

**HONG KONG-ZHUHAI-MACAU BRIDGE JUDICIAL REVIEW: DOCUMENT 2**

**AIR QUALITY IMPACT ASSESSMENT  
[IN HONG KONG] OF THE  
HONG KONG-ZHUHAI-MACAU BRIDGE  
JUDICIAL REVIEW**



**August 2011  
David Renton**

## **PREFACE**

The Hong Kong-Zhuhai-Macau Bridge Judicial Review is probably one of Hong Kong's most important legal cases relating to the environment. As such, it spurred us to dedicate time and effort to understand the case and its ramifications so that Civic Exchange can provide thoughtful reflections for the public. Legal judgments are often complex and not easy for the layman to understand and we hope our effort will produce a series of reports to inform people.

This is the second in a series of papers on this landmark case, which has implications for a number of issues including the administration of Hong Kong's EIA Ordinance, the challenge to achieving sustainable development, the judicial review process, and the ongoing planning, consultation and development of cross-border infrastructure in the Pearl River Delta. We are grateful to David Renton of Baker Botts LLP for providing a comprehensive review from a legal perspective of the assessment of air quality in the judicial review. The case was heard on 22-24 February 2011, and the judgment was handed down on 18 April 2011.

This project would not have been possible without the assistance of several key people – the author and his firm of course, and also Peter J Thompson for providing funding for a Chinese translation to be produced and for the paper to be published. I am grateful to Mike Kilburn for working closely with the author to bring this report to publication, Michelle Wong for design and layout, and Vera Poon for the excellent translation.

Christine Loh  
Chief Executive Officer

August 2011

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**OF THE HONG KONG-ZHUHAI-MACAU BRIDGE JUDICIAL REVIEW**

This article as its title implies is the second of a series of documents for this milestone case which affects issues in many areas, including the administration of Hong Kong's Environmental Impact Assessment Ordinance, challenges to realizing sustainable development, the judicial review process, as well as the sustained planning, consultation and development of the cross-border infrastructure construction in the Pearl River Delta area.

This article is written by Mr. David Renton, a lawyer at Baker Botts L.L.P. who comprehensively reviews from a legal point of view, the issues raised in the judicial review of the air quality assessment made with respect to the air quality impact assessment of the Hong Kong-Zhuhai-Macau Bridge. The case was heard during February 22-24, 2011 and the ruling was made on April 18, 2011. The decision is subject to an appeal that is due to be heard beginning on the 23rd August.

## **1. The Decision**

- 1.1 On 18 April 2011, Mr Justice Fok quashed the environmental approvals for two key elements of the Hong Kong-Zhuhai-Macau Bridge (HZMB) project in Hong Kong, ruling that the Director of Environmental Protection (the Director) had no power to grant the permits because the project's environmental impact assessment (EIA) was not conducted in accordance with Hong Kong's environmental Impact Assessment Ordinance (EIAO).
- 1.2 The Judge's decision means although work on the main sections of the bridge is under way, work on the elements of the project that are to be constructed in Hong Kong, the Hong Kong Boundary Crossing Facilities (HKBCF) and the Hong Kong Link Road (HKLR) cannot proceed until the HZMB's impact on air quality in Hong Kong is reassessed in accordance with the Judge's ruling. The Director is appealing the Judge's decision.<sup>1</sup>
- 1.3 The environmental approvals were challenged by a resident of a housing estate in Tung Chung close to HKBCF and the HKLR. Chu Yee Wah complained that the EIA reports had grossly underestimated the bridge's impact on air quality; in fact, the authorities had predicted that the bridge would have no adverse air quality impact in operation, a conclusion that Madam Chu described as absurd. She challenged the approvals on seven separate grounds, but the Judge accepted only one of her objections. The Judge agreed that the assessment reports failed to identify the scale of the projects' impact on air quality and, therefore, had denied readers of the reports, including the Director, relevant information for evaluating the acceptability of the project's environmental impacts.<sup>2</sup>
- 1.4 The Director argued that the EIA reports had sufficiently established the acceptability of the bridge's air quality impact by predicting that air quality will comply with Hong Kong's current air quality objectives (AQOs) even after the bridge opens. The criteria for evaluating the acceptability of predicted air quality impacts is set out in Annex 4, paragraph 1.1 of the technical memorandum issued under section 16 of the EIAO (the TM). As long as the predicted air quality meets the AQOs and other standards established under the Air Pollution Control Ordinance, section 4.5.1 of the TM allows the Director to approve an EIA report, either with or without conditions. The Judge ruled, however, that compliance with the AQOs is not the sole criterion for determining the acceptability of air quality impacts. It

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<sup>1</sup> An appeal is pending.

<sup>2</sup> *Chu Yee Wah v Director of Environmental Protection*, Judgment dated 18 April 2011 (the "Judgment") at paras. 78-81.

is also necessary for the authorities to consider whether the predicted impacts can be avoided or reduced. Referring to the EIAO's long title, which emphasizes its objective of protecting the environment, the Judge said that the debate between Madam Chu and the Director :

*boils down to whether environmental protection under the EIAO adopts a scheme whereby the Director is obliged to measure the cumulative impact of a particular project against benchmarks of environmental objectives (the Director's position) or whether it adopts a scheme whereby any change which has an environmental impact is to be identified and measures and then an assessment made as to whether that change is adverse so that measures for mitigation should, if possible, be drawn up (the applicant's position).<sup>3</sup>*

- 1.5 The Judge decided that Madam Chu was right. The EIA reports should have included a "stand alone analysis" of background air quality in the absence of the projects so that readers of the report might understand the magnitude of the bridge's impacts on air quality and come to a view as to whether those impacts could be reduced:

*If environmental protection is to be meaningful, it seems to me that it must aim to minimize the environmental impact of any project and, in the case of air quality, by minimizing the amount of pollutants released into the atmosphere. It would be contrary to the purpose of the EIAO, which recognizes that the environment is worthy of protection, if the statutory scheme were to be construed as if it treated the environment like a bucket into which waste may be deposited until it is full. That approach does not protect the environment. Instead, protecting the environment means endeavouring to minimize the environmental impacts of a proposed project.<sup>4</sup>*

- 1.6 The Judge's ruling is consistent with the Environmental Protection Department's (EPD) own guidelines. Four months before the Delta Bridge decision, EPD had issued guidelines explaining its EIA process in terms that are similar to those used by the Judge. These guidelines emphasize the importance of finding ways of avoiding or reducing a project's adverse environmental impacts regardless of whether those impacts are within or outside established limits or criteria.<sup>5</sup>
- 1.7 The Administration was upset with the Delta Bridge decision. Hong Kong's Chief Executive accused politicians who had supported Madam Chu and helped her bring her challenge of using "*legal proceedings or other means, under the excuse of environmental protection or conservation, to block large-scale projects when works are about to start.*"<sup>6</sup> The Director filed a Notice of Appeal against the Judge's ruling on 13 May 2011.
- 1.8 In an affidavit filed with the Court of Appeal, an official of the EPD claimed that some 78 projects with pending applications for environmental approvals are being delayed by the ruling.<sup>7</sup> The Director requested the Court of Appeal to grant an expedited hearing of the Director's appeal so that the Judgment can be clarified as soon as possible. In her submissions to the Court of Appeal, the Director asserted that the approach to the air quality impact assessment of the HZMB projects was no different from the approach used for other projects.

<sup>3</sup> Judgment at para. 73.

<sup>4</sup> Judgment at para. 75.

<sup>5</sup> "**Principle Two: Avoidance, Pre-emption and Prevention of Adverse Environmental Consequence** - the aim of the EIA process is to avoid and prevent adverse environmental consequences of the proposed project; if adverse environmental impacts cannot be fully avoided, measures should be considered to reduce and control the possible adverse environmental impacts to within established limits or criteria." Basic Principles of the Environmental Impact Assessment Process (EPD December 2010).

<sup>6</sup> 'Certain Party' is Hurting City: Tsang, South China Morning Post, 20 May 2011.

<sup>7</sup> Affidavit of Tse Chin Wan in CACV 84/2011, at paras. 12-17.

*“Prior to the Judgment, the [Director’s] understanding ... has been all along that no “stand alone analysis” [of the environmental conditions in the absence of the projects] was required in EIA reports and this has been the way in which EIA reports have been assessed in the past. The likely result of the Judgment is therefore that the EIA reports which have already been produced and submitted may have to be redrafted and resubmitted to the [Director] for consideration, and the EIA reports under preparation may have to be revised.”<sup>8</sup>*

However, this is not the case. A review of the pending applications referred to in the Director’s submissions reveals that they all contain the required stand alone analysis in the form of a table setting out the long term (5-year) averages of the most recent monitored data obtained by the EPD for the air pollutants included in the assessment. This is the approach recommended by the EPD for making *“a first attempt to provide a reasonable estimate of the background air quality level for use in conjunction with EIA air quality assessment to address the cumulative impacts upon a locality.”<sup>9</sup>*

- 1.9 The EIA report for the HKBCF and HKLR contained a similar table (Table 5-2) but this was not used to address the projects’ cumulative air quality impact on air quality. The Director admitted that the background air quality without the projects that was actually used in the assessment was predicted using a computer model and that forecast was not presented in the EIA reports. *“[O]nly the cumulative environmental impacts (with the projects in place) were presented in the EIA reports ...”<sup>10</sup>* The presentation of a stand alone analysis of background air quality that was not in fact used in the assessment<sup>11</sup> and the failure to present the results of the analysis that was actually used marked a significant departure from sophisticated practice.
- 1.10 Moreover, none of the 78 projects referred to in the Director’s submission to the Court of Appeal adopts this approach and it is difficult to see why any of them should be affected by the Delta Bridge decision. A small number of projects whose environmental applications were withdrawn after the judgment was issued (and are therefore not on the Director’s list of pending applications) may suffer from the same defect as the HZMB assessments. If so, their air quality impact assessments will need to be redone unless the judgment is reversed on appeal.

<sup>8</sup> Affidavit of Tse Chin Wan dated 16 May 2011 at para. 16.

<sup>9</sup> Clause 3.1 of the *“Guidelines on Assessing the ‘TOTAL’ Air Quality impacts”*, set out on Appendix B-2 of the study brief issued by the Director under section 5(7) of the EIAO in relation to the HKBCF and the HKLR (the SB).

<sup>10</sup> Judgment at para. 49.

<sup>11</sup> Counsel for the Director referred to Table 5-2 in argument as *“background in the historical sense”*. Judgment at para. 65.

## 2. The requirement for a stand alone analysis

- 2.1 The requirement for a stand alone analysis of background air quality is not new. Ever since the EIAO was enacted, EIA reports have presented a baseline air quality without the projects from which the proposed project's cumulative air quality impacts can be measured. This baseline usually represents the long term (5-year) averages of the most recent monitored air quality data available at the time of the assessment. What was new about the air quality impact assessment of the HZMB projects was that the project proponent abandoned this tried and tested method of drawing the baseline in favour of a new and untested computer-based approach and chose not to present the baseline in the EIA reports.<sup>12</sup>
- 2.2 The recommended methodologies for assessing a project's air quality impact are explained in EPD guidelines contained in Appendices B-1 to B-3 of the study briefs issued under section 5(7) of the EIAO. These guidelines require the air pollution impact of the proposed project facilities and any secondary contributions from unrelated sources of pollution in the vicinity of the project site to be assessed using appropriate computer models.<sup>13</sup> All of the data used to run the models, including the physical size, location, height and emission characteristics of the identified sources of pollution must be clearly stated for verification.<sup>14</sup>
- 2.3 In addition to emissions from the project facilities and other nearby sources of pollution, air quality impact assessments must also take account of emissions that contribute to background air quality. The sources of background air pollution are often located at a considerable distance from the assessment study area and are not easy to identify. Furthermore, how pollution is transported from these sources across the region over time cannot be adequately predicted using the kind of computer models that are used to assess pollution from the project and other near-field sources.<sup>15</sup> To provide a reasonable estimate of the background air quality level for use in conjunction with EIA air quality assessments, the EPD guidelines recommends using a benchmark that reflects the long term (5-year) averages of the most recent monitored air quality data available at the time of the assessment.<sup>16</sup> This methodology is illustrated in Exhibit 1.

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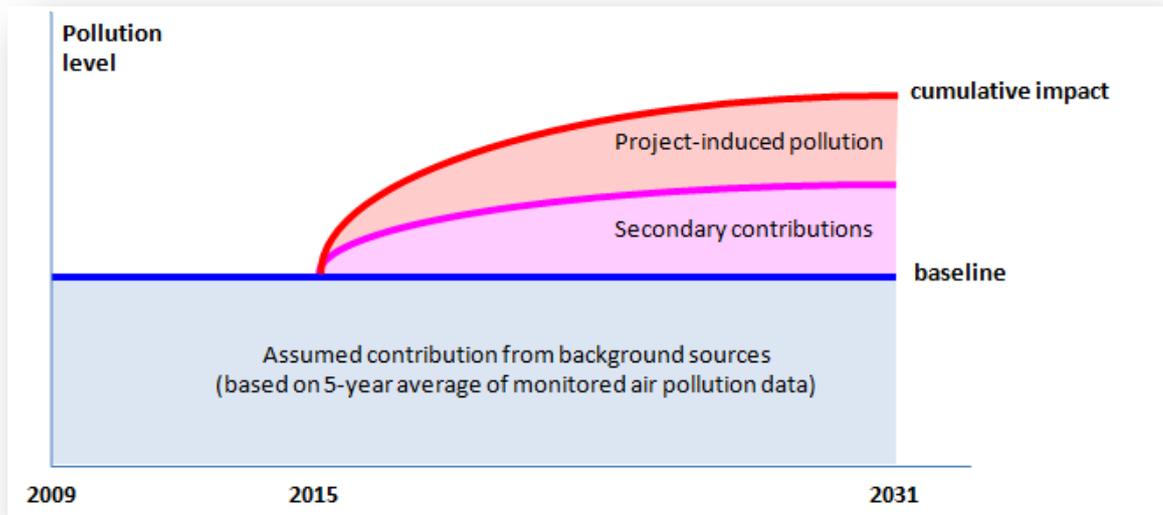
<sup>12</sup> The EIA report for the HKBCF and HKLR reveals that this new approach was used only for the operational air quality impact assessment. The project proponent used the 5-year mean of the annual averaged monitored TSP [total suspended particulate] concentration as the baseline for the project's construction phase assessment. EIA report at para. 5.5.3.

<sup>13</sup> SB, Appendix B-2 Clause 2.

<sup>14</sup> SB, Appendix B-1, Clause 3.2. According to SB, section 3.4.1.4(ii)(b), confirmation of the validity of the assumptions used in the modelling of emissions from identified sources of pollution, including the magnitude of the polluting activities, should be obtained from the relevant government departments and documented.

<sup>15</sup> SB, Appendix B-2 Clause 2.3.

<sup>16</sup> SB, Appendix B-2 Clause 3.1.

**Exhibit 1: Assessing cumulative impacts; the traditional approach.**

- 2.4 This chart shows why the proponent of the HKBCF and HKLR did not want to use this methodology. Table 5-2 of the EIA reports shows that the 5-year average of the most recent monitored data for nitrogen dioxide (NO<sub>2</sub>) and respirable suspended particulate (RSP) around Tung Chung is already close to the current AQO and the average concentration of ozone exceeds the AQO by some 40%. If these figures had been used as the baseline for the air quality impact assessment, the projects' cumulative impact would have caused air quality to exceed the AQOs after the additional pollution produced by the projects and the secondary contributions from nearby sources were taken into account. The Director could not have granted the projects an environmental permit in the face of an EIA report showing that air quality would exceed the AQOs.<sup>17</sup> Given the scale and regional nature of the HZMB project, it is difficult to imagine what mitigation measures the project proponent or the HKSAR Government could implement on their own would make a big enough difference to keep air quality within the AQOs.
- 2.5 The study brief for the HKBCF and HKLR seemed to offer the project proponent an easy solution to this problem by allowing it to use a computer model to predict future background air quality instead of using monitored data to set the baseline.<sup>18</sup> The computer model, a comprehensive territory-made air quality modelling system known as PATH (Pollutants in the Atmosphere and their Transport over Hong Kong), had been developed by the EPD as a tool for predicting the impact of various emissions reduction strategies being pursued by the HKSAR and Guangdong Governments on air quality in Hong Kong.<sup>19</sup> PATH works by simulating the transportation of pollutants across the PRD using data about the location, amount and type of polluting sources, meteorological conditions and algorithms representing the photochemical reactions that occur between different pollutants in the atmosphere.<sup>20</sup>
- 2.6 Drawing on an inventory of predicted emission sources for the year 2010 originally compiled in 2003 and updated in 2008 as part of the Mid Term Review of the PRD Regional Air Quality Management Plan and a 2020 inventory drawn up by the Guangdong

<sup>17</sup> Section 3.4.1.4(vi) requires a project proponent to demonstrate quantitatively that a project's residual impacts after incorporation of the proposed mitigation measures will comply with the criteria stipulated a section of Annex 4 of the technical memorandum issued under section 16 of the EIAO (the TM). One of those criteria is whether air quality is in compliance with the prevailing AQOs.

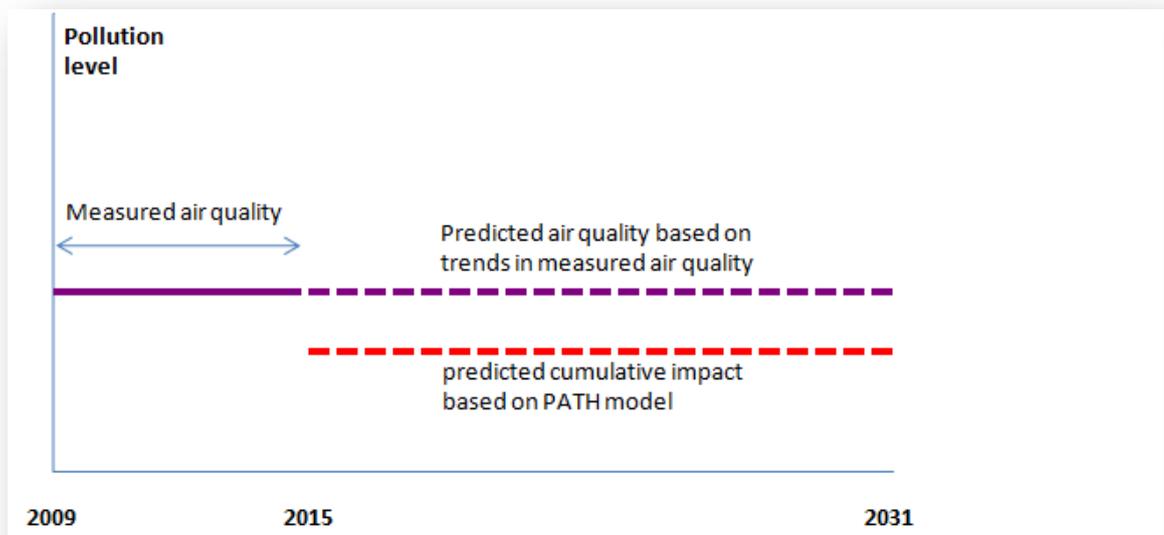
<sup>18</sup> SB, section 3.4.1.3.

<sup>19</sup> SB, Appendix B-2 Clause 3.1.

<sup>20</sup> Judgment at para. 86.

Government in 2006, the project proponent extrapolated an inventory of PRD emission sources for the year 2015, which it then assumed would reflect a reasonably worst-case scenario for background emissions up to the year 2031.<sup>21</sup> Using PATH to forecast the cumulative impact of pollution from all these sources of pollution and combining the results with the output of computer simulations showing how pollution from the HKBCF, HKLR and other nearby projects would affect air quality at identified receivers in 2031, the project proponent claimed that air quality would show a significant improvement over current air quality even with the proposed projects in place. The methodology used by the consultant is illustrated in Exhibit 2.

**Exhibit 2: The HZMB method of assessing cumulative impacts.**



2.7 Madam Chu raised three legal objections to this methodology.

- a. She argued that the methodology used did not differentiate between the impacts of the HKBCF and HKLR and the impacts of other unrelated projects, preventing readers of the EIA reports from evaluating how far the bridge was expected to aggravate the existing or projected air quality in the absence of the projects.<sup>22</sup> The Judge accepted this objection and ruled that an air quality impact assessment that did not include a “*stand alone assessment*” of environmental conditions in the absence of the projects did not meet legal requirements.
- b. She also argued that the Director should not allow unverified computer data to be used in an EIA assessment. Section 3.4.1.4(ii)(b) of the SB requires the validity of assumptions about emission sources which are expected to impede the assessment of the projects’ cumulative impact to be confirmed with relevant governments and documented. The assumptions underpinning the 2031 emissions inventory that was

<sup>21</sup> EIA Reports for the HKBCF and HKLR at para. 5.6.3.4.

<sup>22</sup> TM section 4.3.1(c) requires the methodology used to evaluate a project’s environmental impacts to be capable of addressing the following issues:

- i. the existing or projected environmental conditions without the project in place;
- ii. the projected environmental conditions with the project in place and the sum total of the environmental impacts taking into account all relevant existing, committed and planned projects;
- iii. a differentiation between the environmental impact caused by the project and that caused by other projects, and to what extent the project aggravates or improves the existing or projected environmental conditions;
- iv. the environmental impact during different phases of construction and development of the project; and
- v. the evaluation of the seriousness of the residual impacts (see section 4.4.3).

used in the PATH model were incapable of being verified because no one can possibly predict the type, magnitude and location of all of the sources of air pollution across the region that will affect background air quality in 2031. On this particular point, the Judge accepted the evidence of the Director's experts that the accuracy of all air pollution dispersion models depends on the accuracy of the emissions data fed into them and held that the PATH model could not be regarded as flawed or not in compliance with the TM or SB because of defects that are common to all dispersion models.<sup>23</sup>

- c. Finally, Madam Chu objected that, even if the results of the assessment are accepted as sufficiently reliable, the methodology only establishes that cumulative air quality with the projects in place will only meet the AQOs in 2031. It does not foreclose the possibility that cumulative air quality might breach the AQOs in an earlier year because the predicted improvements in background air quality might not be fully achieved before 2031. Rejecting Madam Chu's submission that section 3.4.1.4(iv)(a) of the SB<sup>24</sup> requires all elements making up a project's cumulative impact on air quality (background air quality, secondary contributions from unrelated projects as well as traffic emissions) to reflect the reasonably worst-case scenario to ensure that the overall prediction will hold good for the entire 15 year study period, the Judge accepted the Director's submission that section 3.4.1.4(iv)(b) of the SB<sup>25</sup> requires all elements of the project's cumulative impact to be assessed for the same year of assessment, the year of expected highest emission strength from the road within the first 15 years after the project goes into operation.<sup>26</sup>

### 3. The Scope of the Assessment

- 3.1 In her application for judicial review, Madam Chu questioned the project proponent's failure to assess the projects' impact on the concentration of ozone (O<sub>3</sub>), a pollutant that is currently some 40% over the relevant AQO. During the public inspection stage of the assessment, members of the public, as well as members of the Advisory Council on the Environment, expressed concern that a major regional transportation project would be likely to cause a significant increase in the concentration of ground level ozone, a key ingredient in the formation of photochemical smog.
- 3.2 The Director sought to justify omission of ozone from the assessment on the grounds that the proposed projects would not in fact produce any significant amount of ozone.

<sup>23</sup> Judgment at para. 107. The author believes that the Judge was wrong on this point. The EPD acknowledges in Appendix B-2 of the SB that how far-field sources of air pollution affect air quality in the study area cannot adequately be predicted using the computer models currently available because of the difficulty of ascertaining all of the sources that will affect background air quality and because of the complex photochemical reactions between pollutants in the atmosphere that affect how the pollutants are transported over large distances. See text at footnote 13 above. In view of this, the EIA Report should have contained some explanation of how the use of the PATH model with a predicted inventory of emission sources for the year 2031 would overcome these problems and produce reliable predictions.

<sup>24</sup> The Applicant shall calculate the expected air pollution concentrations at the identified ASRs based on an assumed reasonably worst-case scenario under normal operating conditions. The evaluation shall be based on the strength of the emission sources identified in sub-section 3.4.1.4(ii)(b) above. The Applicant shall follow sub-section 3.4.1.4(v) below when carrying out the quantitative assessment.

<sup>25</sup> The air pollution impacts of future road traffic shall be calculated based on the highest emission strength from the road within the next 15 years upon commencement of operation of the proposed road. The applicant shall demonstrate that the selected year of assessment represents the highest emission scenario given the combination of vehicular emission factors and traffic flow for the selected year. The Fleet Average Emission Factors used in the assessment shall be agreed with the Director. If necessary, the Fleet Average Emission Factors shall be determined by a motor vehicle emission model such as EMFAC-HK model to be agreed with the Director. All the traffic flow data and assumptions that are used in the assessment shall be clearly and properly documented in the report.

<sup>26</sup> The author believes the Judge's interpretation of the SB is difficult to reconcile with section 10(2)(b) of the EIAO, which requires the Director, in deciding whether to grant an environmental permit, to have regard to the attainment and maintenance of an acceptable environmental quality. The Director has a duty to prevent projects from causing an unacceptable deterioration in air quality at any time, not just in a particular year of assessment selected in accordance with the SB.

*To put the matter into proper perspective, it should be emphasized that O<sub>3</sub> is a regional air pollution problem which, it is well recognized, affects the Pearl River Delta Economic Zone ("PRDEZ"). Unlike other pollutants such as particulates, NO<sub>x</sub> (nitrogen oxides), O<sub>3</sub> is not a pollutant directly emitted from man-made sources but is formed by a set of complex chain reactions between other pollutants (e.g. NO<sub>x</sub> and VOC (volatile organic compounds)) in the presence of sunlight. As it would generally take several hours for these photochemical reactions to proceed, O<sub>3</sub> recorded locally could be attributed to emissions generated from places afar. Furthermore, the formation of O<sub>3</sub> is attributable to the cumulative effects of all emission sources in the PRDEZ to which the contribution by the HKBCF and HKLR is minimal (NO<sub>x</sub> and VOC from the HKBCF and HKLR only constitute 0.09% and 0.01% respectively of the regional total). In other words, O<sub>3</sub> level at Tung Chung is mainly contributed by sources afar. As the project itself would not generate O<sub>3</sub>, it is not considered as a key/representative pollutant parameter. The direct effect of the Project is the reduction of O<sub>3</sub> in the immediate vicinity of the roads by the reaction of O<sub>3</sub> with NO emission directly from vehicles. Further downwind of the roads, the O<sub>3</sub> level could be perturbed by the projects' contribution but should be minimal as explained above.<sup>27</sup>*

- 3.3 The Judge accepted the Director's explanation. He said the essential point about ozone was that it was formed at the end of a chain of chemical reactions in which NO<sub>x</sub> was converted to NO<sub>2</sub> and only later reacted with VOCs to form ozone. During the initial stages of this reaction (the formation of NO<sub>2</sub>) ozone is actually consumed, so that the concentration of ozone in the vicinity of a road tends to be lower than it would be in an environment where there are few sources of NO<sub>x</sub>. At a later stage of the reaction, VOCs from traffic using the projects will contribute to the formation of ozone but this occurs at some distance from the HKBCF and HKLR and well away from the identified ASRs.
- 3.4 In general, courts will not second-guess a regulatory agency's findings of fact unless they are so perverse as to be unfair. It is not the role of the courts to pass judgment on the wisdom of regulatory decisions but to determine only whether they are lawful. Anyone seeking to challenge the EPD's reasons for excluding ozone from the assessment faces an uphill task. It will be necessary to show that the Director overlooked a relevant fact which, had it been taken into account, might have a difference to the Director's view that the projects' effect on ozone production would be insignificant.
- 3.5 In upholding the project proponent's decision to exclude ozone from the assessment, the Director took into account only the production of ozone by motor vehicles using the HKBCF and the HKLR. The HKBCF and HKLR are, however, only two elements of a much bigger regional project, the HZMB. Motor vehicles using sections of the Delta Bridge outside Hong Kong, new factories that will be set up in the western PRD to take advantage of the improved road links with Hong Kong and increased operations at Hong Kong's International Airport and its marine cargo terminals to distribute the products of these new factories around the world will all contribute to ozone formation in Hong Kong but were ignored by the Director and the project proponent. Had these wider impacts been taken into account, it would have been realised that the projects would likely have a far greater impact on ozone levels in Hong Kong.
- 3.6 One of the main reasons why the TM requires EIA reports to contain a stand alone analysis of the expected environmental conditions with and without the proposed project is to assist in identifying the kind of impacts that a project is likely to have on the environment. Section 4.3.1(b) of the TM requires assessment methodologies to be capable of:
- (i) *identifying potential impacts which may be harmful or beneficial to the environment;*
  - (ii) *identifying receivers, habitats or resources which are vulnerable to change;*

<sup>27</sup> Judgment at para. 133 [reference omitted].

- (iii) *defining project/environment interactions;*
- (iv) *examining the chain of events or “pathways” linking cause with effect;*
- (v) *describing and predicting the reasonable case scenario and/or the worst-case scenario, or such scenarios as are required in the EIA study brief; and*
- (vi) *predicting the likely nature, extent and magnitude of the anticipated changes and effects such that an evaluation, in quantitative terms as far as possible, can be made with respect to the criteria described in Annexes 4 to 10 inclusive.*

The fact that much of the ozone that will be produced as a result of the Delta Bridge will be produced across the border in Guangdong does not mean that the Director can ignore it. Adverse impacts which affect an issue of international or regional concern are to be treated as important.<sup>28</sup> Where an impact arises is irrelevant to the issue of whether its effects are required to be assessed.<sup>29</sup>

#### 4. Taking Account of Health Impacts

- 4.1 Perhaps the most important issue raised by the Delta Bridge case concerns how public health should be taken into account in air quality impacts assessments.
- 4.2 Section 10(2)(c) of the EIAO requires the Director, in granting or refusing an environmental permit to have regard to *“whether the environmental impact caused or experienced by the designated project is likely to be prejudicial to the health or well-being of people, flora, fauna or ecosystems.”* Madam Chu argued that this requires the Director to call for a quantitative assessment of a proposed project’s adverse public health impacts (measured by references to increase in mortality, morbidity, healthcare costs or lost production due to ill-health) and pollutants that are known to be harmful to public health such as fine suspended particulates (PM<sub>2.5</sub>) and toxic air pollutants (TAPs) should be included in the assessment of major road projects even though no AQOs or other standards of acceptability have yet been established for these pollutants in Hong Kong.
- 4.3 The Judge rejected these arguments. He said that, while there was room for considerable disagreement over whether Hong Kong’s AQOs were sufficiently protective of public health, it was not irrational for the Director to look to them as reflecting the Government’s current policy as to what is an acceptable level of air pollution. It was unnecessary for the Director to call for a more detailed examination of a project’s public health impacts. For the courts to take any other position, he said, would be to trespass on an area of policy which is the exclusive domain of the Executive.<sup>30</sup> As regards the question of whether PM<sub>2.5</sub> and TAPs should have been included in the assessment, the Judge emphasized that the choice of pollutants for assessment is primarily a matter for the project proponent.<sup>31</sup> He said there was no evidence that either PM<sub>2.5</sub> and TAPs had been raised as a matter of concern during the public inspection of the EIA reports and, therefore, it was permissible for the Director to approve the EIA reports without requiring a detailed assessment of their impact.<sup>32</sup>

<sup>28</sup> TM section 4.4.3(a)(ix)

<sup>29</sup> *‘environmental impact’ for a designated project means -*  
 (a) *an on-site or off-site change that the project may cause the environment;*  
 (b) *an effect of the change on -*  
 (i) *the well being of people, flora, fauna and ecosystems;*

...  
*whether the change or effect occurs within or outside the site of the project.*  
 EIAO, Appendix 1 (Interpretation).

<sup>30</sup> Judgment at para. 169-173.

<sup>31</sup> Judgment at para. 178.

<sup>32</sup> Judgment at para. 186.

- 4.4 The Judge does not claim that the AQOs are a public health standard<sup>33</sup> but he nevertheless concludes that it is lawful for the Director to regard compliance with them as a sufficient basis for deciding that a project's impact on public health is acceptable.<sup>34</sup> The Judge found no evidence that the Director had taken the public health impacts of the HZMB into account in considering whether to grant the HKBCF and HKLR an environmental permit beyond ascertaining that the EIA Report predicted that air quality would meet the AQOs in 2031.<sup>35</sup>
- 4.5 Today's AQOs were set as long ago as 1987 under section 7 of the Air Pollution Control Ordinance. They were intended to represent "*the quality which, in the opinion of this Secretary, should be achieved and maintained in order to promote the conservation and best use of air... in the public interest.*" While the curious phrase "*the conservation and best use of air... in the public interest*" allows the Secretary to take public health into account in setting the AQOs, public health concerns are clearly not the only consideration when setting AQOs. AQOs reflect the Administration's judgment at the time the AQOs were set as to what air quality standards should be achieved taking into account a range of political and socio-economic considerations, including what was known at the time about the effects of air pollution on public health. Today, the Administration admits that our current AQOs do not reflect the latest scientific knowledge about the health impacts of air pollution and agrees that the AQOs should be reviewed in light of WHO Guidelines. Pending the outcome of that review and a clear statement from the Administration as to what level of air pollution it would regard as being prejudicial to health, there is no basis for concluding that the Director had regard to whether the Delta Bridge would be prejudicial to public health when it goes into operation.
- 4.6 The way in which section 10(2) of the EIAO is structured provides further support for Madam Chu's argument that the Director's duty to have regard to whether the predicted air quality will be prejudicial to health is not satisfied by determining that it will meet the AQOs. Section 10(2)(b) requires the Director to have regard to the attainment and maintenance of an acceptable environmental quality, an enquiry in which the AQOs are clearly relevant. The different duty under section 10(2)(c) to have regard to whether the predicted environmental impacts will be prejudicial to public health is there to protect against the risk that the government's environmental standards may fail to protect public health adequately if they do not take account of the ever-deepening scientific knowledge about the health effects of pollution. The two provisions complement each other and reinforce the EIAO's purpose of protecting the environment. They offer members of the public whose health may be prejudiced by government infrastructure projects the opportunity to challenge environmental approvals in court where the government relies exclusively on outdated environmental standards such as the AQOs to justify the projects or, in a more extreme case, refuse to set any standards at all for pollutants that have a significant on public health.

## 5. Conclusions

- 5.1 The Delta Bridge case has left the EIA process in Hong Kong in a state of confusion, not because of anything in the Judgment but because the Government used an approach to the air quality impact assessment of the HKBCF and HKLR that differed significantly from its usual practice. The use of the PATH computer model to predict future improvements in background air quality has not been shown to be capable of producing reliable predictions about future background air quality. The use of unverified and unverifiable "emission inventories" that claims to provide reliable information about the type, size and location of

<sup>33</sup> Judgment at para. 171: "*The fact remains, therefore, that the current AQOs represent the current policy of the Government as regards the acceptable level of air pollutants having taken into account a number of factors, including public health.*"

<sup>34</sup> Judgment at para. 173.

<sup>35</sup> Judgment at para. 162.

the sources of air pollution in the PRD that will affect background air quality in Hong Kong twenty years from now is of particular concern and risks bringing the EIA process in Hong Kong into disgrace. The Government can expect to face further challenges to the use of this methodology in other projects.

- 5.2 The case is important because it revealed that Hong Kong's environmental regulator, the EPD, has fundamentally misunderstood its role in the EIA process. It is shocking to hear the Director say in open court that she believes she is under no duty to control avoidable environmental impacts when licensing new projects unless environmental conditions are about to become totally unacceptable. The Judge rejected this view and ruled that the effectiveness of the EIA process in protecting the environment depends on project proponents identifying the nature and magnitude of the likely environmental impacts of a proposed project so that they can be minimized or even avoided altogether.
- 5.3 The Judge may not have been entirely consistent in applying his ruling on the need for a stand alone analysis to the other issues in the case. In agreeing with the Director that ozone was not a key/representative pollutant that was required to be included in the air quality impact assessment, he seems to have overlooked that, in the absence of a stand alone analysis comparing the production of ozone with and without the projects, there was no reliable evidence as to the size of the bridge's likely impact on ozone production. Without that, the Director could not justify her claim that ozone is not a serious issue.
- 5.4 Important as the Delta Bridge case has proved to be, the environmental problems that the case has highlighted will not be resolved in court. Their root cause lies in the EPD's failure to ensure that its environmental policies, and particularly Hong Kong's AQOs, are adequate to deal with the amount of pollution that will be generated by the large number of projects the Government wishes to undertake. The application for environmental permits for the HZMB projects has demonstrated that the economic development plans are not sustainable, and there are many more infrastructure projects queuing up for their own environmental approvals. To use the Judge's apt analogy, the EPD has sat back for too long and watched Hong Kong's air quality bucket fill up with pollution to the point where there is now no room left for new projects. The solution lies in the Government's hands.

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