Increasing Efficiency and Reducing Costs for Container, Bulk and Break Bulk Terminals in Ports Operation Management

Port Terminal Infrastructure

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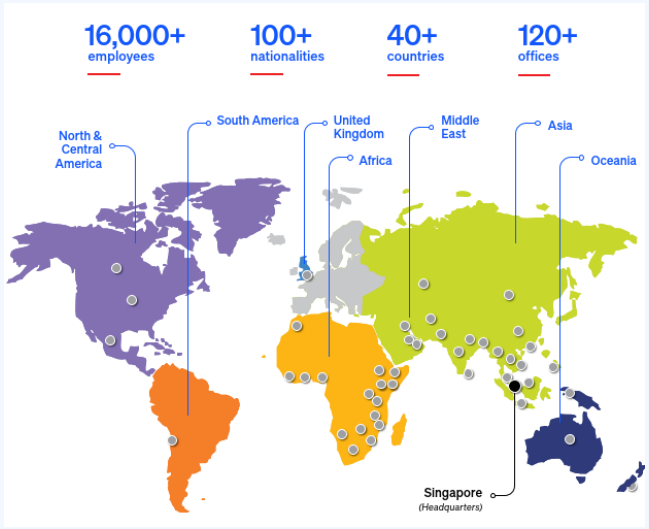
Real impact, made together

SJ Group is a global urban, infrastructure, and managed services consulting firm headquartered in Singapore, known for delivering sustainable solutions across the entire project lifecycle.



- One of the largest Asia-based global urban, infrastructure and management services consulting firms
- Over 70 years track record of successful project delivery
- Ranked #23 in ENR 2024 Top 225 International Design Firms
- Ranked 14th in World Architecture 100 2025
- Increased Singapore's land mass by 16% through reclamation
- Completed master planning in over 60 countries
- Planned over 100 industrial parks worldwide
- Engineered 1 of 7 engineering wonders of the modern world – Snowy Mountains Hydroelectric Scheme
- Engineered Southeast Asia's 1st underground rock cavern with a storage capacity of 17.6 million barrels of oil
- Designed over 1 million homes in Singapore

Building + Cities (B+C) | Infrastructure + Energy (I+E) | Integrated Solution

Diversity is our strength

Founded in diversity, and now a global organisation of 5400+ employees across 38+ countries, we harness diversity of thought, experience and expertise driven by a common purpose.

Through our network of global specialists and by collaborating with local partners, we connect you with the best teams and capabilities to deliver highly innovative and sustainable solutions.

5400+
Employees

38+
Countries

100
Nationalities

Building + Cities (B+C)

Infrastructure + Energy (I+E)

Integrated Solution

SJ Group

Seamless delivery across business lines

Working together, the SJ Group is leading smart and sustainable solutions, at every scale, to build and create a regenerative future.

SJ Real impact, made together.

Buildings + Cities

Urban Development + Residential
- Residential
- Urban Development

Transport
- Rail Stations
- Terminals (Airports, Ground Transport, Marine, Inter-modal)

Mixed-Use + Commercial
- Office
- Retail
- Hospitality
- Transit Oriented / Mixed-Use Development

Healthcare + Institutional
- Healthcare + Life Sciences
- Education + Civic + Culture
- Defence + Government

Industrial
- Data Centre + Technology
- Manufacturing + Logistics

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Infrastructure + Energy

Transport (Infrastructure)
- Geotechnics & Tunnels
- Roads & Highways
- Rail & Metro
- Aviation & Aerospace
- Ports & Maritime

Water & Environment
- Environment
- Waste & Resource Recovery
- Water Infrastructure
- Coastal Engineering & Management
- Water Resources & Irrigation
- Dams & Hydropower

Energy
- Renewables
- Power & Gas
- Energy Transition
- Fuels

smec · KTP · SURBANA JURONG

Integrated Solutions

Security
- Physical Security
- Digital Security
- Operational Cyber
- Security Beyond Traditional Training

Digital Technology Services
- Campus, Estate and City-Wide Asset Monitoring
- Comprehensive Digital Solutions

Facilities Management (FM)
Asset Management (AM)
- Integrated FM
- AM Consulting
- Integrated Command Centres
- Smart FM

Mission Critical Facilities (MCF)
- Blast Proof Design
- Testing and Certifications
- Specialist MCF Related Solutions

Defence
- Design, Engineering & Security Consultancy
- Live Firing & Simulation
- Remote Systems & Sensors
- Fitness & Wellness
- Freight & Logistics

AETOS · smec · PROSTRUCT CONSULTING

Connect global teams, seamless local delivery

As part of the SJ Group, SMEC offers end-to-end services from planning and engineering to coastal, environmental, and asset management for comprehensive port development.

Having undertaken port planning, design and construction management for port freight and passenger facilities, SMEC has established a diverse portfolio in maritime infrastructure. From the Mangapwani multipurpose port facility in Zanzibar, providing adequate infrastructure to meet the growing demands of trade and cargo passage through the region to port expansion in Northern Australia supporting regional economic growth, our team has a track record of overcoming diverse port challenges.

Seamless delivery across:

- Planning and Feasibility
- Design
- Construction
- Operations & Maintenance
- Port Planning, Operations & Logistics
- Ports & Maritime Infrastructure Development
- Terminal Landside Development
- Intermodal Facility Planning & Development
- Dredging & Reclamation
- Geotechnical Investigation & Engineering
- Contamination, Environment & Sustainability
- Asset Management & Durability Design

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PH Port Terminal Infrastructure

Cargo terminal infrastructure in the Philippines is undergoing rapid modernization, driven by private-sector investments from major operators like International Container Terminal Services, Inc. (ICTSI) and Asian Terminals Inc. (ATI), largely aligned with the government's "Build Better More" program.

Key developments focus on increasing capacity for larger vessels, adopting green technologies (hybrid RTG cranes), and automating terminal operations

PH Port Terminal Modernization

The modernization including the adoption of automation, digital systems (IoT, AI, blockchain), and advanced handling equipment significantly boosts port operational efficiency by increasing throughput, reducing vessel turnaround times, and enhancing safety.

These improvements lead to lower logistics costs, better resource utilization, and improved sustainability through reduced emissions

Green Port for Cargo Terminal Operations

Green port initiatives enhance cargo terminal operations by improving efficiency, reducing long-term operational expenditures (OPEX), and lowering environmental impacts. Key benefits include lower energy consumption, reduced carbon emissions via electrified equipment and shore power, improved safety, and better regulatory compliance.

Green Port for Cargo Terminal Operations

Key Operational Benefits:

- **Energy and Cost Efficiency:**

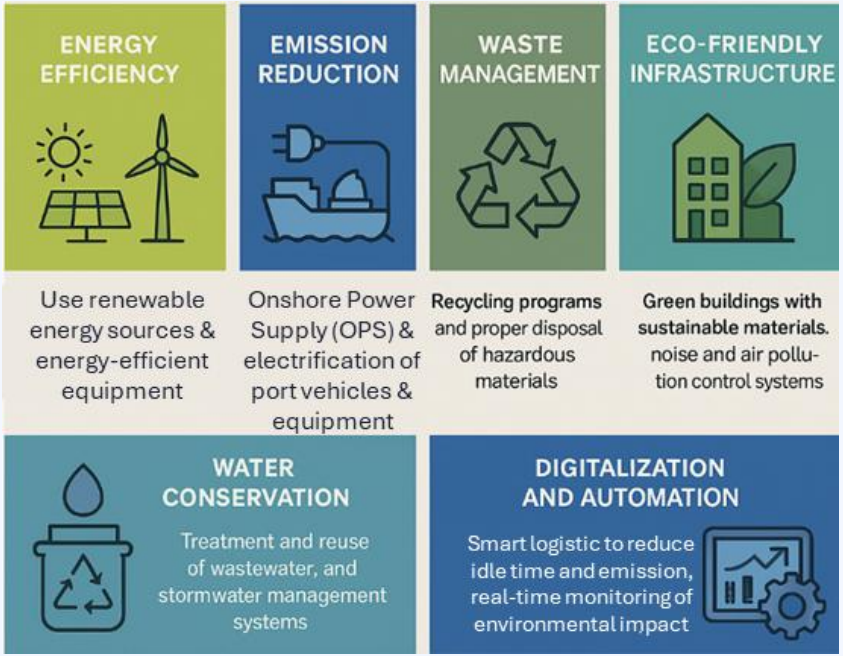
Generating green power on site at ports (Solar, Wind)

Improved Terminal Performance:

Green technologies optimize processes, decreasing bottlenecks and increasing throughput

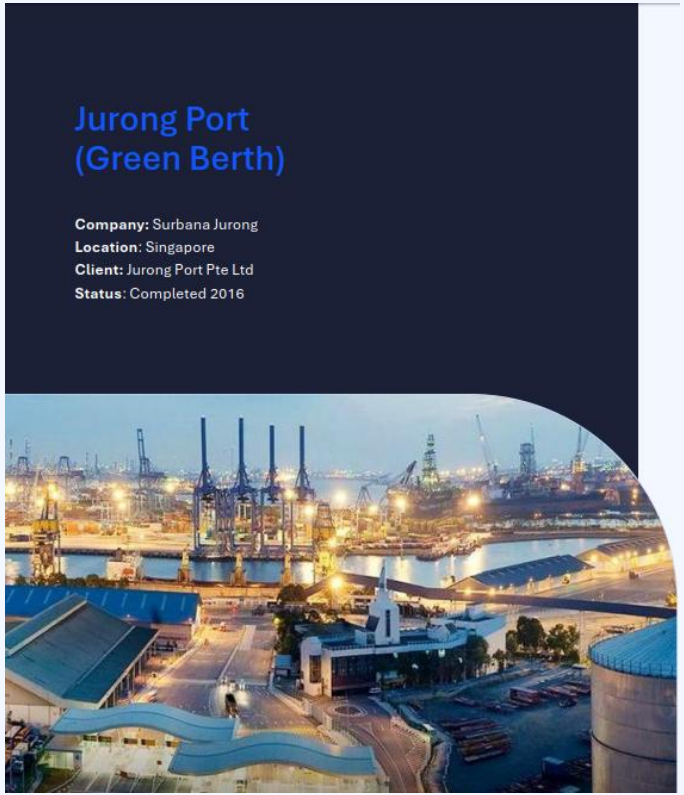
- **Environmental Compliance and Reputation**
- **Sustainable Infrastructure:**

Investing in greener infrastructure and energy optimization (EV's, On Shore Power Supply for berthed ships)



Green Port for Cargo Terminal Operations

- Reduction of GHG emissions produced at a port come from docked vessels.
- Port operators can actively contribute to the sustainability journey in port operation efficiency (e.g. reduce ship's fuel consumption & emission during dock as well as reduce port's energy waste)
- Charge lower fees for green vessels. As of 2022, 60% of ports in Europe offered lower fees for "green" vessels . Some ports in Asia (e.g. Singapore, Shenzhen, and Hong Kong) are also adopting this environmental port fee.



How Surbana Jurong Can Support Green Port Development

Master Planning & Design	Sustainable port masterplan, green infrastructure, climate resilience design
Environmental & Sustainability Consulting	ESIA study, carbon reduction strategies, sustainability roadmap, advise on green certification compliance
Engineering & Technical Solution	Design OPS infrastructure, integrate renewable energy sources, green port design
Smart & Digital Solution	Use AI & data analytic to optimize operations, implement digital twin, smart port design
Project Management & Implementation	Provide end-to-end project delivery

Jurong Port Green Berth (J10 & J11)

Berths J10 & J11 of Jurong Port are the **1st green berths in the world**.

The BCA Singapore has awarded a Green Mark (**Gold**) certification for berth J10 & J11.

The award recognizes the berth's green construction methods and materials and environmental sustainability features (recycled concrete from existing structures at the port).

The challenge:

There are limited items to comply with the available Green Mark guidelines as a port infrastructure project. There was no international green certification which offered any guidelines for port facilities.

After working with owners and BCA, the team managed to kick start the project and achieved the very first Green certified port in the world with a Green Mark Gold award. This marked the Port as a distinguished leader locally as well as internationally in terms of sustainability.

Client: Jurong Port

Year: 2016

Scope of works:

Concept & Basic Engineering Design;

Project & Construction management

Jakarta Integrated Green Terminal (JIGT)

The Jakarta Integrated Green Terminal (JIGT) project aims to address the increasing energy demands in Java and supporting Indonesia's shift towards a net-zero economy. As the country's population grows and urbanization accelerates, there is an urgent need for modern, world-class terminal infrastructure to support sustainable economic development.

The JIGT will be located at Kalibaru area on the new reclaim land. JIGT ambition is to achieve future certifiable claim of Carbon Neutrality (ISO 14068-1:2023).

As a 'Green' Terminal, JIGT has the opportunity to be environmentally-conscious on two main fronts: providing **Green Products** as well as **Green Operations**.

On the product side, it has been determined that JIGT will be a hub for green products (e.g. Liquid CO2, Used Cooking Oil, Sustainable Aviation Fuel). It will also assist with the transition away from higher-emissions Coal-fired energy production by providing facilities for Liquid Natural Gas (LNG).

The scope of Green Operations is to reduce the emissions incurred through the operation of facilities.

Client: PIS

Year: 2024

Scope of works:

Masterplan & Concept Engineering Design;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