

空氣質素指標檢討
業界諮詢會議

Review of the Air Quality Objectives (AQO)
Stakeholders Engagement Meeting

非道路移動機械
Non-road Mobile Machinery (NRMM)

AECOM  **Environmental Protection
Department**

25 August 2017

會議議程 Agenda

1. 空氣質素指標檢討 - 背景資料

AQO Review - Background

2. 探討進一步減少非道路移動機械(包括受規管機械和非道路車輛)的排放的可行性

The practicability to further reduce emissions from NRMM (both regulated machines and non-road vehicles)

3. 其他事項

Any Other Business

空氣質素指標檢討 - 背景資料

The AQO Review - Background

空氣質素指標 vs 世衛的《空氣質素指引》及中期目標

AQO vs WHO Air Quality Guidelines (AQG) and Interim Targets (IT)

綠色方格為現行空氣質素指標
Current AQOs in Green

		世衛中期目標 (微克/立方米) WHO Interim Targets (ug/m ³)			世衛《指引》 (微克/立方米) WHO AQG (ug/m ³)
		IT-1	IT-2	IT-3	
	10分鐘 min		--		500
二氧化硫 SO ₂	24小時 hr	125	50		20
可吸入懸浮粒子 RSP(PM ₁₀)	24小時 hr	150	100	75	50
	1年 Annual	70	50	30	20
微細懸浮粒子 FSP (PM _{2.5})	24小時 hr	75	50	37.5	25
	1年 Annual	35	25	15	10
二氧化氮 NO ₂	1小時 hr		--		200
	1年 Annual		--		40
臭氧 O ₃	8小時 hr		160		100
一氧化碳 CO	1小時 hr		--		30,000
	8小時 hr		--		10,000
鉛 Pb	1年 Annual		--		0.5

檢討空氣質素指標 The AQO Review

- 《空氣污染管制條例》 的要求
Requirement in the Air Pollution Control Ordinance (APCO)
- 環境局局長最少每五年檢討一次
Secretary for the Environment to review at least once every five year
- 向環境諮詢委員會(環諮會)呈交檢討報告
Submit review report to the Advisory Council on the Environment (ACE)



工作展望 Action Ahead



- 建議切實可行的空氣質素改善措施(主要污染源)
- Identify Potential measures for improving air quality (Key Sources)

進行中
In progress

- 評估現時空氣質素狀況、排放估算
- Evaluation of current air quality data, emission reduction estimation, etc.



Q2
2016 –
Q3 2017

- 檢視及評估已建議的措施
- Review & Assessment of the proposed measures

Q3-Q4
2017

- 提供檢討結果初稿
- Draft the review findings



Q4 2017

- 向環境局局長匯報檢討結果
- Report to Secretary for the Environment



Mid 2018

- 向環境諮詢委員會及環境事務委員會報告
- Report to Advisory Council on Environment and LegCo EA Panel

Q3 2018

- 公眾諮詢
- Public Consultation



2019

- 建議新的空氣質素指標
- Propose New AQOs

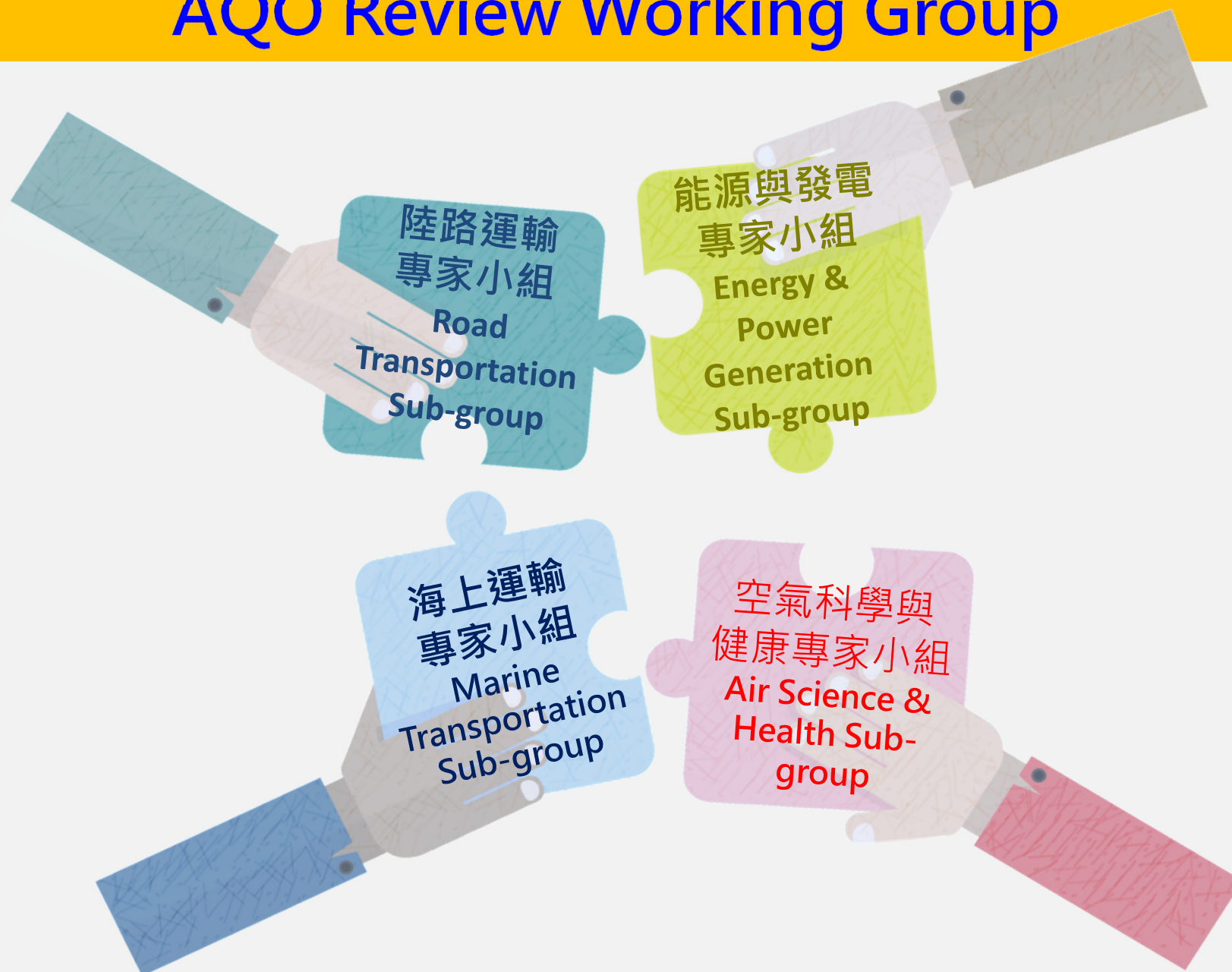
持份者及各專家透過工作小組參與討論
Engaged experts and stakeholders to form working group

公眾參與
Public Engagement



空氣質素指標檢討工作小組

AQO Review Working Group



實施可行性

Practicability for Implementation



短期措施 Short term	可能在2025年或以前可見成效 Likely to produce results by 2025 or earlier
中期措施 Medium term	於下一次檢討期間再作考慮 Maybe ready for consideration in the next AOQ Review period
長期措施 Long term	需要更詳細規劃或進一步研究以確定在下一個檢討期以後的實施可行性 Require detailed planning or further study to ascertain the practicability for implementation beyond the next Review period
其他 Others	非切實可行, 不具改善空氣質素的效益或合乎是次檢討範圍 Considered as not practicable, short of air quality improvement benefits or not suitable to be considered under the current scope of the Review

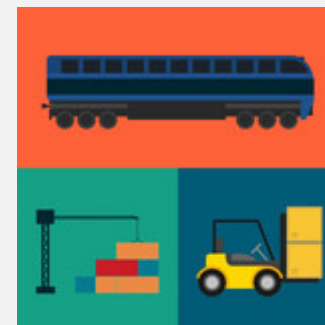
其他排放源

Other Emission Sources



含揮發性有機化
合物的產品
VOC-
containing
Products

非道路移動機械
Non-Road
Mobile
Machinery



煮食油煙
Cooking Fumes

民用航空
Civil Aviation



持份者的參與

Stakeholders' Engagement

- 在檢討空氣質素指標過程中，與相關持份者探討減少非道路移動機械排放的可能性。

Engage the relevant stakeholders to explore the possibility of reducing emissions from NRMM in the AQO Review.

探討進一步減少非道路移動機械的
排放的可行性

The practicability to further
reduce emissions from NRMM

非道路移動機械

Non-road Mobile Machinery

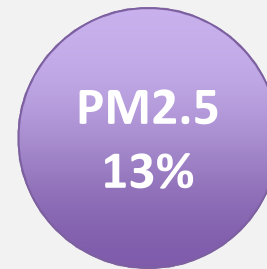
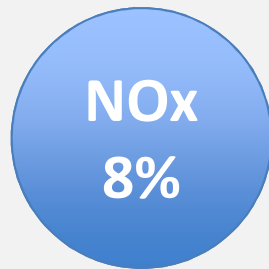
- 包括各種由內燃式引擎驅動的移動機械(包括流動工業設備) 或車輛，通常不在道路上使用。
Include a wide range of mobile machines (including transportable industrial equipment), or vehicles powered by internal combustion engines used primarily off-road.
- 於建築地盤、貨櫃碼頭及機場禁區內廣泛使用。
Widely used at construction sites, container terminals and restricted areas within the airport in Hong Kong.
- 至2017年7月底，香港共有超過45,000部非道路移動機械。
More than 45,000 NRMM in Hong Kong as at end of July 2017 .



非道路移動機械

Non-road Mobile Machinery

- 本港的非道路移動機械大部份屬較舊型號 (如歐盟I期) , 排放較高。
Most of the NRMM in Hong Kong are older models (e.g. Euro Stage I) with higher emission levels.
- 2015年所排放的氮氧化物(NO_x)、可吸入懸浮粒子(PM10)和微細懸浮粒子(PM2.5), 佔全港排放量的**8% - 13%**。
Emissions of nitrogen oxides (NO_x), respirable suspended particulates (PM10) and fine suspended particulates (FSP) in 2015 accounted for **8% - 13%** of the total emissions in Hong Kong.



香港現行管制措施

The prevailing control in Hong Kong



《空氣污染管制(非道路移動機械)(排放)規例》生效

Air Pollution Control (Non-road Mobile Machinery)(Emission) Regulation in effect

- 由2015年9月1日起，任何出售或出租以供本港使用的受規管非道路移動機械，均須符合法例訂明的排放標準，或獲環保署的豁免。

From 1 September 2015, all regulated NRMM sold or leased for use in Hong Kong must comply with the prescribed emission standards, or be exempted by EPD.

空氣污染管制 (非道路移動機械)(排放)規例
Air Pollution Control (Non-road Mobile Machinery) (Emission) Regulation

1.6.2015 條例開始生效 接受核准或豁免標籤申請
Commencement of the Regulation
Accept approval or exemption label applications

30.11.2015 為現有非道路移動機械申請 豁免標籤的期限
Deadline for application for exemption label for existing NRMMs

1.9.2015 出售或出租以供本港使用的受規管機械須貼上由 環保署發出的核准或豁免標籤
All regulated machines sold or leased for use in Hong Kong must bear an approval or exemption label issued by EPD

1.12.2015 於指明活動或地點使用非道路移動機械須 貼上由環保署發出的核准或豁免標籤
Use of NRMMs in specified activities and locations must bear an approval or exemption label issued by EPD

豁免標籤樣本
Sample of Exemption Label
EPD-E-12315-2111

核准標籤樣本
Sample of Approval Label
EPD-A-12345-20X1

新的非道路移動機械必須符合訂明的排放標準。現有機械可申請豁免標籤。出售、出租或使用非道路移動機械，必須附有由環保署發出的核准或豁免標籤。各種情況及貼上的標籤資料可在環保署網頁查閱。
New non-road mobile machinery (NRMMs) must meet the prescribed emission standards. Application for exemption labels can be made to EPD for existing machinery. Sale, lease and use of NRMMs must be approved or exempted with proper labels issued by EPD. Information of approved or exempted NRMMs can be checked via EPD's website.

查詢Enquiries:
電話 Tel: 2594 6590 (9am - 5:30pm) 傳真 Fax: 2838 2155
電郵 Email: nonroadenq@epd.gov.hk 環保署網址 EPD website: www.epd.gov.hk
網上系統 Online application system: http://nrmm.epd.gov.hk/application/common/home

香港現行管制措施

The prevailing control in Hong Kong

規例下的非道路移動機械包括：

NRMM under the regulation include:

➤ **受規管機械 Regulated machines:**

- 移動機械或流動工業設備

Mobile machines or transportable industrial equipment

- 額定引擎輸出功率大於19千瓦，但不大於560千瓦

Rated engine power output greater than 19 kW but not 560 kW

➤ **非道路車輛 Non-road vehicles:**

- 私家車, 貨車, 巴士, 小型巴士, 特別用途車輛, 電單車及機動三輪車

Private car, goods vehicle, bus, light bus, special purpose vehicle, motor cycle and motor tricycle

- 沒有根據法例第374E章領牌的車輛

Not licensed under Cap. 374E

法例訂明的排放標準

Statutory emission standards

- 受規管機械 Regulated machines

壓燃式引擎 Compression-ignition engines

額定引擎輸出功率 Rated engine power output (P) (以千瓦特作單位) kW	廢氣排放標準 Emission standards adopted
$37 \leq P \leq 560$	歐盟 IIIA 期、美國第 3 級或日本環境省排放標準* EU Stage IIIA, US Tier 3 or Japan MoE standards*
$19 < P < 37$	歐盟 IIIA 期、美國第 2 級或日本環境省排放標準* EU Stage IIIA, US Tier 2 or Japan MoE standards*

強制點火式引擎 Positive-ignition engines

額定引擎輸出功率(P) Rated engine power output (以千瓦特作單位) kW	廢氣排放標準 Emission standards adopted
$19 < P \leq 560$	美國第 2 級或日本環境省排放標準* US Tier 2 or Japan MoE standards*

*指由日本環境省於2006年作出第72公告的標準

* *Standards specified in Announcement No.72 made by MoE in 2006*

法例訂明的排放標準

Statutory emission standards

- 非道路車輛 Non-road vehicles

私家車、貨車、巴士及小型巴士 Private cars, good vehicles, buses and light buses	歐盟五期排放標準 Euro V emission standards
電單車及機動三輪車 Motorcycle and motortricycles	歐盟三期排放標準 Euro III emission standards
特別用途車輛 Special purpose vehicles	符合煙霧的要求* Smoke requirements*

* 如空氣污染管制 (車輛設計標準) (排放) 規例 (第311J章) 中的規定 as stipulated under the Air Pollution Control (Vehicle Design Standards) (Emission) Regulations (Cap. 311J)

政府新基本工程合約的要求

Requirements in Government's New Capital Works Contracts

對獲豁免的受規管機械數量要求

Requirements on the number of exempted regulated machines

受規管機械 Regulated machines	第一階段 Phase I 招標期 Tender to be invited between: 01/06/2015 - 31/05/2017	第二階段Phase II 招標期 Tender to be invited between: 01/06/2017 - 31/05/2019	第三階段Phase III 招標期 Tender to be invited: 從01/06/2019起 from 01/06/2019 onwards
發電機 Generators		X	
空氣壓縮機Air compressors		X	
挖掘機 Excavators	< 50%	< 20%	X
履帶式起重機 Crawler Cranes	< 50%	< 20%	X

X – 代表不允許使用 Not allowed to be used.

其他國家現行排放準標

Prevailing emission standards in other countries

非道路壓縮點火引擎 Non-road compression ignition engines

地方 Places	引擎輸出功率 (千瓦) Power output (kW)	排放標準 Emission standards	實施年份 Implementation Year
歐盟 EU	$37 \leq P < 56$	歐盟IIIB期 EU Stage IIIB	2013
	$56 \leq P < 75$	歐盟IV期 EU Stage IV	2014
	$75 \leq P < 130$		
	$130 \leq P < 560$		
美國 US	$P < 19$	美國第4級 US Tier 4	2008
	$19 \leq P < 56$		2008
	$56 \leq P < 130$		2012
	$130 \leq P$		2011
日本 Japan	$19 \leq P < 37$	與美國第4級相近 Similar to US Tier 4	2013
	$37 \leq P < 56$	歐盟IIIB期 EU Stage IIIB	2013
	$56 \leq P < 560$	歐盟IV期 EU Stage IV	2015 / 2016

其他國家現行排放準標

Prevailing emission standards in other countries

車輛 Vehicles

- 歐盟已於2013年12月31日開始為新的車輛(電單車及機動三輪車除外)分階段引入**歐盟VI期**排放標準。

The EU introduced **Euro VI** emission standards for new vehicles (except motor cycles and tricycles) in phases on 31 December 2013.

- 環保署亦已於2017年7月1日起，分階段收緊新登記車輛(柴油私家車、設計重量不逾9公噸的巴士、設計重量逾3.5公噸的小巴、電單車及機動三輪車除外)的排放標準至**歐盟VI期**。於2017年10月1日起，收緊柴油私家車的排放標準至**加州LEV III期**。

EPD has tightened the statutory emission standards for newly registered motor vehicles (except diesel private cars, buses with a design weight of not more than 9 tonnes, light buses with a design weight of more than 3.5 tonnes, motorcycles and tricycles) to Euro VI in phases from July 1, 2017. From Oct 1 2017, the statutory emission standard for diesel private cars will be tightened to California LEV III.

可能實施的新措施

New possible measures

1. 探討收緊新供應香港的受規管機械及非道路車輛的廢氣排放標準Explore the tightening of emission standards of regulated machines and non-road vehicles newly supplied to Hong Kong



歐盟IIIA期 → 歐盟IIIB / IV期 / 美國第4級?
Euro IIIA → Euro IIIB / Euro IV / US Tier 4?



歐盟五 → 歐盟六?
EU V → EU VI?

2. 探討為獲豁免的受規管機械及非道路車輛進行改裝以改善其排放表現Explore the feasibility of retrofitting exempted regulated machines and non-road vehicles to improve their emission performance



柴油粒子過濾器 Diesel particulate filter??
柴油氧化催化器 Diesel oxidation catalyst??
選擇性催化還原器 Selective catalytic reduction??

考慮要點 (新措施1)

Key Considerations (New measure 1)

1. 國際監管的發展

International regulatory development

- 歐美及日本的廢氣排放標準較香港嚴格

Emission standards in the EU, US and Japan are more stringent

2. 符合標準的機械/車輛的供應、使用趨勢

Availability of compliant machines/vehicles, trend of usage

- 預期可從歐美或日本市場進口符合排放標準較嚴格之機械

It is anticipated that machines complying with stringent emission standards are available in the EU/US/Japan markets.

3. 成本影響 Cost implication

- 使用符合較嚴格排放標準的機械的成本可能較高

Greater costs may be incurred due to the use of machinery complying with stringent emission standards

4. 業界反應 Trade reaction

- 主要視乎對成本的影響 Mainly subject to the cost implication

考慮要點 (新措施2)

Key Considerations (New measure 2)

1. 海外經驗 Overseas experience

- 管制在用機械排放並不常見，改裝一般並非強制

Not a common practice to control emission of in-use NRMM, retrofitting is normally not mandatory

2. 技術成熟程度及限制

Technical maturity and constraints

- 改裝技術可能只適用於特定引擎及/或特定配置，並須要有足夠空間安裝減排裝置。

Retrofit technology may be only suitable for use with specific engines and/or specific configurations. There should be sufficient space for the retrofit device.

3. 成本影響 Cost implication

- 額外運作及維修成本 Extra costs on operation and maintenance

4. 業界反應 Trade reaction

- 主要視乎成本影響及技術可行性

Mainly subject to the cost implication and technical feasibility



Thank You

25 August 2017



AECOM