Storage and blending

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Tanks, terminals and caverns

Storage is the second pillar of the oil hub. Tanks allow traders to buy cargoes when prices are low and sell them when prices rise, to assemble large cargoes from small parcels and to break large cargoes into the smaller lots that regional buyers require. Ong Eng Tong describes the function in these terms: large cargoes arrive from Europe and the Middle East and are stored and reshipped in smaller lots. He also calls Singapore a “swing refinery” that supplies countries whose own refining capacity is insufficient or whose refineries have suffered outages. Storage makes that role possible, since it allows products to be held ready for buyers whose needs change at short notice.

Much of the storage belongs to the refineries themselves. Aster alone holds 4.3 million cubic metres of tankage on Bukom and Jurong Island, designed for a refinery of 500,000 barrels per day. The company has studied leasing part of it to third parties after the reduction of crude capacity. Independent terminals add further capacity. They are owned by specialist storage companies, by the storage arms of trading houses and by investors, and they lease tanks to traders, refiners and bunker suppliers. Vitol, which opened its Singapore office in 1979, founded the storage

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company VTTI in 2006 and now reports storage of about 24 million cubic metres worldwide.[1] A precise figure for total commercial storage in Singapore could not be confirmed from public sources and is therefore not given here.

The most original contribution of the state is underground. Construction of the Jurong Rock Caverns began on 8 February 2007. The facility was officially opened on 2 September 2014. It stores up to 1.47 million cubic metres of liquid hydrocarbons, such as crude oil and condensate, about 130 metres beneath the Banyan Basin of Jurong Island. JTC describes it as the first commercial underground rock cavern facility for liquid hydrocarbons in Southeast Asia and estimates that it saves about 60 hectares of land above ground.[2] Prime Minister Lee Hsien Loong later observed that the land saved would be enough for six petrochemical plants. A second phase of about 1.32 million cubic metres has been studied but not built.[3]

Blending as a trading function

Blending turns storage into a source of value. Oil products are sold to specifications that define density, viscosity, sulphur content, flash point, octane and other properties. Components that do not meet a specification on their own can be mixed in tanks or on board ships until the blend does. A trader who buys cheap components, such as high-sulphur fuel oil, cutter stocks, naphtha or reformate, and blends them into a marketable grade earns the difference between the value of the components and that of the finished product. Singapore's concentration of tanks, refineries, jetties and laboratories makes it one of the most important blending locations in the world.

The rules on marine fuel show how regulation can transform this business. From 1 January 2020 the International Maritime Organization reduced the maximum sulphur content of fuel used by ships outside emission control areas from 3.5 to 0.5 per cent.[4] The demand for high-sulphur fuel oil, the traditional residue of Asian refineries, collapsed almost overnight, while demand for very low sulphur fuel oil rose. Much of the new fuel was produced by blending low-sulphur residues with distillates and other components in Singapore tanks. The change rewarded traders with access to storage and blending capacity in the world's largest bunkering port,

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which Chapter III of this part examines. It also raised the risk of off-specification blends, a problem that the same chapter discusses in connection with fuel quality and contamination.

Blending carries legal risk as well as commercial opportunity. A cargo described as conforming to a specification must in fact do so, and blends that meet the test parameters while containing unusual or harmful components may expose the seller to claims from buyers and shipowners. Contracts therefore define the specification, the method of sampling and the inspection company whose certificate is final. The independent surveyors and laboratories that test cargoes in Singapore perform the function that the Geneva volume attributes to the Société Générale de Surveillance in the history of Swiss trading.

The integrity of stocks

Large stocks of a valuable and fungible liquid invite fraud. For about a decade from 2007, groups of Shell employees siphoned marine gasoil from the Bukom site and sold it through a network of buyers. On 31 March 2022 one of the leaders was sentenced to 29 years' imprisonment for misappropriating gasoil worth nearly S$128 million between 2007 and 2017.[56] The case revealed how difficult it is to reconcile measured quantities in a large tank farm with those loaded onto barges, and how much depends on the honesty of the employees who record the movements.

Stock fraud of a different kind brought down Hin Leong Trading in April 2020. The company filed for court protection on 17 April 2020 after its founder had disclosed to lenders that the company had not reported futures losses of about US$800 million.[7] Banks discovered that stocks pledged to them as collateral did not exist in the quantities stated or had been pledged several times. Chapter II of Part H examines the collapse and its consequences for trade finance, while Chapter I of Part B showed how the colonial Penal Code was applied to its founder. For the oil hub, the lesson is that storage is valuable to lenders only when tank receipts, inspection reports and inventory records can be trusted.

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Common misconception

It is often said that Singapore's oil prices are set on an exchange. The prices that Asian contracts use are in fact assessments published by a private price reporting agency, based on bids, offers and trades in the physical market reported to it by participants. Futures and cleared swaps refer to those assessments and settle against them. Exchanges and clearing houses provide the hedge, while the price itself comes from the physical market observed by Platts.

Notes

1. Vitol, "About" (vitol.com, accessed November 2026): "Founded in Rotterdam in 1966"; "opened its first Swiss office in 1968 in Zug"; Singapore (1979); "established VTTI, a storage company, in 2006"; "circa 24 million cubic meters of storage". ↩
2. JTC Corporation, "Jurong Rock Caverns" (jtc.gov.sg/find-space/jurong-rock-caverns, accessed November 2026): storage of up to 1.47 million m^3 of liquid hydrocarbons such as crude oil and condensate; about 150 metres below ground and 130 metres beneath the Banyan Basin; first commercial underground facility of its kind in Southeast Asia; frees about 60 hectares of land. ↩
3. Wikipedia, "Jurong Island" (accessed November 2026): Phase 2 of the Jurong Rock Caverns could add about 1.32 million cubic metres but was only being explored. ↩
4. Wikipedia, "IMO 2020" (accessed November 2026): from 1 January 2020 the global sulphur limit for marine fuel outside emission control areas fell from 3.5 per cent to 0.5 per cent; 0.10 per cent inside emission control areas. ↩
5. "Ex-Shell employee gets 29 years' jail for $128 million gasoil heist at Pulau Bukom", Yahoo News Singapore, 31 March 2022: "sentenced to 29 years' jail at a court hearing on Thursday (31 March)"; "From 2007 to 2017, the Singaporean misappropriated nearly $128 million worth of gasoil". ↩

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6. Wikipedia, “Pulau Bukom” (accessed November 2026), gives more than 350,000 tonnes worth over S$200 million for the whole scheme of 2007–2018; press reports of July 2025 on a second leader (sentence of more than 25 years for fuel worth about S$100 million). ↩
7. Wikipedia, “Hin Leong” (accessed November 2026): “allegations of $800 million in undisclosed losses”; in a meeting with lenders Lim revealed that the company “had written off $800 million in futures trading losses”; filing for court protection on 17 April 2020. ↩

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