, based on the policy initiatives announced up to that point, providing a realistic, policy-anchored view of the transition rather than a theoretical net-zero endpoint.

The analysis suggests that, by 2035, Singapore's energy mix will be more diversified and materially lower-carbon, while continuing to prioritise energy security and system reliability. Natural gas is expected to remain the single largest fuel, but its share will decline from today's ~95% as other low-carbon sources scale. By 2035, Singapore aims to reduce reliance on natural gas, which will make up more than 50% of the energy mix, paving the way for other sources of renewable energy.

The Government targets to import around 6GW of low-carbon electricity by 2035, potentially supplying about 30% of total demand, which will be complemented by domestic solar deployment of at least 2GWp by 2030, which will contribute meaningfully to daytime generation despite land and intermittency constraints.

Figure 12: What Singapore's energy mix may look like in 2035



Source: EDB Singapore

Beyond gas, solar and imports, the 2035 mix is expected to rely increasingly on system enablers rather than a single breakthrough technology. Energy storage, demand-side flexibility, grid digitalisation and fast-start generation will play a larger role in maintaining stability as variability rises. Hydrogen and hydrogen carriers such as ammonia are likely to remain at a pilot or early-deployment stage by 2035, influencing asset design and infrastructure planning rather than contributing materially to generation. CCUS may begin to feature through feasibility studies and early projects that leverage existing gas infrastructure, but is unlikely to be a dominant contributor within this timeframe.

Sector-Level Impact For Singapore Equities

Utilities and infrastructure

Gencos and integrated players pivoting from merchant gas to decarbonised generation, imports, and grid solutions.

Singapore's power generation companies (gencos) and integrated energy players are pivoting from a predominantly merchant natural gas model towards a more diversified, decarbonised portfolio, aligned with the Energy 2050 vision. This transition is being driven by tighter carbon policy, rising demand from DCs and electrification, and the Government's push for structurally cleaner supply through hydrogen-ready gas plants, large-scale energy storage, regional electricity imports and grid solutions. Jurong Island remains the focal point of this evolution, hosting next-generation CCGTs, fast-start capacity, utility-scale BESS, and early-stage CCS feasibility studies.

Sembcorp Industries (SCI SP, NR) remains a central beneficiary of Singapore's power transition, with a broad and increasingly integrated domestic platform spanning generation, storage, solar and contracted offtake. In Singapore, Sembcorp is developing a 600MW hydrogen-ready cogeneration CCGT that is targeted for completion in 2026 – which will anchor its role in providing efficient, dispatchable baseload power while remaining compatible with future low-carbon fuels. This is complemented by its grid-scale storage footprint on Jurong Island, which supports system flexibility as solar penetration and electricity imports increase. On the renewable energy front, Sembcorp has 484MW of solar capacity installed in Singapore and continues to scale this meaningfully despite land constraints. The company plans to add a further 142MW by 2025, 3MW by 2026, and 100MW by 2027, across rooftop, floating and distributed installations. Together with its portfolio of long-term industrial and commercial power purchase agreements (PPAs), these assets enhance earnings visibility and position Sembcorp to capture demand from power-intensive customers, including DCs that seek reliable low-carbon electricity. Key near-term catalysts remain solar and ESS expansions, and the ramp-up of contracted offtake linked to Singapore's evolving low-carbon power mix.

Keppel's (KEP SP, NR) business exposure to Singapore's energy transition spans multiple layers of the evolving power and infrastructure ecosystem, leveraged through its infrastructure division, strategic asset vehicles, and project-level engagements that support decarbonisation, grid evolution and low-carbon fuels. Headquartered in Singapore with global operations, Keppel is repositioning itself from traditional engineering roots towards a portfolio of infrastructure and energy transition businesses, including power and renewables, environmental services, and energy-as-a-service solutions. Its infrastructure unit focuses on developing and implementing low-carbon energy value chain solutions, including renewable energy, power generation, and decarbonisation infrastructure, while also providing district cooling systems (DCS) that improve energy efficiency in industrial and data-intensive parks — an important enabler of Singapore's "green growth" roadmap.

In Singapore's domestic transition, Keppel plays a direct role in advancing low-carbon fuels and grid solutions. A Keppel-led consortium has been appointed by the EMA and the Maritime and Port Authority to conduct the next phase of study for a low- or zero-carbon ammonia power generation and bunkering solution on Jurong Island, covering a 55-65MW ammonia power plant, terminal infrastructure, and bunkering facilities, a first of its kind if realised – underscoring Keppel's engineering and project management capability in emerging fuels.

Energy infrastructure

Keppel Infrastructure Trust (KIT SP, BUY, TP: SGD0.55) plays a systemically important role in Singapore's energy transition through ownership of critical power and gas infrastructure that underpins economic growth and decarbonisation. In the power segment, KIT holds a 51% stake in the 1,300MW Keppel Merlimau Cogen (KMC) CCGT plant, one of Singapore's most efficient gas-fired facilities. Following a first turbine upgrade completed in 2022, a second turbine upgrade is scheduled for completion by end-Jun 2025, which is expected to reduce carbon emissions by at least 17,800 tCO_2e per year, improve operational reliability and extend maintenance intervals. Importantly, the upgraded turbine will be hydrogen co-firing capable, allowing KMC to blend hydrogen with natural gas and align with Singapore's longer-term hydrogen pathway for the power sector. This positions KMC as a transition-ready baseload asset rather than a stranded gas plant.

KIT's 100%-owned City Energy represents a complementary downstream pillar of the energy transition. City Energy is Singapore's sole producer and retailer of piped town gas, supplying around 1.6m cu m per day to more than 900,000 residential, commercial and industrial customers. The business is expanding beyond traditional gas distribution into lower-carbon solutions that include EV charging, solar and smart energy services. It has secured exclusive rights to deploy 4,800 EV charging lots in private residential and mixed-use developments, and has entered the LPG market through a 51% acquisition of Tan Soon Huah, the second-largest LPG cylinder distributor in Singapore. Gas remains a relevant transition fuel. In 2024, 78% of new private housing units launched with town gas access were equipped with gas water heaters, which emit around 80% less carbon than electric storage heaters and offer lower lifecycle costs. Regulatory support, including the National Environent Agency's (NEA) extension of the Mandatory Energy Labelling Scheme to household water heaters from Apr 2025, is likely to reinforce demand for efficient gas appliances.

Looking ahead, City Energy is positioning itself for hydrogen adoption and decentralised renewables growth. It is working with Gentari on a joint feasibility study to import hydrogen from Malaysia via pipeline, with the objective of replacing grey hydrogen in town gas production with low-carbon hydrogen, potentially reducing Singapore's national emissions footprint. This strategy is supported by a SGD400m sustainability-linked loan, with interest costs tied to environmental performance targets. In parallel, City Energy's solar arm, Sun City, has grown rapidly since its launch in Dec 2023, expanding from 0.7MW of installed capacity to a potential 3.0MW through PPAs signed in 2024. Collectively, KIT's exposure through efficient gas generation, hydrogen-ready upgrades, gas distribution, EV charging and distributed solar provides investors with diversified, infrastructure-like participation in Singapore's energy transition, underpinned by regulated or contracted cash flows rather than merchant power volatility.

Real estate and REITs

Office, retail, industrial and logistics REITs: Capex for green buildings, rooftop solar, and energy retrofits.

Office, retail, industrial and logistics REITs sit at the centre of Singapore's decarbonisation effort given the built environment's material emissions footprint. Buildings account for over 20% of Singapore's emissions, and around 37% globally, making asset-level energy performance a key regulatory and valuation driver. Policy momentum is anchored by the Singapore Green Building Masterplan (SGBMP) under the Green Plan 2030, which sets the "80-80-80 by 2030" targets:

i. Greening 80% of buildings by gross floor area;

ii. Ensuring 80% of new buildings are Super Low Energy (SLE) from 2030;

iii. Achieving 80% energy efficiency improvement for best-in-class assets vs 2005 levels.

This has translated into rising, but increasingly unavoidable, capex for energy retrofits, cooling upgrades, smart building systems, and rooftop solar across office, retail, industrial and logistics portfolios.

For existing assets, the Green Mark Incentive Scheme for Existing Buildings 2.0 (GMIS-EB 2.0) is a key mitigant to upfront capex, providing SGD63m of grant support through 2027 to co-fund energy improvement works and accelerate Green Mark certification. The scheme is outcome-based, linking funding to verified emissions reductions, and applies across commercial, light industrial and selected residential common areas, directly benefiting REIT-heavy asset classes. Evidence to date suggests improving economic. By end-2022, around 55% of Singapore's building stock by GFA had been greened, with best-in-class buildings achieving c.71% energy efficiency improvement vs 2005 levels. Energy disclosures indicate c.SGD100m per year in energy savings across 172 Green Mark-certified commercial buildings, while SLE buildings can achieve payback within 4.5-6.5 years, supporting NAV resilience over the asset life cycle.

We assess that this sustainability capex for the sector should increasingly be viewed as defensive and value-accretive, rather than discretionary. Assets with high Green Mark ratings, on-site solar, and smart energy management are better positioned to manage rising electricity costs, carbon pricing exposure and tenant ESG requirements, while benefiting from lower operating expenses, stronger leasing demand and access to green financing. Conversely, laggard portfolios face higher retrofit risk, potential obsolescence and valuation discounts as minimum energy performance standards tighten.

The transition, therefore, reinforces a widening performance gap within office, retail, industrial and logistics REITs, favouring well-capitalised platforms with credible execution on green retrofits.

DC REITs and sponsors in the context of the Green DC Roadmap.

DC REITs and sponsors sit at the sharp end of Singapore's energy transition, given the city state's role as a regional digital hub with installed DC capacity exceeding 1.4GW and the sector's disproportionate consumption of electricity and water. The Green DC Roadmap 2030, launched by Infocomm Media Development Authority (IMDA), reframes growth away from unconstrained capacity expansion towards a "quality-over-quantity" model anchored on best-in-class energy efficiency and access to green power. Capacity allocations are now conditional on operators demonstrating superior performance at both the hardware (facility and cooling systems) and software (IT utilisation and optimisation) levels, alongside credible plans to source low-carbon electricity. For investors, this raises entry barriers and favours well-capitalised sponsors with advanced design capabilities, strong utility partnerships and the balance sheet capacity to absorb higher upfront capex.

Regulatory standards have also tightened with the introduction of the Green Mark for Data Centres (GMDC) 2024 by BCA and IMDA, updating the earlier 2019 framework. The revised criteria place stronger emphasis on operational energy efficiency, intelligent systems, carbon reduction, resilience and maintainability, reinforcing expectations that DCs continuously track, disclose and improve sustainability performance.

For DC-focused REITs, this translates into higher ongoing capex for cooling upgrades, power management systems and digital optimisation, but also clearer differentiation between compliant, future-proof assets and legacy facilities at risk of obsolescence. Over time, assets that meet GMDC standards are likely to enjoy preferential access to new capacity, lower operating risk and stronger tenant demand, while laggards face constrained growth and valuation pressure as Singapore enforces its green growth pathway.

City Development (CIT SP, BUY, TP: SGD8.50). CIT has been a pioneer in environmental sustainability and is the first Singapore real estate developer to sign World Green Building Council's (WorldGBC) Net Zero Carbon Buildings Commitment – a global pledge to achieve net zero operational carbon by 2030. Complementing its pledge toward operational net zero by 2030, CIT has achieved a 25% reduction in carbon emissions intensity in 2024 from the base year of 2016. It is on track to achieve its Science Based Targets Initiative-validated target of a 63% reduction by 2030. All its owned and/or managed buildings are Green Mark Certified. Overall, we see CIT's efforts reaping tangible positive benefits with inclusion into various sustainability-related indices, cost savings and at the same time achieving best sustainable outcomes that put it in a good position, in light of climate and environmental changes.

CapitaLand Ascendas REIT (CLAR SP, BUY, TP: SGD3.20). CLAR has one of the largest number of BCA Green Mark properties among the industrial S-REITs. It has set a target to achieve a minimum green rating for all assets by 2030. 49% of portfolio assets by GFA have been green-certified as of Dec 2024. 26 Singapore assets have now been fitted with solar panels, vs 22 in 2023 (one of the largest combined solar installations in Singapore among SREITs). CLAR also has 54% green lease coverage by NLA, marking an increase of 8ppt YoY. The REIT is committed to meeting a net-zero target for Scope1 and 2 emissions by 2050.

AIMS APAC REIT (AAREIT SP, BUY, TP: SGD1.52). It has committed to reduce 42% Scope 2 emissions by FY30 (with FY20 as the base year). In FY23, it entered into a partnership with Singapore Power Group to install rooftop solar PV systems across six industrial, logistics and warehouse properties by Dec 2023. The total solar PV is estimated to produce a combined >14,500MWh of energy per year, which will help avoid over 5,900 tonnes of carbon emissions. Half of the REIT's Singapore portfolio by NLA is BCA Green Mark-compliant while Optus Centre has achieved a 5-star NABERS rating.

Suntec REIT (SUN SP, BUY, TP: SGD1.60). All SUN's buildings are rated highly by green mark standards in respective countries. SUN has set net-zero carbon status by 2030 for assets with full ownership control, and by 2050 for all assets across its portfolio. About 70% of its total debt are green or sustainability-linked loans. In the 2024 Global Real Estate Sustainability Benchmark (GRESB) Assessment, Suntec REIT was awarded GRESB's 5-Star rating for the fifth consecutive year and maintained an "A" rating under the GRESB Public Disclosure. 177 Pacific Highway, 55 Currie Street are certified as carbon neutral. SUN also obtained a "B" EPC Energy Rating for The Minster Building. 21 Harris Street, 477 Collins Street, Nova Properties and The Minster Building use 100% renewable energy.

Land transport, and aviation

Land transport operators and fleet decarbonisation.

Land transport operators are increasingly exposed to fleet decarbonisation mandates, rising fuel and carbon costs, and tightening regulatory standards under Singapore's Green Plan 2030, with public transport positioned as a priority sector for electrification. **ComfortDelGro (CD SP, BUY, TP: SGD1.75)**, as Singapore's largest land transport operator with significant exposure to public buses, rail and taxis, sits at the centre of this transition. Policy direction is anchored by the Land Transport Authority's (LTA) commitment to achieve a 100% cleaner-energy public bus fleet by 2040 and full electrification of new vehicle registrations by 2030, implying a progressive replacement of diesel buses and taxis with electric and other low-emission alternatives. This creates medium- to long-term capex requirements for fleet renewal and charging infrastructure, although these are largely mitigated by the regulated nature of public transport contracts and government co-funding mechanisms.

ComfortDelGro is a core beneficiary and enabler of Singapore's land transport decarbonisation agenda, with clearly articulated fleet transition targets across its global operations. The group is targeting 90% of its global car fleet to be cleaner-energy vehicles by 2030, rising to 100% by 2040, while its bus fleet is expected to reach 50% cleaner-energy penetration by 2030 and 100% by 2050. In Singapore, progress is already well advanced, with around 60% of its vehicle fleet comprising cleaner-energy vehicles. The momentum of transition accelerated in 2024, particularly at SBS Transit, where the number of cleaner-energy buses increased to 110 units, including 85 electric buses and 25 diesel-hybrid buses. Within the taxi segment, close to 90% of the fleet is now running on cleaner energy, comprising more than 200 electric taxis and over 7,300 hybrid taxis, materially reducing fuel and emissions intensity.

Beyond fleet renewal, ComfortDelGro is building strategic exposure to EV infrastructure and commercial electrification solutions, strengthening its long-term positioning in a low-carbon transport ecosystem. ComfortDelGro ENGIE (CDG ENGIE), a JV with ENGIE South East Asia, has emerged as Singapore's leading EV infrastructure integrator, with a network of over 2,600 charging points across Singapore, Malaysia and Thailand as at 2024. This provides vertical integration benefits and optional growth as EV adoption scales across private, commercial and public fleets. In parallel, the group entered into the electric commercial vehicles area, commencing commercial distribution of the KYC V7 electric van in Jun 2024, with 35 units sold by the year-end, signalling early traction in electrified last-mile and logistics applications.

ComfortDelGro's transition strategy is characterised by measurable execution, regulatory alignment and earnings defensiveness, supported by contract-based public transport operations and growing exposure to EV infrastructure and services.

Airlines, airports, and caterers under SAF mandates and levies.

Singapore Airlines (SIA SP, NR) sits at the centre of Singapore's aviation decarbonisation pathway and is directly exposed to the SAF mandate and levy announced by the Civil Aviation Authority of Singapore (CAAS). From 1 Apr 2026, a SAF levy will be imposed on air tickets, with SAF uplift required for flights departing Singapore from 1 Oct 2026, initially at 1% SAF for all departures, rising to 3-5% by 2030, depending on SAF availability and cost trajectories. SIA has publicly committed to achieving net-zero carbon emissions by 2050, with SAF identified as the primary decarbonisation lever for long-haul aviation. The group has conducted multiple SAF pilot programmes since 2017 and secured SAF offtake agreements with suppliers including Neste, while embedding SAF costs into long-term fleet and pricing assumptions. While SAF represents a structural cost headwind relative to conventional jet fuel, the levy-based pass-through framework limits margin volatility and preserves Singapore's hub competitiveness by applying costs uniformly across carriers.

SATS (SATS SP, NR), as a leading aviation services and inflight catering provider, is indirectly but materially impacted by SAF adoption through airline customers, airport operations, and its own Scope 1 and 2 emissions footprint. SATS has committed to net-zero emissions by 2050, with an interim target to reduce absolute Scope 1 and 2 emissions by 20% by 2030 (from a 2019 baseline), driven by electrification of ground support equipment, energy-efficient kitchen operations, and increased renewable electricity procurement. While SATS does not directly bear the SAF levy, SAF mandates influence airline operating costs, flight volumes, and service demand, making operational efficiency and contract pricing discipline increasingly important. In parallel, SATS has been investing in centralised, energy-efficient catering facilities and food waste reduction initiatives, positioning itself to support airline customers' broader decarbonisation strategies.

Taken together, SAF mandates formalise aviation's transition costs while reducing regulatory uncertainty. For SIA, this reinforces the importance of scale, balance sheet strength, and fuel procurement sophistication in managing higher input costs over time. For SATS, alignment with airline sustainability objectives, coupled with disciplined capital deployment and energy efficiency gains, underpins earnings resilience.

Industrial and manufacturing

Electronics, precision engineering, and advanced manufacturing facilities facing rising carbon and electricity costs but also benefiting from green demand.

Electronics, precision engineering and advanced manufacturing facilities in Singapore face rising carbon and electricity costs due to the energy-intensive nature of their operations, but also benefit from policy support and growing green demand from global customers. Policy exposure is shaped by Singapore's sustainable manufacturing agenda, with incentives administered by the Economic Development Board (EDB) and NEA to co-fund energy-efficient and emissions-reduction projects. Carbon and power cost sensitivity varies across companies, with disclosed data highlighting meaningful exposure. **Venture Corp (VMS SP, BUY, TP: SGD16.66)** reported utilities consumption of 127-129k MWh and 84-88k tonnes of CO_2 emissions in FY23–24. **Frencken (FRKN SP, BUY, TP: SGD1.66)** incurred SGD10-11m in utilities costs and reported 46-49k tonnes of CO_2 emissions, while **UMS Holdings (UMSH SP, BUY, TP: SGD1.86)** disclosed 12-13k tonnes of CO_2 emissions, underscoring differing emissions intensity profiles across the sector.

Capex needs for decarbonisation are generally undisclosed, and companies typically disclose carbon reduction and energy initiatives without quantifying financial impact. Government incentives help offset costs but remain immaterial at the earnings level, with the NEA Energy Efficiency Grant (EEG) providing co-funding of up to SGD350,000 for manufacturing businesses with group annual turnover below SGD500m. Larger manufacturers can tap the Resource Efficiency Grant for Emissions (REG(E)) by EDB, which supports projects delivering at least 250 tonnes of verifiable annual carbon abatement, capped at 50% of qualifying costs. Despite Singapore's relatively high average solar irradiation of c.1,580 kWh/sqm, on-site solar deployment is constrained by land scarcity, rooftop limitations, urban shading and intermittency, limiting its ability to provide baseload power for manufacturing facilities.

In response, manufacturers are focusing on efficiency investments and green power sourcing. UMSH has installed solar panels at its Singapore facilities, VMS has deployed solar panels at its Penang site and is proceeding with installation at its Johor Bahru site, while FRKN is in the process of implementing renewable energy at its Singapore operations. Given the limited domestic renewable options, manufacturers increasingly rely on Singapore's "Four Switches" framework, combining on-site solar, regional power imports, emerging low-carbon alternatives and energy efficiency measures.

From an equity perspective, UMSH is preferred for its lower reported carbon emissions and early solar adoption, while FRKN is viewed positively for its ongoing renewable energy implementation, positioning both to better manage transition risks and capture demand from customers prioritising low-carbon supply chains.

Telecoms

The digital and telecoms sector sits at the intersection of structural data demand growth and rising decarbonisation pressure, with DCs being a key driver of electricity consumption and Scope 2 emissions. Singapore telcos and cloud-linked players are clear beneficiaries of DC-led growth, but are increasingly constrained by the Green Data Centre Roadmap, which prioritises energy efficiency, low PUE and access to low-carbon power. IMDA's benchmark of PUE ≤ 1.3 at 100 per cent IT load over the next decade compares with an industry average of around 1.47 at end-2024, raising compliance capex and operational discipline requirements. Against this backdrop, **Singtel's (ST SP, BUY, TP: SGD5.20)** Nxera platform is scaling aggressively, with over 200MW of DC capacity expected by end-2026 (from ~62MW currently). Meanwhile, **StarHub's (STH SP, NEUTRAL, TP: SGD1.19)** DC footprint remains more enterprise-focused rather than wholesale. Financing structures are increasingly aligned with sustainability outcomes, illustrated by Singtel's SGD476m green loan to fund DC development, reinforcing the link between energy efficiency and cost of capital.

From a transition perspective, Singapore telcos have articulated net-zero ambitions by 2050, supported by interim 2030 targets. Singtel has brought forward its net-zero target to 2045, aiming to cut Scope 1 and 2 emissions by 55% and Scope 3 by 40% by 2030 (baseline 2023), while StarHub targets a 50% Scope 1 and 2 reduction and 25% Scope 3 reduction by 2030, alongside 30% renewable energy consumption. While sustainability capex is largely embedded within overall network and digital transformation spend, both operators highlight rising transition risks, including higher electricity costs and carbon pricing, as earnings headwinds. Sector profitability remains pressured by intense competition and ARPU dilution, particularly in consumer segments, placing greater emphasis on enterprise growth, cost efficiency and capital discipline. Within this context, Singtel stands out – given its ROIC expansion trajectory, capital management optionality and earnings resilience driven by diversified offshore exposure.

Financials

Banks as financiers of the transition, exposure to high-carbon clients, and opportunities in sustainable finance.

Singapore banks are central to financing the energy transition, with policy exposure focused primarily on reducing financed emissions, which constitute the bulk of their total emissions footprint. All major local banks have identified their exposures to high-emission sectors that they finance and have committed to achieving net zero for these sectors by 2050. These priority sectors include power, oil and gas, automotive, aviation, steel, real estate and shipping, although there are variations in sectoral focus and portfolio composition across banks. For context, the identified priority sectors account for around 40% of **OCBC's (OCBC SP, NEUTRAL, TP: SGD18.70)** corporate and commercial banking book, 50% of **DBS's (DBS SP, BUY, TP: SGD59.00)** corporate loans, and 60% of **United Overseas Bank's (UOB SP, NEUTRAL, TP: SGD36.10)** corporate book. In contrast, operational emissions are a smaller issue, with Singapore banks maintaining carbon neutrality for banking operations and targeting net zero by 2050. Direct sensitivity to carbon and power costs is limited, as staff costs account for around 62% of total operating expenses, with IT costs the next largest component.

In terms of financial impact, the transition is not expected to be materially earnings-disruptive. Banks may forego certain revenue opportunities due to policy commitments, such as exiting or restricting financing for coal-fired power plants, but this is partly offset by growing demand for transition financing, sustainability-linked facilities and advisory solutions. Capex requirements linked to decarbonisation are generally not disclosed and are not expected to be significant at the sector level, although OCBC has indicated plans to invest over SGD25m in decarbonisation efforts across Singapore, Malaysia and Greater China, including energy-efficient technologies and solar systems to increase renewable energy usage. Incremental operating expenses related to sustainability initiatives is expected to be modest and manageable within existing cost structures.

Conversely, opportunities in green and sustainable finance are increasingly prominent. Singapore banks have developed a strong regional reputation for sustainable finance solutions, with green financing frequently cited as a driver of loan growth. OCBC has progressively raised its sustainable finance ambitions, with its sustainable finance portfolio reaching SGD71bn in 2024, well ahead of its earlier 2025 target of SGD50bn. Similarly, UOB's sustainable financing portfolio stood at SGD58bn as at Dec 2024, exceeding its prior SGD30bn target by 2025. More recently, Singapore banks have been reported to be establishing carbon trading desks and building capabilities in carbon credits. While the carbon market remains relatively small, this early positioning could provide a competitive advantage as trusted intermediaries and reinforce the sector's role in supporting the region's transition to a low-carbon economy.

From a stock perspective, DBS remains the preferred sector pick, supported by strong dividend visibility following the reaffirmation of its SGD0.24 annual DPS step-up for 2026 and its commitment to 15 cents per quarter in capital return DPS for 2026 and 2027, translating into a 110–140 basis point dividend yield premium over peers.

Stocks Under Coverage Mentioned In The Report

Figure 13: Singapore – valuation comparison (I) for stocks under coverage mentioned in the report

Company name	M Cap (USDm)	Rating	TP	Upside (%)	1FY year	P/E (x) 1FY	P/E (x) 2FY	EPSG (%) 1FY	EPSG (%) 2FY	Div. Yld (%) 1FY	Div. Yld (%) 2FY	DPSG (%) 1FY	DPSG (%) 2FY
AIMS APAC REIT	932	Buy	1.52	3.3	Mar-26	9.0	9.2	147.7	-2.1	6.7	6.9	3.5	3.2
CapitaLand Ascendas REIT	9,903	Buy	3.20	15.6	Dec-25	16.0	15.1	3.4	6.2	5.5	5.8	-0.3	4.5
City Developments	5,198	Buy	8.50	13.3	Dec-25	21.5	20.2	57.1	6.4	2.0	2.0	50.0	0.0
ComfortDelGro	2,437	Buy	1.75	20.7	Dec-25	12.8	10.8	16.9	17.8	5.9	6.5	9.6	9.9
DBS Group	122,146	Buy	59.00	6.3	Dec-25	14.0	14.1	-1.5	-0.3	5.5	5.8	37.7	5.9
Frencken Group	441	Buy	1.66	24.5	Dec-25	14.0	12.8	9.5	8.9	2.0	2.1	14.5	9.5
Keppel Infra. Trust	2,219	Buy	0.55	16.0	Dec-25	47.0	44.2	-4.7	6.3	8.4	8.4	6.5	0.5
OCBC	67,711	Neutral	18.70	-3.8	Dec-25	11.8	11.6	-2.6	1.4	5.1	4.5	-2.4	-11.7
SingTel	58,321	Buy	5.20	14.0	Mar-26	26.4	22.2	15.6	19.1	4.3	4.4	14.7	2.6
StarHub	1,510	Neutral	1.19	5.3	Dec-25	17.0	14.1	-18.0	20.7	5.8	6.2	4.8	7.7
Suntec REIT	3,199	Buy	1.60	14.4	Dec-25	14.8	13.0	104.4	13.2	4.7	4.9	6.7	4.0
UMS Integration	722	Buy	1.86	42.0	Dec-25	20.2	17.3	10.4	17.2	2.3	2.3	-6.3	0.0
UOB	44,537	Neutral	36.10	3.9	Dec-25	12.0	10.2	-22.3	17.5	5.4	4.9	-9.3	-8.3
Venture Corp	3,305	Buy	16.66	12.5	Dec-25	17.8	16.5	-1.7	7.8	5.4	5.1	7.2	-6.7

Note: Prices are as at 16 Dec 2025. EPSG = EPS Growth, DPSG = DPS Growth
Source: Bloomberg, RHB

Figure 14: Singapore – valuation comparison (II) and returns for stocks under coverage mentioned in the report

Company name	M Cap (USDm)	Rating	TP	Upside (%)	1FY year	P/BV (x) 1FY	P/BV (x) 2FY	ROE (%) 1FY	ROE (%) 2FY	ND/E (x) 1FY	ND/E (x) 2FY	Returns 1M	Returns YTD
AIMS APAC REIT	932	Buy	1.52	3.3	Mar-26	1.2	1.2	13.1	12.7	0.7	0.7	4.3	17.6
CapitaLand Ascendas REIT	9,903	Buy	3.20	15.6	Dec-25	1.2	1.2	7.4	8.1	0.6	0.6	-1.1	7.8
City Developments	5,198	Buy	8.50	13.3	Dec-25	0.7	0.7	3.4	3.6	1.0	1.0	2.0	46.8
ComfortDelGro	2,437	Buy	1.75	20.7	Dec-25	1.1	1.1	9.2	10.4	0.2	0.1	-0.7	-2.0
DBS Group	122,146	Buy	59.00	6.3	Dec-25	2.2	2.1	16.0	15.4	na	na	2.8	26.9
Frencken Group	441	Buy	1.66	24.5	Dec-25	1.2	1.1	9.1	9.2	-0.2	-0.3	-13.6	17.7
Keppel Infra. Trust	2,219	Buy	0.55	16.0	Dec-25	3.9	5.2	7.4	10.1	3.7	4.9	1.1	4.4
OCBC	67,711	Neutral	18.70	-3.8	Dec-25	1.4	1.3	12.2	11.7	na	na	5.0	16.5
SingTel	58,321	Buy	5.20	14.0	Mar-26	2.9	2.8	11.3	13.0	0.4	0.4	-6.2	48.1
StarHub	1,510	Neutral	1.19	5.3	Dec-25	3.2	3.1	18.8	22.4	1.2	1.1	-1.7	-6.6
Suntec REIT	3,199	Buy	1.60	14.4	Dec-25	0.7	0.7	4.6	5.2	0.6	0.6	2.2	19.7
UMS Integration	722	Buy	1.86	42.0	Dec-25	2.1	2.0	10.4	11.7	-0.2	-0.2	-7.7	27.2
UOB	44,537	Neutral	36.10	3.9	Dec-25	1.1	1.1	9.6	10.9	na	na	2.2	-4.3
Venture Corp	3,305	Buy	16.66	12.5	Dec-25	1.5	1.4	8.3	8.8	-0.5	-0.5	1.7	12.6

Note: Prices are as at 16 Dec 2025, ND/E = Net debt/Equity
Source: Bloomberg, RHB

Note: The risks to the energy transition are detailed in the next page.

Risks

Policy risk

Singapore's energy transition is policy-led, with material implications from carbon pricing, technology standards and sector-specific mandates. The step-up in the carbon taxes, increases cost pressure on power, industrial, aviation and maritime sectors, while future adjustments to offsets eligibility and international carbon credit rules could alter compliance costs and investment economics. There is also policy execution risk around hydrogen, CCUS, electricity imports and grid reforms, where timelines, subsidies or regulatory frameworks may evolve as technologies mature and geopolitical conditions change.

Carbon leakage

As a highly open, trade-dependent economy, Singapore faces carbon leakage risks if higher domestic carbon costs reduce competitiveness relative to regional peers without comparable pricing. This is most relevant for energy-intensive manufacturing, refining, petrochemicals, aviation and maritime activities, where production or routing could shift offshore. While the Government mitigates this through transitional allowances, partial use of high-integrity international carbon credits, and regional cooperation under Article 6, investors should recognise that uneven carbon pricing across ASEAN could still pressure margins or volumes for Singapore-based operators.

Stranded assets

There is a risk that long-lived assets such as natural gas power plants, industrial facilities, pipelines, ports and aviation infrastructure become partially stranded if decarbonisation accelerates faster than expected or if alternative technologies achieve cost breakthroughs. Although Singapore has sought to reduce this risk by mandating hydrogen-ready CCGTs, supporting CCUS feasibility studies, and favouring flexible assets such as fast-start plants and energy storage, capital recovery periods may still be challenged under higher carbon prices or lower utilisation rates over time.

Execution and technology risk

Many pathways critical to Singapore's net-zero ambition, including large-scale hydrogen and ammonia use, CCUS, deep geothermal, regional power grids and advanced grid digitalisation, remain at the early or pilot stages. Risks include cost overruns, delays, supply chain constraints, safety and permitting challenges, and uncertain commercial viability at scale. For investors, returns depend not only on policy intent but also on successful execution, cross-border coordination and global technology cost curves, with downside risk if deployment is slower or more expensive than assumed by current transition roadmaps.

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