MPA Green Initiatives

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21 March 2018
Maritime Singapore

- Contributes 7% to our nation’s GDP
- Over 170,000 employees
- More than 5,000 maritime establishments
- World’s busiest container transhipment hub
- In 2017, vessel arrival tonnage reached 2.8 billion GT
- 33.7 million TEUs of container throughput in 2017
- Approximately 1,000 ships in the port of Singapore at any one time
- Supplied 50.6 million tonnes of bunker in 2017
- The Singapore Registry of Ships (SRS) is amongst the world’s top 5 largest ship registries
**Objective:** To lead and promote sustainability practices in Environment, Economic, Social and Financial spheres ensuring that the maritime industry is future ready

**Framework:** 4 sustainability excellence strategic thrusts
- Environment
- Economic
- Social
- Financial

**Efforts:** Internal and External
MPA Green Initiatives

Level

Approach

Incentives
R & D
Legislations

Industry

Clean & Green
MSGI

Innovation

Co-funding mode, COEs

National

Harbourcraft requirements
Terminal requirements

International

MPA GHG Team

WOG & NGP
NUS/NTU Research
PAR
APSN
Maritime Singapore Green Initiative (Industry - Incentives)

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- Encourage reduction of CO₂, SOₓ and NOₓ
- Encourage reduction of SOₓ and NOₓ
- Encourage adoption of green technologies
- Promote adoption of alternate/green marine fuels
- Promote awareness of green shipping

*Introduced in 1 July 2016*
Green Ship Programme

• Applicable
  • Singapore-flagged ships

• How to qualify?
  • Ships exceeding current IMO’s Energy Efficiency Design Index (EEDI)
  • Ships with approved SOx scrubbers installed which enable ship to meet next stage of MARPOL Annex VI sulphur limit
  • Ships that use LNG

• Incentives
  • 25-75% reduction of Initial Registration Fees
  • 20-50% reduction of Annual Tonnage Tax
  • Green Ship Certificate
  • Green Ship of the Year Award
Green Port Programme

• **Applicable**
  - Ocean-going ships calling at the Port of Singapore

• **How to qualify?**
  - Burn clean fuels (<0.5% m/m sulphur content) within port limits
  - Use of approved abatement technology
  - Use of clean fuels (e.g. LNG)
  - Applicable to port calls of five days or less, and maintain use throughout entire port stay

• **Incentives**
  - 25% reduction in port dues
Green Technology Programme

• **Applicable**
  - Local maritime companies

• **How to qualify?**
  - Projects on green technological solutions/systems
  - Verifiable emissions results
  - Not commonly deployed
  - System installation done in Singapore

• **Incentives**
  - Grants of up to 50% of qualifying costs that can achieve more than 5% emission reduction per technology
  - For funding above S$2 million, achievement of more than 20% reduction in emission levels required
Green Awareness Programme

• **Applicable**
  • Maritime companies

• **Incentives**
  • Workshops/forums on industry best practices for sustainable shipping
  • Recognition for Maritime Singapore Green Pledge
  • Co-funding Initiative for Sustainability Reporting
    (50% of consultant costs, up to S$50,000 per company)
Green Energy Programme

• Applicable
  • Shipping industry

• Promote the adoption of alternate / cleaner fuel
  • Support asset development through new buildings or retrofitting
  • Support infrastructural development for alternate fuel sources

• Incentives
  • 5-year waiver of craft dues for new LNG-fuelled harbourcraft
  • 10% port dues concession GPP qualified vessels that engage LNG-fuelled harbourcraft for port operations
  • $18 mil co-funding for new LNG-fuelled vessels, up to $2 mil per vessel
  • $6 mil co-funding for LNG bunker vessels
Report Card - Dec 2017

- **Green Ship Programme**
  - 436 Singapore-registered ships from 60+ companies
  - More than 50% of new ships under Singapore flag exceeded their EEDI requirements (>20%)

- **Green Port Programme**
  - >4,400 vessel calls

- **Green Technology Programme**
  - 18 projects, >50 ships
  - 250K tons CO₂ abated each year

- **Green Energy Programme**
  - $12 mil for 6 LNG powered vessels
  - $6 mil for LNG bunker vessels

- **Green Awareness Programme**
  - 10 companies awarded up to $50K grant for Sustainability Reporting
MPA Green Initiatives: Industry – R & D

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      - MSGI
    - Innovation
      - MINT
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    - Harbourcraft requirements
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    - Terminal requirements
    - Co-funding mode, COEs
    - NUS/NTU Research
      - PAR
      - APSN
    - WOG & NGP
    - MPA GHG Team
Some key milestones of innovation:

- **2003**: MINT Fund established, with allocation of $100m in 2003
  - Launch of MPA-NTU Maritime Clean Energy Research Programme
- **2010**: Top-up of $50m, Extended to 2018
  - Launch of LNG Bunkering Pilot Programme
- **2011**: Top-up of $50m, Extended to 2021
  - Launch of Next Generation VTMS
- **2015**: Set-up of MPA Living Lab
- **2017**: Launch of COEs: Maritime Energy Sustainable Development (NTU); Centre for Next Generation Ports (NUS)
- **2018**: Development of Maritime Singapore R&D and Tech Roadmap
  - Launch of COEs: Maritime Energy Sustainable Development (NTU); Centre for Next Generation Ports (NUS)
  - Launch of LNG Bunkering Pilot Programme
  - Launch of Next Generation VTMS
  - Development of Maritime Singapore R&D and Tech Roadmap
  - Launch of MPA-NTU Maritime Clean Energy Research Programme
  - Launch of MPA-JP Green Port & Productivity Solutions R&D Programme
  - Launch of MPA-PSA Port Tech R&D Programme
  - Launch of Maritime Energy Test Bed in NTU
MPA Green Initiatives: Industry – Legislations

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Legislations

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Legislations – Harbourcraft and Port Terminal

**Harbourcraft operations**
- Harbour craft plying our port waters are currently using MGO, which contains lower level of SO\(_x\) and NO\(_x\) compared to HFO
- Ongoing efforts to incentivise harbourcraft to switch to burning of LNG, biofuel, other alternate fuel or use electricity
- Target to achieve BAU-20% by 2030

**Port terminal operations**
- PSA’s current annual container throughput is about 34 million TEUs but only a small contributor to Singapore’s national emission inventory
- Ongoing efforts to electrify all operations
- Likely to surpass BAU-20% by 2030
Green and efficient terminal operations

- Initiatives to optimise land use by exploring co-located mixed uses in spaces above the container terminal for higher land productivity

- Initiatives to improve operational productivity with automation and robotics
Since early 1980s, MPA has been using solar energy to power four offshore lighthouses and about 160 navigational beacons and buoys.

In 2014, in line with MPA’s sustainability drive, we have installed Solar Energy Systems at all MPA’s premises - aligned with WOG approach to Solar Power.
Building the Next Generation Port

**Bigger**

- Capacity by 30%
- Automated port equipment
- Automated yard cranes
- Above ground and underground spaces
- Capacity:
  - CURRENT: 50 million TEU
  - NEW: 65 million TEU

**Greener**

- More than 60% reclaimed land using excavated and dredged materials
- Relocated 2,300 out of 2,800 corals colonies to preserve marine biodiversity
- More than 60% reclaimed land using excavated and dredged materials

**Green technology**

- Eliminate inter-terminal haulage: efficiency, economies of scale, productivity
Pre-Reclamation: $6m Coral Relocation Project to Preserve Biodiversity

2012: Carried out Environmental Impact Study to assess impact of the Tuas Terminal development.

2013-2015: Collaborated with National University of Singapore and National Parks Board to relocate 2,300 out of 2,800 corals from Sultan Shoal, south of Tuas, to St John’s and Sisters’ islands.

Transplanted coral fragments to Kusu Island, Lazarus East and Lazarus West to rehabilitate degraded reefs, and to establish new reef communities at non-reef areas.

2016: Commence reclamation works for Tuas Terminal

2016-2019: Monitor health and growth of relocated corals and remaining corals at Sultan Shoal. A Marine Park was created in the process!
Impact

> $1 billion cost savings

> 18 million m³ dumping space created

> 18 months time savings

Benefits to Singapore & MPA

Economy Efficiency Effectiveness

And a brand new Marine Park!
New port systems to support an intelligent port

**Just-In-Time Planning & Coordination**

- Vessel Arrival
- Berth
- Pilotage
- Towage
- Bunker
- Supplies
- Repairs

Reduce ships’ waiting time and delays at port; optimise resource deployment

**Maritime Single Window**

A one-stop digital platform for seamless and faster port clearance

**Maritime Sense-Making System**

Enhanced maritime situational awareness; smart algorithms to detect anomalies & suspicious activities

**Next Gen Vessel Traffic Management Systems**

Predict congestion hotspots & detect potential collision to assist vessel passage planning for ships
To study energy efficient technologies for container terminal and new buildings in Tuas Terminal Gateway such as solar energy, centralized cooling facilities and smart grid, etc.
In recent years, however, there has been mounting pressure for aviation and maritime sectors to reduce their greenhouse gas (GHG) emissions.

Singapore’s key interests are:
- Support IMO as the champion in leading the maritime community in addressing GHG issues
- Ensure a level playing field in line with the IMO principles of non-discrimination and universality

International Environmental Protection : IMO

Balance environmental protection with growth of our port & maritime industries

Protect marine environment (Air & Sea)

Sustainable, thriving Hub Port and Registry
Singapore actively participates in ITE discussions at UNFCCC, ICAO and IMO

Seek to play interlocutor role to bridge gaps between differing views at IMO
  - Stage the progress of discussions
  - Balance the need to sustain momentum of the IMO’s work and to prevent any show-stopper
  - Close partnership and support to IMO Secretariat

Share our research findings from NUS/NTU

Share best practices at PAR and APSN
International Environmental Protection: PAR

Establishing Singapore as LNG Bunker Ready

- Growing Singapore as an LNG Hub
- Setting up of LNG Infrastructure
- Network of LNG Bunker Ready Ports
- Launch of Singapore’s first Standard for LNG Bunkering
- LNG Bunkering Operations in Singapore
- Understanding Industry’s Needs

S$26 Million from MPA
- LNG-fuelled harbor craft
- LNG bunker vessel
- Truck loading facility

11 members from Asia, Europe and Americas

Singapore’s first LNG-fuelled tug by Keppel SMIT to be delivered in April 2018
MPA Green Initiatives - CONCLUSION

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Thank You