

**AIR QUALITY OBJECTIVES (AQO) REVIEW WORKING GROUP
MARINE TRANSPORTATION SUB-GROUP**

**Digest of the 4th Meeting
held on 29 November 2016 at 10:00 a.m.
in Conference Room, 33/F., Revenue Tower, 5 Gloucester Road, Wanchai**

Present:

Ms. Christine LOH	Under Secretary for the Environment (Chairperson), Environment Bureau (ENB)
Mrs. Alice CHEUNG	Deputy Director of Environmental Protection (3) (Vice-chairperson) , Environmental Protection Department (EPD)
Mr. Ellis CHUNG	
Mr. FUNG Pak-sing	
Mr. Sunny HO	
Mr. KEUNG Siu-fai	
Mr. KWOK Tak-kee	
Mr. Jeff BENT	
Mr. Tony TONG	
Mr. Danny WU	
Mr. MOK Wai-chuen	Assistant Director of Environmental Protection (Air Policy), EPD
Mr. Brian LAU	Acting Principal Environmental Protection Officer (Air Policy), EPD
Ms. Louisa YAN	Principal Assistant Secretary (Transport)10, Transport and Housing Bureau (THB)
Mr. LAI Ying-keung	Chief (Marine Policy), Marine Department (MD)

In Attendance:

Ms. Josephine HO	Acting Senior Environmental Protection Officer (Air Policy) 1, EPD
Dr. Peter LOUIE	Senior Environmental Protection Officer (Air Policy) 5, EPD

Mr. Simon LAM	Environmental Protection Officer (Air Policy) 11, EPD
Dr. Jackie NG	Assistant Environmental Protection Officer (Air Policy) 12, EPD
Mr. Freeman CHEUNG	Consultant's representative, AECOM Asia Co. Ltd.
Mr. Ping KONG	Consultant's representative, AECOM Asia Co. Ltd.
Mr. Karl AN	Consultant's representative, AECOM Asia Co. Ltd.
Dr. Jimmy CHAN	Consultant's representative, HKUST

Absent with apologies:

Mr. Arthur BOWRING
 Mr. CHIANG Sui-ki
 Ms. Jessie CHUNG
 Ms. Sandy MAK
 Mr. David KONG
 Mr. David WONG Yui-cheong
 Prof. John LIU Jian-hua
 Mr. Simon NG

The **Vice-chairperson** welcomed Mr. Danny Wu from Chu Kong Shipping Enterprises (Group) Co. Ltd. as a replacement of Mr. CHEN Huan-you to join the sub-group. The **Vice-chairperson** also introduced the Consultant, AECOM Asia Co. Ltd., to help EPD on the AQO Review.

2. The Administration informed Members that the meeting was to seek Members' endorsement of the assessments on the practicability of the proposed new air quality improvement measures under "Use of clean fuel" for endorsement that were drawn up in light of Members' deliberation in the last meeting; and to collect Members' views on the key considerations for the proposed measures under "Technical measures" and "Fuel economy, energy efficiency and port management".

Agenda Item 1 – Confirmation of Digest of the Third Meeting

3. The draft digest of the third meeting held on 22 September 2016 was confirmed.

Agenda Item 2 – Assessments on the practicability to implement the proposed new air quality improvement measures under “Use of clean fuel”

4. Based on the deliberations on the proposed measures under “Use of clean fuel” in the third sub-group meeting on 22 September 2016, the Secretariat prepared draft assessments on the practicability of the proposed measures, which had been sent to Members before the meeting.

5. The Administration briefed Members on the draft assessments on the practicability of the proposed measures under “Use of clean fuel”. Further comments from Members and the conclusions after deliberations are summarized in the **Annex A**.
[Post-meeting note: Mr. Arthur BOWRING submitted his comments to the Secretariat in the afternoon of 29 November 2016. His comments were incorporated into Annex A.]

Agenda Item 3 – Discussion on key considerations for the implementation of proposed measures under “Technical measures” (Items B1 to B3) and “Fuel economy, energy efficiency and port management” (Items C1 and C2)

6. The Administration briefed Members on the evaluations of key considerations for implementing the proposed measures under “Technical measures”. Members’ comments are summarized in the **Annex B**.

7. In view of Members’ concerns on the feasibility in adopting the proposed technical measures on local vessels, the Administration would meet with individual Members to collect their views on the proposed measure B1 “*Impose emission standards on outboard engines of pleasure crafts*” and provide further analysis on the applicability of the proposed measure B2 and B3 for Members’ consideration in the next meeting.
[Post-meeting note: EPD and the Consultant met with Mr. KEUNG Siu-fai and Mr. KWOK Tak-kee on 7 December 2016. Their views on the key considerations for implementing the proposed measure of B1 have been incorporated into Annex B.]

8. Because of time constraint, the evaluations of key consideration for implementing the proposed measures under “Fuel economy, energy efficiency and port management” would be deferred to the next meeting.

9. In response to a Member’s query, the Administration responded that the use of light-weight materials (e.g. carbon fibre) in constructing ship hull for reducing fuel consumption and emission would be discussed in Item C4 under “Fuel Economy, energy

efficiency and port management” in the next sub-group meeting.

Agenda Item 4 – Any other business

10. No other business was raised.

Agenda Item 5 – Date of the next meeting

11. The next meeting would be held on 10 January 2017 (Tuesday). The meeting was adjourned at 12:20 p.m.

Proposed new air quality improvement measures	Comments from Members and the conclusion
<i>A. Use of clean fuel</i>	
1. Explore the use of Liquefied Natural Gas (LNG) for marine vessels	<p><u>Comments from Members:</u></p> <ul style="list-style-type: none"> ● In the Mainland, some river trade vessels (RTV) had been retrofitted with dual-fueled engines powered by marine diesel or LNG. The provision of LNG bunkering facilities in Hong Kong might encourage more RTV to use LNG. With LNG bunkering capability, Hong Kong could be a regional LNG bunkering hub in the Pearl River Delta (PRD) region. It would also attract container liners and cruise companies to deploy their LNG vessels to the region. ● Subject to the investment cost required, the trade may not be keen on retrofitting their RTV to use LNG, but may prefer phasing out their existing old diesel RTV with new LNG RTV. ● The Government could consider providing incentives to encourage the use of LNG in marine vessels. ● Offshore LNG bunkering by floating barge would involve less complicated infrastructure and lower investment cost and that the bunkering facility could be shared by different sectors, e.g. LNG supply for power plants and marine vessels. ● The Marine Department responded that the technical requirements for using LNG as fuel for local vessels and the associated safety regulations should be sorted out before using LNG as fuel in marine vessels. <p><u>Conclusion:</u></p> <p>Practicability for implementation: Long-term</p> <p>The sub-group concluded that the Government should sort out the technical requirements and associated safety regulations for using LNG in marine vessels while keeping a close watch on all relevant developments</p>

Proposed new air quality improvement measures	Comments from Members and the conclusion
<i>A. Use of clean fuel</i>	
	for planning ahead the development of LNG bunkering facilities in Hong Kong; and explore collaboration within the PRD region on LNG bunkering.
2. Explore the use of biofuel (e.g. B5), fuel cell, Liquefied Petroleum Gas (LPG), Compressed Natural Gas (CNG), methanol, nuclear and renewable energy, e.g. wind and solar energy, etc. for marine vessels	<p><u>Comments from Members:</u> Members confirmed the assessment.</p> <p><u>Conclusion:</u> Practicability for implementation: Long-term The sub-group concluded that the use of these alternative fuels in marine vessels is considered not commercially viable in Hong Kong in the foreseeable future. The Government should keep watch of the relevant technological development such that their potential for a wide application in the marine sector can be revisited timely.</p>
3. Explore the use of hybrid, diesel electric and electric vessels	<p><u>Comments from Members:</u> Members confirmed the assessment with the following suggestions.</p> <ul style="list-style-type: none"> ● Hybrid technology may be suitable for small vessels such as fishing boats, working boats, pleasure crafts, etc. ● Electric vessels might be applicable to ferries plying within the Victoria Harbour with dockside charging facilities installed at ferry piers. <p><u>Conclusion:</u> Practicability for implementation: Long-term</p>

Proposed new air quality improvement measures	Comments from Members and the conclusion
<i>A. Use of clean fuel</i>	
	<p>The sub-group concluded that the technologies of hybrid, diesel-electric and electric vessels are unlikely to replace conventional powering technologies of vessels in the foreseeable future. The Administration should keep close monitoring of the development in adopting these technologies in local marine applications.</p>
<p>4. Ocean-going vessels (OGVs) at berth to use marine diesel with lower fuel sulphur content, e.g. not exceeding 0.1%</p>	<p><u>Comments from Members:</u> Members confirmed the assessment.</p> <p><u>Conclusion:</u> Practicability for implementation: Short-term The sub-group concluded that the proposed initiative could be practicable if 0.1% sulphur marine diesel becomes widely available in the region. The measure should be pursued on a regional basis to avoid jeopardizing the competitiveness of local ports. The Administration would watch for the development of the PRD Domestic Emission Control Area (DECA), in particular the review on whether to further tighten the fuel sulphur limit to 0.1% by end 2019.</p>
<p>5. Local vessels to use electricity from the power grid while at berth</p>	<p><u>Comments from Members:</u> Members confirmed the assessment.</p> <p><u>Conclusion:</u> Practicability for implementation: Short-term The sub-group concluded that the measure has already been implemented by local vessel operators provided that the conditions such as space, safety and operation requirements could be satisfied by the power</p>

Proposed new air quality improvement measures	Comments from Members and the conclusion
<i>A. Use of clean fuel</i>	
	companies and the relevant authorities.
6. River trade vessels to use on-shore power supply (OPS) while at berth at terminals	<p><u>Comments from Members:</u> Members confirmed the assessment.</p> <p><u>Conclusion:</u> Practicability for implementation: Others – not practicable The sub-group concluded that the measure is considered not practicable due to the limited space for setting up the OPS facilities at terminals and the quick mooring and turnaround time for RTV.</p>
7. OGVs to use OPS while at berth	<p><u>Comments from Members:</u></p> <ul style="list-style-type: none"> ● Very few cruise ships in Asia are OPS-ready and the cost of using OPS in Hong Kong would be higher than generating electricity onboard; ● Scrubbers are commonly used on cruise ships while the use of LNG is also getting popular. These technologies could be used during both voyage and at berth to comply with the emission requirements. Compared with these technologies, OPS could only be used at berth, but it causes no emission impact to nearby areas. <p><u>Conclusion:</u> Practicability for implementation (for container terminals): Others – not practicable The sub-group concluded that the lack of space for installing OPS facilities and a unified OPS standard are the major obstacles to the adoption of OPS at container terminals. These constraints would make it impracticable for container terminal operators to install OPS systems.</p>

Proposed new air quality improvement measures	Comments from Members and the conclusion
<i>A. Use of clean fuel</i>	
	<p>Practicability for implementation (for cruise terminal): Long-term</p> <p>Regarding the use of OPS at the cruise terminal, the sub-group concluded that the Administration should continue to keep close monitoring of the international and regional development in the use of OPS for cruise ships, so that timely action could be taken to pursue the use of OPS for cruise ships.</p>

Measure B1 - Impose emission standards on outboard engines of pleasure crafts

Key Considerations	Comments from Members/Administration
1. International regulatory development	<ul style="list-style-type: none"> ● Members confirmed the evaluation.
2. Technology maturity and trend of usage	<ul style="list-style-type: none"> ● A member suggested that conventional 2-stroke outboard engines are commonly used on small sampans and boats, while low-emission 2-stroke outboard engines or 4-stroke outboard engines that can comply with overseas emission standards (e.g. the USEPA emission limits for spark-ignition outboard engines and personal watercrafts) are usually used on high power pleasure crafts. ● A member advised that most operators of small sampans and boats are using conventional 2-stroke outboard engines because they are simple to operate and repair. Repairing of 4-stroke outboard engines can only be done by the manufacturers or suppliers. ● A member advised that, in general, the operation lifetime of a conventional 2-stroke outboard engine is about 2-3 years, while that of a 4-stroke outboard engine is about 5-6 years.
3. Cost implications	<ul style="list-style-type: none"> ● A member advised that the cost of a low-emission 2-stroke outboard engine or a 4-stroke outboard engine is about 50% to 100% higher than a conventional 2-stroke outboard engine of the same output power. Nevertheless, the fuel consumption of 4-stroke outboard engines is approximately one-third less than that of conventional 2-stroke engines during engine idling.
4. Applications to other types of local vessels	<ul style="list-style-type: none"> ● Outboard engines are mainly used on small fishing sampans and pleasure crafts. Other marine vessels use on-board diesel internal combustion engines.
5. Trade reaction	<ul style="list-style-type: none"> ● Given that low emission 2-stroke outboard engines and 4-stroke outboard engines are mainly used on pleasure crafts, a member considered it would be more feasible to control emissions from outboard

Key Considerations	Comments from Members/Administration
	<p>engines in pleasure crafts other than from other small fishing boats. In addition, exemption should be applied to small power outboard engines, e.g. those used in small fishing sampans.</p> <ul style="list-style-type: none"> ● A member opined that the major concerns to the trade would be the high capital cost for low emission 2-stroke outboard engines and 4-stroke outboard engines, as well as the cost of repair by manufacturers or suppliers. Unless with Government's subsidies, the trade would not be keen on replacing their conventional 2-stroke outboard engines. In addition, a grace period should also be allowed for gradually phasing out those non-compliant outboard engines. ● A member also opined that the Government should facilitate the collection of waste lubricating oil from 4-stroke outboard engines.

Measure B2 - Install emission reduction device (e.g. particulate filters) to reduce particulate matters (PM) emitted from local vessels

Key Considerations	Comments from Members/Administration
1. Technical feasibility for installation	<ul style="list-style-type: none"> ● A member expressed reservation on the applicability of particulate filters to local vessels whose engine power is higher than that of road vehicles and might cause damage to the engines due to high back pressure. ● Another member opined that unless the particulate filters could achieve high PM removal efficiency, the additional fuel consumption due to the installation of particulate filters may offset the reduction of PM emissions.
2. International trend and regulatory development in reducing PM emissions from marine vessels	<ul style="list-style-type: none"> ● Members confirmed the evaluation.
3. Cost implications	<ul style="list-style-type: none"> ● A member raised concern on the additional fuel consumption due to the use of particulate filters which in turn will increase their operating cost.
4. Maintenance considerations	<ul style="list-style-type: none"> ● Members confirmed the evaluation.
5. Trade reaction	<ul style="list-style-type: none"> ● Given the feasibility of applying particulate filters to local vessels is yet to be ascertained, a member considered that the trade would have strong reservation on the proposed initiative.

Measure B3 - Impose control on nitrogen oxides (NOx) emissions from engines of local vessels

Key Considerations	Comments from Members/Administration
1. Technology maturity and technical feasibility for installation	<ul style="list-style-type: none"> ● The Administration stated that the selective catalytic reduction (SCR) technology has to be coupled with the use of ultra low sulphur diesel. ● A member opined that the technology might not be applicable to old diesel engines and the effectiveness in reducing NOx emissions from local vessels would need to be further explored.
2. Cost implications	<ul style="list-style-type: none"> ● Members confirmed the evaluation.
3. Trade reaction	<ul style="list-style-type: none"> ● Members confirmed the evaluation.
4. International trend and regulatory development in reducing NOx emissions from marine vessels	<ul style="list-style-type: none"> ● Members confirmed the evaluation.