Intelligent Investment

China Cold Storage

Special Report

Investment opportunities
in the pandemic era

December 2021

Executive Summary

With the COVID-19 pandemic having fueled the growth of China's stay-at-home economy, recent years have seen a sharp increase in online grocery sales. China's online food sales grew 64% y-o-y to RMB 459 billion in 2020 and are projected to increase by a further 46.2% y-o-y to RMB 670 billion by the end of 2021. This has spurred rapid growth by leading online grocery platforms such as DingDong and Missfress, several of which have completed successful listings on the NASDAQ.

Rapid growth in the online grocery segment has had a strong knock-on effect on demand for cold storage. CBRE data show nationwide cold storage leasing volume doubled in 2020 compared to that for 2019. This strong momentum carried through to the first three quarters of 2021, with leasing volume for the period surpassing that for full-year 2020, driven by strong take-up by leading platforms such as Duoduo Maicai, Hema and Meituan, as well as third party cold storage operators.

Despite the recent surge in demand, China's stock of cold storage facilities lags that of developing countries. Global Cold Chain Alliance (GCCA) data show that there is just 0.15 cu. m. of cold storage per capita in China's urban areas, just a quarter of that of the U.S.

The strong growth potential for cold storage in China is drawing more investors to the sector. CBRE's 2021 China Investor Intentions Survey found that 38% of respondents named cold storage as their preferred alternative sector, compared to 20% in last year's survey. Since 2020, domestic and overseas investors have accelerated their investment in cold storage, led by Blackstone's RMB 4.4 billion acquisition of a logistics park including a cold storage facility in the Greater Bay Area.

Compared to dry warehouses, the construction, operation and management of cold storage is more complicated and requires higher capital expenditure. Within the cold storage segment, there exist several different types of facilities, some of which may offer more attractive prospects for investors than others. Functional cold storage properties such as distribution centres and sorting hubs that perform a variety of roles including as storage, distribution, delivery, and processing are generally more sought after by buyers as they can generate sustainable income.

When considering investment in cold storage, factors such as city, location, size, quality, and function all play a key role in determining investment returns. This report by CBRE identifies the optimal investment opportunities, strategies and locations for cold storage investment in China and is designed to serve as a guide for investors, service providers and occupiers seeking to access this rapidly growing sector.

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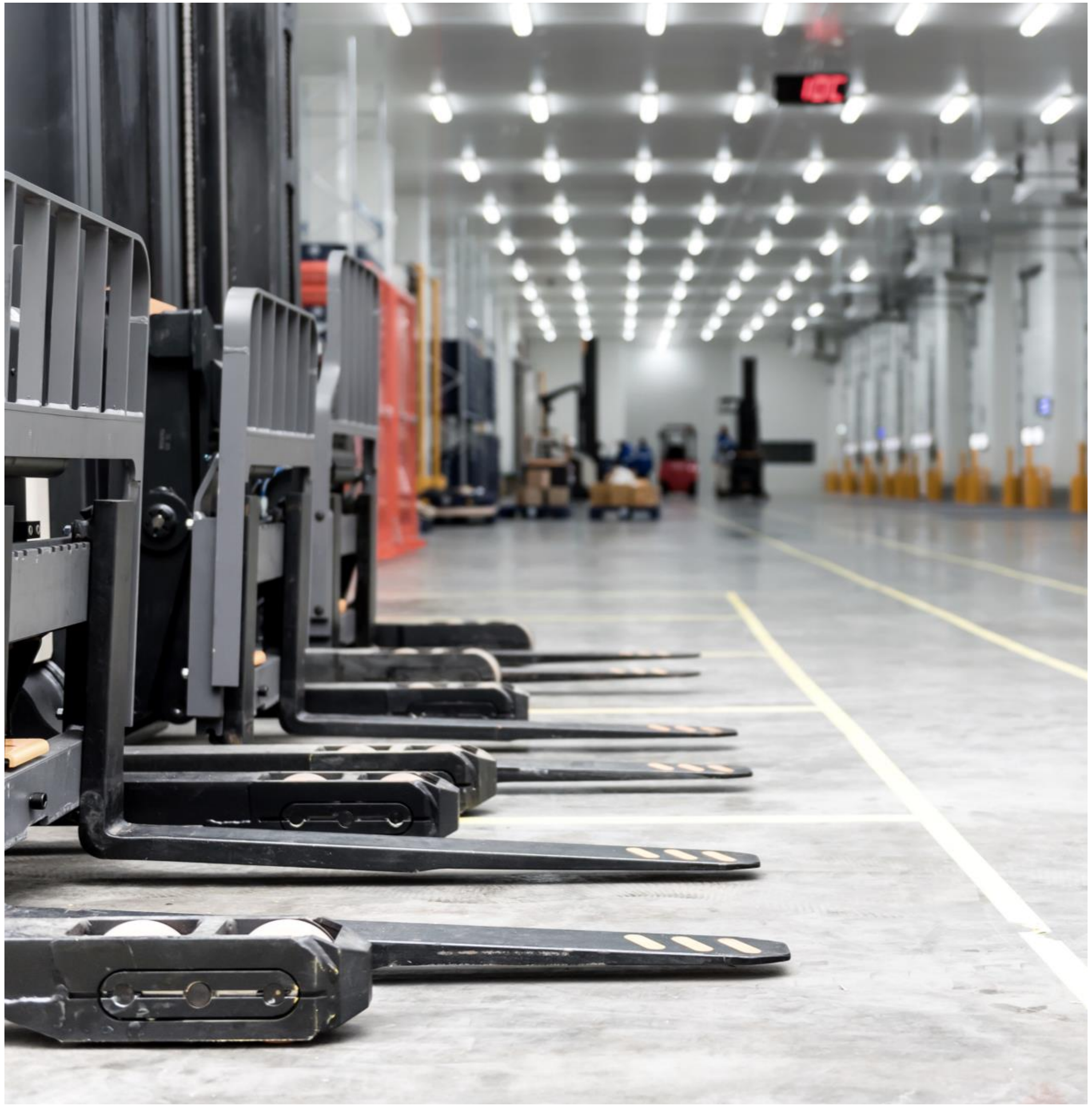


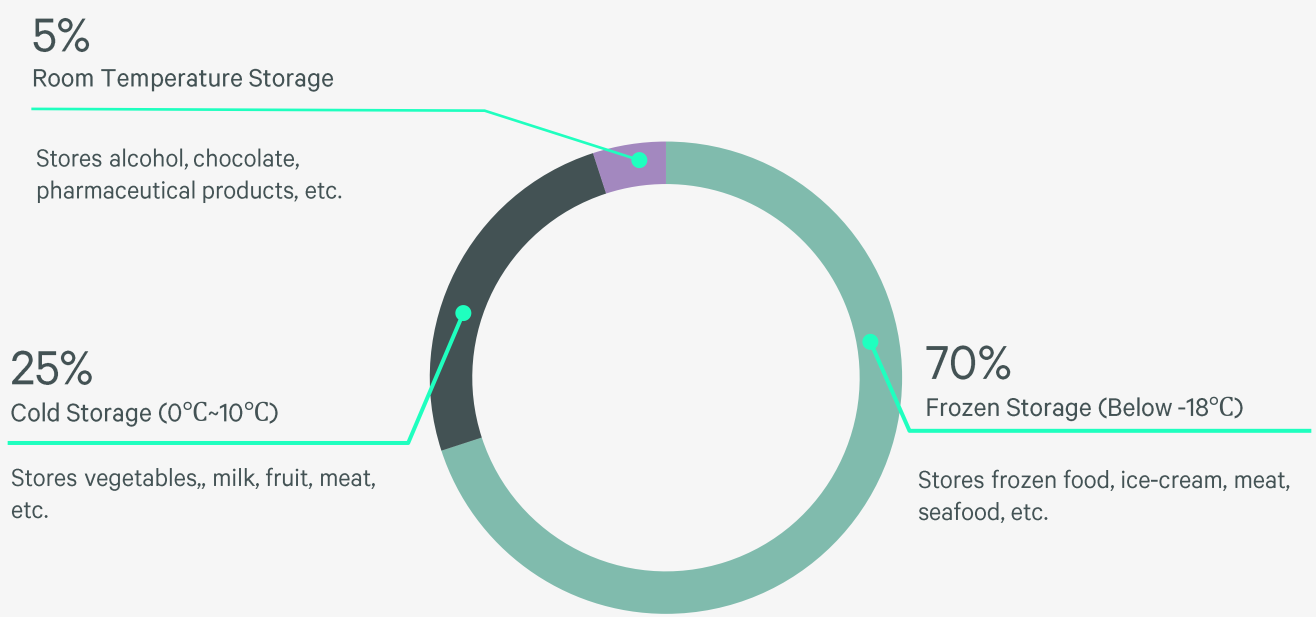
Type of Cold Storage in China

The Classification and Basic Specification for Cold Chain Logistics" (GB/T 28577-2012) national standard defines the role of cold chain logistics as to guarantee the quality of fresh food and to limit its loss during transportation by maintaining a suitable temperature during the whole supply chain process including production, circulation, sales, and consumption. Cold storage is therefore critical to ensuring the supply of groceries and is an essential pathway for imported food.

Companies operating in the food and pharmaceutical cold chain are the primary occupiers of cold storage. Most cold storage in China is used to store fresh food, with pharmaceutical companies preferring to build their own facilities rather than renting a third-party property.

Frozen storage accounts for 70% of total cold storage stock and is used for the storage of frozen food. Cold storage accounts for 25% of total stock and is used for the storage of products such as fresh vegetables and milk. Room temperature storage accounts for 5% of total stock and is designed to hold products such as alcohol and electronics.

Figure 1: Types of Cold Storage



Source: CBRE, November 2021

Functional Cold Storage is Most Suitable for Investment

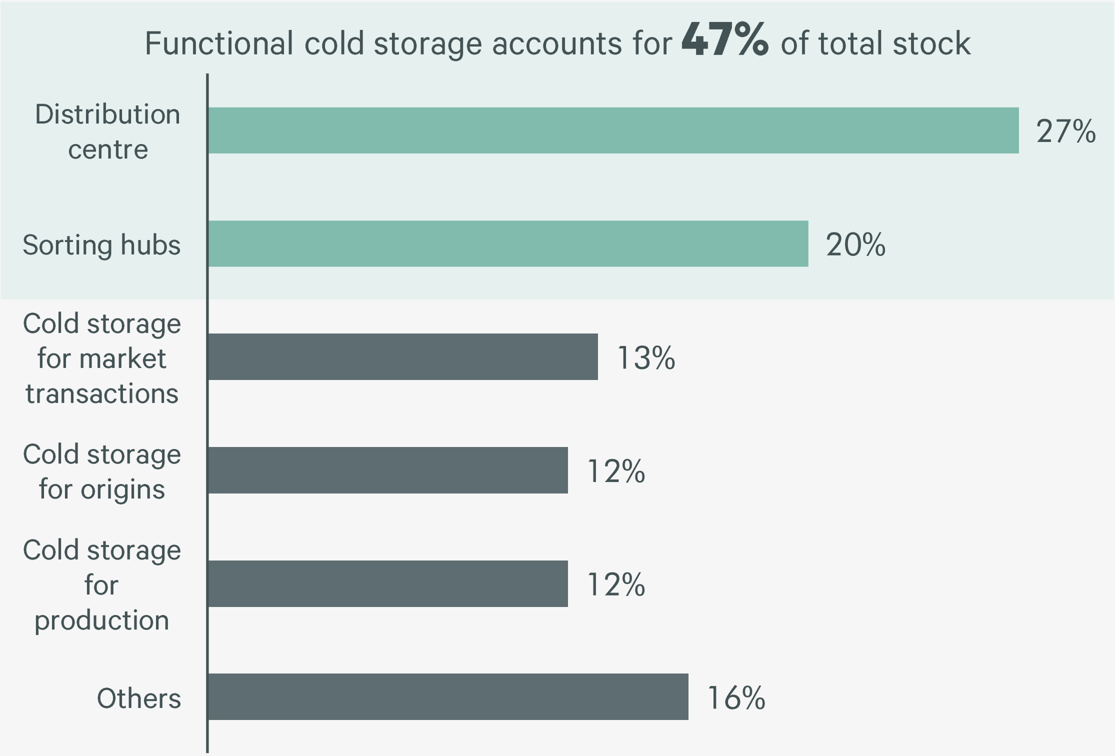
- **Functional cold storage,** which performs a variety of roles including storage, distribution, delivery and production, caters to different types of customers and is located in transportation hubs and near major consumption markets. This makes functional cold storage properties more suitable for investment compared to other types of warehouses.

- **Cold storage for market transactions** provides trading and storage services for market traders and is located in agriculture-oriented cities.

- **Cold storage for origins** provides services to farmers, including first-mile cold storage, and is located in agriculture-oriented cities.

- **Cold storage for production** provides services to manufactories and food processors, including storage services for raw materials and finished products, and is located near food processors.

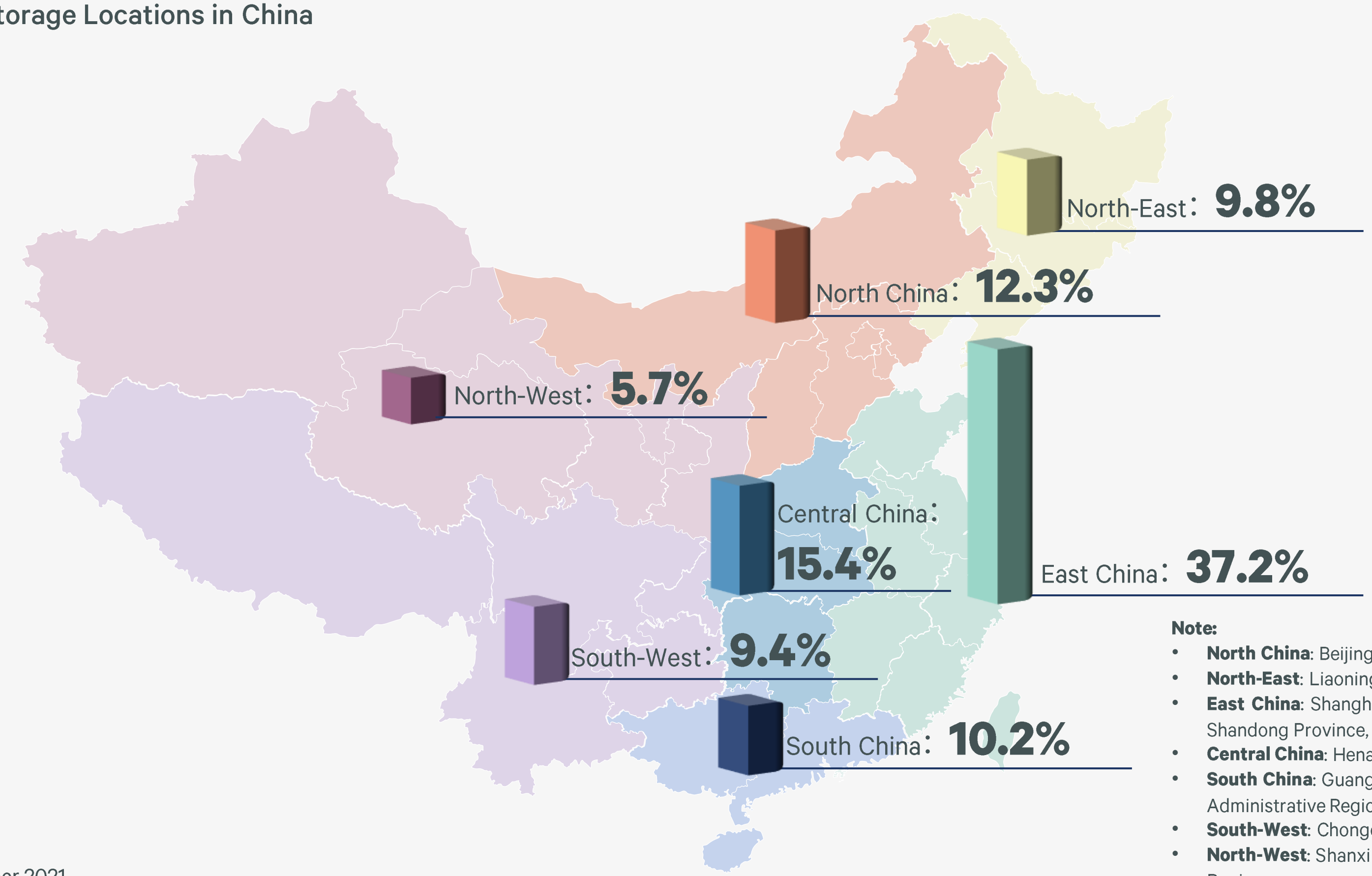
Figure 2: Functions of Cold Storage



Source: CBRE, November 2021

40% of Cold Storage Facilities Are Located in East China

Figure 3: Cold Storage Locations in China



Note:

- **North China**: Beijing, Tianjin, Hebei Province, Shanxi Province, Inner Mongolia Autonomous Region
- **North-East**: Liaoning Province, Jilin Province, Heilongjiang Province
- **East China**: Shanghai, Jiangsu Province, Zhejiang Province, Anhui Province, Fujian Province, Jiangxi Province, Shandong Province, Taiwan Province
- **Central China**: Henan Province, Hubei Province, Hunan Province
- **South China**: Guangdong Province, Guangxi Zhuang Autonomous Region, Hainan Province, Hong Kong Special Administrative Region, Macao Special Administrative Region
- **South-West**: Chongqing, Sichuan Province, Guizhou Province, Yunnan Province, Xizang Autonomous Region
- **North-West**: Shanxi Province, Gansu Province, Ningxia Hui Autonomous Region, Jiangjiang Uygur Autonomous Region

Source: CBRE, November 2021

Surging Demand for Online Groceries

Unprecedented growth in demand for online groceries has driven the rapid expansion of China's cold storage industry. At the same time, improved cold storage service capabilities are facilitating the expansion of online grocery platforms, which are leasing large volumes of cold storage space as they look to grab more market share. Other drivers of demand include consumption upgrading, characterised by more local consumers purchasing imported food, which requires cold storage during transportation.

The rapid expansion of catering chain stores is driving demand for high standard warehouses to serve transportation networks. China's catering market achieved a total market size of RMB 4,000 billion in 2020, with chain stores registering growth of 46% over the same year. Food processing companies also require cold storage for distribution. With the integration of online and offline sales, as well as emerging business models such as community buying, cold storage is playing a key role in the upgrading of storage, sorting, and distribution.

Figure 4: 2016-2023 China Online Grocery Transaction Volume and Growth Rate

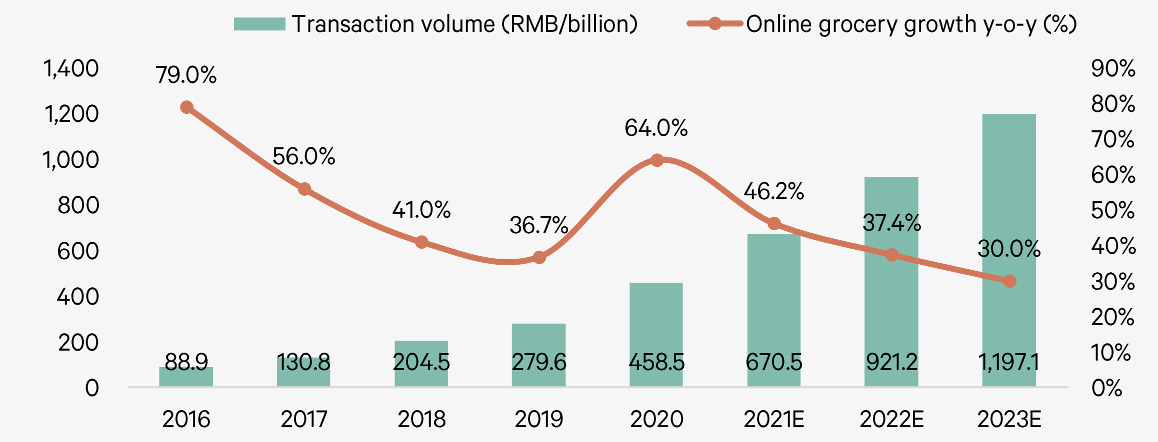
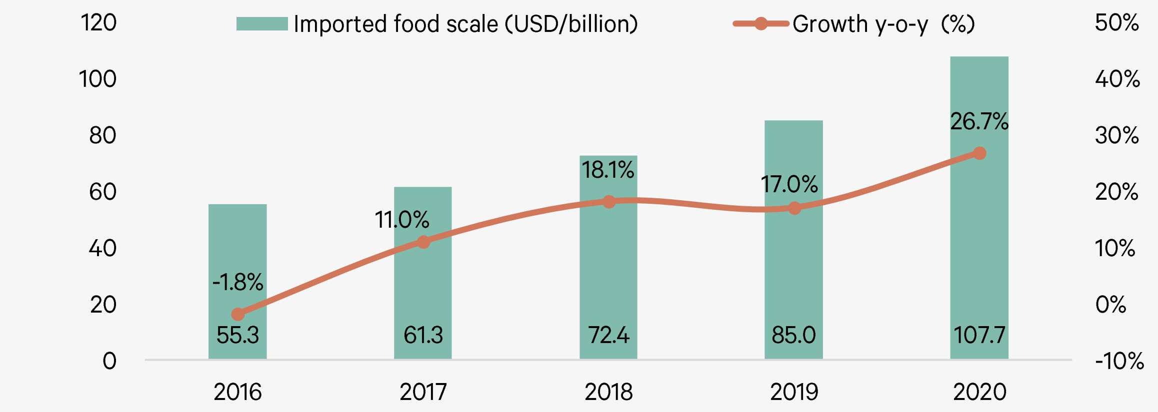


Figure 5: 2016-2020 China Imported Food Scale and Growth Rate



Source: Ministry of Commerce, iResearch, CBRE, November 2021

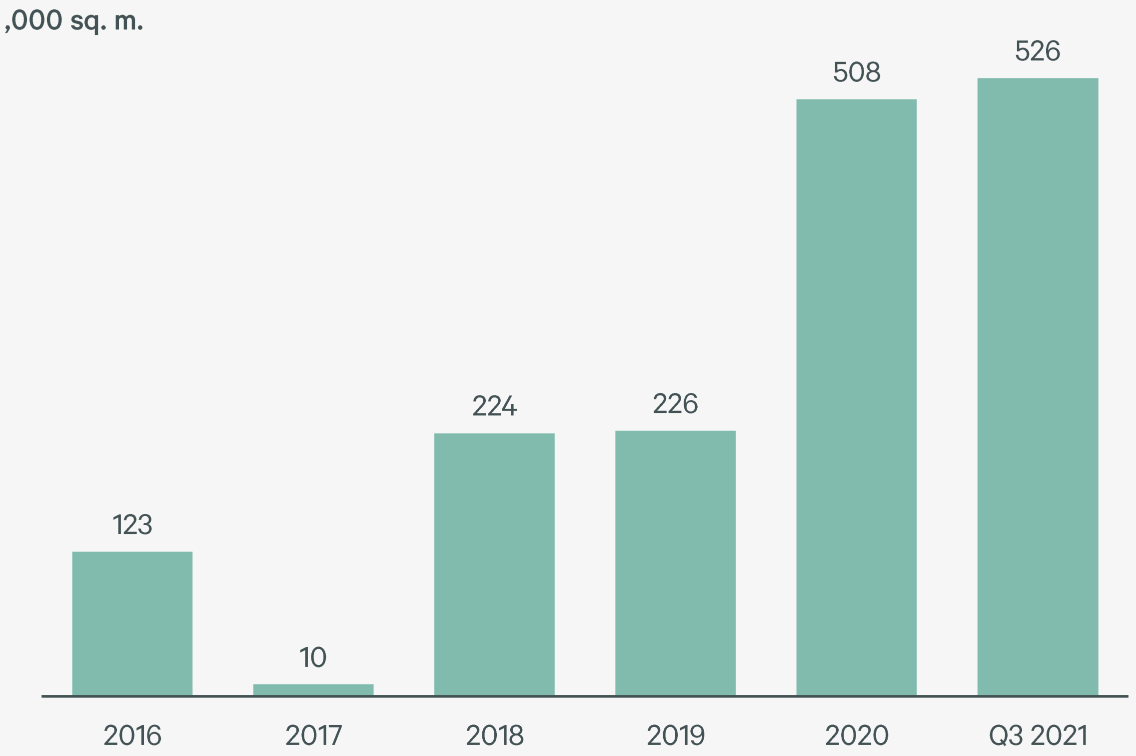
Cold Storage Leasing Transactions

The annual Gross Merchandise Value (GMV) of online groceries in China grew by 42.5% y-o-y to RMB 364.1 billion in 2020. Forecasted growth of 28% y-o-y this year is set to bring GMV to RMB 465.8 billion by end-2021. Leading online grocery retailer Dingdong expanded rapidly in 2020, with growth of 192% raising its GMV to RMB 13 billion, a significant increase on its GMV of just RMB 742 million in 2018. Recent strong growth in the sector has driven an uptick in leasing transactions, with CBRE data showing cold storage leasing volume more than doubled y-o-y in 2020. Amid swift expansion by online grocery platforms such as Dingdong, Duoduo Maicai, Hema and Meituan, as well as third party cold storage operators, cold storage leasing volume for the first three quarters of 2021 has already eclipsed last year's total.

China Federation of Logistics & Purchasing data show that China's cold storage capacity achieved a Compound Average Growth Rate (CAGR) of over 10% from 2015 to 2020. Cold storage facilities remain concentrated in Shanghai, Shandong, and Guangzhou, with most facilities operating at full or near full capacity.

Global Cold Chain Alliance data show that total cold storage capacity in China stood at 131 million cu. m. in 2020, an increase of about 25% from 2018. With just 0.15 cu. m. of cold storage per capita in China's urban areas - around a quarter of that of the U.S. – there is significant potential for growth.

Figure 6: Cold Storage Leasing Transactions From 2019 to 2021



Note: Leasing transactions include online retailers and cold storage service providers, which may include some dry space.
Source: CBRE, November 2021

Active Investment in Cold Storage

CBRE's 2021 China Investor Intentions Survey found that 38% of respondents named cold storage as their preferred alternative sector for investment. Since 2020, both domestic and overseas have increased their investment in China cold storage, led by major deals such as Blackstone's 4.4 billion RMB acquisition of a logistics park including an 80,000-tonne cold storage facility in the Greater Bay Area. Also in 2020, Hines acquired a cold storage project in Dongguan for its first logistics deal in China, while FountainVest purchased a 100% equity stake in CJ Rokin Logistics, which operates several cold storage facilities.

In addition to investing in completed cold storage assets, developers such as VX Logistics, Metcold, GFS, Tianhuan Cold Chain, Wanxin Cold Chain and Asia Cold are increasing their exposure to the sector by developing new assets through land purchases and construction and/or conversion of dry warehouses. According to the China Federation of Logistics and Purchasing (CFLP), the total capacity of newly developed or redeveloped cold storage facilities reached 3.54 million tonnes (8.85 million cu. m.) in H1 2021.

Figure 7: Preferred Alternative Sector for Investment

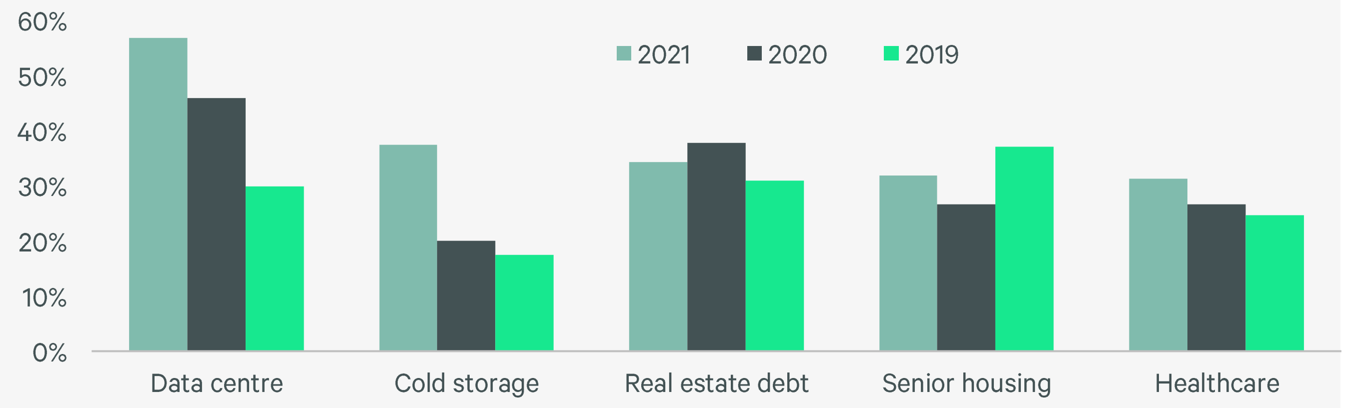


Figure 8: Major Cold Storage Investment Transactions Since 2020

Time	Seller	Buyer	Volume (RMB/billion)	Remarks
Apr 2020	Zhangzidao Cold Logistics	GFS	0.14	Acquisition of 75% share in Zhangzidao Cold Logistics including a 40,000-tonne modern cold storage facility and a 10,000 sq. m. cold container station
Nov 2020	Minima Technology	Sumitomo; Hidden Hill; Yunda Express	/	Strategic investment
Aug 2020	Jiuye Supply Chain	Sino-ocean	/	Strategic investment
Sep 2020	Dongjiang Cold Chain	Xinfadi	/	Strategic investment
Nov 2020	Guangzhou R&F Airport Logistics Park	Blackstone	4.41	Acquisition of a 70% interest in a logistics park including an 80,000-tonne cold storage facility
Nov 2020	Well-known Fund	Hines	/	Acquisition of an A-class cold storage facility in Dongguan Shatian
Feb 2021	CJ Rokin	FountainVest	4.30	100% equity acquisition

Source: CBRE, November 2021

Major Cold Storage Service Providers

- There are three types of cold storage service providers: facility providers, third-party cold storage operators and consolidated services providers.
- Well-located and high-quality cold storage facilities with good quality and locations are keenly sought after by occupiers, with strong service capability also now an important consideration.

Figure 9: Cold Storage Service Providers

	Facility Providers	Third-Party Operators	Comprehensive Service Providers
Business Model	• More leasing of cold storage • Less operational services	• More operations of cold storage • Less self-constructed cold storage	• Cold storage facilities • Cold storage operations
Source of Income	Rent	Services	Rent + Service
Asset Type	Self-built or lease	Rarely self-built	Self-built or lease
Leading Companies	Metcold 美库 亚冷 ASIA COLD Orange Cold Chain Center 启橙冷链中心	新夏晖 Xiahui SF EXPRESS 顺丰速运 Cold Chain 冷运 京东冷链 JD Cold Chain	VX 万纬冷链物流 宇培供应链 YPSCM SINOTRANS 中外运冷链物流有限公司 SINOTRANS COLD CHAIN LOGISTICS CO., LTD. GFS

Source: CBRE, November 2021

Cold Storage Investment Processes

- Compared to dry warehouses, the investment, construction and operation of cold storage is more complicated and requires greater capital expenditure.

Figure 10: Cold Storage Investment Process

Investment

Location and amenities
- Located closer to downtown areas compared to dry storage for fast delivery
- Far from polluted locations
- Guaranteed 24-hour power supply

Project Design
- Dustproof and insulated
- Separation of warehouse space into storage, processing, and sorting

Construction

Construction Cost
- Construction cost: 1.2 times of that of dry warehouses
- Refrigeration sost: same as cold storage construction cost
- Total cost: 2-2.5 times of dry warehouses

Construction Period
- 1-1.5 years, three to six months longer than dry warehouses

Operation

Services:
- Cold storage leases
- On-site operation service: Load-in, load-out, distribution, processing and repackaging

Income Structure:
- Unit: by space (m2), weight (tonnes), storage unit (pallet)
- Rental income: 2.5-3 times that of dry warehouses
- Operating income: according to operating content, quantity and cycle. Charged by pallet, box and piece.

Operation Cost:
- Equipment and maintenance fees, property management fees and labour cost

Types of Cold Storage Suitable For Investment

Port Warehouse

★★★★

Classification	Function
Origin	Storage
Location	**GFA (000' m²)**
Port City	20-50

Manufactory

Place of origin

★★

Classification	Function
Origin	Storage
Location	**GFA (000' m²)**
Agricultural city	≤ 3

Sorting Hubs

★★★

Classification
Distribution
Function
Storage, regional distribution, and processing
Location
Transportation hub cities
GFA (000' m²)
20-50

Market Trading Warehouse

★★

Classification
Market trading
Function
Storage, exhibition and trade
Location
Suburbs of tier I cities and downtown areas of agricultural oriented tier II cities
GFA (000' m²)
50-100

Warehouse compatibility analysis

★	low, mostly self-built
★★	Low-medium, suitable for seasonal products with limited use
★★★	Medium, located at transportation hubs with multiple functions
★★★★	Medium-high, strong storage capabilities including meat, fruits, milk, etc.
★★★★★	High, located in tier I and major tier II cities for delivery

Distribution Centre

★★★★★

Classification	Function
Delivery	Storage, packaging, labelling, order combination, etc.
Location	
Developed retail sales cities	
GFA (000' m²)	
10-30	

Last-mile Delivery

★

Classification	Function
Delivery	Short-term storage and delivery, etc.
Location	**GFA (000' m²)**
Key communities in core cities	≤ 0.5

Source: CBRE, November 2021

Cold Storage Investment Principles

- CBRE has identified three core principles of cold storage investment: follow the development of a city; cater to the consumer; and choose locations near transportation hubs and major consumption markets.

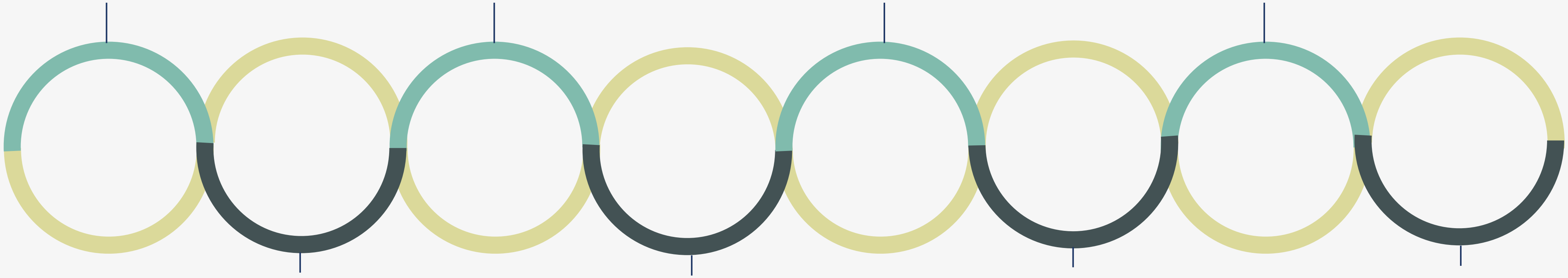
Figure 11: Eight Factors to Consider in Cold Storage Investment

City Features
- Strong consumption
- Transportation hubs

Property Scale
- Match with feature and consuming power of the region

Functions
- Cold/frozen storage
- Equipped with sorting and processing functions
- Compatible and flexible

Operations and Management
- Property management
- Standard Operating Procedure (SOP)
- Professional operations team



Site selection
- Proximity to end users
- Proximity to transportation facilities

Construction Quality
- Sustainable, environmentally friendly and safe

Equipment
- Sackers, racks, pallets, forklifts, etc.
- Warehouse automation and equipment
- Backup power

Information Systems
- Order Management System (OMS), Warehouse Management System (WMS), Transport Management System (TMS), Billing Management System (BMS)

Source: CBRE, November 2021

Cold Storage Investment

- In 2020, CBRE assisted a foreign-funded enterprise in its acquisition of a cold storage facility in Guangdong Dongguan, its first logistics property in China.

➢ City Profile
Dongguan is the logistics centre of Greater Bay Area and hosts rapidly developing e-commerce, supermarket, fresh food delivery and 3PL industries.

➢ Locational Advantage
The project has access to good transportation networks and can facilitate deliveries to Guangzhou, Dongguan and Shenzhen within half an hour.

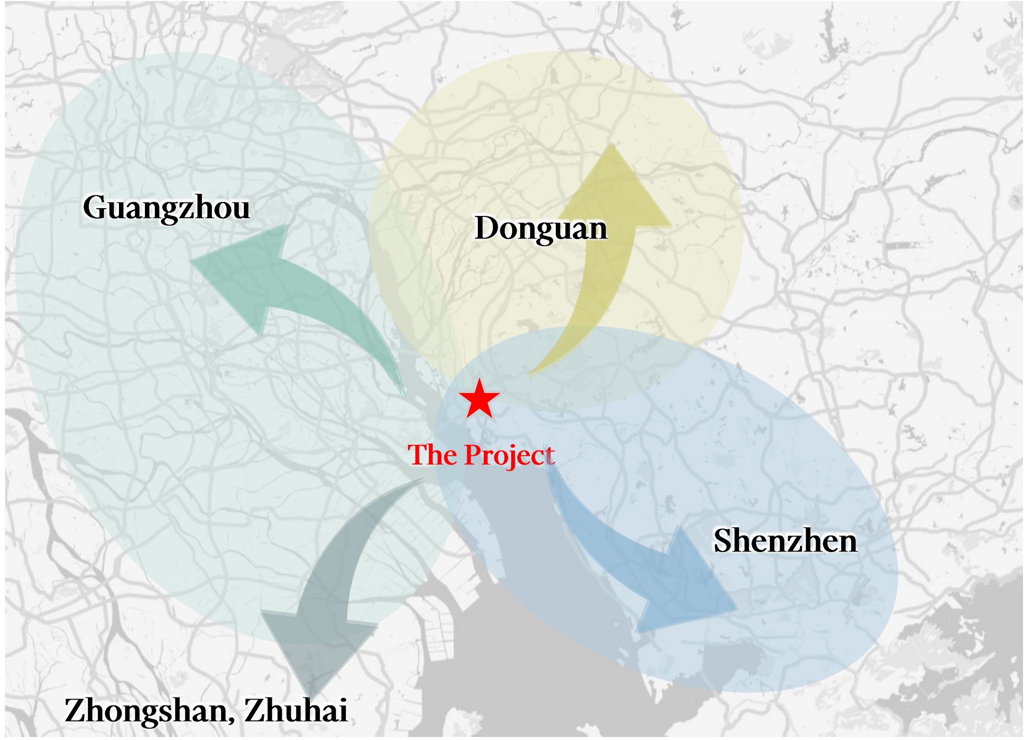
➢ Project Scale
The Phase 1 warehouse has a GFA of near 34,000 sq. m. and serves 200 supermarkets in South China.

➢ Quality
The property is designed in accordance with international standards and possesses BRC Global Warehouse and Delivery Standard certification.

➢ Multiple Functions
The facility is designed to be a regional fresh food distribution centre. It has three temperature zones and multiple functions including docking, storage, distribution and delivery.

➢ Equipment and Systems
The project is equipped with automated forklifts, an Order Management System (OMS) and a Warehouse Management System (WMS).

- CBRE provided consultancy services for the acquisition of the Dongguan project. This included analysis of the Greater Bay Area logistics market; warehouse and development and operations; and cold storage market trends.
- The project is a high standard cold storage facility in accordance with occupier requirements, provides stable income and holds significant potential for capital value appreciation.



Source: CBRE, November 2021

Cold Storage Leasing

Merck Beijing Shunyi Airport Operation Centre

Project Information

➢ **City Profile:** Beijing, the capital of China and the centre of North China	➢ **Site selection:** Proximity to airport, ensuring instant delivery and transfer
➢ **Project Size:** 6,800 m^2	➢ **Quality:** Constructed by a well-known warehouse developer
➢ **Functions:** Caters to pharmaceutical occupiers	➢ **Equipment and Systems:** Operated by occupiers and installed with warehouse automation equipment

- CBRE and the property owner provided a consolidated solution to satisfy the client's needs. In addition to pharmaceutical cold storage, the project features the provision of customised solutions including property redevelopment, warehouse automation design, financial services and logistics equipment.
- The project is scheduled to come on stream by end 2021.

Parexel International Suzhou Clinical Research Supply Chain Operation Centre

- The project is located in an industrial park in Suzhou High Technology Zone. CBRE assisted the client in site selection and with negotiating leasing contracts.
- The project was completed in November 2021 and is due to come on stream in mid-2022.

Project Information

➢ **City Profile:** Suzhou, a key hub in the global supply chain network serving China and Asia	➢ **Locational Advantage:** The project's location in a high technology zone can satisfy the tenant's clinical research supply and operation needs
➢ **Project Size:** 2,369.5 m^2	➢ **Quality:** Constructed by a leading global warehouse developer
➢ **Functions:** Multiple temperature zone (cold storage 2-8°C, and frozen storage -20°C) with repackaging and labelling functions.	➢ **Equipment and System:** Operated by the tenant and installed with equipment for clinical research, drug packaging, sorting and distribution.

Source: CBRE, November 2021

Conclusions and Recommendations

- With more stringent food safety requirements and consumption upgrading set to ensure cold storage plays a more important role in modern infrastructure, the sector is poised to attract a substantial volume of capital in the coming years. Investors looking to optimise their cold storage investment strategies in China are advised to consider the following suggestions:

City Selection

- Consumption markets, transportation hubs and port cities should be the focus for investment
- Shanghai, Beijing, Guangzhou, Shenzhen, Hangzhou, Wuhan, Chengdu are the preferred locations

Client Demand

- Investment should closely follow demand from cold storage occupiers such as food importers, online groceries and chain restaurants

Cold Storage Type

- With the compatibility and flexibility of cold storage critical for future leasing, operations and transactions, cold storage offering higher compatibility such as sorting hubs and delivery centers should be targeted.

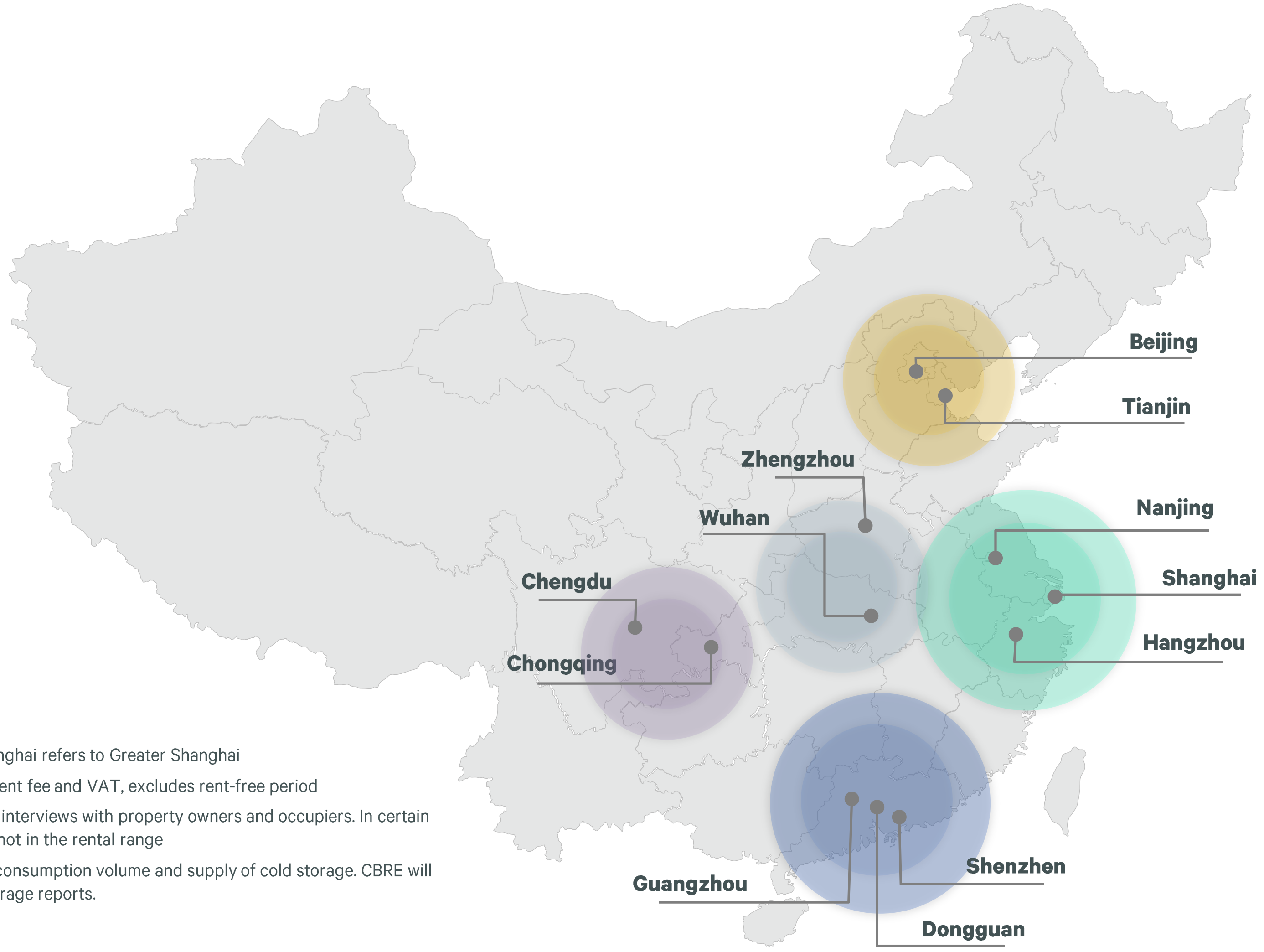
Cold Storage Function

- Cold storage projects can range from single storage warehouses to integrated industrial parks with multiple functions such as transferring, processing and storage.
- Space should be reserved for future redevelopment or customised solutions for investors to raise retention rates.

ESG

- Due to cold storage facilities' large power consumption, landlords should ensure refrigerator systems and energy consumption adhere to strict power management guidelines
- Owners are advised to evaluate the installation of solar power to ensure lower energy consumption.

Appendix: 12 Core Cities for Cold Storage Investment in China



Rent of 12 Key Cities

City	Rent[2] (RMB/Pallet/Day)
Beijing[1]	3.5-5.2
Tianjin	2.8-3.5
Zhengzhou	2.2-3.6
Wuhan	2.5-4.0
Chengdu	2.8-4.2
Chongqing	2.8-4.2
Nanjing	2.8-4.0
Shanghai[1]	3.0-5.0
Hangzhou	3.0-4.5
Guangzhou	3.5-5.0
Shenzhen	4.0-6.5
Dongguan	3.3-4.2

Note:

(1) Beijing refers to Greater Beijing, Shanghai refers to Greater Shanghai

(2) Rent includes electric fee, management fee and VAT, excludes rent-free period

(3) Rents are collated by CBRE through interviews with property owners and occupiers. In certain cases, some projects may exist that are not in the rental range

(4) The 12 cities are selected based on consumption volume and supply of cold storage. CBRE will include more cities in upcoming cold storage reports.

Source: CBRE, November 2021

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