Reducing Vessel Emissions in Hong Kong & Pearl River Delta region: Stakeholder Action & Regional Policy

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San Pedro, USA
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Civic Exchange

- Hong Kong-based independent, public policy think tank
- Convenes air quality scientists, public health professionals, government officials and other experts together with relevant stakeholders to tackle air pollution
- Longstanding focus on marine & port emission reductions, including 2008 Green Harbours work
## Sustainability Challenge: Expanding Ports

(TEU throughput in thousands)

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GUANGZHOU 12,550m TEU

SHENZHEN 22,510m TEU

ZHONGSHAN 1,08m TEU

HONG KONG 23,699m TEU

MACAU 0,09m TEU

ZHUHAI 0,70m TEU

10.5% GLOBAL TEU

PRD MAJOR CONTAINER PORT THROUGHPUT 2010
Pearl River Delta Region = San Francisco Bay Area
Emission trends by source

• Since 1990, most sectors have reduced their air emissions in Hong Kong.

<table>
<thead>
<tr>
<th>Source</th>
<th>Sulphur Dioxide</th>
<th>Nitrogen Oxides</th>
<th>Particulate Matters</th>
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<tr>
<td>Power Generation</td>
<td>↓49%</td>
<td>↓67%</td>
<td>↓69%</td>
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<td>Road Transport</td>
<td>↓95%</td>
<td>↓22%</td>
<td>↓64%</td>
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<td>Marine</td>
<td>↑93%</td>
<td>↑84%</td>
<td>↑61%</td>
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<td>Civil Aviation</td>
<td>↑155%</td>
<td>↑156%</td>
<td>no change</td>
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<tr>
<td>Other Fuel Combustion</td>
<td>↓65%</td>
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<td>↓35%</td>
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<tr>
<td>Non-combustion</td>
<td>N/A</td>
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<td>↑19%</td>
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<tr>
<td>Total</td>
<td>↓51%</td>
<td>↓48%</td>
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Source: HKSAR EPD (1/2009)
Proximity to ports poses a serious public health risk
Ship emissions affect urban air quality: \( \text{SO}_2 \)

Source: http://hedleyindex.sph.hku.hk/
“Findings quoted in this presentation may not be final & are subject to revision, until the Final Report of the Study is finalized & published.”
Hong Kong Marine Emission Inventory
Spatial Distribution of SO$_2$ Emission by Container Vessel (2007 data)

Simon Ng: simonng@ust.hk

Port District

Findings quoted in this presentation may not be final & are subject to revision, until the Final Report of the Study is finalized & published.
International Regulation

• International Maritime Organization (IMO)
  • International Convention for the Prevention of Pollution from Ships (MARPOL)
  • Annex VI: Air Emissions – 3.5% Jan 2012, getting tighter
    • Emission Control Areas – 1% now, 0.1% in 2015

• Regional regulation
  • EU Ports
  • California

• Ships that call at these ports have cleaner fuel on board when in HK-PRD
Regulation and mortality from ship emissions

North America ECA approved (2012)

North Sea, Baltic Sea, English Channel ECA now in effect

ASIA – what regulation? Highest impact on people

Cardiopulmonary mortality
- 1 - 10
- 11 - 50
- 51 - 100
- 101 - 200
- 201 - 300
- 301 - 600

Note: Data from 2002
Port Activity: Green Harbours

- Cross-sector project:
  - Container terminal operators
  - Shipping lines
  - Local craft (barges & tugs)
  - Trucks
  - Shippers (cargo producers)
  - Fuel providers
  - Government & Academia

- Major finding: shipping industry wants regulation consistent with MARPOL Annex VI & ECAs in HKPRD
2010: World’s first shipping industry-led, voluntary, unsubsidized, at-berth fuel switch

The Fair Winds Charter 2011 - 2012

As international carriers, we recognize the emissions from our ships affect air quality in Hong Kong and the Pearl River Delta region. As responsible businesses, WE VOLUNTARILY COMMIT TO:

- Switching to a fuel containing 0.50% sulphur content or less (“low sulphur fuel”) while at berth (at the terminal or at anchorage) in Hong Kong, to the maximum extent possible;
- Undertaking this voluntary initiative between 1 January 2011 and 31 December 2012;
- Collaborating within our sector and with the Hong Kong SAR and Guangdong Governments to introduce regulation on ship emissions, consistent with international standards.

In support of the HKLSA FAIR WINDS CHARTER, WE:

- Urge the Hong Kong SAR Government to take a lead and work with the Guangdong Government to regulate the use of low sulphur fuel in the Pearl River Delta region by 31 December 2012;
- Urge the Hong Kong SAR Government to encourage broader industry participation by providing incentives, as it has done with other transport modes;
- Encourage the container terminals to support this initiative by offering advantages to participating ships, as well as by addressing emissions from cargo handling equipment, and the trucks and local craft that service the terminals.
- Encourage ocean-going passenger liners and other maritime users of the Port of Hong Kong to use low sulphur fuel while at berth in Hong Kong;
- Encourage cargo producers and buyers to favour participating shipping lines as a way of meeting their sustainable supply chain commitments;
- Welcome the support of end consumers who purchase the goods that the shipping industry carries.

[ logos of various shipping lines ]
Policy Documents refer to vessel emission reduction

- China’s 12th 5-Year Plan: HK & Macao
  - Deepening HK-PRD-Guangdong cooperation

  - environmental considerations should be taken into account in planning the Pearl River Delta region.

- Study on the Action Plan for the Bay Area of the Pearl River Estuary (2009-11)
  - proposes China’s first Emissions Control Area (ECA) in HK-PRD.

- Framework Agreement on Hong Kong/Guangdong Co-operation (2010)
  - “Guangdong and Hong Kong will progressively adopt air quality objectives and fuel and emission standards for…vessels which are more advanced than other places in the Mainland.”

- Regional Cooperation Plan on Building a Quality Living Area - Guangdong, Macau & Hong Kong authorities (September 2011)
Clear policy intent: reduce vessel emissions

(d) Exploring opportunities in controlling air pollutant emissions from vessels in the Greater PRD waters

(i) conducting a joint basic study on controlling air pollution from vessels in the Greater PRD waters by the three sides, including compilation of an emissions inventory on vessels in the Greater PRD waters; and

(ii) formulating cooperation plans on controlling air pollutant emissions from vessels. Initial cooperation proposals include:

- jointly formulating emissions reduction targets for vessels and their fuel standards with a view to further strengthening control of vessel emissions;
- restricting emissions from vessels, including NOx emissions from new vessels which should be in line with the latest development of the engine manufacturing and ship building industries as well as the shipping sector;
- examining measures to encourage vehicles entering the port areas to use cleaner fuels with a view to reducing air pollutant emissions in their vicinity;
- exploring the possibility of using cleaner energy by providing onshore power supply to cruise vessels and ocean-going vessels berthing at the Greater PRD ports;
- considering requiring ocean-going vessels at berth and at anchorage at the Greater PRD ports to use low sulphur fuel or onshore power; and
- studying and exploring the establishment of an "Emission Control Area" in Greater PRD waters.
LEGISLATIVE COUNCIL
PANEL ON ENVIRONMENTAL AFFAIRS

Controlling Emissions from Vessels

PURPOSE

This paper seeks Members’ views on a proposal to control emissions from vessels for further improvement to air quality.

BACKGROUND

2. Since 1990, we have taken proactive actions to reduce land-based emissions, which have a more direct impact on the general public. As a result of these efforts, the land-based emissions of sulphur dioxide (SO₂), respirable suspended particulates (RSP) and nitrogen oxides (NOₓ) were reduced by about 61%, 64% and 52% respectively during 1990 to 2008. In the same period, these emissions from vessels increased by 54%, 41% and 4% respectively, with the maritime activities as reflected by vessel arrival numbers increased by 57% to 76%, depending on specific marine trades. Vessels have become one of the major local air pollution sources, being the largest source of RSP, and the second largest SO₂ and NOₓ emitter after power plants.

3. These pollutants could cause a variety of health impacts, including damage to respiratory and lung functions, aggravation of existing respiratory and heart diseases and increased risk of developing chronic respiratory diseases. The emissions also contribute to visibility impairment, which is a major environmental problem overcasting Hong Kong and the Pearl River Delta (PRD) region. Moreover, the impacts of their emissions are particularly discernible at locations near the Kwai Chung container terminals where ocean going vessels (OGVs) berth and in places close to their routes. To further improve air quality, the analysis of the emissions from marine activities is essential.
HK-PRD: Looking ahead

- 4 joint policy documents in last 3 years
- Policy address on 12 October reinforced this:
  - “explore with the governments of Guangdong, Shenzhen and Macao proposals for requiring ocean-going vessels to switch to low-sulphur diesel while berthing in PRD waters”
  - “setting up an Emission Control Area in PRD waters”
  - “study…ways to improve the quality of vessel fuels sold locally to reduce vessel emissions.”
- LegCo paper: legislation in 2012?
Regional Initiatives

Japan
- MILT reviewing possible ECA

Taiwan
- Fuel switch & slow steam
- Inventory

Shanghai
- Inventory

Hong Kong
- Fair Winds Charter
- EPD Inventory

Shenzhen & Guangzhou
- Green Ports activities

Singapore
- Green Port Programme
Thank you

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