Port Environmental Protection
Past, Present & Future

A member of the Hutchison Port Holdings Group
Hong Kong Port - The Heart of Asia
Social Responsibility and Commitment
Green Accomplishments at HIT
Environmental Protection Programme Implementation at HIT
Other Initiatives and Options
Port Environmental Protection

Social Responsibility and Commitment
Social Responsibility and Commitment

- HIT’s Environmental Policy
- Organisational Structure for Managing Environmental Issues
- Business Environment Council Membership
- Clean Air Charter Compliance
HIT’s Environmental Policy

As a world-class private container terminal, HIT is committed to conducting its business in an ethical and socially responsible manner by protecting the environment and conserving natural resources.

• **Legal Compliance**
  HIT complies with applicable environmental regulations and statutory requirements and sets its own guidelines where regulations do not exist.

• **Pollution Prevention, Resource Conservation and Waste Minimisation**
  HIT factors the environment into planning and operations in order to prevent pollution, save energy and conserve resources.

• **Continual Monitoring and Improvement**
  The company conducts periodic audits and self-assessments to check compliance with environmental policy.

• **Sustainable Development**
  HIT communicates environmental objectives throughout the company and to business partners to ensure environmental sustainability. It is the objective of every employee from top management to ground staff to help implement sustainability initiatives.

  Managing Directors, General Managers and Department Heads are all members of the HIT Environmental Steering Committee.

  HIT also commits resources to implement sustainability policy.
HIT’s Environmental Policy
Mission Statement

HIT commits the resources needed to implement environmental policy. Environmental policy and sustainability are among HIT’s primary objectives. They are the responsibility of every employee from top management to ground staff.
Organisational Structure for Managing Environmental Issues

**Organisational Chart:**

- **MD**
  - Directors
    - General Managers
      - Engineering Managers (responsible for environmental works)
      - Environmental Steering Committee
    - Environmental Awareness Committee
    - Consultants
    - Superintendents/ Engineers (responsible for environmental works)
Organisational Structure: Environmental Management Committee

- HIT recognises the value of having an **Environmental Management Committee** and supports its operations within the company to help manage environmental matters in a structured and coordinated manner.

- The **Environmental Steering Committee** meets on a quarterly basis to formulate, issue and implement HIT’s environmental policy.

- The **Environmental Awareness Committee** comprises representatives from the workforce who develop environmental awareness and communicate environmental objectives throughout HIT.
HIT is a member of the Business Environment Council (BEC) – an organisation set up by business for business to provide environmental solutions. BEC members include organizations of all sizes across diverse sectors in Hong Kong.

HIT participates in the following BEC committees:
- Transportation and Air Pollution Working Group
- Sustainable Development Working Group
- Waste Reduction Working Group
Compliance with Clean Air Charter

- HIT signed the Clean Air Charter of the Hong Kong General Chamber of Commerce and the Business Coalition on the Environment in 2006.
- Members seek business community support to reduce emissions and manage air quality.
- HIT actively investigates initiatives to reduce emissions of diesel-driven cranes.
Clean Air Charter - Awards Recognising HIT's Environmental Achievements

• Hong Kong Awards for Industries: Environmental Performance – Certificate of Merit 2003 and 2007

• Gold Wastewise Logo 2007
Port Environmental Protection

Green Accomplishments at HIT
Green Accomplishments at HIT

- Reduction of Building Electricity Consumption
- Green Office
- Solar Water Heating
- Dimming of Quay Crane Floodlights When Idling
- Control of Ozone Depleting Substances
- Container Yard Wastewater Treatment
- Industrial Waste Recycling
- Chemical Waste Treatment
- Reduction of Noise Pollution
- Paper Conservation
Reduction of Building Electricity Consumption

- Used new technology in controlling indoor air temperature and airflow (10% energy savings)
- Installed e-ballasts and energy-saving lighting (15% energy savings)
- Promoted internal temperature of 25°C
- Annual electricity savings ~ 750,000kWh
Green Office

Waste Recycling

Installed color-coded recycling bins to collect
  – Paper
  – Plastic bottles
  – Aluminum cans

Installed office bins for
  – Used envelopes (for internal mail)
  – Scrap paper (for draft printing)
Green Office

Set up a recycling programme in 2005 to collect:

• Compact discs
• Rechargeable batteries
• Expanded polystyrene (supported by Friends of the Earth)
Green Office

Canteen Wastewater Treatment

- Installed under-sink grease traps
- Installed dissolved air flotation (DAF) system to separate/retrieve oil from emulsified grease before off-site disposal
- O&G and COD levels reduced significantly (94% and 45% respectively)
Green Office

Reduction of Water Consumption

- Installed automatic water taps and seawater flushing devices for urinals
- Installed water-saving devices in showers
- Reduced water consumption by 15%
- Reduced sewage discharged to wastewater treatment plant by 10%
Solar Water Heaters

• Installed at Tower 1 in 2005 and Tower 4 in 2006
• Yearly savings of 16,000kWh
Dimming of Quay Crane Floodlights When Idling

- Non-essential floodlights on quay crane booms automatically switch off when boom is raised.
- 41 cranes modified in 2006
- Saves 262MWh per year
Control of Ozone Depleting Substances

- Replaced all BTM firefighting systems with FM200 or CO2 systems
- Replaced six R22 chillers with chillers that use eco-friendly R134a refrigerant
Yard Wastewater Treatment

- Installed drainage system to collect emulsified grease in maintenance workshop wastewater for off-site disposal
- Added underground oil interceptors beneath petrol filling stations
Recycling of Industrial Waste

- Added containers to collect and separate recyclable materials such as batteries, scrap metal, toner cartridges and tyres
Chemical Waste Treatment

- Set up chemical waste collection points
- Set up centralized chemical waste storage center
Purification of Used Oil

• Dynamic oil purifiers recycle lubricant and hydraulic oil

• Reduced total lubricant consumption by 46% to 26,000 litres per year

• Benefits:
  – Waste minimisation
  – Cost savings
Noise Abatement

- Timers reduce volume of yard crane warning sirens from 23:00 – 07:00 to reduce impact on nearby homes.

- Loud hailers and PA systems are muted except during maintenance and emergencies.

- Conducted feasibility study on using low-noise engines/equipment
Paper Conservation

Set up the following electronic systems:
- eProcurement System
- Computerised Inventory Control System
- Annual Leave Application System
- Clock Card System
- eInvoice System
- eFax System

Promotion of two-sided printing cut paper consumption by 20% in 2007
Port Environmental Protection

Environmental Protection
Programme Implementation at HIT
Switch from IDO to Ultra-Low-Sulphur Diesel (ULSD)

• Sulphur content reduction from 0.5% (IDO – 5,000ppm) to 0.005% (ULSD - 50ppm)
• Reduction of SO$_2$ emissions by over 90%
• Additional cost per year: HK$4.2 million
• Schedule: Completed phases I, II and III in 2007 and IV in 2008
• On track to exceeding HK SAR guidelines
Electric Rubber-Tyre Gantry Crane

Diesel Engine

Electricity
Required Works
Electric RTGC

Benefits

• Improves energy efficiency, lowers costs by 65%
• Eliminates SO₂, NO₂, particulate matter and black smoke
• No engine noise
• Eliminates engine maintenance; reduces disposal of lubricant, filters, engine components, etc.
eRTGC Implementation Plan

Phase I – Completed two prototypes in Q2 2007

Phase II – 17 units in satellite yard in Q1 2008

Phase III – 13 units in Terminal 9 in Q4 2008

Phase IV – 14 units in Terminal 9 and 12 units in Terminal 4 by 2009

Phase V – 40 units in Terminals 6/7 in 2009/2010
Targets

- 70% of RTGCs converted from diesel to electric power
- CO$_2$ emission reduction of 20 kilotonnes by 2010 (234 tonnes/RTGC/year)
- Teaming up with CLP to meet power quality requirements
Engine Speed Reduction

- Fuel Consumption \( \propto \) Engine Speed
- Reducing engine speed from 1800 to 1500 rpm saves up to 15% of fuel
- Payback period is 3.5 months
- A simple way to realise fuel savings without a huge investment
- 30 RTGCs modified in 2007; remaining 30 will be modified in 2008
Control of Vehicle Emissions

- EURO III/IV engines in new vehicles
- All company vehicles will be replaced with EURO III/IV vehicles within 5 years (50% complete).
- Cleaner and more fuel efficient (25% black smoke reduction and 5% fuel reduction)
Electronic Ballasts for Crane Floodlights

• Developed electronic ballasts for crane floodlights (high intensity discharge lamps, 600-1,000W) to reduce energy consumption by 40%

• Installed 346 e-ballast floodlights on 6 QCs, 5 RTGCs, 12 RMGCs and 2 BCs

• 1,000 more units scheduled for replacement in 2008
Port Environmental Protection

Environmental Initiatives
Under Investigation
Variable-Speed Engine

- Could greatly reduce pollution and noise from RTGCs
- Could reduce fuel consumption by 20%
Hybrid RTGC

- **Lithium-ion batteries**
  - Would reduce engine size by 2/3
  - Would recharge batteries when lowering containers and when idling
  - Would supply power from engine and battery combined during hoisting
  - Could save up to 57% on energy costs
  - Total modification cost: HK$1.2 million per RTGC
The controller is the heart of the system

- Engine Generator
- Converter
- Charging & Discharging Controller
- Storage Battery
- Li-ion Battery
- Electrical Box
- Engine Generator
- IM
- Others
- DBU
- Resistor
- AC
- DC

Core System

Other components include:
- Inverter
- Aux. /Lighting System Diagram

The controller is the heart of the system.
Comparison of Black Smoke Emission During Hoisting

Significant reduction in smoke emission
Electric Car

• Ongoing research into first Hong Kong-made electric patrol car

• My Car-EV: a fully electric vehicle with no emissions
Port Environmental Protection

Other Initiatives and Options
Other Initiatives and Options

- Cold Ironing
- Hybrid Container Trucks
- Biodiesel
- Renewable Energy
  - Solar Energy
  - Wind Turbines
- CNG/LNG Power in Mobile Equipment
Cold Ironing

- Ships would run on shore electricity instead of engines while in port
- Eliminates particulate matter, nitrogen oxides, sulfur oxides and greenhouse gasses
- A 7.5MV.A supply would be dedicated to one berth (350m)
- Shore power cheaper than light diesel
Hybrid Container Trucks

- Prototypes available and under development
- Minimum of 30% savings according to field tests
- Three-year payback period if diesel prices stay steady or go higher
- Service life of road trucks usually up to 10 years
Biodiesel

- Obtained from vegetable oils or animal fats
- Can be blended with petrol or diesel, or used pure: 5%, 20% and 100% = B5, B20 and B100
- Blended biodiesel may work in any diesel engine with few or no modifications to the engine or fuel system and with little impact on performance.

Drawbacks

- Encourages deforestation and raises food prices, while damaging ecosystems
- Biofuel production uses more fuel in the form of nitrogen fertilisers, derived from natural gas, and in the refining process than is expended by fossil fuels in car tanks.
Solar Energy

- Widely used for water heating and generation of electricity in HK
- Large open spaces are generally required
- Development cost is high; payback period is long
- With solar insolation \((\text{MWh/m}^2/\text{yr})>3.00\)
Wind Turbines

- From 100kW to MW; can be grouped on wind farms
- Turbines below 100kW sometimes combined with diesel generators, batteries, and photovoltaic systems to form hybrid wind systems
- Long payback period
- Average annual wind speeds of at least 4.0m/s; preferably above 6m/s above ground level
Our Mission

To be the global market leader in port development, operations and logistics services
Recent Environmental Awareness Committee Activities

• Regular communication of environmental protection messages to the staff through e-mail and posters

• Environmental protection promotion
  – Environment Week: promotes recycling through exhibitions, used item collections, quizzes, daily tips, and the screening of environmental protection videos