

"Dept of Community
Medicine, HKU"
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To byu@legco.gov.hk

Subject Comments on EPD paper CB(1) 1257/08-09(3)

15 April 2009

Ms Audrey Eu
Chair
Environmental Affairs Panel

Dear Ms Eu

Comments on EPD paper CB(1) 1257/08-09(3)

We are sending you our preliminary comments and questions on the EPD memorandum about the Arup consultancy.

We apologise for the late submission but responding to the EPD document presents several challenges. The information provided is sparse and difficult to interpret. It raises many more questions than it provides answers to previous queries.

We shall continue to work on a fuller paper documenting our own analyses and raising relevant questions about what should be the central focus of this review, namely the protection of public health from pollution in Hong Kong.

Although our paper is rather longer than we had intended, we have highlighted in *italic* the questions which we believe it may be helpful to pose to the EPD and the consultant at this stage.

Please let us know if you require further clarification.

Yours sincerely

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Panel on Environmental Affairs
Subcommittee on Improving Air Quality
Follow-up actions arising from the meeting on 19 March 2009

Comments on the EPD paper CB(1) 1257/08-09(03)

This is a very poorly written, badly referenced report which provides very little useful new data on which to base an interpretation of Arup's review. It is a very low level document with which to represent a \$6 million study.

Where is the decision analysis for the AQO?

- There is still no information which would explain exactly how the consultant arrived at the proposed new Air Quality Objectives from their models.

Population exposures

- The table of AQOs and “predicted” exceedances does not properly represent the exposure levels experienced by the population.
- Given that 50% of the population live and/or work at the roadside, the concentrations of pollutants and exceedances of the AQOs should take the estimated roadside levels into account.

How has the consultant taken roadside levels into account in analysing exposures and health outcomes?

The Arup AQOs are not AQGs

- The claim by the consultant and EPD that they have adopted 6 out of 12 WHO Air Quality Guidelines (AQG) is incorrect. None of the ARUP AQOs match any WHO IT or AQG.
- The WHO AQG are not only *single limit values* but also specify an *allowable number of exceedances*.
- The Arup AQOs specify a larger number of exceedances than WHO and it appears that the AQO are calibrated to accommodate predicted exceedances from modeling poor air quality, rather than establish new rigorous targets beneficial to health.

Why have the numbers of exceedances allowed been inflated?

The Arup AQOs will not protect health

- The Arup AQOs, are either so permissive compared to the AQG limit (e.g. in the case of SO₂), or less rigorous than the WHO Interim Targets in terms of exceedances, (e.g. in the case of PM₁₀ or PM_{2.5}) that they may either cause deterioration of air quality or fail to achieve the potential gains which might be expected from full compliance with a WHO IT or AQG.
- We need to take note that exploitation of lax AQOs under the EIA Ordinance has actually allowed pollutants to be driven upwards over many years.
- The consultant implies that there are major limitations to pollution control because of regional influences. We are concerned that this may be overstated.

Distributions of pollutants, AQOs and exceedances

Models based on existing pollutant distributions indicate that the higher number of allowed exceedances may predictably lead to higher average exposures and adverse health effects. For example:

SO₂: This is an example of a pollutant for which local emissions from marine and port activities and power generation make an important contribution to exceedances. The Arup AQO of 125µgm⁻³ allows 3 days of exceedances compared with zero for the WHO IT-1. The estimated annual mean resulting from a 24 hour AQO set at a 99th percentile of 125 with 3 days exceedances could be as high as 43µgm⁻³. Full compliance with a WHO AQG of 20µgm⁻³ could achieve an annual mean of 4µgm⁻³.

The Tap Mun exceedances for SO₂ appear to be inflated.

Why has the AQO been set 525% above the WHO AQG and 468% above the current annual mean for SO₂?

How are Tap Mun exceedances for all pollutants calculated?

PM₁₀: In attachment 1 the EPD claim that there is total compliance with the current Hong Kong AQO of 55. We suggest this needs further detail and explanation to support risk communication for the general public. For example, a closer examination of the PM₁₀ patterns gives a very different picture to the EPD table. While the PM₁₀ annual average of general stations is 55.08 including Tap Mun, the exclusion of Tap Mun gives an average of 55.76 and there are 157 days of exceedances of the current HKAQO at general stations (hourly based) or 161 days of exceedances using 24 hour moving average.

A better indicator of population exposures, the average of general and roadside stations, is 64µgm⁻³ with an average of 195 days exceedances of the current AQO (hourly based) or 199 days of exceedances using 24 hour moving average..

At the roadside stations the average PM₁₀ is 73µgm⁻³ with 237 days in exceedance of the HKAQO or 246 days of exceedances using 24 hour moving average.

Why has the AQO for PM₁₀ been set 150% above the WHO AQG?

- It is reported that the reason for the selection of a very high IT for SO₂ is that the EPD and the consultant believe the WHO AQG is “wrong”.

In view of the clear demonstration in Hong Kong of the effects of SO₂ on child and adult respiratory health and mortality, may we have a full explanation of the consultants and EPD’s as yet undisclosed views on all the WHO IT/AQG and especially SO₂?

Types and sources of information

- May we see a detailed summary of which air pollution and health studies in Hong Kong have been specifically taken into account in the consultant’s decision making? Please also improve the referencing of sources, especially the UK studies which have been applied.
- In the application of the UK report, for example, have the comments about the importance of a confidence interval around the uncertain estimate of the reduction in risk of air pollution health effects been taken into account?
- We are told that in assessing acute medical costs, the consultant has made reference to two studies by local universities. In the first of these, “Final report for Provision of Service for Study of Short Term Health Impact and Costs due to Road Traffic-related Air Pollution” the Department of Community Medicine, University of Hong Kong was the designer, principal investigator and grant-holder and prepared, authored and submitted the report to EPD. However there has never been any contact between the consultant and this department with specific questions about the interpretation and application of this seven year old report or extensive subsequently published work on air pollution and health.

May we see the full details of analyses and sources of information?

Chronic Health Effects

- The consultants’ state that “there are no local data for the chronic medical cost due to air pollution “. We suggest that in a project costing \$6 million the consultants had an ideal opportunity to sponsor such modeling in the two local Departments of Community Medicine rather than using a rule of thumb approach to the adoption of overseas models in a different population and exposure environment.

(It is worth noting here that a research proposal submitted to the Hong Kong UGC Research Grants Committee (“Policy”) in 2007 in collaboration with experienced overseas researchers who worked on the

quoted UK report, would have estimated the value of increase in life expectancy by reducing air pollution in Hong Kong; it received good reviews from independent external reviewers but was never funded by the committee. The cost of this project would have been a fraction of the Arup consultancy)

- Under Chronic Health Benefits (Attachment 3; Section 6) there is no mention of the health care costs arising from respiratory symptoms. In the UK report from which the data that the consultants used was derived, there was an acknowledgement of this gap and such effects were intended to be included in the next version of the report.

Why were chronic effects from respiratory disease not included in the consultant's analysis?

Discounting

- The consultants applied an annual discount rate of 4% (Attachment 3; Para 2).

*May we know the reason for selecting this rate in Hong Kong and also whether it was used to discount **benefits**, including benefits to the future health of children and adolescents?*

- The consultants say they have followed the UK model for this analysis but the UK IGCB report states discount rates as 3.5% (0-30 yrs), 3.0% (31-75 yrs) and 2.5% (76-125 yrs).

What is the overall effect of discounting benefits on the cost-benefit equation and therefore its possible influence on decisions made on the basis of the cost benefit equations?

This is important since many costs are up front (therefore not discounted) while benefits are often far in the future (therefore heavily discounted). So a small difference in discount rate could have a big effect on the relative value of costs and benefits.

- The costs and benefits were "adjusted for a period of 50 years". Does this mean that benefits have been "cut off" after 50 years? The UK study states that air quality policies were assessed up to 100 years. Many of the benefits e.g. health effects accruing to children, will not be obtained until 50+ years from now when these children are adults.

Have the benefits of air quality improvements been underestimated?

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