

Achieving **economic growth** and **environmental protection**, together

SUEZ's integrated water and waste management services
in Shanghai Chemical Industry Park



China is fostering a new resource-saving growth model for green and sustainable development. At the same time, the country is transitioning from an industrial to an ecological economy by establishing stringent systems for pollution prevention and control at the source. At present, China's 219 state-level industrial parks account for about 11% of the country's total economic output. Achieving high-quality green development among industrial parks is crucial to China's transition to a circular economy. However, industrial parks still face challenges such as high variability in the quality of industrial wastewater, unstable effluents from wastewater treatment plants, lack of separation between rainwater and wastewater, damage and leakage in pipe networks, complex industrial effluent treatment requirements, and discharge of harmful pollutants. Professional environmental services to effectively manage water, solid waste and air quality are required by industrial parks to minimise environmental impact.

Ecological objectives in China



To achieve
peak CO₂ emissions by 2030



To achieve
carbon neutrality by 2060



To reduce emissions per unit of
GDP by more than 65% by 2030
(compared to 2005 levels)



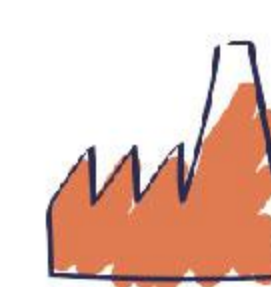
Non-fossil fuel energy will
account for about 25% of primary
energy consumption by 2030



To reduce greenhouse gas
emissions by 45%, consistent with
the carbon neutrality goal of a
1.5°C trajectory by 2050



To achieve the sustainable
application of biodiverse
resources, as well as benefit
sharing and harmony between
man and nature by 2050



To build
50 new smart chemical parks
during the 14th Five-year Plan period



To create
50 green chemical parks
during the 14th Five-year Plan period

Partnering with industrial customers to promote a circular economy and green, sustainable industrial development in China

SUEZ has a **160-year proven track record of managing water and waste resources**. We understand that the top challenge for our industrial customers is ensuring **safe, continuous production** while **complying with environmental regulations**. Therefore, we customise solutions for our industrial clients to improve economic and environmental performance, while achieving sustainability goals.



Meet regulations and
safety compliance



Boost brand equity
through corporate
social responsibility



Develop 100%
circular solutions



Increase
competitiveness

SUEZ helps Shanghai Chemical Industry Park become the best model of global ecological protection and the circular economy

Shanghai Chemical Industry Park ("SCIP") is one of China's seven key petrochemical industrial bases and the first professional petroleum and chemical industrial park. Situated in the south of Shanghai and north of Hangzhou Bay, SCIP currently manages an area of 29.4 km². SCIP is home to world-renowned Chinese and global petrochemical giants, including Sinopec, BASF, Covestro, Evonik, Huntsman, Mitsubishi Gas Chemical, and Mitsui Chemicals.

Customers in SCIP come from different industries and face countless environmental challenges. The chemical companies of large-scale production have huge water demand, generate high-concentrated effluents and substantial amount of wastes. These include a considerable variety of hazardous waste that can react in complex processes. SUEZ understands the importance of integrated design and management, especially for world-class parks such as SCIP. The best technologies in the world may fail if we do not pay enough attention to **integrated design and management**. Hence, we participated in early developments of the Park and provide **sustainable and full-range solutions**.



SUEZ's water and waste projects in SCIP are recognised as **Model Case Studies of Third-Party Environmental Solutions in Industrial Parks** owing to their outstanding performance in economic circularity, energy conservation and emissions reduction.

#1 SCIP has topped the rankings of Top 30 Chemical Parks in China for years



SUEZ provides integrated environmental solutions to SCIP: water, wastewater, waste and environmental management

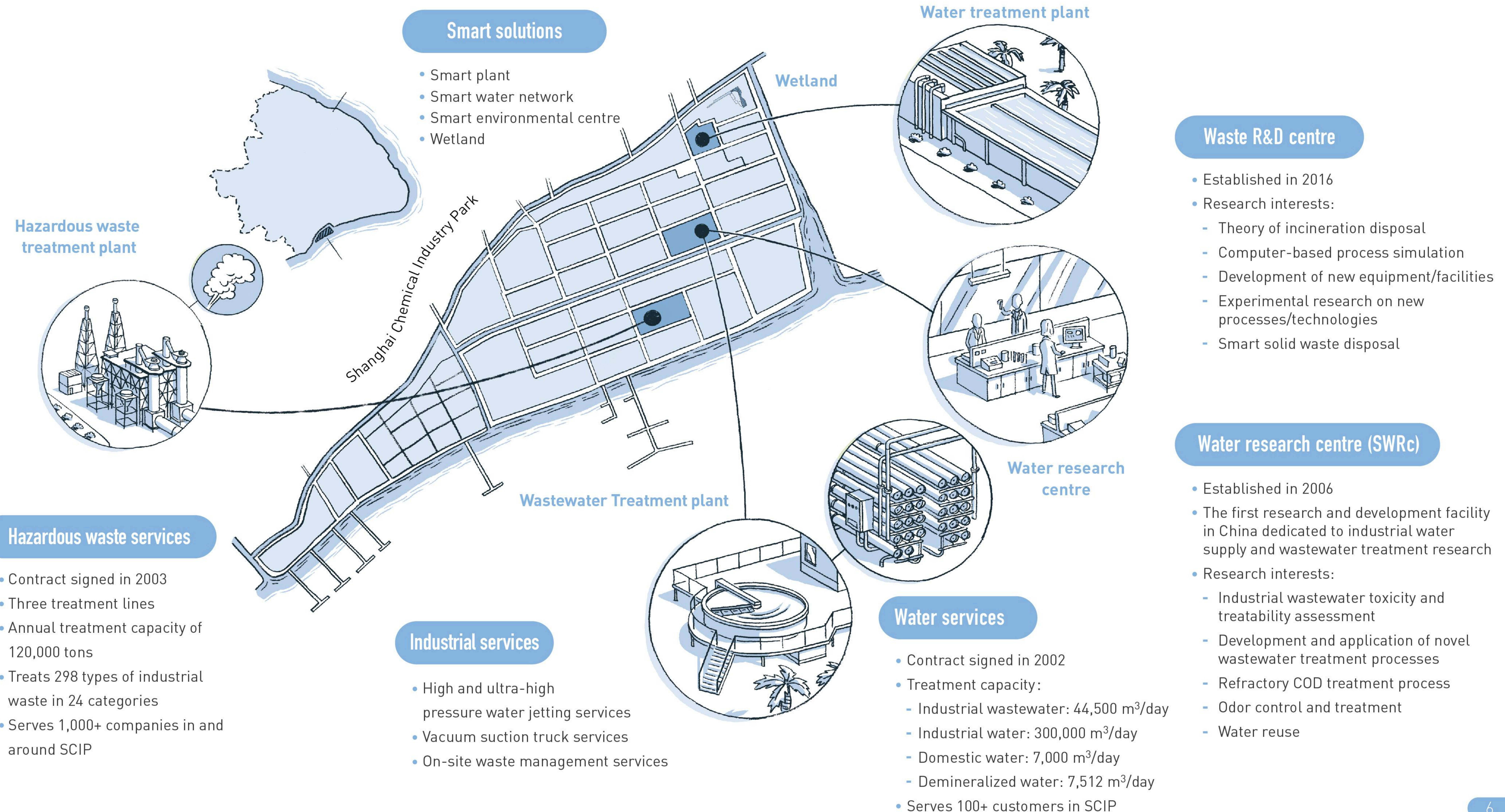
Among the sources of potential pollution in industrial parks are wastewater, solid waste and flue gases from combustion processes.

To help SCIP become a global benchmark of excellence in ecological protection and boost circular economy, SUEZ has designed and co-invested in centralised, state-of-the-art infrastructure for water production, wastewater treatment as well as hazardous waste incineration. Operated by experienced staff backed by the expertise of SUEZ, the facilities provide the Park's petrochemical industries with **a safe, reliable and cost-efficient solution for their effluents and hazardous waste.**

Our technologies avoid the Park industries to carry out complex pre-treatment and by combining different residues, we facilitate the various treatment processes. Residues are collected by a pipe network or hauled to the site by specialised vehicles. For specific operations like the removal of chemical catalysts or complex cleaning operations in industrial process, specialised staff is made available to our clients for on-site services. We adjust to our clients' fluctuating production and thanks to our several treatment lines, storage capacities and redundancies, we can guarantee 365-day acceptance even during maintenance operations. Besides, industrial steam produced by our operations is returned to our clients to save on energy.

To maintain technological excellence, SUEZ and SCIP have established **R&D centres for water and waste**, supporting our operations and promoting innovation in environmental protection. We also leverage on our international operations to deploy smart solutions to achieve water and wastewater refined management. Choosing SUEZ as a partner, SCIP has made since 2002 the choice of technological and operational excellence.

Promoting **CIRCULAR** Economy
Achieving **GREEN** Development



Industrial water services promoting the circular use of water resources

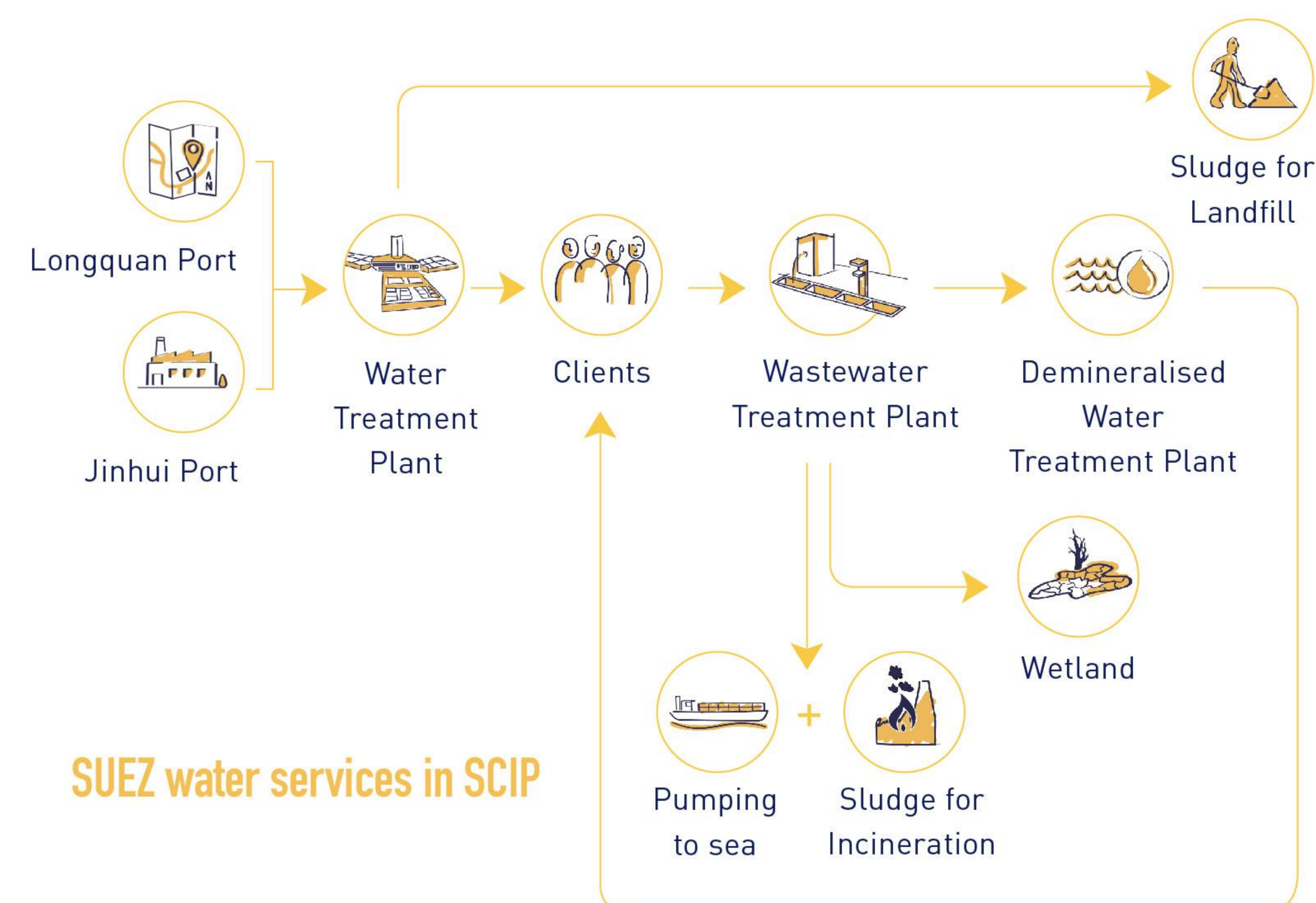
Major chemical companies have a high demand for water and generate highly concentrated wastewater. They require professional water services to achieve the balance between production, ecology and the harmonious development of industry and environment. In 2002, SUEZ signed a cooperation agreement with SCIP to provide water supply and wastewater treatment services for industrial customers in the Park, in keeping up with the Park's growing footprint. SUEZ runs a water treatment plant and a wastewater treatment plant, covering industrial water, drinking water, demineralized water supply, and wastewater collection and treatment services.

Our wastewater treatment plants (WWTP) are designed to treat all types of effluents generated from the production process, including those with high organic concentration and salinity.

- ⇒ At the WWTP, wastewater collected are treated according to its characteristics. It then enters the biological treatment process before being discharged into the Hangzhou Bay. In addition, the WWTP has set up several emergency wastewater tanks to effectively deal with emergencies during production and operation.
- ⇒ To enable **whole-process monitoring of wastewater quality**, the wastewater from each customer is transferred through **a dedicated line (or through a common line at staggered hours)**. This enables precise control and regulation of the wastewater treatment plant water quality, ensures stable operations for upstream customers, and increases preparedness for unexpected events. In addition, we further protect the environment through dual monitoring. While supervising the discharge of wastewater from customers, we are monitored by the Ecological Environment Bureau.
- ⇒ The treated effluents can **produce demineralized water** through process of advanced treatment and membrane technology, which can **save 2 million cubic meters of water** every year. This saving helps to realise the **reuse of resources**, reducing wastewater discharge, and optimises the ecological environment of the Park.

Water research centre (SWRc)

SUEZ, SCIP, Tongji University, and East China University of Technology jointly established the first research and development facility in China dedicated to industrial water supply and wastewater treatment research. The facility focuses on treatment feasibility for industrial wastewater, the recovery of treated industrial wastewater, and sludge reduction treatments and technologies.



SUEZ water services in SCIP



44,500 m³
daily wastewater treatment capacity



2,000,000 m³
water saved per year

Hazardous waste services achieving energy recovery and leading in the circular economy

A large number of chemical companies is often accompanied by multiple streams of industrial waste, with a particularly large variety of hazardous waste prone to react via complex processes. Therefore, professional treatment of hazardous waste is necessary to ensure safety and environment protection within and around the Park.

In 2003, SUEZ launched a partnership with SCIP to provide hazardous waste disposal services to the petrochemical giants within the Park, as well as for other industrial enterprises in and around Shanghai. SUEZ currently operates three incineration lines with an annual treatment capacity of 120,000 tons, which is **one of the largest facilities in Asia**. Our disposal solutions cover a wide range of hazardous waste and services spanning across acceptance, packaging, collection, transportation, incineration and analysis. We make sure that 298 types of industrial waste in 24 categories are disposed properly for the business continuity of our industrial customers. We also focus on making sure that the treatment of their hazardous waste is **100% compliant, safe and timely, with end-to-end transparency and traceability**.

120,000 tons
of hazardous waste treatment
capacity per year

143,000 tons
of carbon dioxide emissions from
coal combustion saved per year

Two systems effectively meet the goals of economic circularity, energy

- ⇒ Incineration that complies with European Union (EU) emission standards, which are among the most stringent in the world. For instance, dioxin is a harmful substance easily produced from incomplete incineration of waste. Our incinerators can control dioxin concentrations below the EU standards, thus ensuring cleaner air.
- ⇒ The incinerator is also equipped with an advanced **energy recovery system** to recycle the heat generated from incineration and **produce steam for industrial companies in SCIP**. By using steam as a replacement for traditional fossil fuel, industries within the Park reduce their fossil fuel consumption, carbon footprint and emissions of greenhouse gases.



SUEZ waste services in SCIP

SCIP waste R&D centre

SUEZ has set up a Waste R&D Centre in SCIP to develop innovative solutions for hazardous waste recycling and disposal, with a focus on improved waste-to-energy recovery, process optimisation, and industrial standardisation. We will also use this R&D platform to strengthen our partnership with Shanghai Jiaotong University and Tongji University on innovative technologies for waste disposal and utilisation.

Waste incineration

- Pre-treatment of waste before feeding
- Incineration process (secondary combustion chamber in rotary kiln), with waste retention duration of at least 2 seconds at a temperature of $>1,100^{\circ}\text{C}$

Exhaust treatment

- Four-stage off-gas treatment process (removal of halogens, sulfur, heavy metals, and fly ash)
- Online emissions monitoring system continuously transmits data to Shanghai Municipal Bureau of Ecology and Environment

Energy recovery

- Waste heat boilers recover energy and generate steam



Smart water solutions enhancing SCIP's comprehensive competitiveness

By deploying smart solutions for more sophisticated water management, SUEZ helps the Park pursue its dual goals of becoming a world-class industrial park and improving its overall competitiveness. We are currently involved in shaping the “1+6+X” model for the smart industrial park initiative to create a favourable business climate and provide quality services to industrial customers.



To promote company
for smart management



To increase customers'
satisfaction



To support government with
environmental monitoring and
management

Smart environment centre

In 2019, SUEZ and SCIP jointly invested in the construction and operation of the Smart Environment Centre, with the aim of further advancing SCIP's digital transformation and smart management. The centre connects the Park, customers, industrial water plants, wastewater treatment plants, desalination plants, and water networks, and it integrates a full suite of SUEZ's advanced digital solutions – including the AQUADVANCED® system, NOSE PLATFORM®, GIS system, and BI reporting, among others. The centre enables centralised, comprehensive, and 24/7 management of key production, operation, and safety data. It also helps improve environmental governance and customer satisfaction with environmental services. It has become a centre of excellence for showcasing smart industrial park services.



AQUADVANCED® Smart Water Networks

In order to meet SCIP's sophisticated management objectives, SUEZ has customised an integrated smart water networks solution. The solution draws upon data support from its GIS system; incorporates the hydraulic model of the AQUADVANCED® system; focuses on the mobile water supply and drainage network monitoring, integrated water supply, and drainage information; and provides network data as a service. Through “visualisation, digitalisation, modularisation, integration, and automation”, this smart water network management solution helps improve performance management and water network efficiency.

NOSE PLATFORM® Atmospheric Pollutants Monitoring System

To better protect air quality and safety in SCIP, optimise the operation of environmental treatment facilities, increase energy conservation, improve emissions reduction efforts, and meet public expectations for environmental quality, SUEZ has developed the NOSE PLATFORM®. This is an online monitoring platform for air pollutants designed specifically for wastewater treatment plants. The NOSE PLATFORM® helps plants achieve uniform and smart monitoring of atmospheric pollutants.

Wetlands

First Chinese industrial park to make integrated use of the Zone Libellule® technology in wastewater treatment

In 2017, we introduced SUEZ's patented technology to be deployed in the artificial wetland project in SCIP, the first project in a Chinese industrial park to **use the Zone Libellule® technology for the treatment of industrial wastewater**. The expanded artificial wetland in SCIP covers an area of over 50 hectares with coastal, salt-tolerant plants that act as strong purifying agents to further treat the high-salinity tailwater generated from the WWTP. This process, considered a typical nature-based solution, uses biological purification capabilities to treat industrial wastewater, while at the same time providing an ecological habitat for the local flora and fauna. It is truly “**based on nature and giving back to nature.**”



160
years

SUEZ is a major player in environmental services. For 160 years, SUEZ has supported local communities and industrial companies in the management of essential services such as **water, waste, and air quality**.

SUEZ incorporates smart and digital solutions with unique expertise and know-how across the entire value chain: Consulting, Design, Construction, Long-term operation and Financing.



66 million

people served by drinking water production plants operated by SUEZ



4.2 million tons of CO₂

avoided on behalf of the Group's customers



3.1 TWh

renewable energy produced



2 million tons

of secondary raw materials produced

In China for China

Across nearly five decades in China, SUEZ a strong history of leadership in driving sustainable development in the region. We have long considered climate change mitigation as one of our key strategies for sustainable development and business growth. We think 360° sustainability when we manage water distribution or waste treatment. Our solutions aim to reduce the climate change consequences on water, promote material recycling, recovery and reuse, and develop climate-responsible models to support China reaching its ambitious environmental goals.

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