



China's Hazardous Waste Sector

Market, Regulations & Opportunities for European SMEs

2024 REPORT



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China's Hazardous Waste Sector Market, Regulations, and Opportunities for European SMEs

EXECUTIVE SUMMARY

Driven by rapid economic growth and industrialization, **China has become the world's largest producer of several types of hazardous waste**, particularly industrial waste. To manage this, China has developed a comprehensive regulatory system that covers the entire lifecycle of hazardous waste. Currently, the country is navigating a transitional phase, balancing its development needs with sustainability goals, including its targets for carbon peaking and carbon neutrality. This has created a strong demand for technologies that minimise environmental harm, reduce waste and emissions, and enhance recycling rates and efficiency, presenting significant opportunities for EU SMEs.

This report aims to provide EU SMEs with a practical guide on China's hazardous waste market. Specifically:

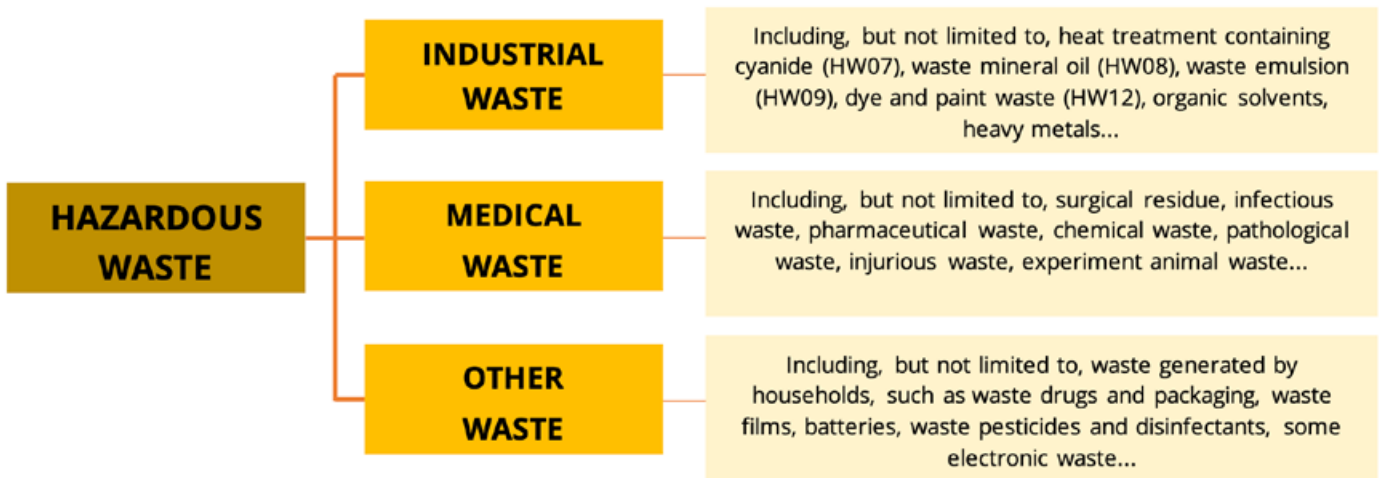
- The first chapter offers an **overview of China's hazardous waste market over four decades of development**, highlighting key legislative and regulatory milestones, such as the *Solid Waste Law*. It also discusses the two main drivers of the sector: government support and technological innovation, alongside an analysis of the market's structure, size, and geographical distribution.
- The second chapter provides detailed **market entry requirements for EU SMEs**. Although China's hazardous waste sector does not impose major restrictions on foreign investment and is considered an 'encouraged' industry, it is crucial for EU companies to thoroughly understand and comply with key regulations. This includes the *National Hazardous Waste Catalogue* and the *National Medical Waste Classification Catalogue*, as well as adhering to China's national standards.
- The third chapter outlines the key opportunities in China's hazardous waste market, focusing on specific technologies that are in high demand. It also offers **practical tips and strategies for EU SMEs** planning market entry. However, taking advantage of these opportunities requires thorough

preparation, significant resources, and long-term commitment, as several challenges remain.

- The final section includes an **interview with an industry practitioner based in China**, offering insights into the strengths of EU SMEs and providing practical advice for market entry.

China's hazardous waste market offers significant opportunities for EU SMEs, driven by increasing government focus and market demand for sustainable solutions and advanced technologies. However, seizing these opportunities requires a deep understanding of China's regulatory framework, strategic planning and execution, considerable financial resources, and long-term commitment. With these elements in place, EU SMEs can effectively position themselves for success in China's evolving hazardous waste market.

1. SECTOR OVERVIEW



In general, hazardous waste encompasses industrial hazardous waste, medical waste, and other types such as pesticides, oil, and sewage. Key sources of hazardous waste include industries such as chemicals, refining, metals, mining, machinery, pharmaceuticals, as well as household waste.

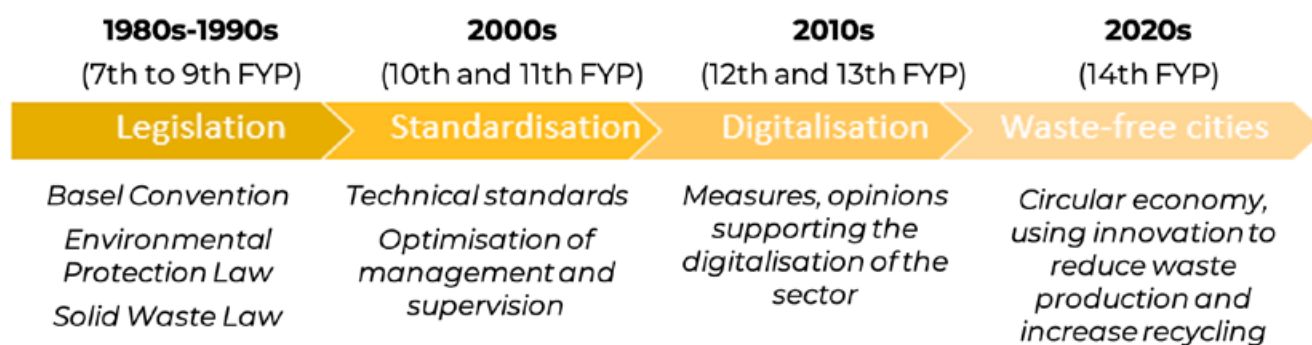
The primary government authority overseeing hazardous waste management is the **Ministry of Ecology and Environment (MEE)**. The MEE is responsible for formulating and supervising policies, plans, and standards related to environmental protection, pollution prevention, and waste management. Practical implementation of these policies is largely delegated to local authorities, particularly at the county level and above. The **National Health Commission (NHC)** oversees medical waste, including the formulation, implementation, and management of policies, plans, and standards for the collection, transportation, and disposal of medical waste. The **National Development and Reform Commission (NDRC)** also plays a significant role by developing industrial policies and plans related to the comprehensive development, utilisation, recycling, and disposal of resources. Additionally, the NDRC ensures coordination among various government bodies to align policies and strategies effectively.

1.1 DEVELOPMENT BACKGROUND

The development of the hazardous waste treatment industry in China began in the 1980s and has since undergone significant evolution over the past 40 years. This progress can be divided into several distinct phases:

- Late 1980s to 1990s: The rising costs of hazardous waste disposal in developed countries led to the illegal trafficking of waste to China and Eastern Europe, heightening China’s environmental awareness. This period was marked by the Basel Convention (1989) and the introduction of China’s two primary laws in the sector.
- Early 2000s: During this decade, China solidified its legal framework with the issuance of numerous laws, regulations, and technical standards designed to regulate and standardise the industry. A significant development was the creation of the National Hazardous Waste and Medical Waste Disposal Facility Construction Plan, which was formulated in response to the SARS outbreak in 2003.
- 2010s: The introduction of digitalisation technologies through the 12th and 13th Five-Year Plans significantly enhanced the efficiency and effectiveness of hazardous waste management systems.
- 2021-2025 (14th Five-Year Plan): China is currently promoting “**Waste-free cities**” (无废城市), an innovation-driven urban management model inspired by the circular economy concept. This initiative aims to reduce waste at the source and increase recycling and re-utilisation rates.

Today, China has developed a comprehensive regulatory system for hazardous waste management that encompasses the entire lifecycle of waste—from identification and transfer to disposal, requalification, and supervision. At the highest legislative level, the primary laws governing this sector are the **Environmental Protection**



Law (1989, last revised in 2014),¹ and the **Law on the Prevention and Control of Solid Waste Pollution** (1995, last revised in 2020, hereinafter referred to as the *Solid Waste Law*).²

While the *Environmental Protection Law* has a broad scope focused on preventing pollution, protecting public health, improving environmental quality, and promoting sustainable socio-economic development, the *Solid Waste Law* provides a specific legal framework for the management of solid waste. This law includes **provisions for the identification, transfer, disposal, recycling, and supervision of various types of solid waste** – including hazardous waste (chapter 6). Specifically, it mandates that (i) provincial-level governments develop plans for the construction and management of centralised hazardous waste disposal facilities, and (ii) businesses generating hazardous waste obtain a specific license, create management plans, maintain detailed ledgers, and regularly report relevant information to local authorities. The *National Hazardous Waste Catalogue*, (outlined in Chapter 2.1 of this report), serves as a cornerstone of the *Solid Waste Law*.

Transition towards Waste-free cities

China's current approach to hazardous waste management is focused on promoting a new green urban development model designed to minimise solid waste generation, reduce landfill usage, and enhance recycling efforts. This model, termed **Waste-free cities** (无废城市), was officially launched in December 2018 by the State Council with the release of the *Work Plan on the Waste-Free City Pilot Programme*.³ At that time, China was producing approximately 10 billion tons of new

solid waste annually, with a backlog of 60 to 70 billion tons. This accumulation led to severe environmental impacts, including some cities being encircled by dump sites and landfills—a phenomenon known as “**garbage siege**” (垃圾围城).⁴

The Work Plan selected several cities across China to implement targeted actions aimed at identifying and addressing bottlenecks in the waste management process, including production, collection, transfer, disposal, and recycling. Key measures include improving waste sorting, enhancing urban planning, and constructing new facilities. **Investment in science, technology, and innovation plays a crucial role—along with research, development, and manufacturing of advanced technologies and equipment for waste reduction and high-quality utilisation.** To date, 113 cities, areas, and districts have been designated as “Waste-Free Cities”, with Zhejiang, Jiangsu, Shandong, and Guangdong provinces having the highest numbers due to their substantial waste generation.

Hazardous waste management is a central component of the Work Plan. It introduces mandatory clean production audits for hazardous waste in industries such as non-ferrous metal smelting, oil extraction, petroleum processing, chemicals, coking, and electroplating. A pilot system has been established for the collection and processing of waste lead-acid batteries, and local governments are tasked with constructing centralised medical waste disposal facilities for all levels and types of medical institutions.

1 https://www.mee.gov.cn/ywgz/fgbz/fl/201404/t20140425_271040.shtml (accessed: 26 Aug 2024).

2 https://www.gov.cn/xinwen/2020-04/30/content_5507561.htm (accessed: 26 Aug 2024).

3 https://www.gov.cn/zhengce/content/2019-01/21/content_5359620.htm. An English version was published by MEE: <https://www.mee.gov.cn/home/ztbd/2020/wfcsjssdgz/dcsj/wfcszcwj/201906/P020190606505202335490.pdf> (both accessed: 26 Aug 2024).

4 https://www.gov.cn/zhengce/2019-01/24/content_5360919.htm (accessed: 26 Aug 2024).

In the years following the Work Plan's launch, several national, provincial, municipal, and district-level plans, measures, and opinions have been issued. Among these:

The *14th Five-Year Plan for Circular Economy Development* promotes the **coordinated disposal of medical, industrial, and domestic waste through methods such as using cement and smelting kilns** ([link](#)). Interregional disposal facilities are encouraged, particularly within the Beijing-Tianjin-Hebei region, the Yangtze River Delta region, and the Greater Bay Area.

Another significant document addressing hazardous waste is the *Reform Implementation Plan for Hazardous Waste Management Supervision and Utilisation Capacity* ([link](#)), which sets goals for a coordinated system of safety and environmental supervision, combating illegal transportation and disposal, and achieving a detoxification rate of over 99% for medical waste in cities. The ultimate goal is to establish a **comprehensive management and supervision system that controls the entire hazardous waste chain**, from generation to final disposal and recycling.

In addition to the strong government priority and support, **technological innovation also plays a crucial role in driving the progress in China's hazardous waste sector.**

1.2 THE INTERSECTION OF GOVERNMENT SUPPORT WITH TECHNOLOGICAL INNOVATION

Technological innovation in China's hazardous waste sector has improved hazardous waste treatment efficiency, and enabled safer disposal methods, driven by advancements in recycling, incineration, and environmental monitoring technologies. **Following these developments is essential for identifying business opportunities;** China's stringent environmental regulations and growing waste management needs create demand for innovative solutions and partnerships in this critical industry. At the same time, a large part of technological innovation is guided and driven by government initiatives.

In May 2023, MEE and the National Development and Reform Commission (NDRC) issued a key document, i.e. the *Overall Implementation Plan for Major Hazardous*

Waste Project Construction (2023-2025).⁵ The goal of the plan is to **significantly improve** (i) **basic research capabilities** for the prevention and control of the environmental risks of hazardous waste; (ii) the **R&D capabilities** for the utilisation and disposal technologies for hazardous waste; and (iii) **technical support capabilities** for management and decision-making, providing a basis for the use and disposal of hazardous wastes, especially special categories of hazardous wastes. This will be achieved through demonstration projects, and the construction or enhancement of a number of technological platforms, specifically:

- **One National Technology Centre:** Located in Beijing, this centre is designed to strengthen hazardous waste management by creating a comprehensive technical support platform. It will focus on the entire lifecycle of hazardous waste—from generation to storage, transfer, recycling, and disposal—emphasising technological innovation, smart supervision, and policy research. The centre will also support national and regional strategies, including the coordinated development of the Beijing-Tianjin-Hebei region, modernising hazardous waste governance, and addressing new pollutants and emerging solid wastes.
- **Six Regional Technology Centres:** These centres will be established in China's Northeast, East, Central, South, Southwest, and Northwest regions, each tailored to meet the specific hazardous waste management needs of its area. They will focus on technological innovation and policy research to assist local governments and businesses. By addressing regional challenges and key industries, these centres aim to bolster ecological risk prevention, support regional development strategies such as the Yangtze River Economic Belt and the Greater Bay Area, and contribute to the coordinated development of various regions in China.
- **Twenty Regional Disposal Centres:** These centres will tackle the challenges associated with hazardous wastes that are difficult to manage due to high environmental risks, underdeveloped treatment technologies, and high disposal costs. Seven of these centres will be "comprehensive regional centres," while thirteen will be "specialised regional centres." They will enhance infrastructure for the disposal and utilisation of special hazardous wastes, demonstrate advanced disposal methods, and support the development of globally competitive enterprises.

⁵ https://www.mee.gov.cn/xxgk/xxgk03/202305/t20230509_1029446.html (accessed: 26 Aug 2024).

Overall, the implementation of these initiatives is expected to significantly improve hazardous waste management in China, promoting technological advancement and supporting sustainable development in the sector. The following case study on recycling technologies of waste electric vehicle batteries provides a practical example of how the role and actions of China's government intersect—and drive—technological innovation.

Case study: Government's role in promoting innovation in electric battery recycling

In August 2024, China's Ministry of Industry and Information Technology (MIIT) released a draft for public comments of the new, 2024 version of the *Specifications for the Comprehensive Utilisation of Waste EV Batteries* ([link](#) in Chinese).

The document calls for relevant companies and organisations to expand R&D and application of recycling technologies, equipment and processes for positive and negative materials, separators and electrolytes of waste EV batteries, to improve the recycling rate and specifically of the metals used. Specific recycling rates are outlined for different metals and process (in some cases even exceeding those of the new EU Batteries Regulation), for instance:

- No less than 98% for copper and aluminium
- No less than 98% for electrode powder after crushing and separation
- The impurity content for aluminium and copper should be less than 1%
- No less than 98% for lithium in the smelting process
- No less than 98% for nickel, cobalt and manganese
- No less than 97% for other major valuable metals
- No less than 99.5% for fluorine
- Less than 2,200kg standard coal/ton for comprehensive energy consumption of lithium carbonate production

To achieve these targets, relevant recycling companies and organisations should spend at least 3% of their annual revenue on R&D and technological upgrading or improvement. A certification demonstrating compliance can be obtained; although it is on a voluntary basis, it is expected that such certification will represent a preferential criterion for participating in public procurement and other initiatives.

In summary, China's focus on technological innovation, guided by robust government initiatives, is transforming hazardous waste management. **This intersection of government and innovation indicates promising opportunities for businesses to engage in the development of products and solutions with strong market potential.**

1.3 MARKET STRUCTURE AND SIZE

As China advances through its industrialisation process, hazardous waste generation continues to rise steadily. According to data from China's MEE and the China Statistical Yearbook, the amount of hazardous waste generated in 2022 reached 95.15 million tons, marking a 10% increase from the previous year. Despite this growth, the country's capacity for hazardous waste utilisation and disposal has also improved, achieving nearly 100% of the generated amount (94.44 million tons in 2022).

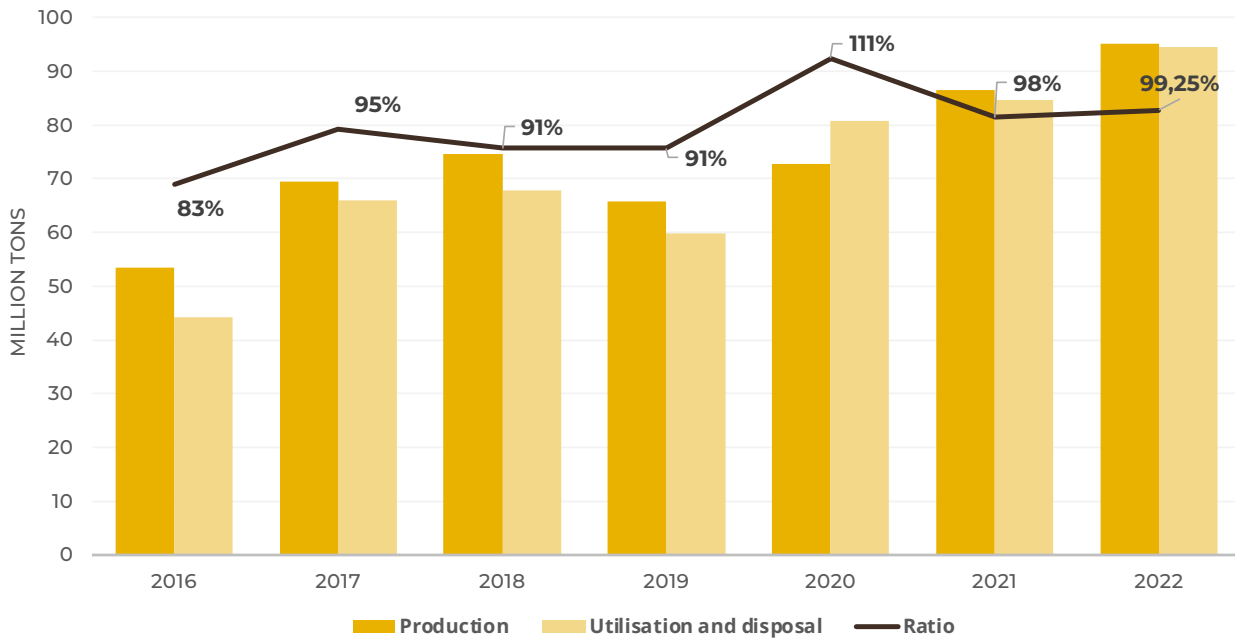
Hazardous waste generation is predominantly concentrated in East China, which accounts for 33% of the total due to its high level of industrialisation and urbanisation. Within this region, Shandong Province leads, followed by Jiangsu and Zhejiang Provinces. **South China** and **North China** each contribute 18% to the total, with Inner Mongolia, Guangdong, and Hebei Provinces being the primary contributors. These proportions are similarly reflected in hazardous waste utilisation and disposal rates.

The uneven distribution of hazardous waste production across China highlights significant growth opportunities for the hazardous waste treatment industry, especially in regions that lack adequate treatment facilities.

According to a report by Qianzhan Industrial Research Institute,⁶ the total value of China's hazardous waste market was estimated at 358.8 billion CNY (approximately 45.7 billion EUR) in 2022, based on an **average treatment price of 4,000 CNY per ton** (around 510 EUR per ton). The market is projected to exceed 640 billion CNY (about 81.6 billion EUR) by 2028, driven by increasing demand, governmental support for initiatives like Waste-Free Cities, and ongoing technological advancements.

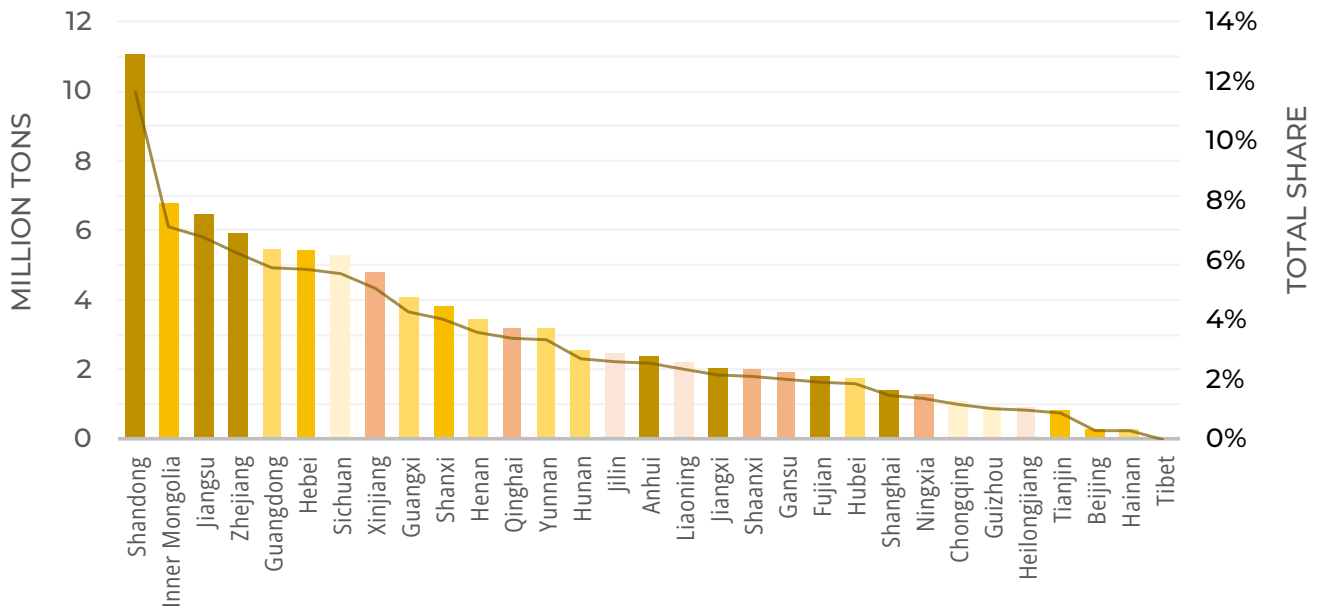
⁶ See: <https://x.qianzhan.com/xcharts/detail/11ee29e115246ae8.html> (accessed: 30 Aug 2024).

Production vs. utilisation and disposal of hazardous waste (2016–2022)



Source: MEE, China's Statistical Yearbooks (sections 8–15). EU SME Centre graphic

Hazardous waste production, by region (2022)



Source: MEE, China's Statistical Yearbooks (sections 8–15). EU SME Centre graphic

Hazardous waste centralised disposal plants

Unlike the European Union, where waste management is largely decentralised and adheres to a stringent cradle-to-grave approach emphasising waste reduction and recycling at the source, China has focused on establishing **hazardous waste centralised disposal plants** to manage the substantial volumes of waste generated by rapid industrialisation. These plants collect hazardous waste from industrial enterprises, institutions, medical facilities, or households for incineration, landfill, other disposal methods, or recycling. They do not include hazardous waste treatment facilities operated by individual enterprises or institutions. Some centralised disposal plants are dedicated exclusively to medical waste, while others offer “collaborative disposal” services, where facilities not only manage their own waste but also accept hazardous waste from external sources for treatment.

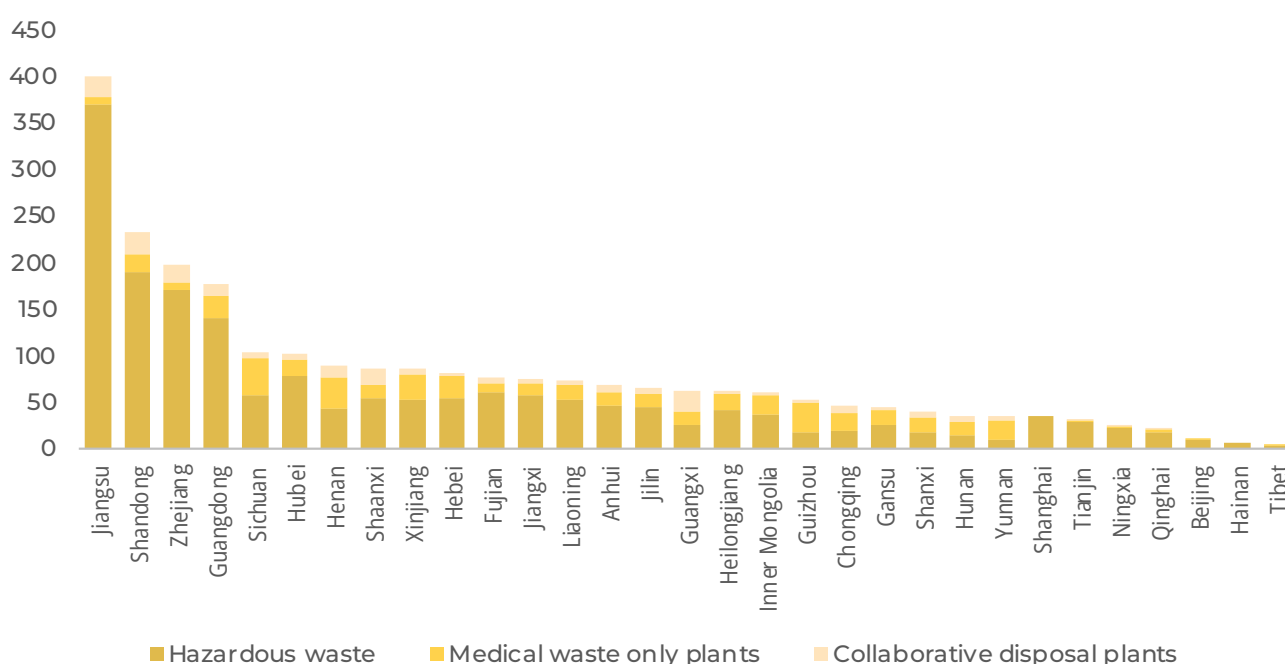
As of the end of 2022, China had a total of 1,803 centralised disposal plants, and other 441 centralised disposal plants specifically for medical waste. The annual operating costs for these plants amounted to 47.05 billion CNY (approximately 5.98 billion EUR).⁷ East China leads in the number of centralised disposal plants, with Jiangsu Province having nearly twice as

many plants as Shandong, despite generating nearly half the amount of hazardous waste. **In Southwest China, Sichuan Province hosts the highest number of medical waste disposal plants**, followed by Guizhou and Henan Provinces.

Emission	Volume
Chemical oxygen demand emissions in wastewater (incl. leachate)	685.8 tons
Ammonia nitrogen emissions	30.8 tons
Sulfur dioxide emissions from incineration waste gas	1,133.6 tons
Nitrogen oxides emissions	8,042.1 tons
Particulate matter emissions	602.4 tons

Centralised disposal plants handle around two-fifths of China's total annual hazardous waste. In 2022, these plants **disposed of 18.7 million tons of hazardous waste** (20% of the total generated), primarily industrial

Hazardous waste centralised disposal plants, by region (2022)



Source: MEE. EU SME Centre graphic

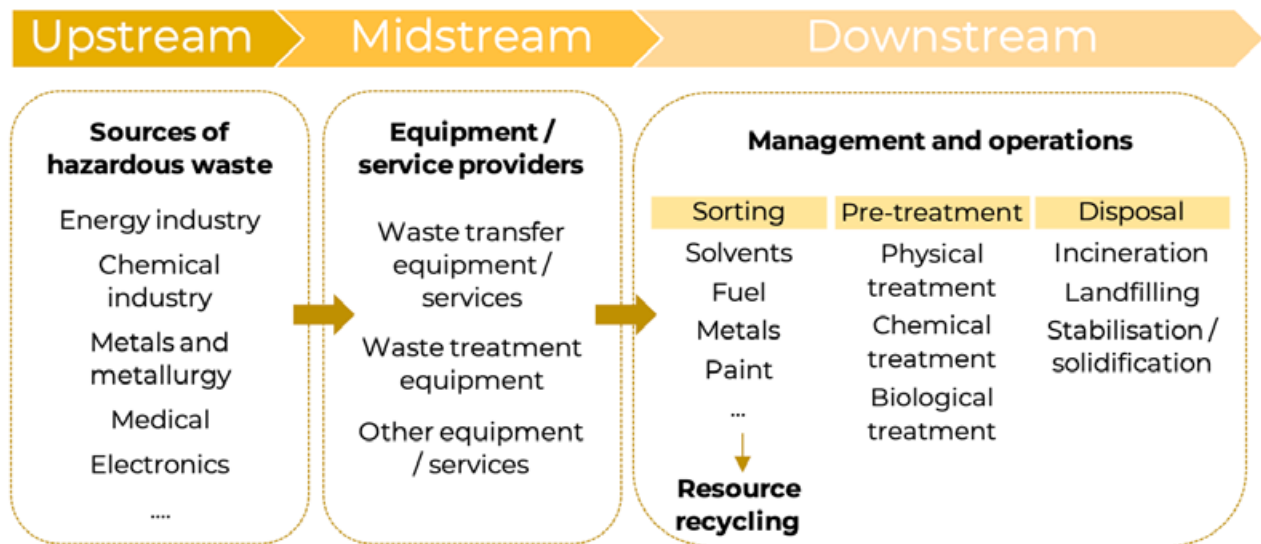
⁷ <https://www.mee.gov.cn/hjzl/sthjzk/sthjtnb/202312/W020231229339540004481.pdf> (accessed: 2 Sep 2024).

waste.⁸ Of this amount, 5.17 million tons (28%) were landfilled, and 7.69 million tons (41%) were incinerated. The emissions from this disposal are indicated in the table on the right.

Typically, centralised disposal plants are operated through a Public-Private Partnership (PPP) model. However, the Chinese government aims to increase the involvement of private actors. In November 2023, the National Development and Reform Commission (NDRC) and the Ministry of Finance (MOF) issued the *Guiding Opinions on Standardising and Implementing New Mechanisms for Cooperation between Government*

*and Social Capital.*⁹ This directive **mandates that newly established or expanded projects for solid waste treatment, incineration, and waste-to-energy must be wholly owned or at least controlled by private enterprises.** This requirement does not extend to agricultural waste reutilisation projects, but for sewage treatment, private enterprises must hold at least 35% equity. This regulatory shift **may present opportunities for European companies** in the hazardous waste sector, given their advanced safety and management practices (more details on opportunities and advices are provided in [chapter 4 of this report](#)).

1.4 KEY PLAYERS



The hazardous waste treatment industry in China is structured into three main segments: upstream, midstream, and downstream.

Upstream: This segment comprises the primary sources of hazardous waste—industries and entities that generate hazardous waste during their manufacturing processes. Key sectors include energy, chemicals, medical, and electronics. **Most upstream actors are state-owned enterprises.** According to official data from MEE,¹⁰ five industries account for nearly three-fourths of the total hazardous waste generated: Manufacturing of chemical raw materials and products; Non-ferrous metal smelting and rolling processing; Oil, coal, and fuel processing; Ferrous metal smelting and rolling processing; Electricity and heat production and supply.

Midstream: This segment comprises actors that provide the equipment and services necessary for the transfer and treatment of hazardous waste, laying the foundation for the industry. Notable companies in this segment include:

- Transfer Equipment (Vehicles): Dongfeng Motor (东风), FAW Jiefang (解放), Futian Automobile (福田), China National Heavy Duty Truck (重汽), Qingling Motors (庆铃), Jiangling Motors (江铃).
- Treatment Equipment: Shijing Technology (仕净科技), Xuelang Environment (雪浪环境), Xinhua Medical (新华医疗), Niutech Environment (恒誉环保).

⁸ <https://www.mee.gov.cn/hjzl/sthjzk/sthjtjnb/202312/W020231229339540004481.pdf> (accessed: 2 Sep 2024).

⁹ https://www.gov.cn/zhengce/content/202311/content_6914161.htm (accessed: 2 Sep 2024).

¹⁰ <https://www.mee.gov.cn/hjzl/sthjzk/sthjtjnb/202312/W020231229339540004481.pdf> (see figure 4-8) (accessed: 29 Aug 2024)

Downstream: This segment comprises actors that are involved in the management and operation of hazardous waste treatment. They focus on recycling, pre-treatment, and harmless disposal. Representative companies include:

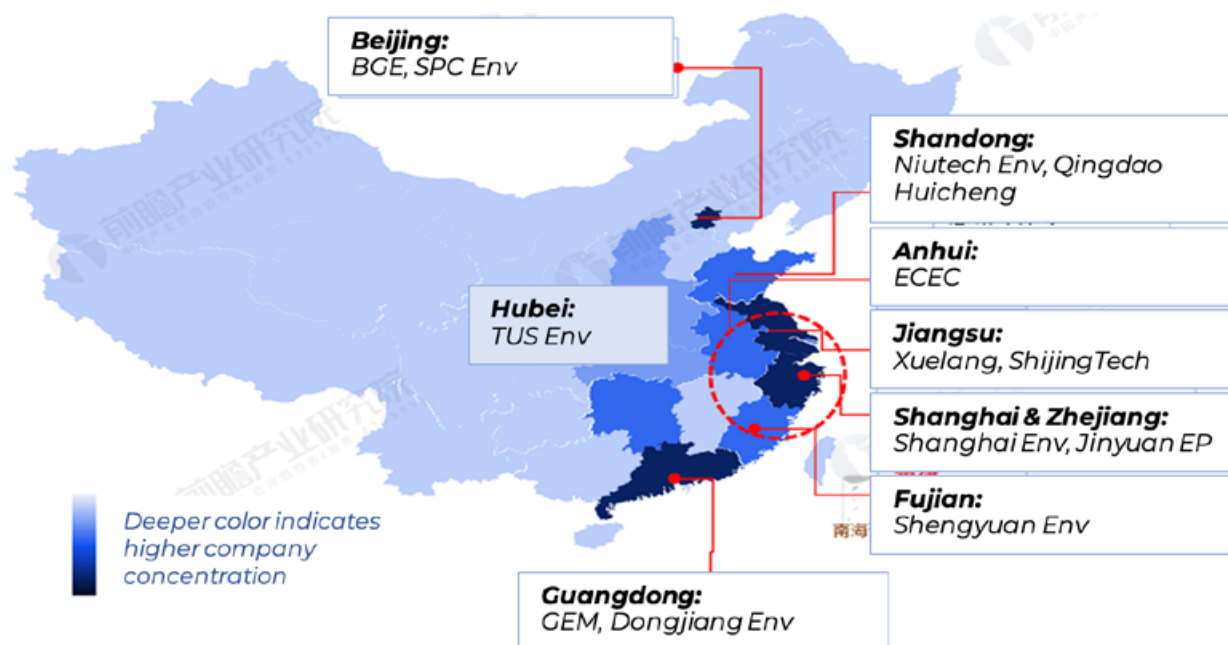
- Industrial Waste Treatment: Dongjiang Environmental (东江环保), Everbright Environment (光大环境), Orient Landscape (东方园林), TUS Env (启迪环境).
- Medical Waste Treatment: Jinyuan Environmental Protection (金圆股份), East China Engineering Company (ECEC, 东华科技), Shengyuan Environmental (圣元环保), Yongker Environmental Protection (永清环保).
- Other Waste Treatment: GEM (格林美), BGE (高能环境), SPIC Yuanda Environmental (远达环保), Shenzhen Energy Env Engineering (深圳能源环保).

As of the end of 2022, it is estimated that over 6,000 enterprises had been granted hazardous waste business licenses. **Geographically, the distribution of**

these enterprises is sparse. However, the majority of midstream and downstream actors are concentrated in coastal regions, particularly in Jiangsu, Zhejiang, and Guangdong provinces. Beijing and Shanghai also host several leading companies. Despite this, the overall hazardous waste treatment capacity remains relatively low, with most companies handling fewer than 50 tons per day. **The market is highly fragmented, with low concentration; the leading company holds only a 2.2% market share.**¹¹ Many players have entered the market through mergers and acquisitions or by expanding from other waste treatment sectors.

Among **foreign companies** active in China's hazardous waste sector, **Veolia** and **Suez** are particularly prominent. Veolia has established 14 hazardous waste facilities across the country, while Suez, with a presence in China for the past 50 years, operates 12 hazardous waste treatment facilities nationwide.

Geographical distribution of hazardous waste companies



Picture from Qianzhan Industrial Research Institute's report "Analysis Report on Market Foresight and Investment Strategic Planning of China's Hazardous Waste Treatment Industry from 2023 to 2028".
Adaption in English by EU SME Centre

¹¹ According to a report of China's Qianzhan Industrial Research Institute, in 2022, the top 3 hazardous waste companies by revenue are Shenzhen-based GEM (7.89 billion CNY), Beijing-based BGE (5.56 billion CNY), and Zhejiang-based Jinyuan EP (4.28 billion CNY). Considering the total size of China's hazardous waste market in that year of 358.8 billion CNY, the respective market shares are 2.2%, 1.5% and 1.2%. See: <https://x.qianzhan.com/xcharts/detail/11ee29e115246ae8.html> (accessed: 30 Aug 2024).

2. REGULATORY FRAMEWORK

China regulates foreign market entry through a series of special administrative measures, including negative lists (which outline restricted or prohibited foreign investments) and positive lists (which encourage foreign investments). **The hazardous waste sector, in particular, does not present major market entry restrictions; in fact, it is an 'encouraged' industry for foreign investment**, as detailed in the *Catalogue of Encouraged Industries for Foreign Investment*.¹² Specifically:

- Manufacturing of solid waste treatment and disposal equipment: This includes equipment for sewage treatment plant sludge disposal and resource utilisation, landfill leachate treatment, construction waste treatment and resource utilisation, hazardous waste treatment, landfill biogas generation and power generation, waste steel treatment, and centralised medical waste disposal facilities (*item 241 of the Catalogue*).
- Professional construction, operation, and technical consulting services for hazardous waste utilisation and disposal facilities (*item 477 of the Catalogue*).

Additionally, the Catalogue covers manufacturing equipment for recycling plastics, electrical appliances, mechanical products, rubber, batteries, textiles, waste heat, and residual gas.

Being classified as an 'encouraged' sector for foreign investment typically means that local administrations may offer various incentives to attract foreign investors, such as tax benefits (e.g., reduced corporate income tax for a specified number of years), favourable terms for land use or office rentals, expedited processes for obtaining operational permits, comprehensive administrative support, and official recognition.¹³ If a company does not invest directly in China but only sells equipment to Chinese partners, it may still qualify for certain subsidies, potentially

allowing the equipment to be purchased at a discounted rate. However, the equipment must be classified as "advanced" or "high-tech" and not be available from domestic manufacturers.

2.1 THE NATIONAL HAZARDOUS WASTE CATALOGUE

As outlined in the *Solid Waste Law*, the cornerstone of China's hazardous waste regulatory system is the **National Hazardous Waste Catalogue** (国家危险废物名录). This document identifies and classifies solid waste that possesses hazardous characteristics, such as toxicity, corrosiveness, flammability, reactivity, or infectivity. The Catalogue is issued and managed by the Ministry of Ecology and Environment (MEE). Since its introduction in 1998, the Catalogue has been revised twice, most recently in 2021,¹⁴ and is currently undergoing another revision.¹⁵

According to the Catalogue, hazardous waste is defined as solid waste (including liquid waste) that meets at least one of the following criteria: (i) it has one or more hazardous characteristics such as toxicity, corrosiveness, flammability, reactivity, or infectivity; or (ii) even if it does not exhibit these characteristics, it cannot be conclusively determined as non-hazardous and may still pose risks to the ecological environment or human health.

The 2021 edition of the National Hazardous Waste Catalogue **categorises hazardous waste into 50 categories and 467 types**. For each type, the Catalogue specifies its hazardous characteristics.

¹² The Catalogue consists of a 'positive list' indicating which sectors are particularly open and welcoming for foreign investment, both nationwide as well as in central and western regions. Foreign investors in these sectors will receive much stronger support from local administrations, in terms of incentives, preferential policies, access to administrative services, etc. The latest edition was published in 2022 by NDRC and MOFCOM, containing 519 sectors, plus many others for specific central and western regions. See: https://www.gov.cn/zhengce/zhengceku/2022-10/28/content_5722417.htm:

¹³ For an overview of the incentives that may be obtained by EU SMEs investing in China, see a dedicated EU SME Centre report: <https://www.eusmecentre.org.cn/publications/incentives-subsidies-and-funding-for-tech-smes-in-china/>. Although the report was made in 2021, the content is, overall, still up-to-date.

¹⁴ https://www.mee.gov.cn/xxgk/xxgk02/202011/t20201127_810202.html (accessed: 26 Aug 2024).

¹⁵ A call for comments on the draft version of the revised Catalogue was published by MEE at the end of 2023: https://www.mee.gov.cn/xxgk/xxgk06/202401/t20240103_1060504.html (accessed: 26 Aug 2024).

Example of items included in the National Hazardous Waste Catalogue

Waste type	Industry source	Waste code	Hazardous waste	Hazardous attribute *
HW07 Heat treatment of cyanide-containing waste	Metal surface treatment and heat treatment processing	336-001-07	Quench bath residue from metal heat treatment using cyanide	T, R
		336-002-07	Treatment of sludge with quenching wastewater from metal heat treatment using cyanide	T, R
		336-003-07	Waste lining produced during maintenance of cyanide-containing heat treatment furnace	T, R
	
		336-049-07	Residue from cyanide heat treatment and annealing operations	T, R
HW08 Waste mineral oil and mineral oil containing waste	Oil extraction	071-001-08	Oil sludge and oil residues from oil extraction and joint station storage	T, I
		071-002-08	Mineral oil is used as the continuous phase to prepare drilling mud for drilling cuttings and waste drilling mud produced by oil extraction	T
	Natural gas extraction	072-001-08	Drilling mud prepared with mineral oil as the continuous phase is used for drilling cuttings and waste drilling mud produced by natural gas extraction	T

* T: toxicity; I: ignitability; R: reactivity

Any entity involved in the collection, storage, transportation, utilisation, or disposal of waste items listed in the National Hazardous Waste Catalogue **must obtain a specific business license** (危险废物经营许可证). They must also strictly adhere to relevant laws and regulations regarding protection measures, risk prevention, safety standards, and labelling and marking (more details in chapter 2.3 of this report). The procedures for obtaining this license are outlined in the *Provisions for the Management of Hazardous Waste Business Licenses*, issued in 2004 and last revised in 2016.¹⁶ There are two types of business licenses:

- **Comprehensive business license for hazardous waste collection, storage and disposal** (危险废物收集、贮存、处置综合经营许可证). This license permits the collection, storage, and disposal of

any type of hazardous waste specified within the license.

- **Hazardous waste collection and operation business license** (危险废物收集经营许可证). This license is valid only for the collection and operation of certain types of hazardous waste specified within the license.

The requirements for obtaining the comprehensive business license are more stringent. In addition to having collection, packaging, transportation, and disposal equipment that complies with China's national standards and technical specifications, entities must also appoint three engineers with specific qualifications and professional experience as responsible persons. **Licenses are issued by municipal-level ecological**

¹⁶ See: https://www.mee.gov.cn/ywgz/fgbz/xzfg/200701/t20070109_99355.shtml (accessed: 26 Aug 2024).

and environmental authorities, and lists of licensed entities are typically published online.¹⁷ It is strictly

prohibited to mix different types of hazardous waste outside the scope of the license obtained.

2.2 THE NATIONAL MEDICAL WASTE CLASSIFICATION CATALOGUE

While the previous catalogue includes medical waste (specifically HW01 medical waste and HW02 pharmaceutical waste), a **more detailed document, the National Medical Waste Classification Catalogue, was specifically formulated for medical waste.** Issued and managed by the National Health Commission, this

Catalogue is intended for use by medical institutions at all levels. It was first introduced in 2003 and last revised in 2021.¹⁸ The Catalogue classifies medical waste into five categories and outlines specific requirements for the collection of each type of medical waste.

National Medical Waste Classification Catalogue

Type	Attribute	Common component or waste name
Infectious waste	Medical waste that carries pathogenic microorganisms and has the risk of causing the spread of infectious diseases	<ol style="list-style-type: none"> 1. Wastes other than sharp weapons contaminated by the patient's blood, body fluids, faeces, etc.; 2. Disposable medical devices discarded after use, such as syringes, infusion sets, dialysers, etc.; 3. Pathogen culture media, specimens, strain and virus seed preservation solutions and containers abandoned by the pathogenic microorganism laboratory; blood, serum, secretions and other specimens and containers abandoned by other laboratories and departments; 4. Isolate waste generated by patients with infectious diseases or suspected infectious diseases.
Injurious waste	Disused sharp medical instruments that can stab or cut the human body.	<ol style="list-style-type: none"> 1.. Discarded metal sharp instruments, such as needles, suture needles, acupuncture needles, probes, puncture needles, scalpels, surgical saws, skin preparation knives, steel nails and guide wires; 2. Discarded glass sharp objects, such as coverslips, glass slides, glass ampoules, etc.; 3. Abandoned sharp weapons from other materials.
Pathological waste	Human waste and corpses of medical laboratory animals produced during diagnosis and treatment	<ol style="list-style-type: none"> 1. Discarded human tissues and organs produced during surgery and other medical services; 2. Discarded human tissue and pathological wax blocks after pathological sectioning; 3. Tissues and corpses of abandoned medical laboratory animals; 4. Embryonic tissue below 16 weeks of gestational age or weighing less than 500 grams; 5. Placenta of pregnant women with confirmed, suspected infectious diseases, or carriers of infectious diseases.

¹⁷ See, for instance, the situation in Shanghai: <https://sthj.sh.gov.cn/hbzhzywpt1103/hbzhzywpt1112/20200302/0024-141005.html> (accessed: 26 Aug 2024). The lists includes several foreign companies.

¹⁸ <http://www.nhc.gov.cn/zygj/s7659/202111/a41b01037b1245d8bacf9acf2cd01c13.shtml> (accessed: 3 Sep 2024).

Pharmaceutical waste	Waste drugs that have expired, deteriorated or are contaminated	<ol style="list-style-type: none"> 1. Discarded general drugs; 2. Discarded cytotoxic drugs and genotoxic drugs; 3. Discarded vaccines and blood products.
Chemical waste	Waste chemicals that are toxic, corrosive, flammable and reactive	<ol style="list-style-type: none"> 1. Chemical waste included in the <i>National Hazardous Waste Catalogue</i>, such as formaldehyde, xylene, etc.; 2. Hazardous waste from non-specific industry sources, such as mercury-containing sphygmomanometers, mercury-containing thermometers, waste dental amalgam materials and their residues

Medical waste must be collected by the generating medical institution in accordance with the Catalogue's requirements and relevant standards, particularly concerning packaging and marking (more details in chapter 2.3 of this report). Each institution must establish dedicated storage facilities for medical waste. Once collected, secured, and documented, the medical waste is consigned to specialised personnel and vehicles for safe transport to the nearest centralised medical

waste disposal facilities.¹⁹

The Catalogue also encourages medical and health institutions to gradually phase out the use of mercury-containing sphygmomanometers and thermometers. It promotes the use of reusable medical devices, appliances, and supplies as replacements for disposable items to achieve source reduction.

2.3 STANDARDS AND TECHNICAL SPECIFICATIONS

In addition to the basic requirements set forth by the two national catalogues, relevant entities must also adhere to the safety and technical requirements outlined by Chinese standards and specifications. China's standardisation system is relatively complex, encompassing government-led and market-driven standards, as well as national and sectoral standards, and both mandatory and voluntary standards. **In the hazardous waste sector, most standards are mandatory due to their direct impact on public health, safety, and the environment.** However, even non-mandatory standards are often highly recommended in practice, as they may be requested by Chinese partners, used as evaluation criteria for government procurement, or necessary for obtaining relevant certifications. The following tables summarise the main standards currently enforced in

the hazardous waste sector, categorised into two main groups:

- **Standards for solid waste pollution control:** These standards specify detailed requirements for the storage, disposal, transportation, and monitoring of solid waste, including hazardous waste. They also include environmental protection requirements for the selection, construction, operation, and closure of waste disposal sites.
- **Standards for the identification of hazardous waste:** These standards generally outline requirements for packaging and marking when collecting, storing, and transporting hazardous waste.

1. Standards for solid waste pollution control		
GB 18597—2023 (Link)	Pollution Control Standard for Hazardous Waste Storage 危险废物贮存污染控制标准	This standard stipulates the overall requirements for pollution control for hazardous waste storage, storage facility site selection and pollution control requirements, container and packaging pollution control requirements, storage process pollution control requirements, as well as environmental management requirements such as pollutant emissions, environmental monitoring, environmental emergency, implementation and supervision, etc.

¹⁹ The main legal framework is detailed in the *Regulation on Medical Waste Management*, last revised in 2011. See: <http://www.nhc.gov.cn/fzs/s3576/201808/e881cd660adb4ccf951f9a91455d0d11.shtml> (accessed: 3 Sep 2024).

1. Standards for solid waste pollution control		
GB 39707—2020 (Link)	Pollution Control Standard for Medical Waste Treatment and Disposal 医疗废物处理处置污染控制标准	This standard stipulates the ecological and environmental protection requirements for the site selection, operation, monitoring of medical waste treatment and disposal facilities and the process of waste receiving, storage, treatment and disposal, as well as implementation and supervision.
GB 18484—2020 (Link)	Pollution Control Standard for Hazardous Waste Incineration 危险废物焚烧污染控制标准	This standard stipulates the ecological and environmental protection requirements for the site selection, operation, monitoring and waste storage, compatibility and incineration of hazardous waste incineration facilities, as well as the implementation and supervision.
GB 18598—2019 (Link)	Hazardous Waste Landfill Pollution Control Standard 危险废物填埋污染控制标准	This standard stipulates the entry conditions for hazardous waste landfills, and the ecological and environmental protection requirements for the site selection, design, construction, operation, closure and monitoring of the landfill.
GB 9132—2018 (Link)	Safety Regulations for Near Surface Disposal of Low-and Medium-Level Radioactive Solid Wastes 低、中水平放射性固体废物近地表处置安全规定	This standard stipulates the overall requirements for near-surface disposal of radioactive solid waste, as well as requirements for the site selection, design, construction, operation, closure, and supervision of near-surface disposal sites. It also stipulates requirements for environmental monitoring, safety process system analysis and quality assurance.
HJ 177—2023 (Link)	Technical specifications for medical waste centralised incineration engineering 医疗废物集中焚烧处置工程技术规范	This standard stipulates the technical requirements to be observed during the design, construction, acceptance, operation and maintenance of centralised medical waste incineration and disposal projects.
HJ 561—2010 (Link)	Technical Specification of Performance Testing for Facilities of Hazardous Waste (including medical waste) Incineration 危险废物（含医疗废物）焚烧处置设施性能测试技术规范	This standard stipulates the test contents, procedures and technical requirements involved in the performance test of hazardous waste (including medical waste) incineration and disposal facilities. It is applicable to the performance test of hazardous waste (including medical waste) incineration and disposal facilities.
Other standards and technical specifications applying to specific types of waste that can be considered hazardous, including, e.g.: <i>GB 13015—2017 Standard for pollution control on Polychlorinated Biphenyls (PCBs) -contaminated wastes</i> <i>HJ 1335—2023 Technical Specifications for Pollution Control of Waste Sulfuric Acid Utilisation and Disposal</i> <i>HJ 1274—2022 Technical Specification for Pollution Control of Chrome-Containing Leather Waste</i> <i>HJ 1275—2022 Technical Specification for Pollution Control of Deactivated Denitration Catalyst Regeneration</i> <i>HJ1241—2022 Technical Specification for Manganese Slag Pollution Control</i> <i>HJ 1186—2021 Technical Specification of Pollution Control for Treatment of Waste Power Lithium-ion Battery</i> <i>HJ 519—2020 Technical Specification of Pollution Control for Treatment of Waste Lead-acid Battery</i> <i>HJ 662-2013 Environmental Protection Technical Specification for Co-processing of Solid Wastes in cement kilns</i>		

2. Standards for the identification of hazardous waste		
HJ 1276—2022 (Link)	Technical Specification for Setting Hazardous Waste Identification Signs 危险废物识别标志设置技术规范	This standard stipulates the classification, content requirements, setting requirements and production methods of hazardous waste identification signs that must be set up by units that generate, collect, store, utilise and dispose of hazardous waste. Specific signage files and images are attached to the standard for download
HJ 298—2019 (Link)	Technical Specification for Hazardous Waste Identification 危险废物鉴别技术规范	This standard stipulates the technical requirements for the collection and testing of samples and the assessment of test results in the identification of the hazardous characteristics of solid waste
HJ 421—2008 (Link)	Standard for Special Packaging Bags, Containers and Warning Signs for Medical Waste 医疗废物专用包装袋、容器和警示标志标准	This standard applies to manufacturers, transportation units and medical waste disposal units of special packaging bags and containers for medical waste
GB 5085 series . (Link)	Hazardous Wastes Identification Standards series. 危险废物鉴别标准系列 1: Corrosiveness腐蚀性鉴别 2: Preliminary screening of acute toxicity急性毒性初筛 3: Leach toxins浸出毒性鉴别 4: Flammability易燃性鉴别 5: Reactivity反应性鉴别 6: Identification of toxic substance content毒性物质含量鉴别 7: General rules (通则)	This standard series includes several parts, aiming to comprehensively assess the hazardous characteristics of solid waste. The technical content of these standards refers to the relevant regulations of the U.S. EPA, ensuring that they are in line with international standards and are also in line with China's actual conditions and needs.

In addition to the aforementioned standards, there are several standards for environmental quality management and systems that are largely based on **international (ISO) standards** and are widely recognised in China. Key examples include:

- *GB/T 24001-2016 Environmental Management System Requirements and Guidelines for Use*, based on **ISO 14001**.
- *GB/T 19001-2016 Quality Management Systems - Requirements*, based on **ISO 9001**.

- *GB/T 45001-2020 Occupational Health and Safety Management Systems -Requirements and Guidelines for Use*, based on **ISO 45001**.

Holding these certifications is generally considered a significant asset for European entities, demonstrating a commitment to high standards in environmental management, quality management, and occupational health and safety.

Standards for hazardous waste machinery, equipment and materials

A wide range of equipment and machinery is used in the hazardous waste recycling and disposal industry. Each year, a significant number of accidents—many serious or fatal—occur due to poorly guarded machinery or improper use, such as unsafe interventions clearing blockages or performing maintenance and repairs while the machinery is still running. In general, it is mandated that hazardous waste operators use adequate and safe equipment and materials that meet the necessary requirements and procedures for hazardous waste collection, transfer, and disposal, thus ensuring public and environmental safety. However, **currently, there are no specific technical specifications applying exclusively to the design and manufacturing of hazardous waste machinery, equipment and materials.** Yet, there are a number of requirements that must be met, mainly based on three steps.

Firstly, **all relevant machinery, equipment, and materials must meet the requirements for hazardous waste pollution control** (see table above for details). For example, hazardous waste incineration must comply with *GB 18484—2020 Pollution Control Standards for Hazardous Waste Incineration*, which sets requirements for purified flue gas emissions and chimney height. Similarly, the equipment and processes used for the incineration and disposal of medical waste must ensure stable flue gas emissions in accordance with *GB 39707—2020 Pollution Control Standard for Medical Waste Treatment and Disposal*.

Secondly, pollution control standards may indicate **additional, more specific requirements for certain machinery, equipment, or materials.** For instance:

- *GB 18484—2020 Pollution Control Standards for Hazardous Waste Incineration* outlines technical performance indicators for hazardous waste

incinerators, requirements for exhaust cylinder height, and limit values for flue gas pollutant concentrations.

- *HJ 177—2023 Technical Specifications for Medical Waste Centralised Incineration Engineering* details requirements for design processes involving collection, storage, incineration, purification, and pollution control. It also specifies equipment and material standards, including incinerators, flue gas cooling equipment, water treatment systems, and disinfection equipment.

Thirdly, **machinery, equipment, and materials must meet general standards and technical specifications applicable to their category or function, even if not specifically designated for hazardous waste recycling or treatment.** For instance, lifting machines and crushing equipment used in hazardous waste treatment must adhere to general safety standards, and landfilling equipment must comply with earth-moving machinery regulations:

- Lifting equipment must comply with TSG 51—2023 Regulation on Safety Technology for Lifting Appliances, obtain a China Manufacturing License (also known as TS or SELO License), and undergo regular inspection and verification. The China Compulsory Certification (CCC) might also need to be obtained for certain types of cranes.²⁰
- Crushing equipment must meet the requirements of GB 18452-2001 Crushing Equipment – Safety Requirements, with additional sectoral standards, such as JB/T 12799-2016 for semi-portable crushing and screening plants, recommended in specific cases.



²⁰ Practical guidelines on China's CCC, its procedure, requirements and costs were produced by the EU SME Centre: <https://www.eusmecentre.org.cn/publications/updated-guidelines-on-the-china-compulsory-certification-ccc-scheme/>.

Earth-moving machinery used in hazardous waste landfilling, such as excavators, bulldozers, and loaders, must follow the standards issued by China's National Technical Committee 334 (TC334) on Earth-Moving Machinery.

These requirements are in addition to overall compliance with China's *Production Safety Law*,²¹ the *Regulations on the Administration of Production License for Industrial Products*.²²

Broadly speaking, Chinese standards are largely aligned with ISO or EN standards. EU actors already in compliance with these international standards should encounter minimal difficulties in meeting Chinese requirements.



21 https://www.mem.gov.cn/fw/flfgbz/fg/202107/t20210716_416558.shtml (accessed: 5 Sep 2024).

22 https://www.gov.cn/zhengce/content/202405/content_6950015.htm (accessed: 5 Sep 2024).

3. OPPORTUNITIES, TIPS AND CHALLENGES

As China's industrialisation progresses, the production of hazardous waste continues to increase. China is already the world's largest producer and consumer of several types of hazardous waste, especially industrial waste and heavy metals. The country is currently navigating a transitional phase: it has made significant strides in addressing regulatory and standardisation issues. However, several challenges remain, including a substantial backlog of previously stored hazardous waste and the improper treatment of waste, which often leads to harmful gas emissions and pollution of soil and groundwater. **There is a strong demand for technologies and solutions that focus on minimising harm and environmental impact, reducing waste or emissions, and enhancing recycling rates and efficiency. Innovations that leverage intelligent and emerging technologies are particularly welcomed.**

Opportunities for EU SMEs exist across all segments of the hazardous waste management chain, and in particular in:

- **Hazardous waste recycling and reutilisation**, in terms of machinery, equipment, but also management and consulting. Solutions for precise disassembly, efficient dissociation of composite materials, clean extraction of valuable raw materials and remanufacturing have particular potential.
- **Hazardous waste disposal**, in terms of technologies, equipment and solutions that enhance the efficiency and reduce the environmental impact of incineration, landfilling and solidification/stabilisation.
- **Integration of cutting-edge technologies** such as big data, artificial intelligence, Internet of Things, and new materials.

Additionally, an expert consulted for this report have noted the rise of a new business model in environmental services. This model involves offering **integrated environmental solutions as a comprehensive package**, which includes equipment installation, servicing, consulting, and development. This approach contrasts with the traditional model of procuring individual solutions to address specific pollutants.

EU SMEs should firmly keep in mind the two most important drivers of the sector: government policies,

and technological innovation. **Policies, action plans and other documents from government administrations at all levels should be closely analysed and monitored.** For instance, at the national level, in February 2024 the State Council issued the *Opinions on Accelerating the Construction of a Waste Recycling System*,²³ indicating—among many things—that advanced technology demonstration projects for recycling will be conducted, while all localities will be encouraged to engage in promotion, docking, application, exchange and training of recycling technologies. R&D of key recycling process technologies and equipment will be incorporated into National Key R&D Programmes, demonstrating the priority and importance of these elements, and thus their market potential.

Secondly, technological innovation priorities and achievements should be identified. A closer look at **China's R&D programmes at both national and local levels will reveal insights into the technologies and innovations that are prioritised and supported to solve gaps and bottlenecks.** For instance, at the national level, R&D of hazardous waste technology is funded under the National Key R&D Programme "*Key technologies and equipment of circular economy*" (循环经济关键技术与装备); numerous topics relating to hazardous waste are supported through annual calls for proposals. The table below summarises the specific topics related to hazardous waste that have been targeted over the past three years. Similar programmes also exist at the local level.

23 https://www.mee.gov.cn/zcwj/gwywj/202402/t20240220_1066422.shtml (accessed: 6 Sep 2024).

National Key R&D Programme – Key technologies and equipment of circular economy		
Specific topics targeting hazardous waste		
2022	2023	2024
<p>1. Exploration of cutting-edge technologies in circular economy (e.g. IoT, big data, AI, new materials, etc)</p> <p>2.1 Real-time monitoring of the whole zinc hydrometallurgy process and source reduction and control technology of anode mud hazardous waste</p> <p>2.3 Vanadium and chromium oxygen-rich efficient alkali leaching and hazardous waste source reduction technology and equipment</p>	<p>1. Regional multi-source solid waste big data and recycling path simulation optimisation technology</p> <p>2. Chemical depolymerisation, recycling and upgrading of waste hybrid polymers</p> <p>3. Collaborative incineration technology of medical waste and domestic waste</p>	<p>1. Precise traceability, risk management and control technology for existing hazardous waste in the chemical and metallurgical industry</p> <p>2. Hazardous liquid resource recovery and purification technology and equipment in the integrated circuit industry</p> <p>3. Mercury resource recovery and safe utilisation technologies for typical mercury-containing wastes</p> <p>4. Efficient detoxification transformation and metal enrichment and separation technology and equipment for multi-source resin waste</p> <p>5. Integrated multi-source solid waste collaborative utilisation technology and integrated demonstration in industries and cities in the Greater Bay Area.</p>

Source: author's analysis of calls for proposals issued on the National S&T Information System Public Service Platform: <https://service.most.gov.cn/>

Below are some **practical tips** that EU SMEs can follow to identify and exploit the opportunities of China's hazardous waste sector:

<p>1</p> <p>Analyse local-level five-year plans and development plans</p>	<p>As deep as the municipal level. By doing so, it is possible to understand the specific problems faced and solutions sought; in some cases, urgently needed technologies are explicitly indicated. It is recommended to start with the provinces accounting for the highest proportion of hazardous waste generated, such as Shandong, Inner Mongolia, Jiangsu, Zhejiang, Guangdong and Hebei; however, do not neglect other interesting options such as Sichuan and Xinjiang, which also feature a prominent role in medical waste.</p>
<p>2</p> <p>Examine relevant catalogues of advanced technologies and equipment</p>	<p>China has issued the <i>Catalogue of Advanced and Applicable Process Technology and Equipment for Comprehensive Utilisation of National Industrial Resources</i> (link). The Catalogue lists a total of 88 process technology equipment, covering industrial solid waste reduction, comprehensive utilisation, recycling of renewable resources, and remanufacturing. The Catalogue was redacted to promote the application of the technologies in the list, therefore items on the list are perceived to have particular market potential in China. Several hazardous waste-related items are on the list.</p>

3

Identify key actors and events in the shortlisted provinces

Identify key actors and operators in the field. One way to do so is by screening the lists of companies which have obtained hazardous waste business licenses, and specifically for which type of hazardous waste. These are publicly available on the websites of provincial-level ecological and environmental departments ([see footnote 17](#) of this report). Try also to identify influential research organisations and industrial associations as these often are very effective in facilitating cooperation. An example is the China Association of Circular Economy (中国循环经济协会). Finally, participate in relevant events, including scientific and academic ones.

4

Explore demonstration projects, e.g. through Horizon Europe or joint calls at Member State level

Fully leverage collaborative mechanisms existing between the EU and China, to explore concrete cooperation initiatives, ideally a demonstration project which could be easily scalable upon successful completion. In this regard, **Horizon Europe could offer an interesting entry point**: Chinese entities are eligible to participate with their own funding, in most of the topics; at the same time, co-funding might also be available from Chinese government agencies, as hazardous waste may fall under priority topics for bilateral cooperation. **Similar opportunities also exist at the Member State-level**: EU SMEs should engage with their national funding agencies to learn more about existing cooperation mechanisms.

Case study: EU-China cooperation under RECONMATIC project

The **Horizon Europe project RECONMATIC** (Grant Agreement ID: 101058580) aims to advance Europe's transition towards a zero-waste construction industry by addressing the entire life cycle of construction and demolition waste (CDW) management. Through innovative automated, digital, and robotic solutions, the project focuses on enhancing collaboration among construction stakeholders and improving waste traceability; the project also evaluates current CDW management practices, from prevention and minimisation to reuse, while identifying new market opportunities to support circular economies and supply chains in the industry.

RECONMATIC, which is led by the Czech Technical University in Prague, sees the participation of 15 EU partners, as well as 7 associated partners, two of which from China. The project has also received co-funding from China's Ministry of Science and Technology, as part of the EU-China co-funding mechanism. The leading implementing unit from the Chinese side is the **Chinese Association of Circular Economy**; other Chinese participants include the China Academy of Building Sciences, the China National Building Materials Science Research Institute, the Beijing University of Technology, Beijing Chaoyang Environment Group, as well as the China-based joint venture of the Spanish Fundación Tecnalia Research and Innovation).

EU SMEs involved in machinery and equipment sales are **strongly advised to obtain key international certifications such as ISO 14001, ISO 45001**, and other sector-specific credentials like the Global Recycling Standard (GRS) or compliance with the Waste Electrical and Electronic Equipment (WEEE) Directive. These certifications demonstrate high-quality management standards and may help Chinese partners secure subsidies or participate in local recognition programs. However, EU SMEs must also ensure full compliance with China's local regulations and standards to succeed.

Yet, despite the opportunities, EU SMEs will **need to account for several challenges** when entering China's hazardous waste sector:

- **Fragmented market**: As highlighted in Chapter 1.4, the market is highly fragmented, with low concentration and fierce competition. The leading company in the sector holds only 2.2% of the market share. This fragmentation necessitates strong branding efforts and continuous improvements in efficiency and cost control.
- **Upfront investment**: Market entry, particularly through projects, demands significant upfront investments and financial resources to cover initial costs. Profits are typically generated over the long term.
- **Regulatory complexity**: Although China's regulatory framework has seen significant

improvements, implementation may lag behind, and grey areas remain. Navigating the extensive range of regulations and standards is complex, requiring specific expertise from EU SMEs.

- **Technology and know-how sharing:** Market entry often entails a degree of technology transfer and knowledge sharing, which is often a key requirement for approval of demonstration projects and equipment sales.²⁴ This aligns with China's focus on building secure and high-quality supply chains. A robust intellectual property protection strategy must be in place well before entering the market.²⁵
- **Talent shortage:** A shortage of skilled professionals, particularly in the recycling sector, may hinder the market entry and expansion plans of EU SMEs.

In short, while China's hazardous waste market offers considerable opportunities for EU SMEs, **capitalising on them requires extensive preparation, resources, and long-term commitment.** By addressing these challenges with tailored strategies, SMEs can position themselves for success in China's evolving market.



²⁴ A typical scenario is that a Chinese client agrees to work with a foreign company only on the condition that the technology is transferred to China, e.g., in the form of local production, local R&D, filing of local patent, licensing IP rights, etc., even if the ownership itself is not transferred. Without such commitment, the Chinese client would not sign the contract.

²⁵ EU SMEs are strongly recommended to engage with the China IP SME Helpdesk, another EU-funded project that provides free of charge, tailored technical assistance on IP issues in China. See: https://intellectual-property-helpdesk.ec.europa.eu/regional-helpdesks/china-ip-sme-helpdesk_en..

4. INTERVIEW WITH AN INDUSTRY PRACTITIONER

The following is an interview with Ms. **Airun**, China Country Manager at West Bridge Curium, specifically focusing on hazardous chemicals.



West Bridge Curium (WBC) is a joint venture between Curium France (<https://curium.world/en/>) and West Bridge, established in 2023 to serve the China and Asia-Pacific markets. Curium has been active in European market since 1994 and decided to expand into the Chinese market in 2018.

WBC are experts in management of critical environmental risks, including chemical, radiological and mixed risks. It provides customised, turnkey solutions, as technical studies and project management, for specific client needs, covering a wide range of industries and includes handling dangerous situations, hazardous products (like chemicals), and hazardous wastes. Clients include not only private companies, but also governmental structures such as ADEME (state-managed orphan industrial sites), ANDRA (National Agency for Radioactive Waste Management), and the Académie de Créteil (remediation of the former Marie Curie laboratory).

Specific services provided include:

- **Engineering & consulting**, such as technical expertise (technical, compliance studies, risk assessment, environmental due diligence), contamination diagnosis, project management assistance (legal, administrative, technical support; works supervision), as well as laboratory and pilot zone for complex precision analyses and experimental studies.
- **Works on site**, such as decontamination of materials, surfaces and equipment, dismantling / depollution / remediation, hazardous substances /waste management, and management of production change/shutdown involving hazardous products

What are the advantages of EU companies in China's hazardous chemicals sector? How can they best support the market?

EU companies possess several significant advantages in the Chinese hazardous chemicals market, especially in the recycling segment. They can adopt a number of ways to best support this market and leverage their strengths.

- **Advanced technology and expertise:** EU companies usually have advanced hazardous chemical handling and recycling technologies, as well as rigorous safety management experience. These technologies and knowledge are critical to improving overall safety standards and recycling efficiency in the Chinese market.
- **Environmental standards and compliance:** EU regulations on environmental protection and chemical management, such as REACH regulations, are notoriously strict. By complying with such high standards, EU companies can promote environmentally friendly practices in China, helping to improve compliance and sustainability in local industries. Basically all provinces in China are investing enormous efforts into upgrading the safety risk level of chemical industrial parks.
- **Circular economy model:** EU companies are familiar with the concept of circular economy and can promote innovative solutions for the conversion of waste to resources and the recycling and reuse of hazardous chemicals. This is in line with China's goal of transitioning to a green and low-carbon economy.
- **International cooperation and market access:** Extensive international networks and experience in penetrating international markets, enable EU companies to introduce international best practices, while at the same time developing international markets for Chinese recycled products.

- **Policy participation and influence:** EU companies often have experience working with governments and are able to participate in the policy development processes at the international level. This may support and benefit the standardisation and internationalisation of China's hazardous chemicals recycling market.

What are the main challenges faced by EU companies to enter China's hazardous chemical market?

EU companies seeking to enter China's hazardous chemical market face several significant challenges. One major obstacle is the **closed-loop structure of the hazardous chemical recycling industry**, which involves tight coordination between production units, local government bodies, and the final hazardous waste disposal process. This makes it difficult for new entrants to penetrate the established network. Cultural differences also pose a challenge, as building business relationships in China often requires establishing trust first, emphasising the importance of effective communication and relationship-building. Additionally, the geopolitical landscape adds complexity, with standards varying not only between provinces but also within different chemical industrial parks.

Data security is another concern, as sharing sensitive information is restricted by strict confidentiality laws and retroactive liability regulations, creating further barriers to collaboration and innovation.²⁶ EU companies must also ensure that their clients' industries are not in sensitive national sectors, which could limit market access and impact their activities. **Intense market and price competition** is another factor, along with the rapid pace of technological advancements and market shifts in China, which might make it challenging for foreign firms to keep up.

What is your advice to EU companies, especially SMEs, that want to enter China's hazardous chemicals sector?

Where there are challenges, there are opportunities as well. There is no "best" way, rather effective ways which are appropriate to each individual case.

Creating a joint venture with a local partner that has good connections in the field could result in a quick development of the market. For machinery and equipment manufacturers, local production could also be an effective option to significantly reduce the price and thus be more competitive in the market; this will also potentially allow other opportunities in the wider Asia-Pacific region thanks to developed infrastructure and numerous free trade agreements in place between China and countries in the region. In such cases, however, a solid intellectual property (IP) protection strategy is required.²⁷

EU SMEs may also consider to partner up with local third party company and become their technical solution provider by area. Training activities with target clients have proved effective in improving their awareness of products and services. For EU SMEs already active on other international markets, their international partners might represent a gateway to the Chinese market, especially if they have active operations or even subsidiaries in the country.

Finding the right partner is very important. Industrial associations and even industry and scientific conferences often act as multipliers to reach out to a vast audience. Among these, EU SMEs involved in the hazardous chemicals sectors should consider **Chinese chemical parks**. In order to improve the level of environmental management and safe production, and promote industrial agglomeration and resource sharing, China has built a large number of chemical parks, among which Shandong, Jiangsu, Zhejiang, Guangdong and other provinces have a large number of chemical parks. Among these, Jiangsu is a major province of chemical industry. At present, there are 136 national-level and provincial-level development zones in the province, of which more than 20 are chemical parks. Jiangsu province ranks first in the number of chemical enterprises in the country, with more than 4,500 chemical enterprises above designated scale, of which more than 2,500 are hazardous chemical production enterprises. Of the 60 key counties (cities and districts) for the safe production of hazardous chemicals identified by the Safety Committee of The State Council, 11 are located in Jiangsu.²⁸

²⁶ For an overview of China's regulatory framework for cybersecurity and cross-border data transfers, see a report of the EU SME Centre: <https://www.eusmecentre.org.cn/publications/cybersecurity-data-and-personal-information-compliance-for-eu-smes-in-china-2/>.

²⁷ EU SMEs are strongly recommended to engage with the China IP SME Helpdesk, another EU-funded project that provides free of charge, tailored technical assistance on IP issues in China. See: https://intellectual-property-helpdesk.ec.europa.eu/regional-helpdesks/china-ip-sme-helpdesk_en.

²⁸ https://www.mem.gov.cn/awhshy_3512/awhbgswj/201403/t20140303_247358.shtml (accessed: 10 Sep 2024). For a closer analysis of the parks specifically within Jiangsu, and their geographical distribution, see [this article](#) written by the private company Sino-Agri Leading Biosciences Co. Ltd.

The following table provides a summary of the distribution and main features of major chemical parks in China.

Overview of chemical parks in China²⁹

Industry / development model	Peculiarity	Representative parks
Petrochemicals	With the large oil-ethylene plant as the leader, such parks drive the development of downstream related industries, and are usually large scale	Shanghai Chemical Industrial Zone; Nanjing Chemical Industrial Zone; Huizhou Daya Bay Petrochemical Zone; Fujian Quangan Petrochemical Industrial Zone
Coal chemicals	Usually established in coal-rich regions, in such parks coal chemical projects act as the leading forces, driving the development of downstream related industries	Yulin coal-based energy and chemical base; Ningdong energy and chemical base
Fine chemicals	Such parks mainly produce fine or special chemicals and mass synthetic materials	Nantong Jingtian Technology Development Zone (Special organic raw materials); Jiangsu High-tech Fluorine Chemical Industrial Park (Development of fluorine chemical products); Taixing Economic Development Zone (caustic soda, chlorine products)
Chemical parks with "enterprise expansion" model	Such parks are built centring on specific, large-scale enterprises, establishing a supply chain based on enterprises' main products	Qilu Chemical industry Circle; Jilin chemical industry circular economy demonstration park
Chemical parks with "urban relocation" model	Such parks feature host a number of chemical enterprises which were previously scattered across different regions	Tianjin Economic and Technological Development Zone Chemical Industrial District; Hebei Cangzhou Lingang Chemical Industrial Park; Hefei Chemical Industry Park (Hefei Circular Economy Demonstration Circle)

The main advantages of chemical parks are:

- **Close to resources.** Many chemical plants are located close to the source of raw materials. For instance, petrochemical plants are often located near oil fields or large ports to facilitate the import of crude oil, such as Daqing, Lanzhou, Shanghai, Qingdao, Dalian, Tianjin and other places. Coal chemical plants are mostly located in regions rich in coal resources, such as Shanxi, Shaanxi, Inner Mongolia and other provinces. The sulfuric acid industry tends to be near places rich in pyrite resources, such as Yunfu in Guangdong Province.
- **Close to consumers.** In order to reduce transportation costs, such as fine chemicals and plastic products, chemical parks tend to be set up around densely populated and economically developed cities, such as Beijing, Shanghai, Nanjing, Guangzhou, etc.
- **Coastal and riverside areas.** Taking advantage of advanced sea and inland waterway transportation infrastructure, many large chemical bases are located in coastal and riverside cities, such as Shanghai, Ningbo, Nanjing, Tianjin, Qingdao, Guangzhou, Dalian, etc. This facilitates the importation and exportation of raw materials and products.

²⁹ Source: China Energy News, see: <https://baijiahao.baidu.com/s?id=1672186206472564710> (accessed: 17 Sep 2024).

- **Specific chemical industry clusters.** Due to historical reasons and policy orientation, certain types of chemical industry clusters have been formed in some regions, such as the refinery cluster in Dongying, Shandong Province, the petrochemical base in Daya Bay, Guangdong Province, and the fertiliser industry in Nanjing, Quzhou, Shijiazhuang and other places.
- **Policy guidance and planning of less developed provinces.** China is attaching great importance to the development of the chemical industry in less developed regions, including Sichuan and Xinjiang under the Western Development strategy, as well as Liaoning and Jilin under the Revitalisation of Northeastern China strategy.

These distribution characteristics reflect the historical track of the development of China's chemical industry, resource endowment, market demand and government policy guidance. With the development of the economy, China's strategy to peak carbon emissions and achieve carbon neutrality by 2030 and 2060, respectively, and the consequent improvement of environmental protection requirements, the distribution and structure of chemical plants will be constantly adjusted and optimised.

By leveraging the resources and networks available in these chemical parks, EU SMEs can better navigate the complexities of China's hazardous chemicals market and capitalize on growth opportunities.



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For any questions or free-of-charge consultations, EU SMEs may contact the EU SME Centre via our **Ask-the-Expert** service: <https://www.eusmecentre.org.cn/ask-the-expert/>.

Further resources

The EU SME Centre has over 200 **reports, guidelines, webinars and case studies** in its Knowledge Centre, the following may be relevant to you:

WEBINAR RECORDINGS

- Sustainable transition for SMEs (July 2024): <https://www.eusmecentre.org.cn/publications/sustainable-transition-for-smes/>
- Taking part in trade fairs in China (May 2024): <https://www.eusmecentre.org.cn/publications/taking-part-in-trade-fairs-in-china/>
- Green supply chain management: Empowering SME suppliers (March 2024): <https://www.eusmecentre.org.cn/publications/green-supply-chain-management-empowering-sme-suppliers/>
- An SME-friendly overview of the IP regulatory landscape and compliance requirements (March 2024): <https://www.eusmecentre.org.cn/publications/ready-for-2024-an-sme-friendly-overview-of-the-ip-regulatory-landscape-and-compliance-considerations/>
- Emerging Opportunities for SMEs in China's Green and Sustainable Urban Landscape (March 2024): <https://www.eusmecentre.org.cn/publications/emerging-opportunities-for-smes-in-chinas-green-and-sustainable-urban-landscape/>

ABOUT THE EU SME CENTRE

The EU SME Centre is an initiative funded by the European Union to assist small and medium-sized enterprises (SMEs) from EU Member States and countries participating in the Single Market Programme, getting them ready to do business in China.

Our core mission is to facilitate market access and provide a comprehensive range of free first-line services to inform, advise, train, and connect SMEs. The Centre forms partnerships with business support organisations and trade promotion organisations to bring our services and expertise to European SMEs of all sectors.

This initiative created in 2010 is now in Phase IV (2022-2025) and is implemented by 4 consortium partners with 2 associated partners, with networks throughout Europe and China.

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