

Surbana Jurong's Experience with Chemical Parks around the World

July 2023



SJ in Numbers

40

Countries

- CANADA
- USA

16,000+

Employees

- UK

- AFGHANISTAN
- KAZAKHSTAN
- GEORGIA

- SHANGHAI
- BEIJING
- SHENZHEN
- XI'AN
- HONG KONG

#14

2022 World's Top Architecture Firms (WA100)

#23

2022 Top International Design Firms

100+

Nationalities

- CHILE
- MEXICO

- SOUTH AFRICA
- KENYA
- TANZANIA

- INDIA
- SRI LANKA
- PAKISTAN
- BANGLADESH
- NEPAL
- SAUDI ARABIA
- UAE

- MALAYSIA
- VIETNAM
- MYANMAR
- INDONESIA
- PHILIPPINES
- PACIFIC

7,000

Active Projects

US\$1.86B

2021 Fee Revenue

Singapore (HQ)

Singapore
8,600 staff

North Asia
500 staff

SEA
1,100 staff

ANZ
2,000 staff

SAME
2,100 staff

Africa
900 staff

Americas
400 staff

UK
400 staff

DONGFANG LINGANG NET ZERO INDUSTRIAL PARK, HAINAN, CHINA



Industrial Development Planning



Dongfang Lingang Industrial Park is one of the 11 key parks planned and constructed in Hainan Province.

Planning area: 39.38 square kilometers

A holistic development of the Oil and Gas industry propelled by extensive energy industrial development, particularly in the domains of thermal and wind power generation. Supported by the pillars of the chemical industry, fine chemical industry, equipment manufacturing industry, and energy industry.

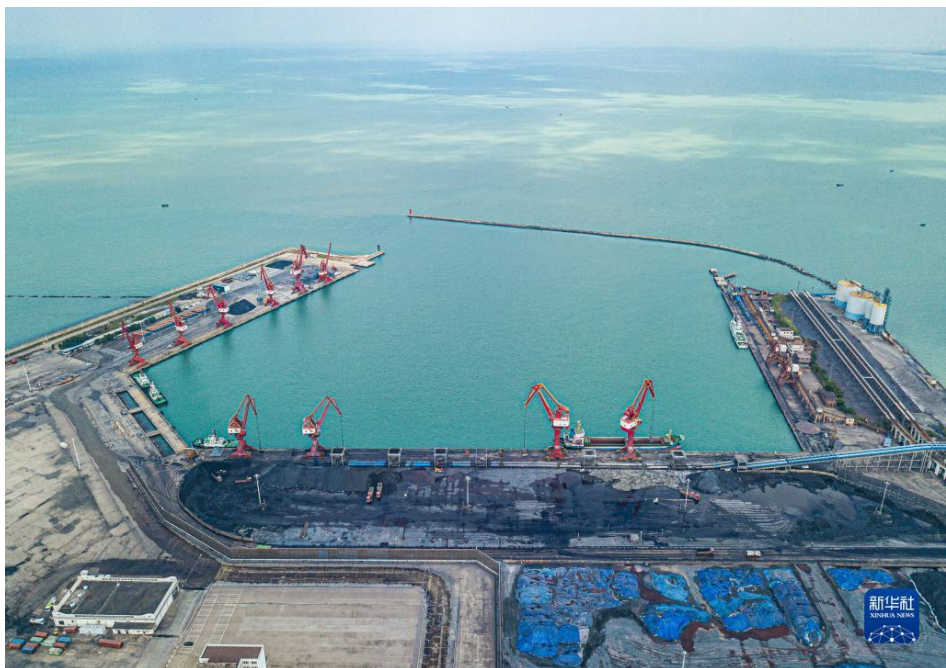
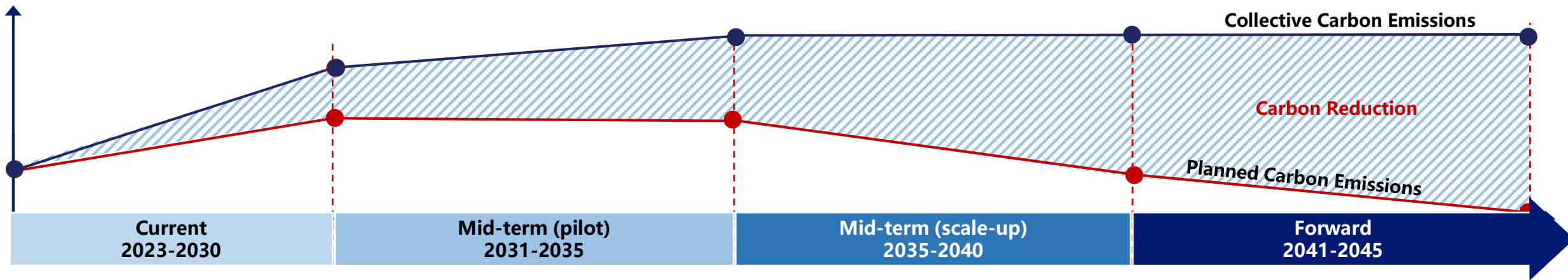
Main key strategies



DONGFANG LINGANG NET ZERO INDUSTRIAL PARK, HAINAN, CHINA



The Oriental Lingang Industrial Park is poised to become a pioneering leader as a demonstrator of the national net-zero emission target.

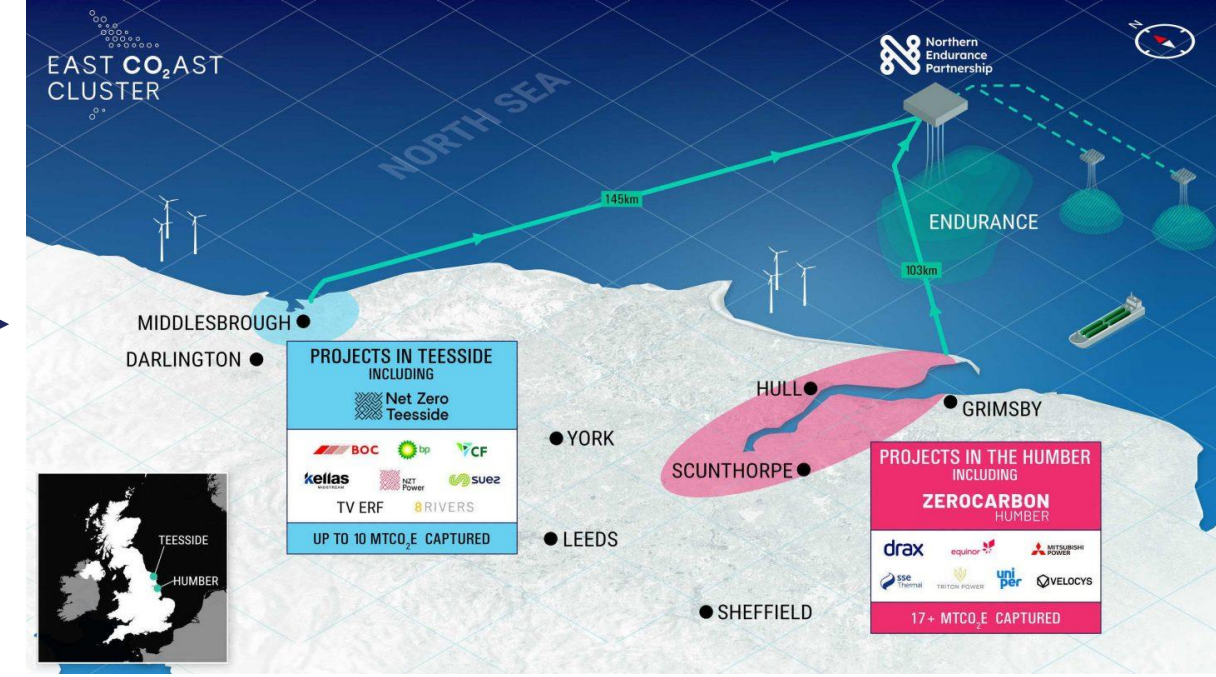
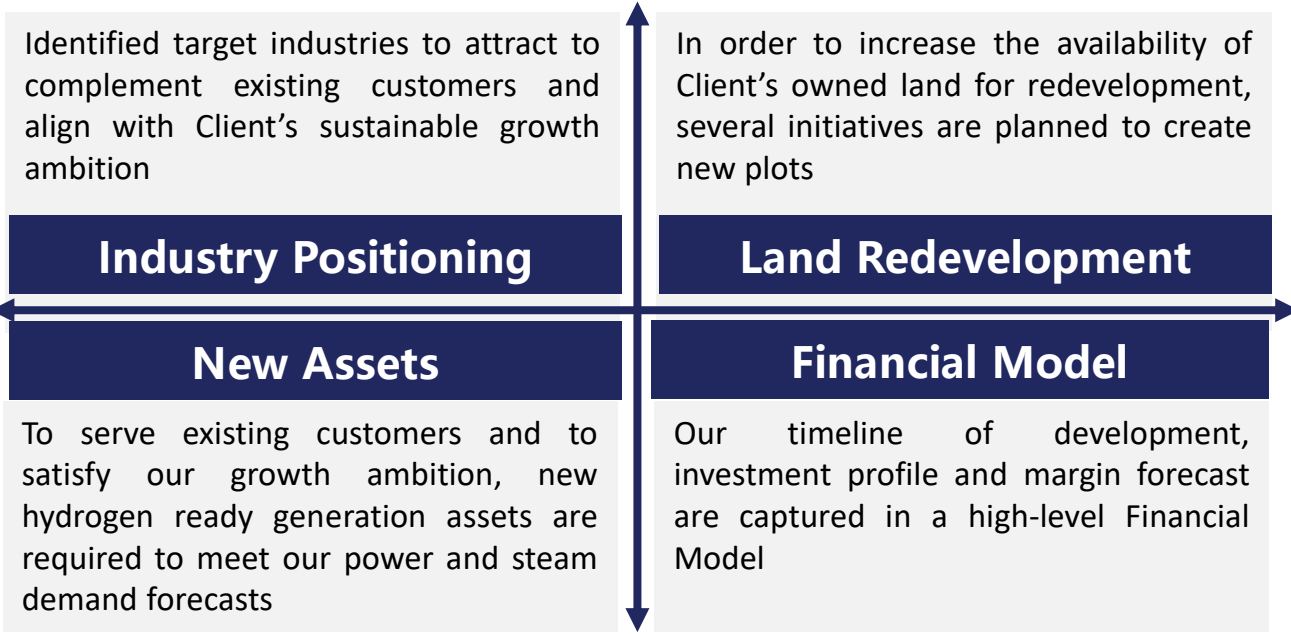


The Hainan Free Trade Port High-tech Industrial Base

- ✓ Development of oil and gas combined with high-end new materials and a sustainable and efficient fertilizer industry.
- ✓ Established as an industrial base with "billion-level carbon-rich gas + billion-level output value" potential
- ✓ Nationally recognized as a carbon utilization demonstration park that drives transformative impact
- ✓ Ultimately, the base seeks to create an influential model of "net zero emission & circular industry" that resonates internationally.

REJUVENATION STRATEGY FOR TEESSIDE, UNITED KINGDOM

Key Outcomes of Transformation to a Net Zero industrial cluster



Background of Teesside industrial cluster

The Teesside industrial cluster is a UK energy hub, with access to gas from UK gas fields, helping ensure national energy security.

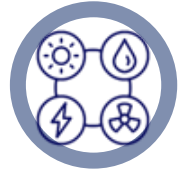
Teesside has a rich industrial history. Alongside planned hydrogen and CCUS projects, this makes it the perfect test bed for the wider economy.

REJUVENATION STRATEGY FOR TEESSIDE, UNITED KINGDOM

5 STRATEGIES TO ACHIEVE THE TARGET



By leveraging and augmenting infrastructure and utilities service provisions in Wilton for sustainable growth



By decarbonising existing utilities through an energy transition plan



By optimising Wilton's land strategy through the adoption of a Conceptual Master Plan



By identifying synergy in industry clustering and forecasting its growth potential



By comparing asset investment scenarios for achieving net zero and attracting new tenants

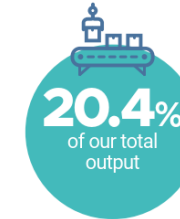


JURONG ISLAND IN SINGAPORE

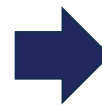
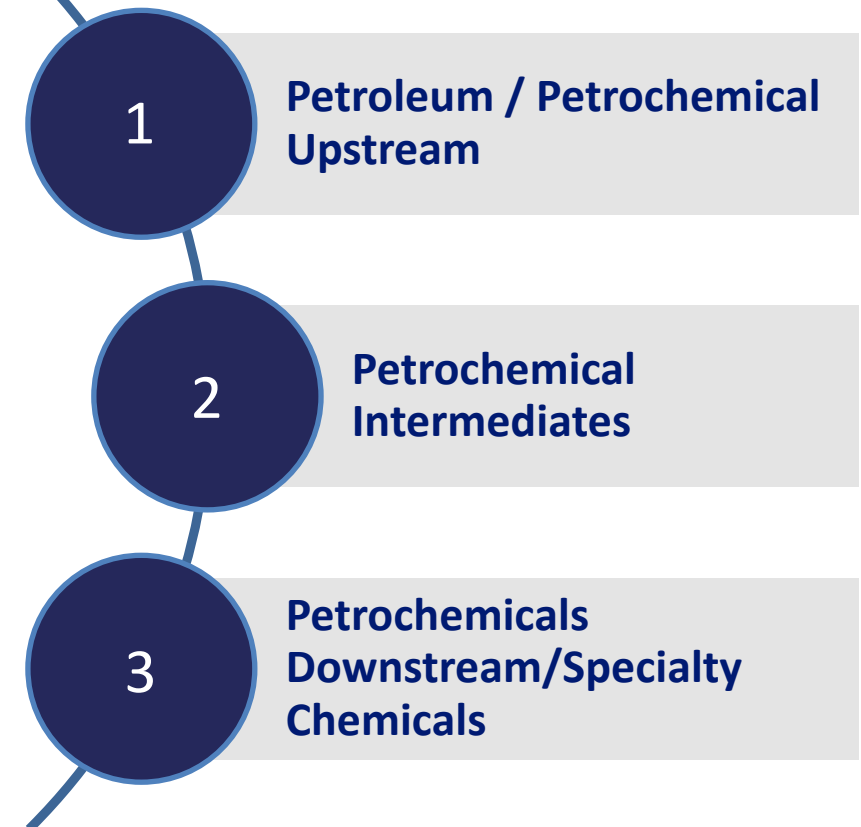


Conceptualised to operate as an integrated chemical hub with a vertically integrated structure

Home to over 100 leading companies from global energy, petrochemical and specialty chemicals sectors, Singapore's Liquefied Natural Gas (LNG) terminal, services providers and power and utility companies that supply around 50% of Singapore's total domestic electricity demand



CLUSTER DEVELOPMENT & INTEGRATION STRATEGY



JURONG ISLAND IN SINGAPORE



The vertically integrated chemical hub concept enabled entire clusters along a chemical production chain to be located on the island to interlink their production processes.



Allowed companies to have a cost-efficient structure, saving up to 30% on capital outlay and 15% on transport.



Singapore Economic Development Board (EDB), the lead government agency for planning and executing strategies to create sustainable economic growth for companies in Singapore, had launched a “Sustainable Jurong Island” to transform Jurong Island into a sustainable energy and chemicals park.

By 2030

Increase the output of sustainable products by **1.5 times** from 2019 levels



Ensure that the refineries and crackers are in the **top quartile** of the world in terms of energy efficiency



Realise at least **2 million tonnes** of carbon capture



By 2050

Increase the output of sustainable products by **4 times** from 2019 levels



Achieve more than **6 million tonnes** of carbon abatement per annum from low-carbon solutions

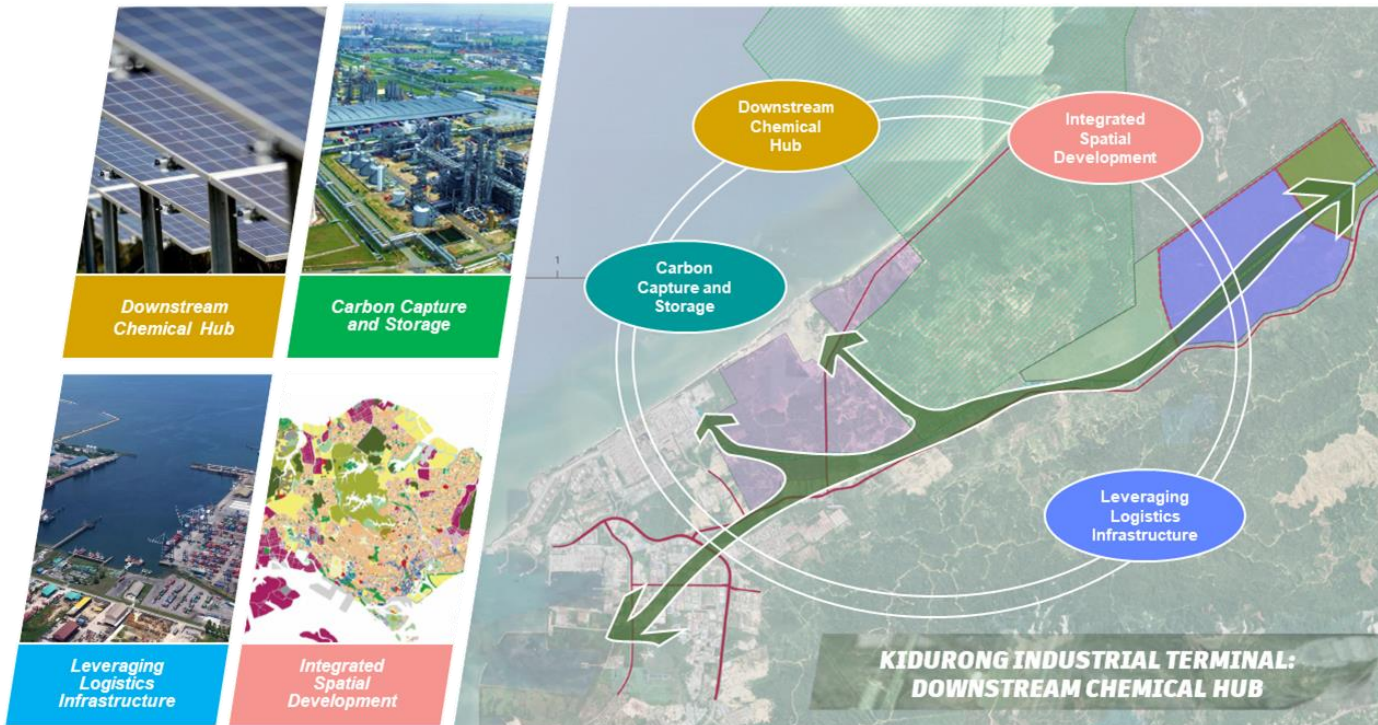


Industry	FAI (\$S million)	TBE (\$S million)	Expected VA generated/annum (\$S million)
Biomedical Manufacturing	234	216	541
Chemicals	4,891	139	1,032
Education/Healthcare Services	3	56	62
Electronics	4,590	524	1,780
Engineering & Environmental Services	1,338	2,052	4,485
General Manufacturing Industries	395	81	244
Headquarters & Professional Services	395	2,028	5,316
Infocommunications & Media	981	1,222	1,543
Logistics	344	315	320
Precision Engineering	470	1,021	7,369
Research & Development	1,239	1,171	6,444
Transport Engineering	303	196	299
Total	15,184	9,020	29,434

Table 1: Investments by Industry

The chemicals sector accounted for **32.2% of fixed asset investments with S\$4.89billion (US\$3.63 billion)**

TANJUNG KIDURONG & BINTULU IN SARAWAK, MALAYSIA



FUTURE OF KIDURONG

Surbana Jurong was engaged by the Ministry of International Trade, Industry and Investment (MINTRED) to undertake a consultancy study as part of the State's broader industrial transformation plan to maximise the value of its decarbonisation drive.

A key aim of the study is to meet the future needs of Sarawak's economic development, with sustainability as a core area of growth, especially in the development of the downstream oil and gas industry.

1,500 hectares of land has been assessed for future heavy industry development in Kidurong

CONCEPTUALISATION OF TANJUNG KIDURONG

Bintulu was a relatively small settlement until the beginning of its rapid development in the 1970s following the discovery of large reserves of natural gas offshore. The Tanjung Kidurong area, about 12 km from Bintulu town around the old airport location, was found to be suitable for the development of gas liquefaction and deep-water port facilities.

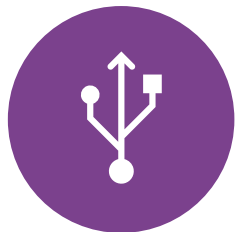
Since the early 1980s, when the first liquefaction plant at the PETRONAS LNG Complex and export facilities at Bintulu Port started operations, the Kidurong area has developed over the years into a full-fledged industrial area for O&G, heavy and light industries.

In the 1990s, Shell MDS was operationalised in Bintulu as the world's first commercial GTL plant of its kind. Development of export facilities at Bintulu Port have also attracted a large cluster of palm oil refineries and other heavy industries such as a cement plant, metal fabrication, fertiliser facilities etc.

Today, Shell MDS Malaysia boasts an output capacity of 500,000 tonnes of GTL Products per annum and exports its products to over 50 countries internationally. As of 2023, the Petchem Industrial Park has attracted MYR 45 billion worth of projects. Development of two onshore gas plants are expected to start in 2025. South Korea and Japan hydrogen projects are expected to be operational in 2027.

TANJUNG KIDURONG & BINTULU IN SARAWAK, MALAYSIA

Kidurong will be the ideal location for a hydrogen production hub with large-scale water electrolysis.



Large-scale electrolyser installation could be powered directly by renewable electricity from Lawas.



One of the principal benefits of having a large-scale hydrogen hub in Kidurong is its ability to meet local demands in petrochemical industry.



Allows for the clustering of a number of services and end-user demands around a centralised hydrogen hub, which lowers cost.

