AN INVESTIGATION INTO THE QUALITY OF ENVIRONMENTAL IMPACT STATEMENTS IN CHINA, FOCUSING ON AIR COMPONENT

by

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Abstract

It is more and more salient that with the development of economy, China is facing a serious problem of environmental pollution, especially in the north where exist a lot of heavy industry. In Hebei Province, which locates in the northern China, the air pollution is significant. The reason that air pollution should be fully considered and controlled is that it is harmful to human health, flora and fauna. As one of the instruments of environmental management, EIA is put into effect by force in most states, and China is included. However, it seems that the effectiveness of EIA in China has not yet been surveyed by the numbers; besides, the comprehensive quality of EISs, which is the outcomes of EIA, are unable to be sure. This paper will establish a checklist, which is base on the system of Lee & Colley review package (Lee et al., 1999), and then start examining and analysing 30 samples of EIS and will produce suggestions for the quality of air impact assessment within EISs in Hebei, China. According to the result of the research, the new edited guidelines for environmental impact assessment Atmospheric environment, which is published in 2009, does not bring an efficient progress of the air quality of EIS; but the whole quality of industry EISs in Hebei Province can be deemed as satisfaction.

Key words: Environmental Impact Statement, Air quality, Environmental Impact Assessment, China,
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Abbreviation

Particulate matter (PM)

Environmental Protection Office (EPO)

Environmental Impact Assessment (EIA)

National Environmental Policy Act (NEPA)

air quality assessment (AQA)

European Commission (EC)

European Union (EU)

Environmental Protection Bureau (EPB)

Ministry of Water Resources (MWR)
Acknowledgement

I am mostly grateful to my tutor Dr. Alan Bond without whose support this project would not implemented. His effective guidance research enabled me to implement the work smoothly. His insightful comments on the study have been both encouraging and helpful. His constant help and care have always inspired me to learn more.

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Chapter 1   Introduction

The emission of greenhouse gases has tremendously increased in China as a result of population growth, industrialization, and urbanizations. The major reason why such a problem is important to human being is that it possesses the potential to affect the daily lives of people, usually in terms of influencing health, visibility, the environment, and the climate (Song et al, 2015). However, the reason why the air pollution issue has come to the forefront in China is mainly because of a documentary called “Under the Dome”. The documentary illustrates the terrible air pollution problems in China and has been watched by some 200 million people within 48 hours since it released\(^1\). Public has been rocked by this independent film and a furious discussion among people was initiate. The quality of air in China is considered to be comparatively low, which can be indicated by the statistic that every 3 out of 4 city dwellers are living below the air-quality standard prevalent in China (Chai, 2015). One of the most drastically affected nations facing Acid rain was China, where almost 1/4\(^{th}\) of its cities in the 1990s were exposed to acid rain for more than 60% rainy days annually (Feng et al, 2002). Today, an entire quarter of the Chinese area is affected as a result. Another harmful air pollutants is Particulate matter (PM). The problem arises as Inhalable particles (PM10) can easily penetrate inside the lungs, and therefore reduces the efficiency of the cardiovascular system as well as the respiratory systems. Moreover, mortality also increases as a result (Nafstad, 2003; Pope, 2002; Wilson and Suh, 1997). Still, in contrast to the coarser particles, there is a much stronger association between negative health effects and PM2.5. Northern China is currently suffering the low air quality, for example the capital city of China, Beijing.

\(^{1}\) Data collected from media platforms of China
Various observations have indicated significantly higher PM2.5 concentrations. In the year 2000, a research conducted by Zheng et al. (2005) suggested a value of 101 µg/m³. These results are comparatively similar to the 1999-2000 research carried out by He et al. (2001), which suggested a value of 115–127 µg/m³. One of the major reasons for this problem includes the dramatic increase in industrial waste gas output. Besides, other nations are also slowly being affected by China’s various environmental problems due to the atmosphere flow. As the biggest contributor of chlorofluorocarbons and sulphur oxides to the atmosphere, China also affects its neighboring nations (The Word Bank, 2001). They are exposed to its aerial pollutants and dust, moving all the way to North America (Liu and Diamond, 2005). Moreover, it also holds the status of being the one to the largest tropical rainforest timber importers (Adams and Castaño, 2000). Therefore, this is also significantly contributing towards tropical deforestation.

Over the past 100 years, there have been dramatic climate changes in China similar to the rest of the world (China National Development and Reform Commission, 2007). Over the past century alone, there has been an increase in air temperature of approximately 0.5–0.8 °C (Kan et al, 2012). This is comparatively higher than the global average. A significant amount of this particular increase was witnessed over the past 5 decades. Significant warming trends were observed in the northern, eastern, and western parts of China in contrast to its south. The most substantial temperature increase was witnessed in winter. Various statistics suggest that climate changes are likely to further increase in the near future.
Even though much attention has been devoted to climate change by the Chinese government, not many efforts have been made in regard to its health impacts. There is a significant amount of evidence present that implies that there have been direct and indirect human health implications of climate change. Many infectious diseases prevalent in China could be affected as a result of drastic weather events, changes in the quality of water and air, and various other changes in regard to infectious diseases’ ecology (Zhang et al., 2010a, b, and c). These diseases are often carried by vectors or animal hosts, which includes schistosomiasis (Zhou et al., 2008, 2010), hemorrhagic fever (Bi et al., 2005; Zhang et al., 2010a, b, c, Japanese encephalitis (Bi et al., 2003a), and lastly, malaria (Bi et al., 2005; Zhang et al., 2010a, b, c; Bi et al., 2003b). Appraising how climate variability and climate change is affecting infectious disease transmission still continues to be a major health concern in China.

In this paper, a systematic method will be built to review 30 sample EISs of Hebei, China, and the quality of the samples will be suggested.

The objectives of the research contain 3 parts:

a) There is no similar or related research done previously by other researchers, which increase the value of the investigation, and this paper aims to fill this gap.

b) The old guideline in 1993 was replaced after the new guideline was enacted in 2009. Now there is no relevant research on the validity of the new guideline. By the screening of the samples on the timeline, the purpose of this paper is to draw the conclusion whether the new guideline can improve the quality of China’s EISs or not.

c) This paper will judge and estimate the overall quality of the EISs in Hebei province by
reviewing and analyzing the samples, thus the quality of EISs in Hebei province is good or bad can be concluded. The results of the study can provide reference for individuals or groups who are interested in the quality of EISs.
Glasson et al. (2012:p.4) defined EIA as “a systematic process that examines the environmental consequences of development actions, in advance”. The key objective of it is the prevention adverse impacts in environment. Compared with the method used to evaluate the impacts of proposed development, the EIA process is more practicable and systematic.

2.1 EIA in the United Kingdom (UK)

EIA process in the UK involves several steps, as outlined in Figure 1 (Glasson et al., 2012). As shown in the figure, the process of EIA is divided in four phases. Public consultation and participation are required as an essential part within the first three phases, which aim to guarantee the quality and effectiveness of EIA. The first step of the whole process is used to determine whether an EIA is needed for a proposed project, so called screening, which means it is the sufficient condition for carrying out the whole process. When an EIA is considered as needed, the scoping is undertaken to decide which impacts and issues should be considered for the project. Then the information about development’s purpose, rationality, location and process etc. needs to be presented. Also, the environmental baseline condition needs to be investigated and the future state should be assumed based on not only the development impacts, but also the impacts resulting from natural events or other human activities (Morris and Therivel, 2009). The last step of the phase one is a combination of the previous steps, with the goal of identifying all the potential impacts of the development either adverse or beneficial (Glasson et al., 2012). Next, the magnitude of impacts will be
determined by comparison with the scale of changes without the development. However, not all the impacts need to be assessed in equal depth. The assessment and evaluation will focus on the main adverse impacts that been defined as significance. In addition, mitigation measures will be designed for each significant impacts in order to avoid, abate and remedy or compensate the adverse effects. All the findings of EIA are then recorded in environmental impact statement with a non-technical summary. Before the relevant authority makes the final decision on the project, EIS should be reviewed carefully, which includes a systematic appraisal of the EIS’s quality. Besides, adverse effects of project still need to be monitored after decision-making as it contributes to project management. As an evaluation approach for the effectiveness of key steps of EIA, the final step of the entire process, auditing, is vital. It compares the actual effects of the projects with prediction effects and suggests the quality of prediction.
Figure 1, the EIA process in the U.K

- Project screening
- Scoping
- Description of the project/development
- Action and alternatives

- Prediction of impacts
- Evaluation and assessment of significance of impacts

- Presentation of finding in the EIS
  (including a non-technical summary)
- Review of EIS

- Post-decision making
  Audit of predictions and mitigation measures

- Public consultation and participation
2.2 EIA in China

The concept of EIA was introduced in China in the early 1970s (Capennelli and Shrestha, 1993; Chen et al., 1999; World Bank, 1992, 1997, 2001; SEPA, 2000), followed after the NEPA act was signed in 1969 in US (Wenger et al., 1990). Historically China has always given importance to the environment. However there has been an oversight in the environment owing to increase in productivity and industrialization. The government after the havoc created by pollution started to look at the ways to evaluate the pollution levels of the country (Huagen, 2015). In 1979 the Environmental Protection Office (EPO) drafted the Environmental Protection Law which marked the EIA has been made compulsory for all construction development (Lin and Lu, 1999; Ren, 2003; Wang et al, 2003). After years of development, has become a vital tool of environmental management EIA (Chen et al, 2007). The process of EIA in China is different with the UK, as outlined in Figure 2.
Unlike the process in the UK which initially draft the proposal project and send for screening process to determine if the EIA is required in the area or not (Dougherty & Hall, 2015). The first attempt of China’s process is investigation and research of relevant legislation. Before 2011, Public participation is not allowed in scoping process of the EIA (Elaw, 2015). Currently there has been an increased push for more public participation in the process and as shown in the figure, Public participation is applied in the entire process.
2.3 Purpose and objective of EIA

Environmental Impact Assessment (EIA) was first developed in the United States of America (USA) in 1969 aiming to response the concern of environmental problems caused by the main developments and introduced in many developed countries afterwards (Gilpin, 1995; Glasson et al., 2012, Jain et al., 2001; Morgan, 2012; Riffat and Khan, 2006 and Talime, 2011). A comprehensive legislation environmental protection was established in the same year, known as the National Environmental Policy Act (NEPA) (Talime, 2011). As the pioneer in EIA realm, the EIA model produced by USA has been considered as a guideline and basis for other countries (Li, 2008).

EIA is widely considered as a tool for assisting decision-making authority to make a better decision by providing useful information about the environmental effects and consequences of the development (Gilpin, 1995; Glasson et al, 2012; Lohani et al, 1997; Schijf, 2002; UNEP, 2002 and Winter, 2001). Also, considered of planning and manage the development, Glasson et al (1995) defined it as an aid for formulating the development actions. The EIA, which is the assessment of the potential impacts of specific projects, is considered as a holistic as well as multidisciplinary system, rather than other simply cost-effectiveness analysis for environmental protection (Li, 2008)

Potential problems are foreseen and addressed are the essential antecedent to reach the goal of EIA at an early stage in the project's planning and design. Assessment provided environmental, social and economic information based on the benefits of the proposed
activities should be listed in order to achieve the objective. Also, EIA is supposed to provide understandable information on which to base a decision rather than offer decision makers with any bias information or prepared answers.

In terms of sustainable development, EIA played an irreplaceable role, which could make the sustainable development performed in a more appropriately and effectively direction. World Commission on Environment and Development (1987, p29) first defined Sustainable development as “development that meets the needs of the present without compromising the ability of future generations to meet their own needs.”

Prior to the implementation of development plans, EIA must ensure that it does not cause a negative impact on nonrenewable resources, ecological environment and people’s daily lives (UNEP, 2002). Therefore, the ultimate aim of ELA is through appropriate enhancement and mitigation measures to promote the development of environmentally friendly and sustainable development (UNEP, 2002). Although not a lot of people are aware of what extent the EIA process could actually reach in the future (Cashmore et al., 2004), the fact is that the final EIA process has the potential on helping achieve the compatibility of environmental protection and sustainable development (Sadler, 1996; George, 1999; Petts, 1999; IAIA, 1999 and Glasson et al., 2012).

**2.4 Effectiveness of EIA**

The probability of making a better decision could be enhanced by improve the quality of the EIA report as a good presented EIS is a major element of the whole process, thus,
assessment of EIS is essential to defined and measure the EIA process’s effectiveness (DEAT, 2004 and Fuller, 1999). Wood (2003) reports that EIA performance in developing nations typically falls far short of that in developed nations despite the substantial rise in support for environmental issues over the past several decades.

The new laws are still narrow in scope. If the EIA does not approve a certain process there are no alternatives suggested for the processes. The new laws have the same old problems. This should be addressed (Wang et al., 2003) According to analysts there are no real changes made to the existing policies regarding the environmental assessment legislation. It still has a lot of factors that needs to be addressed. The law of the PRC on the EIA on 2003 elevated the legislative process as state law (NCEA, 2015) In 2014 more amendment and more authority was given to this law (NCEA, 2015). EIA is the assessment process undertaken to find out the future implications of the current and the new project. The environmental protection methodology is not followed by many of the organizations. They only have to pay a small fee and undertake make up efforts (Huagen, 2015) It has been suggested that by adding more analytical techniques the EIA plans can be made more comprehensive (Miao et al., 2015). The current processes are considered to be narrow in scope and has been suggested that alternatives be mentioned if a proposal is rejected.

**Quality of Environmental Impact Statements**

EIS is the process documentation of the processes undertaken to determine the implications of the assessment process. The quality of the environmental impact statements lacks in transparency. According to the regional reports the government mandated laws were not followed in previous projects (Zhu et al., 2015)). This lead to them halting of ongoing projects
and it has also hindered the approval process for new projects. The quality needs to be improved according to the analyst opinions (Zhu et al., 2015). The quality of EIS needs to be improved according to the global standards. There is a general lack of transparency and accountability that needs to be greatly improved.

**The function of EIS**

The EIS provides documentation of the environmental assessment. It explains the need for new changes, impact of the current changes and the inherent factors associated with the local environment. In short it serves as a detailed guide to the anticipated effects of a project on the environment (NYSE, 2015). The main function of the EIS is to ensure that detailed information of the environmental assessment has been observed. It is important to ensure that the EIS has the latest information that is of high quality. This is a full disclosure document (Osuedu, 2015). A good EIS can generate the anticipated results; this predictive model can explain the nuances of the environment (Osuedu, 2015). The extent of damage can be predicted and the environmental pollution can be avoided by having a high quality EIS.

**The relationship with EIS AND EIA**

Environmental Impact Assessment is the process undertaken in order to find out the implications of new project in the environmental. It is an anticipatory model. Environmental Impact statement is the documentation of the process (EPA, 2015). It plays an important role in giving authorization to the projects, and then mandating rules based on activities in the area, plays the role of a consultant and is responsible for devising Strategic Infrastructure Development (EPA, 2015). The effectiveness of the EIA has improved considerably in the recent years (NCEA, 2015). This has been specifically observed after the amendment of the
2014 Environmental Protection Law (NCEA, 2015). The increase in efficiency of the EIA will be seen in the process documentation and hence the quality of EIA will be improved (EPA, 2015).

**Air Pollution in China:**

The issue of pollution is a major issue affecting productivity, health and the economy of China. Among the type of pollutions the air pollutions in the country is reaching hazardous levels in the city. It is expected that these levels is bound to go up unless initiatives are taken to curb this action.

China alone contributes to 29% of the world greenhouse emissions. It is the combined percentage of Europe and US (Wang, 2015). According to the statistical data of 2010 from the Ministry of Economical Control only 3 cities out of the 74 cities met the standards of national air safety. They were remote cities. All urban cities in China has been affected due to air pollution (Saikawa, 2015) The Particulate pollutants is found to be concentrated in the urban cities like Beijing and Shanghai of China (He et al., 2002) Another worrying trend is that these polluters are now migrating to the under developed towns with their new projects. This will increase PM concentration in more places in China (Miao et al., 2015). The major causative agents for air pollution in China are Sulphur dioxide, Hydro Carbons, PM emissions in China. These pollutants need to decrease by 60% to maintain healthy levels. However the disturbing trend is that it is expected to increase in the next ten to fifteen years owing to high-energy consumption (Wang & Hao, 2012). According to the statistical data it has been observed that for every 10-µg/m³, there was an increase in mortality rate 0.44% (95% PI: 0.23, 0.64). The effects of coal combustion cause more than 30000 deaths in the country. There have been 20
million cases of recorded respiratory illness owing to the increase in greenhouse emissions.

The health cost to tackle the illness causes more than 500 billion Yuan (Millman et al., 2013).

In 2014 the PM levels reached 505 micrograms. The world health organizations recommend 25 micrograms. There has been an exponential increase in the particulate matter in 2014. This has resembled the nuclear winter system. It was appalling and the need to address this pollution was understood by the majority of the people (Kaiman, J).

The number one reason for air pollution is the automotive industry. Apart from this the major causative industries that contribute to this air pollutions are coal mining, petrochemical, landfill, automotive, foam and wool manufacturing etc. (Xin & Jing, 2014). The major causes of this air pollution caused increase in cardiovascular mortality and respiratory mortality (Chen et al., 2012). The impact of this hazardous particulate matter will cause definitive damage to the people. This will result in rising health costs. This will affect economy directly (Maltus et al., 2012).

**Efforts taken by the Government to curb air pollution**

According to the 11th fifth year plan of China, there has been a reduction of Sulphur dioxide levels in the environment to 14%. There has also been reduction of maxima Ozona and Nitrous compounds (Wang et al., 2014). However with new developmental projects there needs to be changes in legislation to maintain a balance between the development, economy and environment (Li & Zhang, 2014).

Currently for the fiscal year 2014, China has allotted 1.64 billion USD to tackle the issues of air pollution. There have been new innovative ventures for this issue. One of the main problems that the government is hoping to tackle is to reduce the size of particulate matter
(Goossens, 2014). One of the new innovative ventures is setting up of urban air corridors in Urban Cities. Even though this is implemented in a small scale there has reduction in pollution levels in the surrounding areas (Whencong & Xin, 2004). The government in the interest of economical development had not placed a lot of importance to the environment in the past. It is now changing in the present. There have been more efforts taken by the government in the past few years than it was taken in the past decades.
Chapter 3   Methodology

In order to reach the goal that investigate the quality of EISs in China, a systematic review method will be build in this chapter. First of all, data and sources essential for the reviewing will be collected. Legislation and standard of air quality will be investigated and listed. Seconds, 30 EISs samples will be collected carefully to evaluation in order to gain the qualitative data. Third, a review checklist based on previous review packages will be established to evaluate the chosen samples. At the end, the results of review will be analysed and discussion.

3.1 Data collection

The preparation of the review is collecting relevant data and information. This research of this paper focuses on the air component, as a result, the legislation and standards relevant with AQ will be collected and listed in table 1².

Table 1 Needed information and sources

² Data sources from MEPPRC
3.2 Sample handling

In order to achieve the objective of this article, 30 samples will be extracted as a review target. 30 Samples are randomly selected from the EISs of industrial sector of Hebei province. Also, the generated year of target samples will be divided in two periods and equal amount of samples will be chosen from each of the period, which is before 2009 and after 2009. Hebei province is located in the northern China, which has a large number of industrial areas. As a result, residents there are suffering the heavy air pollution. The reason for choosing Hebei as the target mainly has two aspects:

a) It is well known that China’s land area is huge, and the number of EISs produced in 2013 is 0.476 million\(^3\), which could not be represented by 30 samples EISs. Therefore, the coverage of the research reduced to provincial level.

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\(^3\) Data sources from MEPPRC
b) Due to the difficulty of sample collection, it is relatively easy to get a sufficient number of samples to meet the requirements if select one province of the project analysis.

c) Hebei province as a typical industrial province with the serious environmental pollution and poor air quality, review the EIS from this area could gain more useful data.

In addition, as shown in Figure 3\(^4\), 4\(^5\) and 5\(^6\), the gas emissions from industry in Hebei dominated the emissions from the whole country in 2003, especially the Oxynitride and Smog emissions. The emission amount of both of these gases are over 100 million tons. Also, compare with other emission sources, industry generated most SO2, Oxynitride and Smog. The core research areas of this article is air component, and therefore the research value of industrial EISs are obviously.

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\(^4\) Ibid
\(^5\) Ibid
\(^6\) Ibid
On the other hand, the Guideline for environmental impact assessment Atmospheric environment (hereinafter referred to as “the new guideline”) in China was edited in 2009. One of the main objectives of this paper is finding out whether the new guideline has improved the quality of air quality assessment (AQA) part in EISs. In order to reach the objective, the same number of samples will be chosen from different time periods, which is before 2009 and after 2009. Through analyse and compare the data of these two groups, the suggestion of the effectiveness of the new guideline will be given.
3.3 Evaluative criteria

The main effective evaluation procedure used to reviewing is review package. It can suggest the strengths and weaknesses of an EIS by compare setting rules and legal standards in a relevant objective and reproducible approach across different environmental component and sectors (Simpson, 2001). The evaluation of the quality and acceptability of EIA reports is supported by a significant collection of sets of criteria and guidance documents that have been generated worldwide. For example, there is the Oxford Brooks University Review Package (1996), the Lee and Colley Review Package (Lee et al., 1999), the European Commission (EC) Guidelines (2001) and packages by Sandham and Pretorius (2008) and Sandham et al. (2008), to name just a few. Simpson (2001) observes that international practice informs all EIA review packages which themselves establish a high bar in terms of content standards for EIA reports as well as offering a deeper understanding of what these reports should consider and what data they should contain. According to Jalava et al. (2010), the criteria set by review packages typically echo EIA objectives and regulatory requirements in order to keep reviewers focussed on relevant concerns. In this part, two out of these review packages will be discussed.

3.3.1 The European Commission Guidelines on EIS Review

The EC Guidelines apply to all European Union (EU) Member States and serve as a method for evaluating EIA report quality. Table 4 illustrates the Guidelines' 7-section, 143-question EIS quality checklist. According to the EC (2001), this list enables findings of similar reports to be compared.
Table 2 EC Guidelines (EC, 2001)

<table>
<thead>
<tr>
<th>Section</th>
<th>Section title</th>
<th>No. of subsections</th>
<th>No. of review questions</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Description of the project</td>
<td>5</td>
<td>49</td>
</tr>
<tr>
<td>2</td>
<td>Alternatives</td>
<td>0</td>
<td>5</td>
</tr>
<tr>
<td>3</td>
<td>Description of the environment</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>likely to be affected by the project</td>
<td>2</td>
<td>22</td>
</tr>
<tr>
<td>4</td>
<td>Description of the likely significant effects of the project</td>
<td>6</td>
<td>38</td>
</tr>
<tr>
<td>5</td>
<td>Description of mitigating measures</td>
<td>0</td>
<td>10</td>
</tr>
<tr>
<td>6</td>
<td>Non-technical summary</td>
<td>0</td>
<td>7</td>
</tr>
<tr>
<td>7</td>
<td>Quality of presentation</td>
<td>0</td>
<td>12</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td>143</td>
</tr>
</tbody>
</table>

Before grade each catalogue, reviewers should identify the adequacy of the information and the relevance between a project and the listed question. Afterwards, reviewers should mark each subsection by using a 5 grades system and then aggregates the results to result in an overall grading for the EIS, which is outlined as follows:

A: Full provision of information with no gaps or weaknesses

B: Good provision of information with only very minor weaknesses which are not of importance to the decision

C: Adequate provision of information with any gaps or weaknesses in information not being vital to the decision process

D: Weak provision of information with gaps and weaknesses which will hinder the decision process but require only minor work to complete

E: Very Poor provision of information with major gaps or weaknesses which would prevent the decision process proceeding and require major work to complete (EC, 2001).

3.3.2 The Lee and Colley review package

The Lee & Colley review package was built specifically for the assessment of EISs generated in the United Kingdom (Lee et al, 1999). It is extensively applied to review the quality of EIA
reports at project level. There are four graded levels in the review package which are made up of various criteria. As can be seen in Figure 6, the package is organised into a general report score, review areas, categories and sub-categories.

Figure 6, the hierarchy of review topic.

As illustrated in Figure 6, the process begins at the sub-categories level (the first level) which includes more basic criteria concerning fundamental tasks and procedural aspects of EIA. Using the results of the previous evaluation, the process proceeds up through the four levels. Each level consists of more detailed criteria relating to more wide-ranging elements of EIA. This process culminates in a final general EIA report grade. The Lee and Colley Review Package is a four-level hierarchical review process. Two people are required to apply the package and must have a previous understanding of EIA requirements and, if possible, an understanding of the technical demands of environmental assessment. The two individuals work separately using a collation sheet to record results. The two reviewers then discuss their findings with the goal of reaching agreement for assessments at all levels. Finally, an overall grade for the EIA report is given using a range of symbols, see table 3.
Through the information collection about the method for reviewing, a decision is finally be
made that the method of this paper will use a Lee and Colley (1999) based review package to
review the quality of EISs. As review packages are widely perceived as valuable quality
assessment tools that provide a fairly reproducible and objective method of comparing
standards at different times and in different industries (Simpson, 2001). However, Glasson et
al. (2005) argue that the majority of review packages are designed to be general in nature and
thus applicable to a variety of effects though not all project types. Fuller (2002) writes that the
most prevalent review method is increasingly the utilisation of review criteria. This research
examined a single environmental factor, air quality. As a result, the assessment criteria had to
be able to evaluate the research sample’s specific forms of EIS.

By adapting the current review packages been described above, a review checklist for the
present study was generated (see appendix A). In particular, the Review Package, developed

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Relevant tasks well performed, no important tasks left incomplete.</td>
</tr>
<tr>
<td>B</td>
<td>Generally satisfactory and complete, only minor omissions and inadequacies.</td>
</tr>
<tr>
<td>C</td>
<td>Can be considered just satisfactory despite omissions and/or inadequacies.</td>
</tr>
<tr>
<td>D</td>
<td>Parts are well attempted but must, as a whole, be considered just unsatisfactory because of omissions or inadequacies.</td>
</tr>
<tr>
<td>E</td>
<td>Not satisfactory, significant omissions or inadequacies.</td>
</tr>
<tr>
<td>F</td>
<td>Very unsatisfactory, important task(s) poorly done or not attempted.</td>
</tr>
<tr>
<td>NA</td>
<td>Not applicable. The Review Topic is not applicable or it is irrelevant in the context of this Statement.</td>
</tr>
</tbody>
</table>
by Lee and Colley in 1992, was used as a modernised version of Lee et al.’s (1999) package which Glasson et al. (2005) note is widely considered to be reliable and valid.

3.5 Limitation of the method

a) Lee and Colley review package required the audit were completed by two reviewers respectively and then integrated the audit result. However, due to the requirements for the article and research independence, the proposed method only contains one reviewer this paper. Although one reviewer system is likely increasing the subjectivity of the results, the similar approaches have also been presented in some relevant article, the results out of a reviewer audit also has reliability and comparability.

b) Currently, the publicity requirements of EIA report is not perfect in China, thus, the performance of sample collection is not easy, coupled with the limited time. Hence, only 30 EISs was chosen for analysis. As a result of the small sample size, results of the investigation may contain deviation from the fact.

c) Some samples’ content are different from the title. The actual content of the EIS is not relevant with the research area, which partly decreased the credibility of research results.
Chapter 4  Results

According to table 4, 51% of the review sub-categories achieve high satisfaction from researching, which are over 80% satisfactory. It is clear to see that sub-category 1.5.3 reaches the highest value, which is 100% satisfactory, from which we have learnt that the description of local climate and meteorological condition and existing air quality in the area has been fully considered. Besides, a brief introduction that describes the project is valued, which reaches 97% satisfactory from the research. However, there is a point need to be reminded that sub-category 3.1.1 achieves a very low satisfactory, which is 10% only. In another word, feasible alternative for project have not yet been considered and described very careful; and reasons for final choice may not be given after discussing the advantages and disadvantages. To sum up, most of the review sub-categories have accomplished satisfaction.

Table 4.

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</table>
Having analysed the review sub-category in table 4, table 5 is the statistics of review category.

There is only 29% of categories achieve high satisfaction, which is scoping and public involvement, evaluation of impact significance, layout, emphasis and non-technical summary. Nevertheless, 82% of them achieve more than 70% satisfactory, which means most of them are in the range of 70% to 79% satisfactory.

Table 5.

<table>
<thead>
<tr>
<th></th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>% satisfactory</th>
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<td>8</td>
<td>8</td>
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<td>73%</td>
</tr>
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<td>73%</td>
</tr>
<tr>
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<td>6</td>
<td>6</td>
<td>12</td>
<td>1</td>
<td>57%</td>
</tr>
<tr>
<td>2.1</td>
<td>Definition and identification of impacts</td>
<td>6</td>
<td>8</td>
<td>7</td>
<td>6</td>
<td>3</td>
<td>70%</td>
</tr>
</tbody>
</table>
Table 5 is the statistics of the overall score for all the samples under the regulation of different guidelines. In order to give a summary score for the general quality of the whole EIS, the symbol that is used to grade the categories has been changed to digit. This is mainly because it is easier to calculate the data. Then symbol A to F are transformed to 6 to 1 and all the calculating progress could be found in appendix B. After the mathematic analysis, all the results are finally transformed to symbol and shown in table 6. It is clear to see that although the guidelines for environmental impact assessment Atmospheric environment was edited in 2009, it does not affect the satisfactory very significant. What is shown in table 6 is only very slight change, which means the emendatory law has not brought an efficient progress.

Table 6.

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<td>C</td>
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</table>

Table 6 is the statistics of the overall score for all the samples under the regulation of different guidelines. In order to give a summary score for the general quality of the whole EIS, the symbol that is used to grade the categories has been changed to digit. This is mainly because it is easier to calculate the data. Then symbol A to F are transformed to 6 to 1 and all the calculating progress could be found in appendix B. After the mathematic analysis, all the results are finally transformed to symbol and shown in table 6. It is clear to see that although the guidelines for environmental impact assessment Atmospheric environment was edited in 2009, it does not affect the satisfactory very significant. What is shown in table 6 is only very slight change, which means the emendatory law has not brought an efficient progress.
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<td>C</td>
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<td>B</td>
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<td>C</td>
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</tbody>
</table>

### Before 2009

- **B**, 1, 6%
- **C**, 10, 67%
- **D**, 4, 27%

### After 2009

- **C**, 67%
- **D**, 6%
- **B, 27%**

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<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>% satisfactory</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>5</td>
<td>8</td>
<td>10</td>
<td>7</td>
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<td></td>
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<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>% satisfactory</th>
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</thead>
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<td></td>
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<td>8</td>
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<td>9</td>
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<th>C</th>
<th>D</th>
<th>E</th>
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<td>9</td>
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<th>B</th>
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<td>9</td>
<td>4</td>
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<td>4.4</td>
<td>Non-technical summary</td>
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</table>
Chapter 5   Discussion

In this chapter, the finding of reviewing will be discussed. These discussions are built on the results in last chapter gathered from EISs reviewed in the context of air quality in Hebei with the objective exam the general quality of EIS in Hebei and assess the effectiveness of the new guideline. Although the quality of EIS was assumed to be low or unsatisfactory by author before carry out the review, the results of reviewing shows a surprise that the general quality of EIS in Hebei can be considered as satisfactory, despite omissions or inadequacies.

5.1 Characters of the samples

The overall satisfactory percentage of the 30 samples is around 83%, which could reflect that the quality of EIS in air component of target area is relative high.

Among the four review areas, the review area 3 shows a major weakness which 2 out of 3 categories within this area are unsatisfactory. This is mainly because the poor complement on the alternatives and commitment of mitigation. Even though the alternatives and commitment step are not been considered as a important phase in the technical guidelines for environmental impact assessment General programme, the importance of these parts still need to be careful. The author considered that the fundamental reason for the low satisfactory of the implementation is mainly caused by the ignorance of the government and imperfection of the legislation and guideline.

Besides, all the sub-category related with the gaps or uncertainty of information and data are poorly done. It seems like the when the EIS was produced, the reliability and credibility are
neglected.

5.2 The strengths and weaknesses

The general satisfactory of the samples are high which means most parts within the checklist are achieved. As one of the most important part, the evaluation of impact significance reach a 90% satisfactory, which could be considered as very satisfied. According to the result of reviewing, most relevant standard and legislation has been followed and sensitive receptors of air pollution has been defined and investigated, for example, pregnant women, elder people, and specific disease group.

However, the low quality of the EIS layout affects the general satisfactory of an EIS. Some sample EISs even do not contain catalogue. The way that half of samples presented the EIS caused different extents confusing for reviewer.

Besides, the baseline condition part only reach 57% satisfactory. When reviewing the EISs, the reviewer found that the data and information sources use to predict the baseline condition are explained poorly or not attempted. On the other hand, the omissions of maps shown the location of development are also been found out through the review.
Chapter 6 Conclusion

As discussed in chapter 5, the EIA process in China still includes not a few weaknesses, even though the EIA was built in China for around 45 years. Suggestions are provided in this chapter to improve the quality of EIA in China.

First of all, the supervision and management of EIA is very important, as it is a tool to control some project in order to protect the environment. The process of EIA in China should improve the aspect of supervision and management, so that the norm will be more standard and we can develop the economy as well as protect the environment in some extent at the same time. It is the responsibility of Chinese government to improve the supervision and management of EIA.

Secondly, alternatives and monitoring are also essential, as it is very important to the quality of EIA. The policy maker, EIA maker as well as government should concern more about alternatives and monitoring.

Finally, the data and information applied in the EIA statement should be ensured that it is real and reliable. Chinese politic system is very special, as it is centralism and has many weakness. If the data are not reliable or completely wrong, the meaning of EIA is empty. So we should make sure that all the data and information is reliable, forbidding corruption is very important. Only in this way EIA can make it own value as well as become efficient.
References


http://www.epa.ie/monitoringassessment/assessment/eia/


Appendix A

Checklist

Review area 1

1.1 Description of the development

1.1.1 The purpose(s) and objective of the development are explained (European Commission, 2001; Lee et al, 1999).

1.1.2 The size/scale and layout of the development are described and shown on a map, plans or diagrams clearly (guideline/lee/cec).

1.1.3 The nature of activities involved in both construction and operational phases are described (European Commission, 2001).

1.2 Site description

1.2.1 The location of the development was described and shown on a map clearly (Guideline/lee/cec).

1.2.2 The uses of land are described and different land use areas are demarcated (Lee et al, 1999).

1.2.3 The estimated duration of the construction phase, operation phase and, where appropriate, decommissioning phase should be given. (Lee et al, 1999)

1.2.4 The number of populations entering the development area during both construction and operation are estimated. There access to the site and likely means of transport are given. (European Commission, 2001; Lee et al, 1999)

1.3 Emissions

1.3.1 The characters and quantities of emission sources are identified. (Including process emissions, fugitive emissions, emissions from combustion of fossil fuels in stationary and mobile plant, emissions from traffic, dust from materials handling, odours.) (European Commission, 2001; Lee et al, 1999)

1.3.2 The ways proposed to handle and/or treat the emissions are indicated, together with the routes by which they will eventually be disposed of to the air. (Lee et al, 1999)

1.3.3 The methods used to estimate the quantity of emissions are explained, and the uncertainty and limitation of method should be given where possible. (Lee et al, 1999)

1.4 Environment description

1.4.1 The area or environment expected to be affect by the emissions should be indicated
and shown on a suitable map.

1.5 Baseline conditions

1.5.1 Existing data sources of air quality should have been searched and, where relevant, utilized. (European Commission, 2001; Lee et al, 1999, moham)

1.5.2 Important gaps or uncertainty in the data on the existing environment are identified and the means used to deal with the gaps are explained.

1.5.3 Local climatic and meteorological conditions and existing air quality in the area should be described (e.g. wind speed and direction). (CEC/Moham)

1.5.4 The air sensitive areas are investigated and described. (guide)

1.5.5 The characters of topography are investigated and described. (guideline)

1.5.6 Sources of data and information on the existing environment have been adequately referenced

Review area 2

2.1 Definition and identification of Impact

2.1.1 A description are given of all potential effects caused by the air emissions, including the direct and any indirect, secondary, cumulative, short, medium and long term, permanent and temporary, positive and negative effects. (Lee et al, 1999)

2.1.2 A systematic methodology is used to identify the effects mentioned above, and rationale for using the method has been described briefly. (European Commission, 2001; Lee et al, 1999)

2.1.3 Impacts which might arise from non-standard operating conditions, due to accidents, should be describes. (Lee et al, 1999)

2.1.4 The impacts are analysed as the deviation from baseline conditions. (Lee et al, 1999)

2.1.5 The compositions and toxicity or other hazards from all emissions to air should be discussed. (cec)
2.1.6 The following receptors are likely to be affected by the air emissions should be investigated and described. (Lee et al, 1999)

- Local residents/ Human being
- Flora and fauna
- Cultural heritage
- Climate
- Material assets

2.2 Scoping

2.2.1 The views of general public and interest parties are collected from a genuine attempt and taking into account.

2.2.2 There are arrangements made to collect the opinion and concern of interest group and general public.

2.2.3 Key AQ impacts are identified and investigated more intensive.

2.2.4 AQ Impacts required less details investigation are indicated and given fully reasons.

2.3 Prediction of impact magnitude

2.3.1 Data used to estimate the magnitude of impacts is reliable and sufficient for the task and clearly described.

2.3.2 Any gaps or uncertainty in the require data on the existing environment are identified and the means used to deal with the gaps are explained.

2.3.3 The methods used to predict the severity of AQ impacts are described and be appropriate to the size and importance of the air quality impact.

2.4 Evaluation of impact significance
2.4.1 All the sensitive receptors are identified and considered, and the significance to them are described (European Commission, 2001; Lee et al, 1999).

2.4.2 The significance of a impact are assessed, taking into account national and local air quality standards where available.

Review area 3

3.1 Alternatives

3.1.1 Feasible alternatives for project have been considered and described, including sites, processes, designs and operating conditions. Reasons for final choice are given after discussing the advantages and disadvantages (Lee et al, 1999; Talime, 2011).

3.2 Mitigation measures

3.2.1 Mitigation measures are applied in all significant adverse impacts on air quality and, where practicable, particular mitigation measures need to be put forward (Lee et al, 1999).

3.2.2 All the unmitigated impacts are described and reasons has been given.

3.2.3 Mitigation measures have considered modification of the project, compensation and pollution control.

3.2.4 The feasibility of proposed mitigation has been clearly justified in terms of environment, economy and technic.

3.2.5 Whether the effectiveness of measures meet the requirement of air quality standard when implemented need to be justified clearly. Where the effectiveness is uncertain or depends on assumptions about different conditions (e.g. climate condition), data should be introduced to justify the reliability of the assumptions.

3.3 commitment of mitigation

3.3.1 A clear record of commitment to mitigating measures given by project developer is offered in the statement. Details of how the measures will be implemented are given.
3.3.2 Monitoring arrangement are proposed and provision are made to adjust mitigation measures where unexpected adverse effects arise.

Review area 4

4.1 Layout

4.1.1 There is a brief introduction describing the project.

4.1.2 Summary include main outcomes of each step are presented.

4.1.3 Under the circumstance that one paper introduces data, conclusions or quality standards from external sources, it should admit the original source on the occasion and the references need to be attached.

4.2 Presentation

4.2.1 The way all the information are presented is accessible and understandable to the non-specialist.

4.2.2 Technical words, acronyms and initials are defined.

4.2.3 The Statement should be presented as an integrated whole. Summaries of data presented in separately bound appendices should be introduced in the main body of the text.

4.3 Emphasis

4.3.1 Emphasis are given to potentially severe adverse impacts as well as to potentially substantial favourable environmental impacts.

4.3.2 The Statement is judicial and presented without any bias or lobbying.

4.4 Non-technical summary

4.4.1 All findings are recorded with a non-technical summary.
### Appendix B

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