Port-Related Emission and Control Programs Technical Exchange 12 July 2011

Hong Kong Port-related Emission Control Programs

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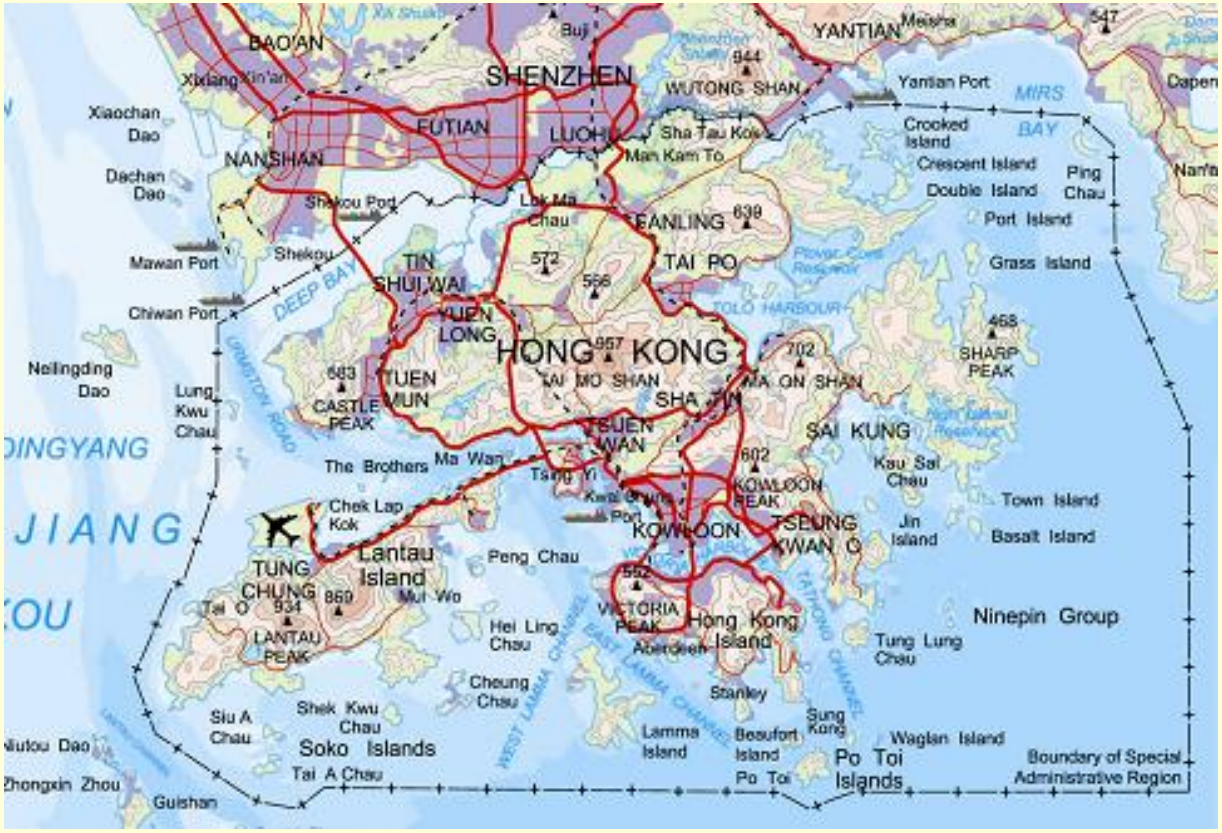
HK Water Boundaries

HK has very small stretch of waters

=> vulnerable to port-related emissions



Container Terminals

Very close to local community

=> environmental, aesthetic and health problems

Controlling Port-related Air Pollution

General – MARPOL Annex VI

Control air pollutant emission from ships

Pollutant	Control
General	Ban onboard incineration
Ozone depleting substances (ODS)	Ban new ODS installation
Sulphur dioxide (SO_2)	Fuel Sulphur cap
Nitrogen oxides (NOx)	NOx emission standard for new engines
Volatile organic compounds (VOCs)	Vapor recovery from tankers during loading

Present Control Programs
Multi-Prong Approach

Vessels in Motion	1. Fuel Standard 2. Smoke Emission 3. Vessel Speed
Vessels at Berth	4. Fuel Switch
Land-based port-machinery	5. Electrification 6. Fuel Standard 7. Operation – Air Pollution Control
Additional Control	8. Govt fleet use ULSD

(1) Fuel Standards

- Regulated under MARPOL Annex VI
- Sulphur cap 4.5% (3.5% in 2012)
- Applied to all vessels (ocean-going, regional and local) in HK waters
- Not stringent enough because

(a) Bunker oil: average sulphur content = 2.8%

(b) Local marine light diesel: sulphur content $\leq$ 0.5%

(2) Smoke Emission Control

Smoky Vessel Spotter Scheme

- Excess smoke emission causing nuisance is an offence
- Spotters use **Ringelmann chart** to assess smoke concentration, report non-compliance to Marine Dept

Ocean-going vessels	Shipping and Port Control Ordinance (Cap.313)
Local vessels	Merchant Shipping (Local Vessels) Ordinance (Cap.548)

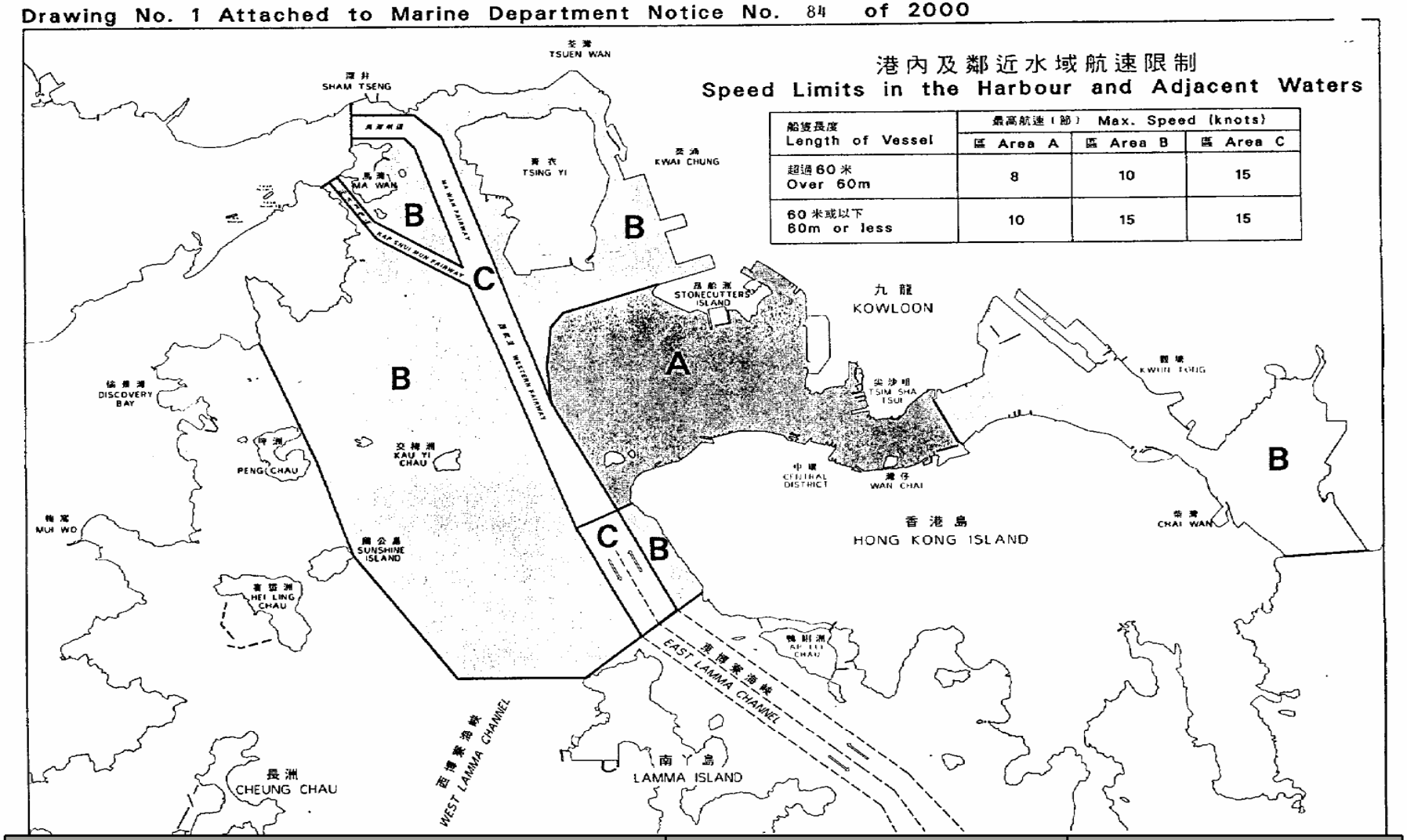
(3) Vessel Speed Control

- Implemented in Victoria Harbor +

  some waters to harbor East and West
- When ships slow down, the load on main engines ↓ considerably compared with the engine load when fast transiting, more than the offset due to longer journey time

  => overall energy consumption / emissions ↓

Drawing No. 1 Attached to Marine Department Notice No. 84 of 2000



	Vessel length≦60m	vessel> 60m
(A) Central Harbor	10kn	8kn
(B) Harbor East & West	15kn	10kn
(C) Major fairways to Harbor west	15kn	

(4) Fuel Switch at Berth

- 17 shipping ship operators signed up to **Fair Winds Charter.** **[**Civic Exchange (local think-tank) facilitated Charter development]
- Committed to **switching voluntarily to 0.5% sulphur diesel** when berthing in HK in 2011-12
- Participating operators account for almost 50% of HK's container terminal tonnage

(5) Electrifying Port Machinery

Container terminals

- Quay cranes mostly electric

- Diesel rubber-tyred gantry cranes being converted to electric or hybrid ones

(6) Clean Fuels for Port Machinery

- Non-road machinery and non-road vehicles (e.g. trucks) must use ultra-low sulphur diesel (max. 50ppm sulphur)
- Actually, mostly using 10ppm sulphur diesel

(7) Operation - Air Pollution Control

Air Pollution Control Ordinance (Cap. 311) imposes control on nuisance and smoke emission from port machinery operation

Nuisance	Air Pollution Control Ordinance, Cap. 311
Smoke	Air Pollution Control (Smoke) Regulations, Cap. 311C

(8) Additional Control

- Govt diesel vessels all using 50ppm diesel since 2001, 10 ppm since 2008

  SO_2 emission ↓ 99%

  Particulate Matters ↓ 30%

Continued Efforts

A. Non-road Mobile Machinery at Ports
B. Fuel Switch at Berth
C. Emission Control Area
D. Clean Fuels for Local Vessels
E. Emission reduction devices for Local vessels
F. Onshore Power Supply

(A) Port Machinery

- Consulting trades on proposal to control emissions from non-road mobile sources until 20 July 2011 (To apply emission standards to mobile machinery newly placed on market)
- Subject to consultation feedback, will initiate legal procedures in 2011

(B) Fuel Switch at Berth

- Monitor progess of voluntary fuel switch at berth scheme and assess key factors:
  - environmental benefit
  - fuel cost implication
  - impact on vessel operation
  - impact on low-sulphur fuel supply chain
- Seek views of shipping industry and other stakeholders; then plan to promote fuel switch

(C) Emission Control Area (ECA)

- Given HK's small stretch of waters, it is meaningless to pursue ECA alone.
- At this stage only information gathering and experience sharing -

Make reference to US and Canada experience in setting up joint ECA; review implementation timeframe, difficulties encountered, cost-benefit analysis, etc.

(D) Clean Fuels for Local Vessels

- HK Marine light diesel, sulphur $\leqq$ 5000ppm
- On 2010, HK EPD completed a trial of **local ferries** using ULSD (sulphur $\leqq$ 50ppm)
- Some operators are concerned about this "big leap"!
- Technical feasibility confirmed, but fuel cost for trial fleet $\uparrow$ 21% (because trial fleet size too)

Next Step: Exploring low sulphur fuels + other control options

(E) Emission Reduction Devices for Local Vessels

- Low sulphur fuels reduce SO_2 and particulate emissions, not NOx
- Selective Catalytic Device (SCR) can cut NOx emission by up to 80%
- Will conduct trial on Govt vessels to assess implications for cost and operation
- Then decide way forward

(F) Onshore Power Supply

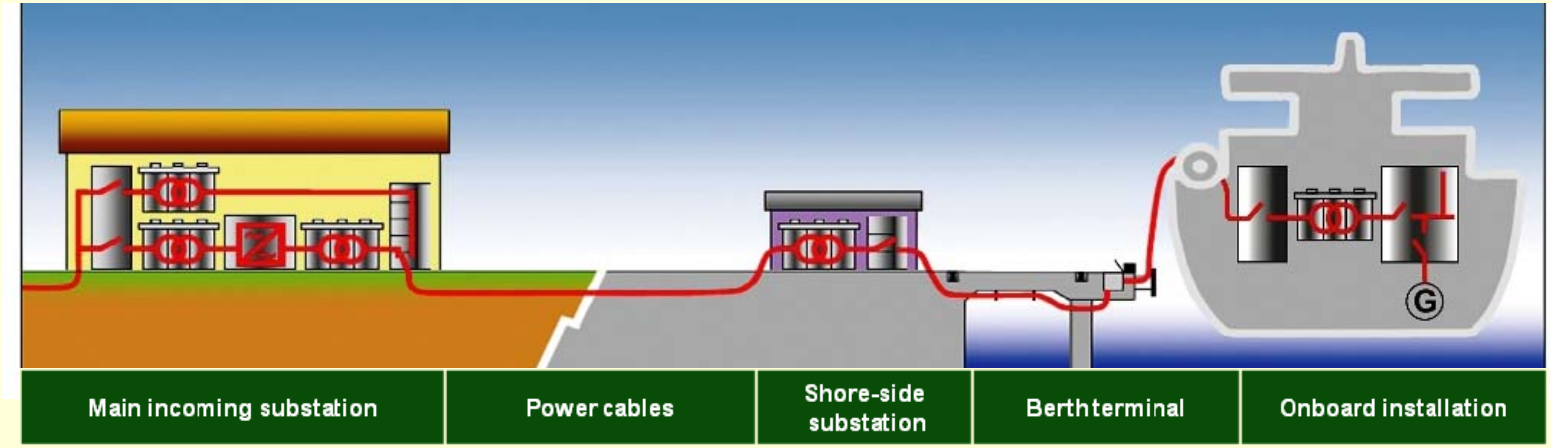
- Onshore power supply (OPS) is also known as “cold ironing”or “alternative maritime power”
- Reduce emission of each ship by 90%
- Examples of ports with OPS available or under construction:

Countries	Ports
US	Los Angeles, Houston, Seattle, Long Beach, San Francisco, San Diego, Oakland, Hueneme, Tacoma, Juneau, New York , Pittsburgh,
Canada	Vancouver, British Columbia
EU	Germany: Lübeck Finland: Inkoo Shipping Oy Ab, Oulu, Helsinki Belgium: Zeebrugge, Antwerp France: Le Havre, Marseille Sweden: Goteborg, Helsingborg, Stockholm, Pitea, Visby Netherlands: Rotterdam, Amsterdam
Japan	Nagoya
Norway	Oslo
Australia	Melbourne
China	Lianyungang, Qingdao, Shanghai, Tianjin, Shekhou

Ref: World Ports Climate Initiative (WPCI) and web search in various port authorities

(E) Onshore Power Supply

- Plan to install OPS facilities in new Cruise Terminal



- OPS harmonized standard (managed by ISO) will be published in September 2011

Enforcement & Control Mechanism

Non-HK ships in HK waters	By Marine Department's **Port State Control** inspection
Local vessels	Survey and certification to ensure compliance with requirements
Port machinery	Environmental Protection Department inspection

Port State Control (PSC)

- HK is a member of ***Memorandum of Understanding on Port State Control in the Asia-Pacific Region*** (Tokyo MOU).
- MD's PSC teams inspect non-HK registered ships calling HK
- Detain ships with serious deficiencies and require them to make rectification

Thank you!

Any questions?