

ENVIRONMENT AND GREENER PORTS



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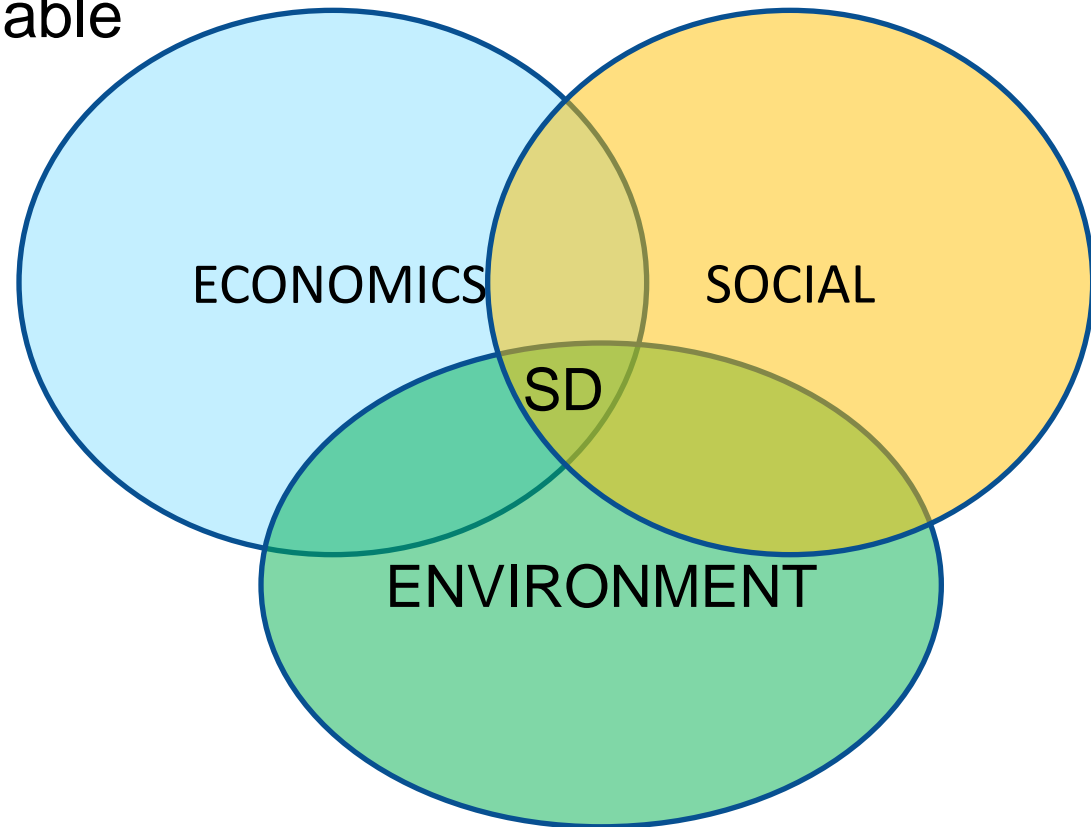
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Sustainable Development

Green Ports & Harbours

The three pillars of sustainable development:

1. Economic
2. Environmental
3. Social



International Developments

Environmental & Carbon Market

Green Carbon Fund	New Green Carbon Fund (\$100b annually)
Kyoto Protocol Extension	31 countries have agreed to extend the Kyoto Protocol until 2020
New Market Mechanism for Greenhouse Gases(GHG)	India, China and USA have agreed to agree on a new legally enforceable international agreement by 2015

The Protocol was adopted on 11 December 1997 in Kyoto, Japan, and entered into force on 16 February 2005. As of September 2011, 191 states have signed and ratified the protocol.

[Source : UNFCCC]

Industry Overview

Green Ports and Harbours

Global GHG emission	2.09% - 3.5% of global emissions
Business Case	Moving freight by sea is better for the environment than by land or air
Creating carbon credits under the Kyoto Protocol	Ports and Harbours needs it

Industry Challenges

Green Ports & Harbours

Major Challenges

Economic & Environmental	We need ports and harbours that are more energy efficient, its good for business. The question is how?
Market Based Mechanisms	<p>Market Based Mechanisms place a price on carbon and serve two purposes:</p> <ol style="list-style-type: none"> 1. Create an economic incentive to reduce fuel consumption 2. Allow offsetting in other sector to offset growing emissions
Political Issues	Major issues between UNFCCC's IMO and who should create and manage the new mechanism?

Why Use Market Based Mechanisms?

Market Based Mechanisms place a price on carbon and serve two main purposes:

- 1. Create an economic incentive to reduce consumption**
- 2. Allow offsetting in other sectors to offset growing emissions**

In addition they can also generate additional funds for climate adaption & transfer of technology

Type of Projects

Sustainable Port Development

- Energy Efficiency
 - Retro-fitting
 - Demand Side
 - Supply Side
 - Fuel Additives
- Fuel Switching
 - From diesel to biodiesel
 - Diesel to natural gas
 - Mixed fuel
- Smart Systems
- New Technologies
- Sustainable Design



Type of Projects

Sustainable Port Development

- New types of emission reduction programs available called 'Programs of Activities – PoAs' alongside standard energy efficiency projects.
- They allow you to bundle an unlimited number of smaller carbon projects together under one project/program.

New Regulations

Shipping Industry

New International Energy Efficiency Standards	Annex VI of the MARPOL Convention amended; <ul style="list-style-type: none">• Energy Efficiency Design Index – EEDI• Ship Energy Efficiency Management Plan – SEEMP
Start Date	1/1/2013
Coverage	70% of Shipping emissions worldwide
Fuel Savings	\$34-60b in fuel costs by 2020
CO ₂ e Savings	180 million tonnes CO ₂ e annually by 2020

This is the first ever mandatory Greenhouse Gas reduction regime globally for an entire economic sector!

Future Challenges

Green Ports & Harbours

- Need of more energy efficient ports
- There will be a cost on carbon
- There will be higher costs
- There will be lower margins

Road Map

Green Ports & Harbours

Step 1	Start measuring your emissions (i.e. EEDI and SEEMP)
Step 2	Reduce your emissions internally (i.e. Energy Efficiency)
Step 3	Offset what you can't reduce internally (i.e. Carbon Credits)
Step 4	Review the various options and market based mechanisms as an 'industry' and work out 'best fit'
Step 5	Get started early and don't wait for the last minute

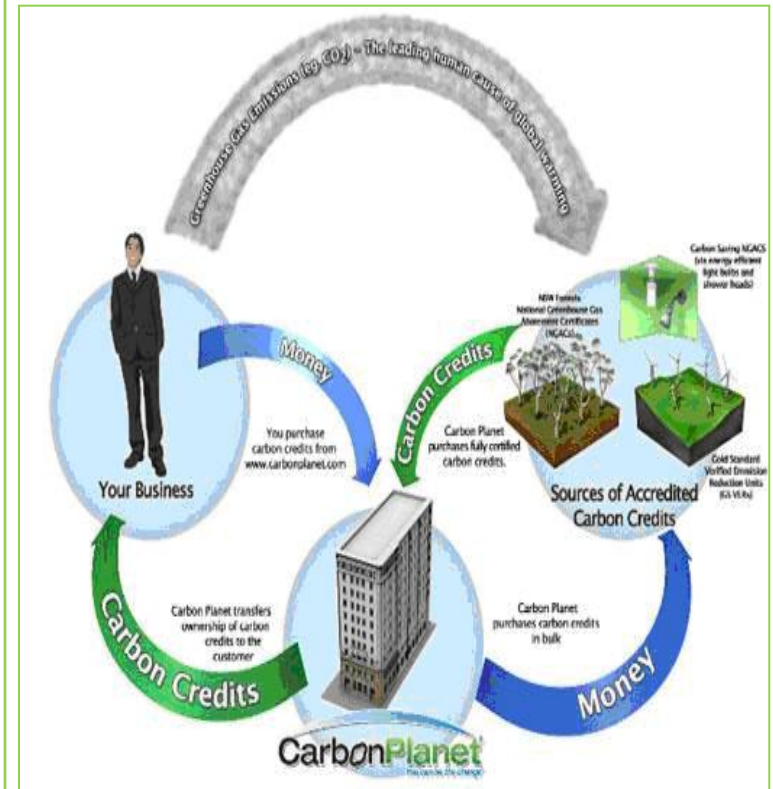
How Does Carbon Finance Work

For carbon finance to work properly the carbon asset being created, sold or traded to a third party needs to;

- Create an asset that is transferrable, contractible or deliverable
- Create a identifiable reduction in energy use and or consumption
- Create a quantifiable tangible increase in energy efficiency

In most cases the carbon asset will also be linked to or derived from of a statutory regime that is regulated such as;

- CDM projects under the Kyoto Protocol
- PAT projects (Perform Achieve and Trade) in India
- Renewable energy certificates (RECs) globally



Port Community System

- Links all trade partners (terminal operations, shipping lines/agents, importers/exporters, Customs, customs agents, freight forwarders, trucking, rail, banking, etc)
- Paperless processes, allowing delivery/receipt of cargo without documentation
- Secure web based platform
- Savings: operational flexibility around the clock, time savings, clerical services, fuel, road congestion, air pollution

Container Handling Equipments

- At water side:
 - Ship to Shore (STS) gantry crane
 - Mobile harbour cranes
 - Wide span crane

- Horizontal transport:
 - Port tractor vehicle
 - Automated Guided Vehicle
 - Forklift truck
 - Reach stacker
 - Straddle carrier
 - Rubber Tyred Gantry (RTG)
 - Rail Mounted Gantry (RMG)

Electric Handling Equipments

Problems due to convention handling equipments: Emission of NO_x, CO₂, Lack of energy recycling and substantial energy consumption

Effect of Electric Handling Equipments:

Lesser fuel consumption

Reduced CO₂ emission

Accurate handling

Variable Speed Generator (VSG)

Electric Vs Conventional Equipments

**Bromma - Electric STS spreader
Vs
Conventional STS spreader**

- Requires 1/10th of the energy
- Weighs less
- Thus, results in power savings by 15%
- Life time reduction of 150,000kWh
- Reduction of 200 tonnes of CO₂

**Cargotec – Electric RTG
Vs
Conventional RTG**

- Better fuel economy
- Fuel savings of up to 60%
- Compared to conventional consuming around 21 litres per hour, CO₂ emissions are reduced by 100 tons/year (assuming 4,000 operating hours/year)

Cluster Development in Maritime Sector

- Clusters grow at locations where enough resources and competencies amass reach a critical threshold, giving it a key position in a given economic branch of a activity
- The Maritime Cluster consists of all economic activities related to the transfer of cargoes and arrival of ships. This includes ship building or repairing

Cluster Advantages

- More efficient investments in enabling infrastructure, dredging, breakwaters and hinterland connections
- Economics of scale in transportation modes
- Better service level (more cost effective pricing)
- Enhanced performance through port community systems, efficient administration, communication
- Better marketing locally and globally
- Fosters knowledge creation, stimulates education and innovation
- Provides increased opportunities for new companies

Cluster development should:

- Enhance global competitiveness of Ports and act as catalyst for further growth of port agglomeration
- Reduce logistic chain costs

Cluster Advantages – Sustainability

- A higher utilization and spread of enabling infrastructure over multiple cargoes results in less dredging, rock revetment, less impact on natural habitat, per ton cargo handled
- Provides more opportunity for sustainability initiatives as they become more accessible and feasible
- Energy efficiency due to close proximity of various actors in logistic chain
- Provides more focus to engage community and public this can be combined with recreation and education

Planning of Clusters

Site Selection



Market Study
and Visioning



Planning and
design



Management
structure



Financial and
economic feasibility



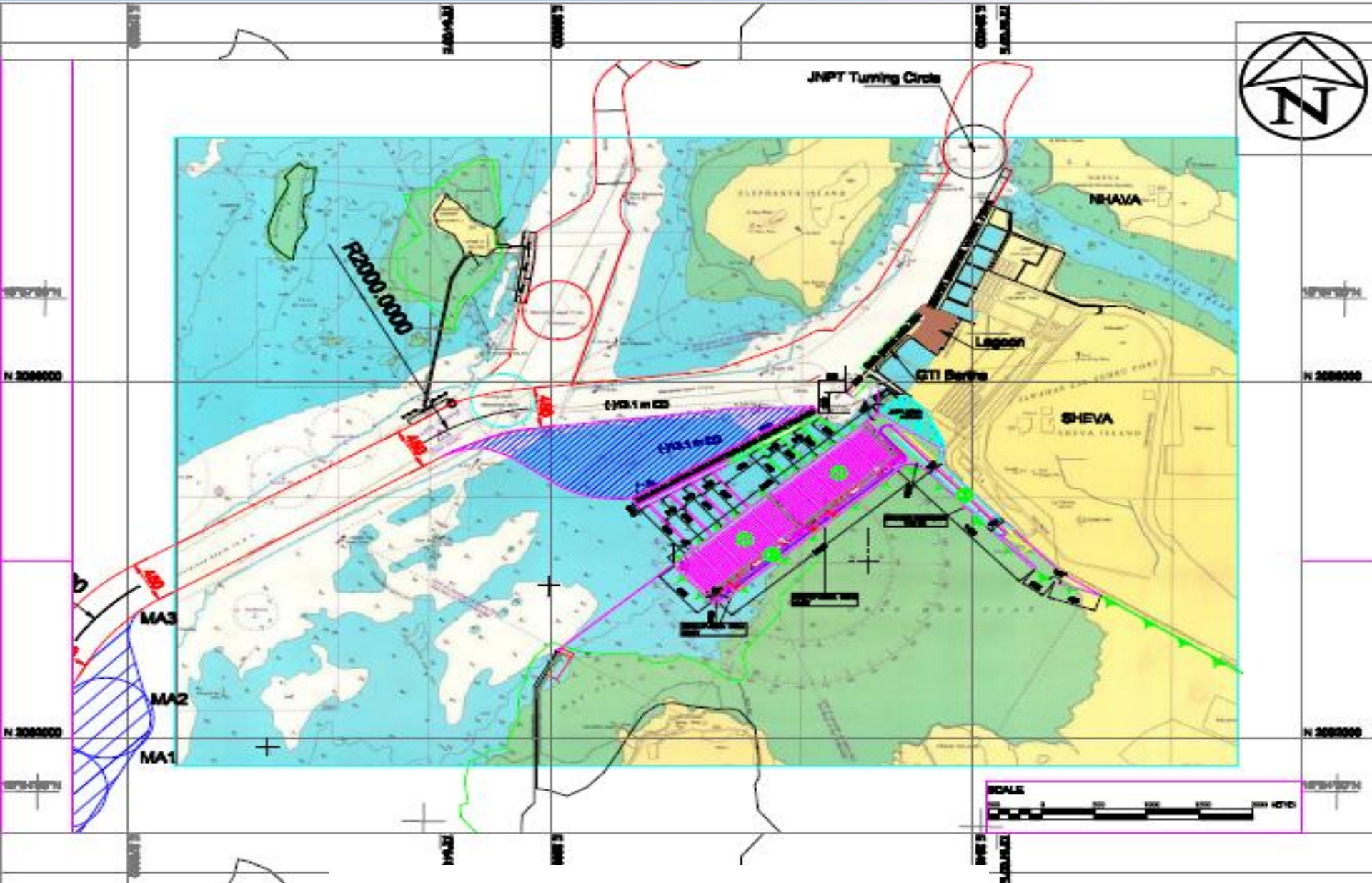
Implementation

- Site selection focused on cluster conditions
- Focus on economic benefits and spin-offs to industries and port community
- Extensive market research throughout the value chain
- Long-term vision important and establish key drivers for success
- Critical threshold of size is essential for competition and support industries to develop
- Allow sufficient space for infrastructure and special development
- Limit socio-environment impacts
- Stakeholders management

Case Study



Proposed New Layout of Fourth CT at JNPT



Salient Features of Proposed New Layout

- No dismantling of existing BPCL jetty
- No construction of matching BPCL jetty
- No construction of Landing Jetty
- Connectivity of the BPCL jetty not required
- Shorter Approach Trestle
- ROB no 1 is not required
- Long haul double stack trains from JNPT to DFC directly (No double Handling)
- Railway line (about 7.5km) from Long haul Rly Marshalling Yard to Jasai Village
- All container handling Quay Cranes shall be Super Post Panamax Cranes
- Common parking area of 7.5 Ha

As moving toward a Greener Port, a port must have:-

- Zero spillage
- Green building
- Rain water harvesting
- Landscaping
- No plastic zone
- Replacing conventional equipments by eco-friendly equipments in a step-wise manner
- Light on solar panels
- Relocation plan of Mangrove
- EDI/PCS
- Closed conveyor bulk handling

The Green Port policy formalizes Five guiding principles:

- Protect the local community and environment from the harmful impacts of port operations;
- Employ the best available technology to minimise port impacts and explore advanced technology solutions;
- Promote sustainability in terminal design, development and all operations;
- Distinguish the Port as a leader in environmental stewardship and regulatory compliance; and,
- Engage and educate the community about Port development and environmental programmes.

THE FUNDAMENTAL GOALS OF THE GREEN PORT ENVIRONMENTAL POLICY COVER SIX CATEGORIES:

Air	Wildlife	Soil/Sediment	Water	Sustainability	Community Engagement
<ul style="list-style-type: none"> •Reduce Emission from port •Adopt Clean Air Action Plan •Ban Dirty Diesel Trucks •Cleaner Cargo Handling Equipments •Low Emission Ship Fuel •Renewable Energy (Solar, Wind) •Apply Clean Air Technology 	<ul style="list-style-type: none"> •Protect, Maintain and restore Aquatic Eco-System •Protect Marine Habitates 	<ul style="list-style-type: none"> •Remove, treat, or render suitable for beneficial reuse all Port-contaminated soils and sediments 	<ul style="list-style-type: none"> •Improve the quality of Port and surrounding harbour waters; •Monitor water quality •Limit storm water run off •Treat water flows from industrial areas •Install storm water treatment devices •Water resources action plan (WRAP) 	<ul style="list-style-type: none"> •Implement sustainable practices in terminal design •Development and Port operations 	<ul style="list-style-type: none"> •Interact with and educate the community regarding Port environmental programmes

THANK YOU