

Green Stocks Phase II Report

Smog-related Risks for Listed Companies

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1. Foreword

In 2013 a new standard for air quality was implemented in 74 cities in China. According to year-round monitoring in 2014, only three (Lhasa, Haikou, and Zhoushan) out of 74 cities came up to the Level II Standard for Air Quality and the other 71 cities violated the new standard to varying degrees. Those 74 cities saw their annual average particulate matter 2.5 (PM_{2.5}) concentration of 72 ug/m³ exceed Level II Standard by 1.1 times.¹

Pollution resulting from smog has hit north China again and again since October 2014. In October 2014, heavy air pollution occurred in Beijing, Tianjin, and Hebei province and their surrounding regions four times, with an affected area totaling several hundred thousand square kilometers. In this situation, smog has become a great environmental threat that troubles a population of several hundred million.

To respond to the worsening air pollution hazard, the State Council introduced the “Action Plan for Prevention and Control of Atmospheric Pollution” (hereinafter referred to as “National Ten Measures”). The “National Ten Measures” represent greater efforts to deal with pollution than before, but face a greater challenge in implementing them. More than one year after the measures were unveiled, air quality has yet to be notably improved. Cloaked in smog, the public look forward to seeing blue skies; some insiders present the view that it will take 30 or even 50 years to control the smog.



Figure 1. NASA satellite map: the North China Plain shrouded in smog on October 9, 2014

Facing smog events that come one after the other, residents wear masks and children are asked not to take part in outdoor activities. Will there come a time when people can do nothing at all? The fact that there were blue skies during the APEC summit of November 2014 confirmed that smog is not a natural phenomenon that is impossible to solve. It showed that it can be controlled effectively even in unfavorable meteorological conditions if pollution emissions are reduced significantly.

¹ http://www.mep.gov.cn/zhxx/hjyw/201403/t20140310_268910.htm

Smog is controllable but this control necessitates a breakthrough at some key points. The practice of air quality guarantee covering seven provinces and municipalities directly under the central governments during Asia-Pacific Economic Cooperation (APEC) 2014 proved that present air pollution shows an obviously regional feature and that coal burning and industries play the main part in emissions in major areas. It is much easier to control the emissions from a limited number of large point sources than to control that from millions diffuse sources such as motor vehicles. Among many air pollution sources, quite a few are related to enterprises affiliated to listed companies in the thermal power, steel, cement, non-ferrous metallurgy and chemical industries.

In our research, we found that enterprises affiliated to over 1,000 listed companies have violated relevant regulations and standards, with a higher proportion of violations amongst listed companies in the smog-causing power, steel, non-ferrous, cement and chemical industries. The real-time disclosure of online monitoring data initiated since 2014 has further highlighted the fact that listed companies and enterprises in some key smog-causing industries frequently fail to discharge pollutants in accordance with the relevant standards.

Listed companies held by the public should not continuously cause damage to the environment and public health. According to an estimate by the World Bank in 2007, the health costs resulting from air and water pollution in China were equivalent to 4.3% of the country's GDP. Some scholars have comprehensively assessed the socio-economic effect² of air pollution events using disease cost methods and the human capital methods. For example, they found that the large-scale, national, smog event in January 2013, caused total health and economic losses due to emergency treatment/outpatient services of around 22.6 billion yuan.³

However, during our research we found that a group of listed companies with serious air emissions failed to respond to questions about smog problems. Most of the 34 enterprises that we communicated with failed to provide proper responses to their serious air emissions, and just three of them made positive responses to this problem. Among the 34 enterprises, one listed steel company based in the region seriously affected by smog explicitly refused to respond to the question about its emission in violation of the discharge standards, saying "the smog problem is not very important for us".

Such severe environmental and health hazards are pushing the Chinese government and all sectors of society to take action. With environmental law enforcement and social supervision being intensified, those listed companies that have air emissions problems will be under increased pressure. The "Environmental Protection Law of the People's Republic of China", which will come into force on January 1, 2015, contains some strong measures such as fines that accrue on a daily basis. Based on this, for some enterprises, that according to online monitoring data, repeatedly violate the related standard and are affiliated to listed companies, we have attempted to measure the daily fines that they would have faced and we found that the amount is likely to reduce the profits of the related enterprises significantly. Meanwhile, the expansion of environmental information disclosure means that existing and new projects of some large-scale pollutant emitters violating the regulations and standards may meet "NIMBY" resistance from local communities.

Only when listed companies from major smog-causing industries that repeatedly violate discharge standards feel that there is a risk in doing so will they carry out large-scale emission reduction on the basis of the rule of law. This will also help to solve severe overcapacity in related industries through survival of the fittest. Our report recommends that the environmental authorities strengthen environment laws and continue to expand information disclosure so as to promote, through social supervision, the implementation of measures such as daily fines.

Facing the public's urgent requirement for smog control and the government's expanding

2 Evaluation of the direct socio-economic costs of the large scale smog event in China in January 2013, Mu Quan and Zhang Shiqiu.

3 Equivalent to 32.2% of Chinese society's average monthly expenditure on health.

information disclosure, the negative and unresponsive large-scale pollutant emitters will not only take risk themselves but also create real investment risk. We recommend that the listed companies that contribute to the smog see the severe situation clearly and move toward large-scale emission reduction and compliance with environmental laws. This report also recommends that investors pay close attention to the emissions and coping capacity of the listed companies, to reduce their exposure to smog risks and drive China's smog control through responsible investment.

2. Emissions from Listed Companies in some Industries are Extremely High

2.1 Large Scale Emitters Repeatedly Violate Discharge Standards

As of December 12, 2014, the IPE's Green Stocks database contained 1069 environmental supervision records for listed companies and their subsidiaries, accounting for almost two fifths of all listed companies.⁴ Emissions of sulfur dioxide, nitrogen oxides and soot from industrial sources account for between 70-90% of their total emissions. Amongst 41 different industries, the five key industries below account for between 78-93% of their total volume of atmospheric pollutant emissions, so they can be referred to as large scale emitters. The report that follows analyses the emissions from listed companies in these five key smog-causing industries:

- ◆ Thermal power production and supply;
- ◆ Ferrous metal smelting and rolling processing industries;
- ◆ Non-ferrous metal smelting and rolling processing industries;
- ◆ Non-metal mineral products industry;
- ◆ Chemical raw materials and chemical products industry.

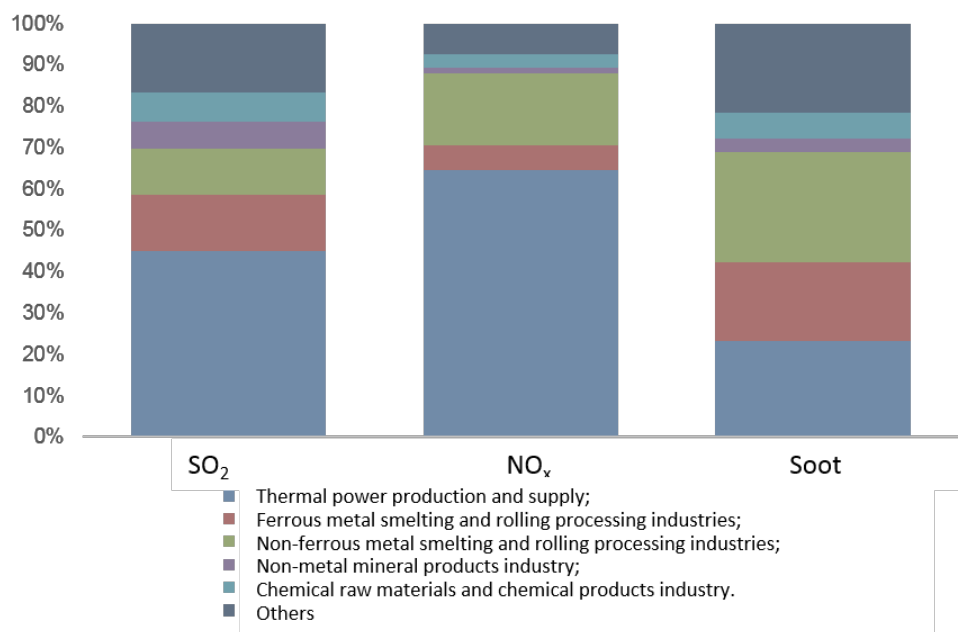


Figure 2. Proportion of emissions from each of the five big emitting industries⁵

Figure 3 shows that listed companies in the five key smog-causing industries (shown in orange) generally have a higher proportion of environmental violations. For example, 34 out of 36 listed steel companies (ferrous metal smelting and rolling processing industries), were under supervision for having poor environmental compliance records, which equals a non-compliance rate of 90%. Furthermore, around 80% of listed companies in the power industry have poor environmental supervision records.

⁴ IPE Green Stocks Database (<http://www.ipe.org.cn/gca/greeninvest.aspx>). In total there are 2679 A share companies, H Share companies and foreign listed companies. As of December 5, 2014 there were a total of 5359 records for 1069 listed companies in the database.

⁵ Source 2012 State of the Environment in China Report

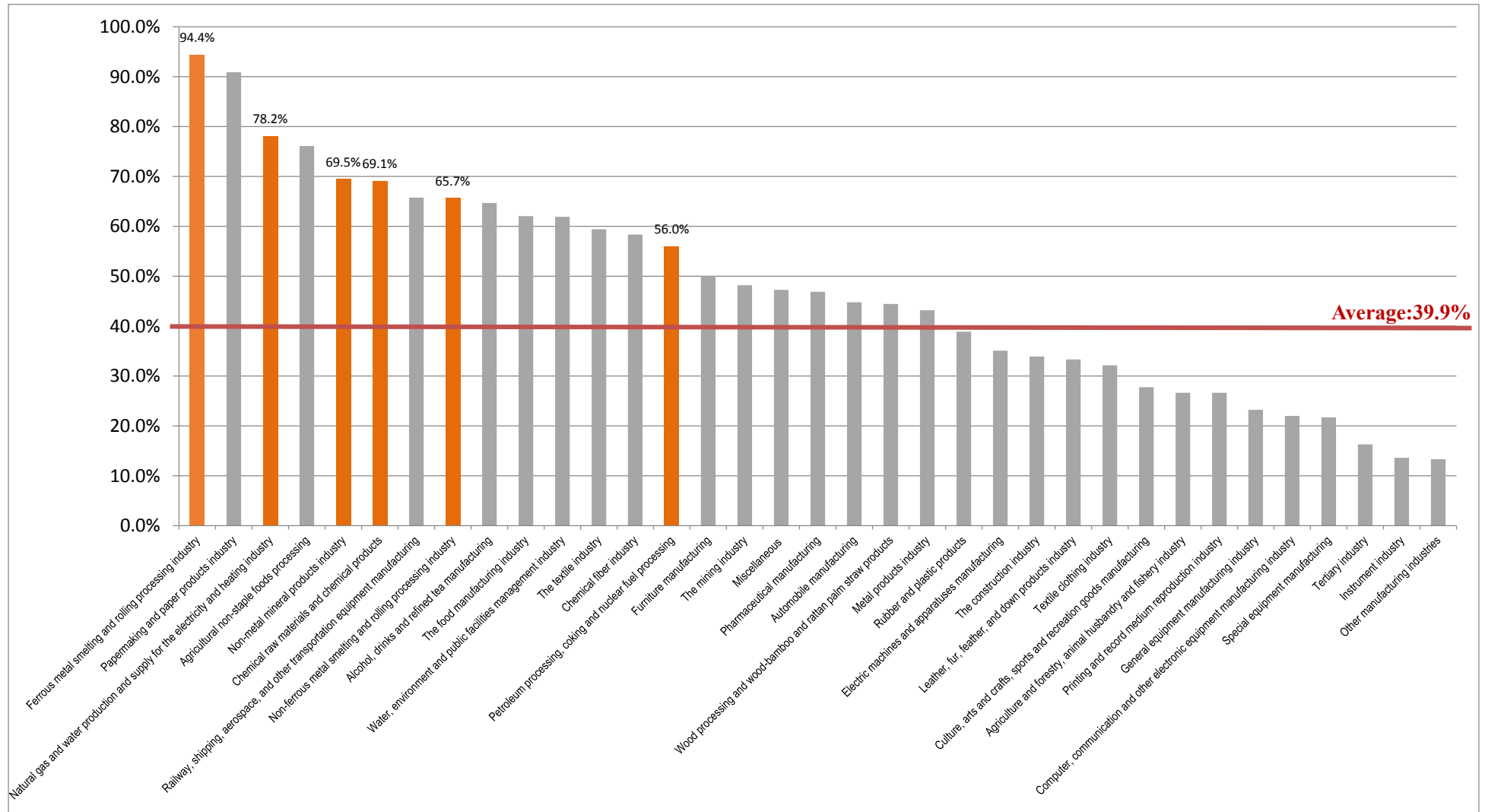


Figure 3. Comparison of the percentage of listed companies in a particular industry that have environmental violation records (as of October 31st 2014)

By looking at the average number of violation records for listed companies in each industry we can see that in the top 15, the five key smog-causing industries are near the top. The 68 listed companies in the power industry have 738 environmental supervision records between them, which means each listed company has on average more than 10 records. One of the reasons for this is that listed power companies often own very large groups of power generators, which means that when discharge standards and supervision enforcement gets stricter, repeat violation problems for power generators, such as emissions breaching discharge standards, become increasingly prominent.

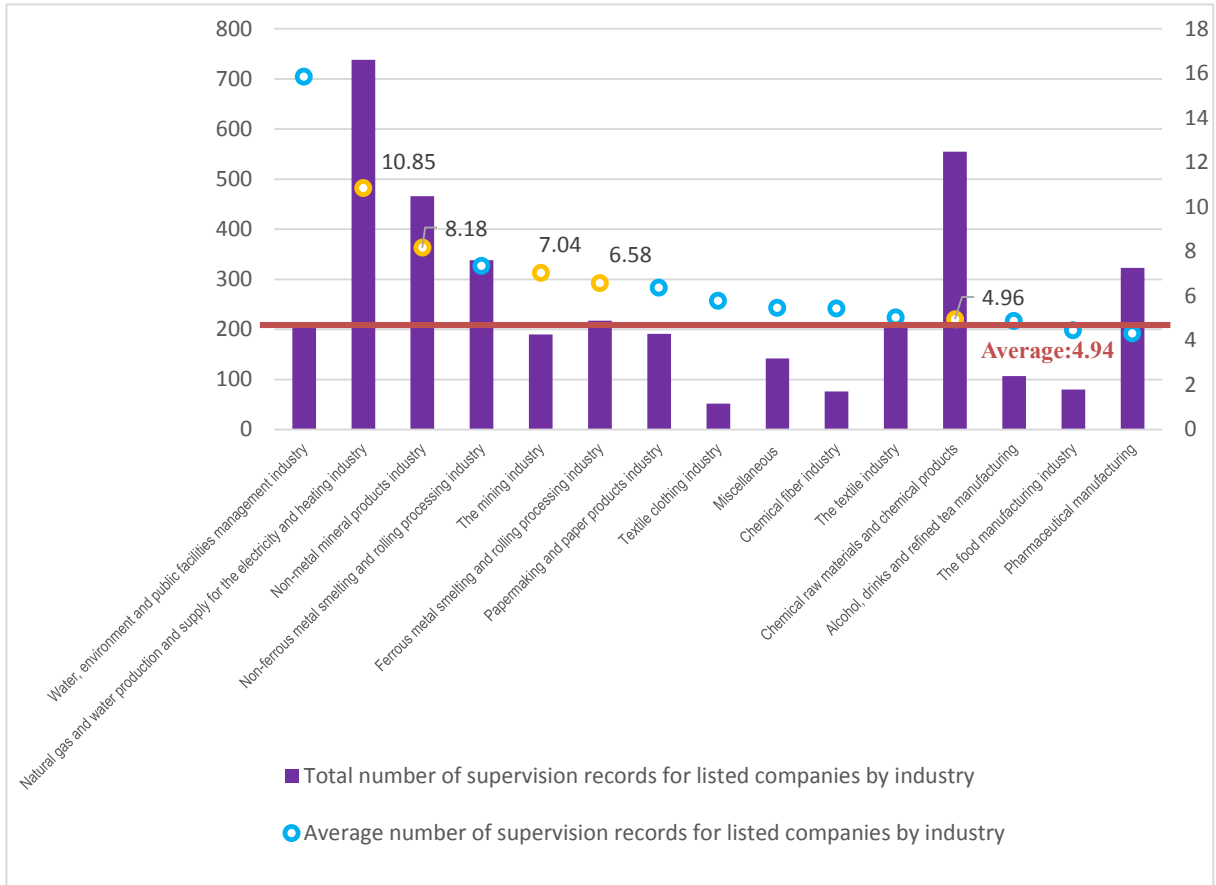


Figure 4. Total number and average number of supervision records for listed companies by industry (as of October 31, 2014)

The real-time disclosure of online monitoring data has helped to highlight that some listed companies are repeatedly breaching discharge standards.

According to Ministry of Environmental Protection (MEP) requirements, since 2014, a large number of environmental protection bureaus (EPBs) at provincial, municipal and autonomous region level across the country have had to set up online platforms to publish real-time discharge data for key state monitored enterprises.

This real-time data has shown that a range of key air emission sources are breaching discharge standards. The “Pollution Map” app developed by IPE and SEE shows that nationally, every hour, there are more than 400 key air emission source enterprises that are unable to adhere to discharge standards.



Figure 5. Screenshot from the “Pollution Map” app with real-time discharge data showing air emission source enterprises breaching discharge standards

We have done some matching of online air emissions data and listed companies and looked in detail at the online monitoring data from 900 affiliates of 213 listed companies in the five key smog-causing industries.

We calculated the instances of discharge standards being breached by affiliates of listed companies according to the following criteria and methodology:

Time period: August 1, 2014 – October 31, 2014. A total of 92 days.

Pollutants: Sulfur dioxide, nitrogen oxides, soot (particulate matter)

Data source: Provincial level key state monitored enterprise self-monitoring information disclosure platforms

Definition of breaching discharge standards: A company is considered to have breached discharge standards if at one discharge outlet, one pollutant, is discharged at a concentration in breach of the legally recognized discharge standard limit value for three hours consecutively.⁶ The day that this occurs is then considered a day whereby the company breached discharge standards.

Table 1 and 2 show that a large number of subsidiaries of listed companies in the five key smog-causing industries have long periods where they breach discharge standards.

⁶ If the data source publishes both real-time concentration and converted concentration values then the converted concentration value will be used for the calculation.

Table 1. Number of listed companies in key industries that have breached discharge standards and the total number of days where discharge standards were breached

Industry Group	No. of Companies Exceeding Discharge Standards	Total No. of Days Discharge Standards were Exceeded
Thermal power production and supply;	125	1621
Non-metal mineral products industry;	83	963
Ferrous metal smelting and rolling processing industries;	19	618
Chemical raw materials and chemical products industry.	18	336
Non-ferrous metal smelting and rolling processing industries;	14	327

Table 2. Top 20 companies according to the number of days where they exceeded discharge standards

Rank	Online Company Name	Region	Listed Company (Stock Code)	Shareholding	Total No. of days where exceedance occurred	Percentage of days where exceedance occurred
1	Qian'an Zhonghua Coal Chemical Co., Ltd.	Hebei	Kailuan Energy Chemical Group Co., Ltd. (600997.SH)	49.82%	92	100.0
1	Qingdao Soda Industry Corporation	Shandong	Qingdao Soda Ash Industrial Company Ltd. (600229.SH)	100%	92	100.0
1	CHTC Helon Co., Ltd.	Shandong	CHTC Helon Co., Ltd. (000677.SZ) ⁷	100%	92	100.0
1	Dongguan Huatai Chemical Industry Group Co., Ltd.	Shandong	Shandong Huatai Group Co., Ltd. (600308.SH)	100%	92	100.0
5	Shandong Huaju Energy Co., Ltd. Nantun Subsidiary	Shandong	Yanzhou Coal Mining Company Ltd. (600188.SH, 1171.HK)	95.14%	91	98.9
5	Tengzhou Jinjing Glass Co., Ltd.	Shandong	Jinjing Group Co., Ltd. (600586.SH)	92.85%	91	98.9
7	Aluminum Corporation of China Shandong Subsidiary Thermal Power Plant	Shandong	Aluminum Corporation of China (601600.SH, 2600.HK)	100%	90	97.8
8	Ningbo Chengfeng Thermal Power Co., Ltd.	Shandong	Youngor Group Co., Ltd. (600177.SH)	50%	89	96.7
8	Zhangzhou Kibing Glass Co., Ltd.	Fujian	Kibing Group Co., Ltd. (601636.SH)	100%	89	96.7
10	Shaanxi Weihe Power Co., Ltd.	Shaanxi	China Travel Service (Holdings) Hong Kong Ltd.	51%	88	95.7
11	Inner Mongolia BaoTou Steel Union Co., Ltd Thermal Power Plant	Inner Mongolia	Inner Mongolia Baogang Steel Group Co., Ltd. (600010.SH)	100%	82	89.1
12	Shandong Sun Paper Industry Joint Stock Co., Ltd.	Shandong	Shandong Sun Paper Industry Joint Stock Co., Ltd. (002078.SZ)	100%	80	87.0
13	Baoshan Iron and Steel Co., Ltd.	Shanghai	Baoshan Iron and Steel Co., Ltd. (600019.SH)	100%	78	84.8

⁷ This company's full name has changed but the stock code is still 000677.

Rank	Online Company Name	Region	Listed Company (Stock Code)	Shareholding	Total No. of days where exceedance occurred	Percentage of days where exceedance occurred
13	Inner Mongolia Fengtai Power Co., Ltd	Inner Mongolia	Inner Mongolia Mengdian Thermal Power Co., Ltd. (600863.SH)	45%	78	84.8
15	Aluminum Corporation of China Zhongzhou Subsidiary	Henan	Aluminum Corporation of China (601600.SH, 2600.HK)	100%	77	83.7
16	Shanghai Shenergy Xinghuo Thermal Power Co., Ltd.	Shanghai	Shenergy Company Limited (600642.SH)	75%	75	81.5
17	Huaneng Power International Inc. Shang'an Power Plant	Hebei	Huaneng Power International Inc. (600011.SH)	100%	70	76.1
17	Befar Thermal Power Co., Ltd.	Shandong	Befar Group Co., Ltd. (601678.SH)	100%	70	76.1
19	Guizhou Conch cement Co., Ltd.	Guizhou	Anhui Conch Cement Group Co., Ltd. (600585.SH)	51%	69	75.0
20	Aluminum Corporation of China Henan Subsidiary	Henan	Aluminum Corporation of China (601600.SH, 2600.HK)	100%	67	72.8

It should be noted that the real-time disclosure platforms are not the same. The platform for Shandong is the most comprehensive and complete and so means that the risk from enterprises in this region is fairly transparent. For provinces like Shanxi and Guangdong that have no real-time disclosure platform, it means it's very difficult to check on the risk of discharge from enterprises in these areas so the public are left in the dark.

2.2 Analysis of Listed Companies in Key Smog-causing Industries

2.2.1 Cement Industry

China is the biggest producer of cement in the world. In 2012, China produced more than 50% of the total global amount of cement produced. Out of all industry sectors in China, the cement industry has the highest discharge of soot, and accounts for 10-12% of national nitrogen oxide emissions, so really can be considered a key smog-causing industry.

As of December 5, 2014, there were 477 environmental violation records for 57 non-ferrous building material listed companies in the IPE's Green Stocks database. Amongst these, subsidiaries of China National Building Materials Group Corporation and Tangshan Jidong Cement Co., Ltd. have many violation records for emissions exceeding the legal standards.

Case Study 1. China National Building Materials Group Corporation (Stock Code: 3323.HK)



Figure 6. Location of some of China National Building Materials Group Corporation's subsidiaries that have violation records

The IPE's Green Stocks database shows that subsidiaries of China National Building Materials Group Corporation have 62 environmental violation records. Over the past three years more than 10 affiliates of the company have been reported by the environmental supervision departments for

having air emissions that were in breach of the legal standards.

Table 3. Recent environmental supervision records for subsidiaries of China National Building Materials (2012-2014)

Subsidiary	Region	Year of Violation	Type of Violation Result of Punishment	Source of Record
Qufu China United Cement Company Limited	Jining	2014	September 2014, Jining City summary of the status of implementation of the new air pollutant standard. Soot discharge was found to not meet emission standards and the company was required to control emissions within a designated time limit.	Shandong EPB
		2013	2013 4 th quarter Shandong Province key state monitored enterprise monitoring showed that discharge of particulate matter and nitrogen oxides exceeded the standard.	Shandong EPB
Jining China United Cement Company Limited	Jining	2014	July 2014, Jining City summary of the status of implementation of the new air pollutant standard. Soot discharge was found to not meet emission standards and the company was required to control emissions within a designated time limit.	Shandong EPB
Dezhou China United Daba Cement Co., Ltd.	Dezhou	2013	2013 4 th quarter Shandong Province key state monitored enterprise monitoring showed that discharge of nitrogen oxides exceeded the standard.	Shandong EPB
			Summary of special atmospheric pollutant inspections in Shandong showed that: thick layer of dust covering construction materials; coal store had no protection to stop dust blowing away in the wind	
Yuzhou China United Cement Co., Ltd.	Yuzhou	2014	2014 1 st quarter Shandong Province key state monitored enterprise monitoring showed that discharge of nitrogen oxides exceeded the standard.	Jiangsu EPB
Dongping China United Meijing Cement Co., Ltd.	Tai'an	2014	Tai'an August, September 2014 atmospheric summary of the status of implementation of the new air pollutant standard. Sulfur dioxide and nitrogen oxide levels exceeded the standard. EPB released a report requiring the company to carry out corrective actions.	Shandong EPB
Hunan Jinlei Nanfang Cement Co., Ltd.	Chenzhou	2014	Hunan Province 2014 3 rd quarter key state monitored pollution source supervision monitoring showed that sulfur dioxide levels exceeded the standard.	Hunan Province EPB
		2012	2012, 1 st and 3 rd quarter Hunan key state monitored pollution source supervision monitoring showed that particulate matter exceeded the standard.	Hunan Province EPB
Rizhao China United Cement Co., Ltd.	Rizhao	2014	Rizhao 2014 March – September summary of implementation status of the new air pollutant standard. Soot discharge exceeded the standard and the company was required to limit production and control the problem.	Shandong EPB
		2013	EPB penalty notice: Suspected of discharging nitrogen oxides exceeding the standard limit and ordered to pay a fine of 50,000 RMB.	Rizhao EPB
Juxian China United Cement Co., Ltd.	Rizhao	2014	Rizhao 2014 March-August summary of the status of the implementation of the new air pollutant standard. Soot discharge exceeded the standard limit level. Company ordered to limit production and control the problem.	Shandong EPB
		2013	EPB Penalty Notice: Suspected of discharging nitrogen oxides exceeding the standard limit and ordered to pay a fine of 50,000 RMB	Rizhao EPB

Subsidiary	Region	Year of Violation	Type of Violation Result of Punishment	Source of Record
Shandong Donghua Cement Co., Ltd.	Zibo	2014	2014, 1 st quarter Shandong key state monitored pollution source supervision monitoring showed that nitrogen oxide levels exceeded the standard limit value.	Zibo EPB
Huzhou Meishan Nanfang Cement Co., Ltd.	Huzhou	2014	2014, 3 rd quarter Zhejiang key state monitored pollution source supervisory monitoring. Nitrogen oxide levels exceeded the standard limit level.	Zhejiang EPB
Changshan Nanfang Cement Co., Ltd.	Quzhou	2013	2013, 1 st , 3 rd , 4 th quarter Zhejiang key state monitored pollution source supervisory monitoring showed that nitrogen oxide levels exceeded the standard limit value multiple times.	Zhejiang EPB
Guilin Nanfang Cement Co., Ltd.	Guilin	2013	2013, 2 nd , 3 rd quarter Guangxi key monitored pollution source supervisory monitoring showed that nitrogen oxide, PM both exceeded the standard limit value.	Guangxi EPB
Jiangxi Jiujiang Nanfang Cement Co., Ltd.	Jiujiang	2013	2013, 4 th quarter Jiangxi key pollution source supervisory monitoring showed that nitrogen oxide exceeded the standard limit value	Jiangxi EPB
Jiangshan Nanfang Cement Co., Ltd.	Quzhou	2013	EPB Penalty Notice: sulfur dioxide levels 3.2 times over the standard limit value. Furthermore, from Oct, 21 2013 – Nov 12 online monitoring showed that sulfur dioxide exceeded the standard limit value many times. Company was given penalty of 50,000RMB.	Zhejiang EPB
Shanghai Baoshan Nanfang Cement Co., Ltd.	Shanghai	2012	EPB Penalty Notice: Soot and PM discharge from this company's No. 2 rotary kiln and No.4 cement mill exceeded the limit value. Company was handed a penalty.	Shanghai Baoshan District EPB

Online monitoring data has shown that the discharge concentrations are very high:

The Shandong key state monitored enterprise self-monitoring disclosure platform showed that between March and August, the average daily discharge of nitrogen oxide from Dezhou China United Daba Cement Co., Ltd. exceeded the standard many times.

It is worth noting that from January 1, 2015, Shandong's cement plants will take the lead and have to adhere to a new stricter regional standard (DB37/2373-2013) which will see nitrogen oxide discharge limit values fall from 800 to 400 mg/m³. Over the past few months this company's nitrogen oxide discharge levels have been within the standard limit value of 800mg/m³ but would be in excess of the new 400mg/m³ standard.

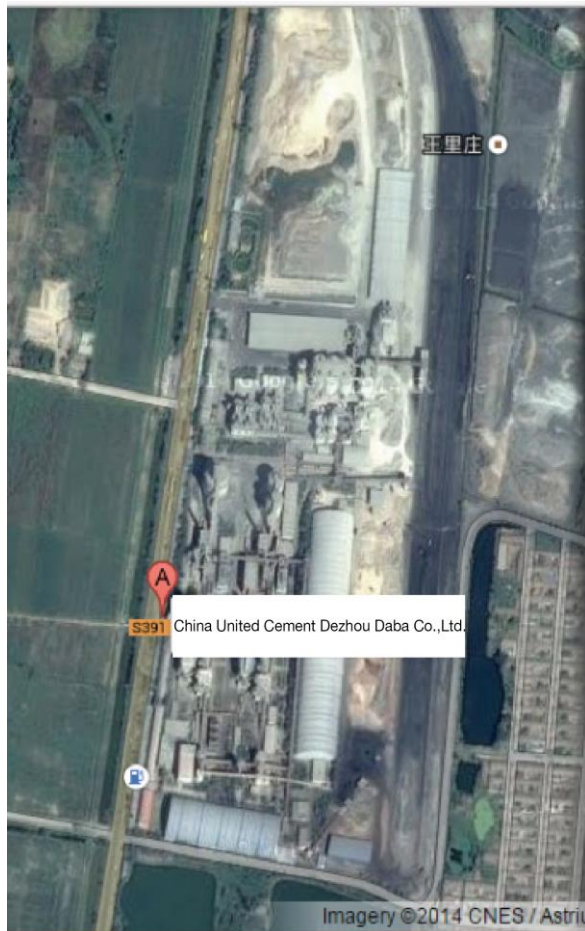


Figure 7. Dezhou China United Daba Cement Co., Ltd. online monitoring data

Case Study 2. Tangshan Jidong Cement Co., Ltd. (000401.SZ)

The IPE's Green Stocks database shows that affiliates and subsidiaries of Jidong Cement have 31 environmental supervision records and have received fines and supervision orders from the environmental authorities on many occasions. Violations include, air emissions exceeding standard limit value, non adherence to construction project EIA processes, key pollution reduction limits on

production and control of pollution.

Table 4. Environmental supervision records for subsidiaries and affiliates of Jidong Cement (2012-2014)

Affiliated Companies	Region	Year	Type of Violation	Source of record
Jidong Cement Chongqing Hechuan	Chongqing	2013	The Chongqing Environmental Monitoring Center self-monitoring report showed that from 9 am to 10 pm on May 6, 2013, and between 7 am and 10pm on May 7 th , 2013, concentrations of sulfur dioxide from Jidong Cement Chongqing Hechuan's discharge outlet exceeded the level in the discharge permit. The company was ordered to correct the violating behavior and pay a 100,000RMB fine. In October 2013, their emissions discharge once again was over the limit prescribed in their discharge permit and they were fined another 260,000 RMB.	Chongqing EPB
Linli Jidong Cement Co., LTD.	Changde	2013	Was included in the 2013 major pollutant emission reduction projects to remedy pollution problems	Changde People's Government Office
Jidong Cement Chongqing Jiangjin	Jiangjin	2013	Spot checks found that the company missed its deadline of the second phase project completion acceptance, and the main project started production without permission. Company was fined 50,000 RMB.	Chongqing EPB
Shenyang Jidong Cement Co., Ltd.	Shenyang	2012	Resident complaint about dust confirmed and now recorded as disturbing people. On checking about the complaints it was found that dust was disturbing the locals, this was because material stores in the factory were not covered, and while transporting and unloading of materials was also creating dust. EPB recommend that dust problems be controlled.	Minxin Network Complaints Center
Datong Jidong Cement Co., Ltd.	Datong	2012	Supervisory monitoring showed that several discharge outlets were exceeding the discharge standard. (Pollutant: PM, 2012, Q2) Flue gas desulfurization facilities had not been built. In May 2012 the city authorities ordered the company to control the pollution within a designated time frame. They were supposed to complete this by the end of 2012 but had not done so and applied for an extension.	Shanxi EPB Datong EPB

Online Monitoring Data Violations:

The Hunan key state monitored enterprise self-monitoring disclosure platform⁸ showed that the sulfur dioxide concentration from the discharge outlet of Linli Jidong Cement's rotary kiln exceeded the national standard many times.

8 <http://222.247.51.155:9000/enterprise-info!getCompanyInfo.action?companyid=10511>

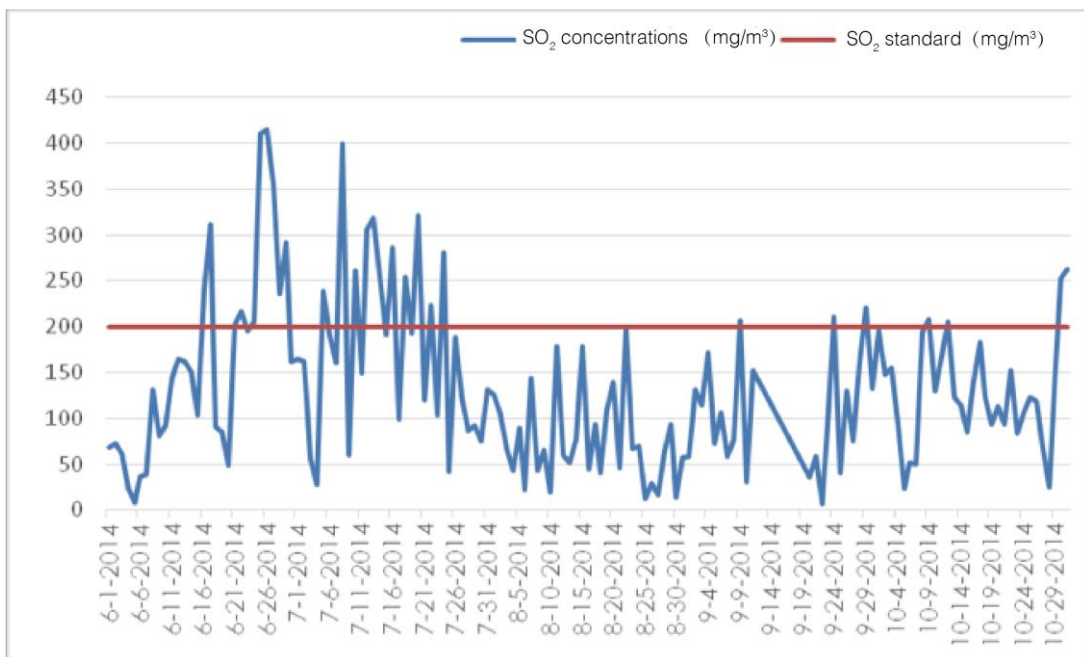


Figure 8. Sulfur dioxide concentrations from the discharge outlet of Linli Jidong Cement Co., Ltd.'s rotary kiln (June-October 2014)

The Jilin Province key state monitored enterprise self-monitoring disclosure platform showed that average daily discharge of soot from the No.2 kiln seriously exceeded the relevant standard.

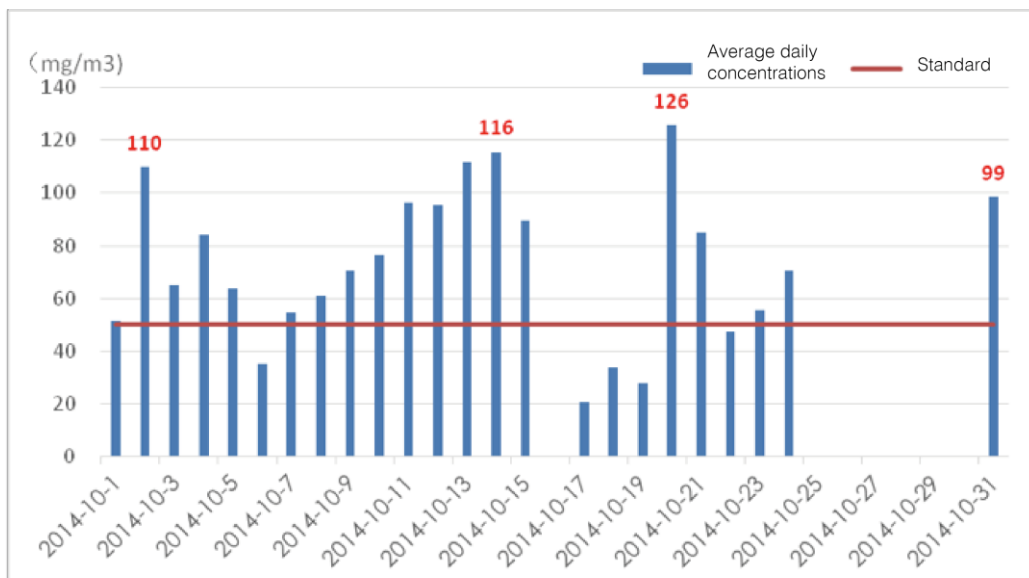


Figure 9. Jidong Cement Panshi Co., Ltd. – October 2014 average daily concentrations of soot from the No.2 kiln discharge outlet

2.2.2 Non-Ferrous Metal Smelting Industry

The non-ferrous metal smelting industry uses a lot of energy, creates a lot of pollution and consumes relatively large amounts of power and raw materials, which can all have a detrimental affect on the environment. By output, aluminum counts for more than half of non-ferrous metal production. During the production of aluminum, fumes from electrolysis contain pollutants such as fluoride, sulfur dioxide and dust. Every ton of aluminum produced requires around 14,000 units of electricity, so it is impossible to ignore the air pollution created to produce such a large amount of energy.

46 listed companies in the non-ferrous metal industry have a total of 341 environmental supervision records in the IPE database. Amongst these, the subsidiaries of the, and Tonglin Non-ferrous Metals have violation records for excessive levels of air emissions.

Case Study 3. Aluminum Corporation of China (Chalco) (Stock Code: 601600.SH, 2600.HK)



Fig 10. Location of Chalco subsidiaries that have violation records for exceeding air emissions discharge limits

The IPE's Green Stocks database shows that Chalco's subsidiaries have a total of 81 environmental supervision records. More than 10 of these companies have, over the past three years, because of air pollutant discharge that has exceeded the legal standards, been given public notices by various different environmental protection authorities.

Table 5. Details of recent environmental supervision records for Chalco (2012-2014)

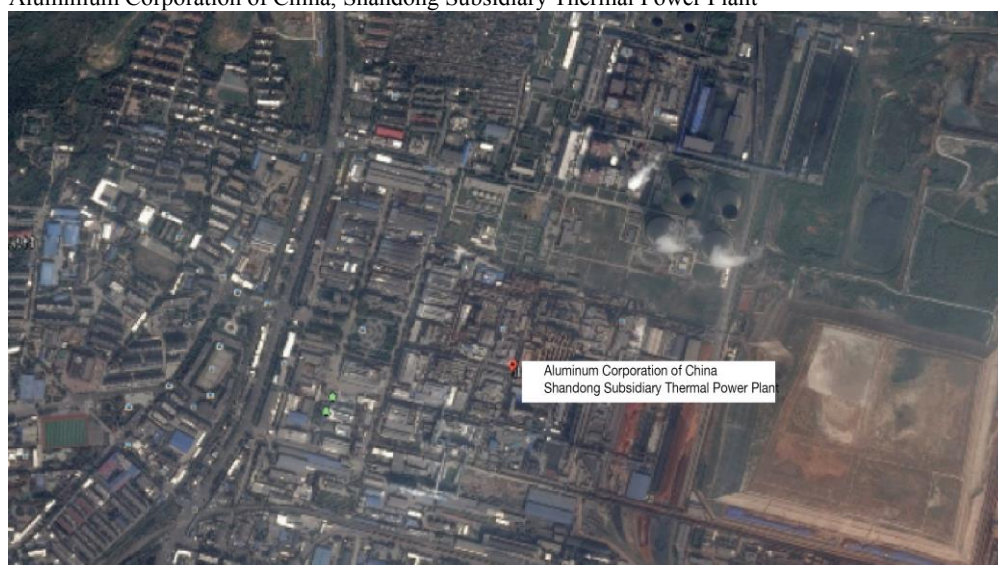
Subsidiary	Region	Year	Details of violation	Source of record
Aluminum Corporation of China Shandong Subsidiary Thermal Power Plant	Zibo	2014	Because of excessive discharge of air pollutants, in 2014, this company was reported in the second campaign by Shandong Province against polluting enterprises. 2014, 1 st and 2 nd quarter supervisory monitoring reports showed that nitrogen oxide and sulfur dioxide emissions exceeded the standard on many occasions. Nitrogen oxide at one point exceeded the standard by 1.6 times.	Shandong People's Government Zibo EPB
		2013	October, unauthorized dilution of the sampling probe which resulted in fabricated self-monitoring data. Were given a notification and investigated. November, stopped operation of desulfurization facilities without permission. This resulted in the concentration of sulfur dioxide discharge from the No.4 and No.5 boilers reaching 1087mg/m ³ , which was well over the legal standard. Resulted in the company being given an administrative penalty. Ordered to stop the violating behavior, correct the problem and were fined 50,000 RMB.	Shandong Province Environmental Information Monitoring Center Shandong EPB
		2013	2013, 1 st , 2 nd , 3 rd , 4 th quarter key state monitored pollution source supervisory monitoring showed that nitrogen oxide, soot and sulfur dioxide exceeded discharge standards on many occasions.	Shandong EPB
Aluminum Corporation of China Zhongzhou Subsidiary	Jiaozuo	2013	2013, Henan Province key state pollution source, 1 st , 4 th quarter supervisory monitoring reports showed that nitrogen oxide exceeded the discharge standard many times.	Jiaozuo EPB
		2012	2012, 2 nd quarter Henan key pollution source supervisory monitoring showed that sulfur dioxide was double the standard limit.	Henan EPB
Baotou Aluminum Co., Ltd.	Baotou	2014	2014, 1 st quarter key state monitored supervisory monitoring showed that PM and sulfur dioxide in air emissions seriously exceeded the legal standard by 2.8 and 1.6 times respectively.	Inner Mongolia EPB
		2013	2013, 1 st , 2 nd , 3 rd , 4 th quarter key state monitored supervisory monitoring reports showed that PM, sulfur dioxide, tar smoke and fluoride all exceeded the standard, with some exceeding the limit value by 18 times.	Inner Mongolia EPB
		2012	The 2012, 4 th quarter supervisory monitoring data showed that discharge of PM, fluorides and sulfur dioxide all exceeded the standard.	Inner Mongolia EPB
Guangxi Huayin Aluminium Company Limited	Baise	2014	The 2014, 1 st , 2 nd , 3 rd quarter key state monitored supervisory monitoring results showed that discharge of nitrogen oxide from the thermal power plants boiler exceeded the standard multiple times. Discharge was 0.3-6.7 times over the standard.	Guangxi EPB
		2012	2012, 1 st , 2 nd quarter key state monitored	Guangxi EPB

Subsidiary	Region	Year	Details of violation	Source record	of
			supervisory monitoring results showed that discharge of nitrogen oxide exceeded the standard multiple times. Discharge was 0.8-1.7 times over the standard.		
Shandong Aluminum Corporation	Huayu	Linyi	2014	2014, 1 st quarter key state monitored supervisory monitoring results showed that soot discharge from numerous outlets exceeded the standard.	Linyi EPB
			2013	2013, 2 nd quarter key state monitored supervisory monitoring reports showed that sulfur dioxide discharge exceeded the standard.	Linyi EPB
Fushun Aluminum Ltd.		Fushun	2014	2014, 3 rd quarter key state monitored enterprise pollution source supervisory monitoring report showed that tar smoke exceeded the standard.	Liaoning EPB
Aluminum Corporation of China, Shanxi Subsidiary		Yuncheng	2013	2013, 3 rd quarter Shanxi state monitored pollution source supervisory monitoring showed that soot fumes from the boiler exceeded the emission standard.	Shanxi EPB
			2012	2012, 2 nd quarter key enterprise supervisory monitoring showed that PM in air emissions exceeded the emissions standard.	Shanxi EPB
Gansu Aluminum Co., Ltd.	Hualu	Baiyin	2012	In 2011 was listed in Gansu because multiple air pollutants exceeded emissions standards. Was ordered to draw up and implement a corrective action plan and ensure stable discharge within the emissions standard. In December 2012, the EPB stated that they would be removed from the notification because improvements had been completed.	Gansu EPB
Aluminum Corporation of China, Henan Subsidiary		Zhengzhou	2012	Improper use of pollutant treatment facilities in contravention of the air pollution prevention law. Fined 30,000 RMB.	Zhengzhou EPB
Qinghai Energy Development Co., Ltd.	Jiangcang	Xining	2012	In the 2012, 1 st quarter Xining key industrial enterprise state of emissions exceedance the company was listed because sulfur dioxide emissions from the coking furnace exceeded emissions standards.	Xining EPB
Aluminum Corporation of China, Guangxi Subsidiary		Baise	2013	2013, 1 st , 2 nd , 3 rd quarter Guangxi key monitored pollution source supervisory monitoring showed that PM and nitrogen oxide in air emissions exceeded the emissions standards by 35 times.	Guangxi EPB
			2013	On January 8, 2013, the Guangxi Subsidiary of China Aluminum Corporation's thermal power plant desulfurization system, DCS system, and No. 6 and No. 8 boilers inlet and outlet flue gas pollutant automatic monitoring system had problems. Company put under investigation because of suspected misuse of online monitoring systems. The company was ordered to immediately fix the problem and was fined 50,000 RMB.	Baise EPB
			2012	2012, 1 st , 2 nd , 4 th quarter Guangxi state monitored pollution source supervisory	Guangxi EPB

Subsidiary	Region	Year	Details of violation	Source of record
Aluminium Corporation of China, Qinghai Subsidiary	Xining	2013	monitoring results showed that nitrogen oxide emissions were over the emissions standard by 0.1-1.7 times.	Qinghai EPB
		2013, 2 nd quarter	state monitored pollution source supervisory monitoring showed that tar smoke exceeded the emissions standard. Furthermore, Aluminium Corporation of China, Qinghai Subsidiary Huatong Carbon Factory was reported for having yellow smoke coming out of a chimney. Through EPB inspections it was found that the company was carrying out work on the electric dust scrubber to clean tar from it that day so the dust scrubbing facilities on the east side were not running, which resulted in yellow smoke being discharged. Because the carbon factory could not meet the new discharge standards the Datong EPB required the company to correct the problem within a set time frame. The company should finish the work before June 30, 2014 and make sure their discharge was in compliance. The company's financing plan and corrective plan have been handed to the group headquarters.	
Zunyi Aluminium Corporation of China,	Zunyi	2013	2013 fourth quarter key state monitored pollution source supervisory monitoring results showed that particulate matter emissions breached discharge standards.	Zunyi EPB
		2012	2012 first quarter key state monitored pollution source supervisory monitoring results showed that fluoride emissions breached discharge standards by 1.17 times.	Zunyi EPB
Shanxi Aluminum Co., Ltd.	Huasheng Yuncheng	2013	2013 third quarter key state monitored pollution source supervisory monitoring results showed that fluoride emissions breached discharge standards.	Shanxi EPB

Subsidiaries with online violations:

Aluminium Corporation of China, Shandong Subsidiary Thermal Power Plant



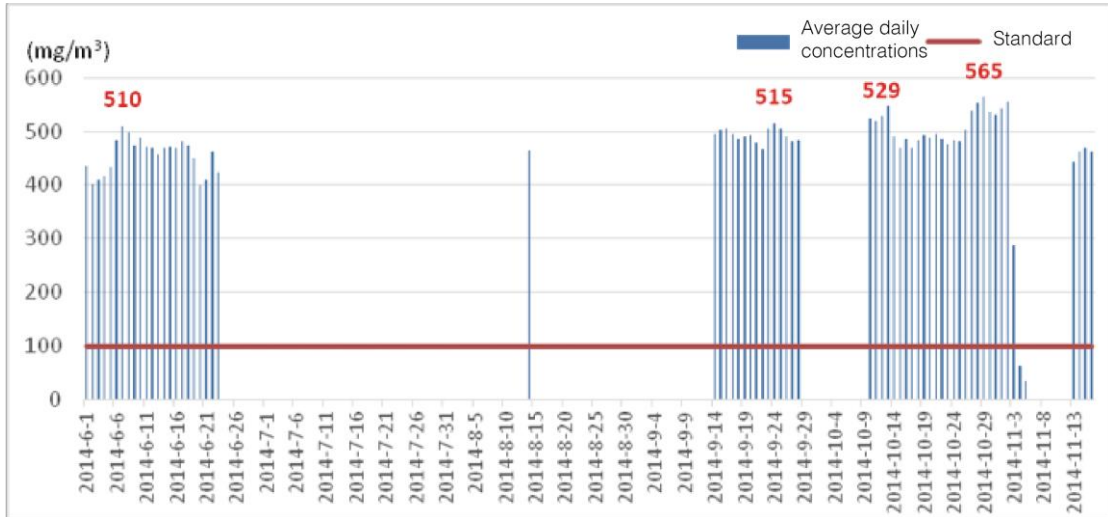


Figure 11. Aluminium Corporation of China, Shandong Subsidiary Thermal Power Plant/Chalco Thermal Power (1-2) nitrogen oxide daily average concentration (June-November 2014)

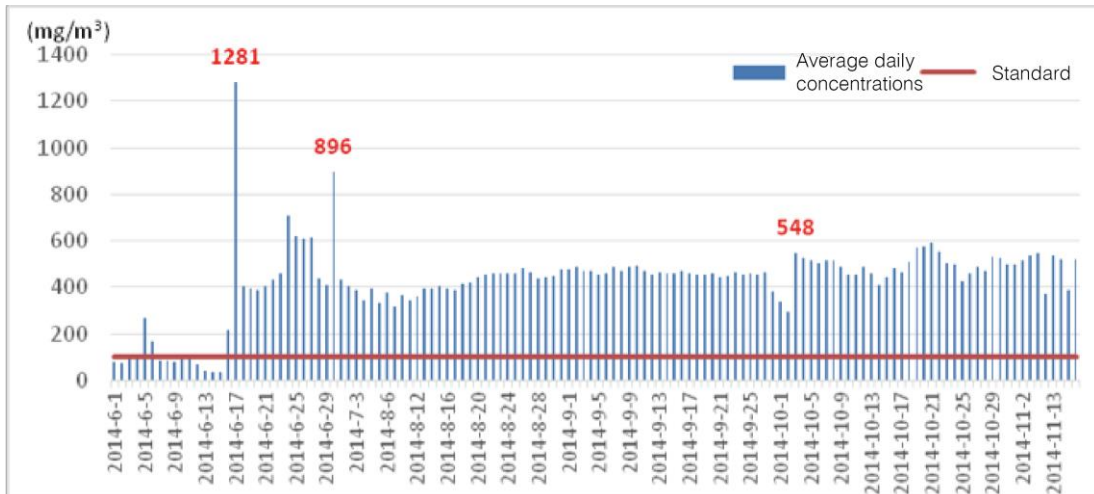


Figure 12. Aluminium Corporation of China, Shandong Subsidiary Thermal Power Plant/Chalco Thermal Power (3) nitrogen oxide daily average concentration (June-November 2014)

Aluminum Corporation of China Zhongzhou Subsidiary

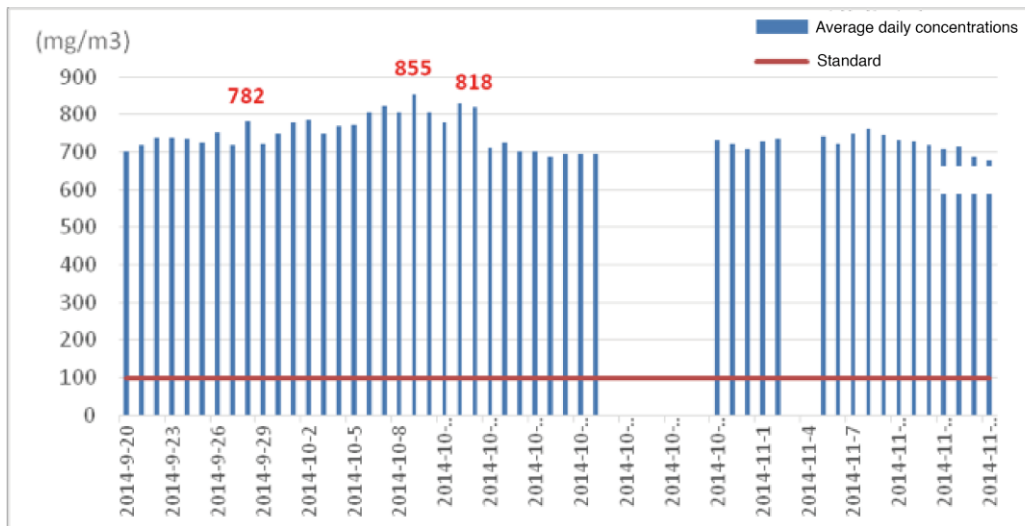


Figure 13. Aluminum Corporation of China Zhongzhou Subsidiary No.1-No.3 Power plant boilers nitrogen oxide daily average concentrations

2.2.3 Steel Industry

The steel industry, a resource and energy intensive industry, is a large scale industry and has long production processes. It covers many production processes from ore mining to final product processing. Environmental pollution caused by the steel industry exists throughout the whole smelting process, in which the link before iron making is the key to controlling atmospheric pollution. In this industry, the major links producing pollution involve coking and fritting before iron making, and the main gaseous pollutants discharged include soot, SO₂, NO, CO₂, CO, HF, and poly-o-chlorinated dibenzodioxin (PCDD).⁹ Thirty-four listed companies in the steel industry have 236 supervision records, mainly covering such violation types as excessive air emissions and abnormal use of pollutant treatment facilities.

Case Study 4. Shandong Iron&Steel Company Ltd (stock code: 600022.SH)

Jinan Subsidiary



Laiwu Subsidiary



⁹ Pollution and treatment methods for different sectors of the iron and steel industry. Pollution prevention before iron making stage. “Emission standard of air pollutants for sintering and pelletizing of iron and steel industry” guidelines, P.25-26.

According to the IPE's Green Stocks database, subsidiaries of Shandong Iron & Steel Company Ltd have eight environmental supervision records. Results of supervisory monitoring conducted multiple times show that Jinan subsidiary and Laiwu subsidiary under Shandong Iron & Steel Company Ltd have seriously breached discharge standards for atmospheric pollutants.

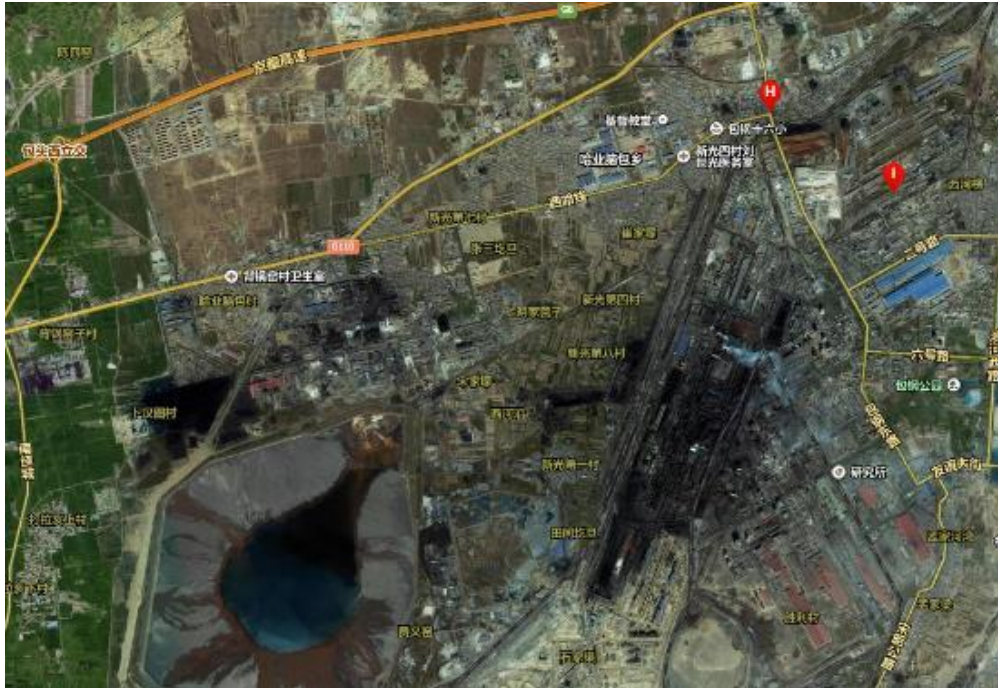
Table 6 Details of environmental supervision records for air emissions for subsidiaries under Shandong Iron & Steel Company Ltd

Subsidiary	Region	Year of Violation	Type of Violation Result of Punishment	Source of Record
Shandong Iron & Steel Company Ltd, Jinan Subsidiary	Jinan	2014	In June and August 2014, the supervisory monitoring report of major pollution sources in Jinan city showed that, with the emission of sulfur dioxide exceeding the standard by 11.6 times and two times respectively, this subsidiary breached the standard for sulfur dioxide most seriously among the checked enterprises in these two months. Additionally, the supervisory monitoring report in April 2014 showed that this subsidiary saw the emission of sulfur dioxide at the coking discharge outlet exceed the standard by 0.3 time.	Jinan Environmental Protection Bureau
Iron Works of Laiwu Subsidiary under Shandong Iron & Steel Company Ltd	Laiwu	2014	The supervisory monitoring results of key pollution sources under national monitoring program in Shandong province in the 1st and 2nd quarters in 2014 showed that the emission of particulate matter, sulfur dioxide and nitrogen oxide from its multiple sintering machines in this iron works exceeded the standard by up to 14 times. According to the check circular of Shandong province on the special action on managing and controlling enterprises with illegal pollutant emission to guarantee the mass health and environmental protection, this iron works was placed on the "List of the Enterprises Failing to Completely Solve the Environmental Problem Reported by Petition Letters and Public Opinions".	Environmental Protection Department of Shandong Province Shandong Provincial People's Government

Facing the public's question about its emission in violation of the standard, Shandong Iron & Steel Company Ltd. stated, "This problem is not very important for us."

On November 19, 2014, we wrote to Shandong Iron & Steel Company Ltd, indicating that subsidiaries of the company had poor environmental supervision records. On the same day, we called the company, explained our intentions and hoped that they could confirm receipt of the letter. However, the company said that it could not make such confirmation. Moreover, the company asked if the request was urgent. We explained that since there was a lot of attention from the public on air pollution and smog problems, we wanted to understand the waste gas emission of subsidiaries under some listed companies and then communicated this to the companies by letter. Shandong Iron & Steel Company Ltd then asked what we would do after communicating this. We indicated that we wanted to understand whether related listed companies had begun to rectify these problems and to learn about the progress of rectifications. The company then said that the problem was not very important for them and hung up. Subsequently, we again made another attempt to fax a document to the company, but the company refused to accept it under the pretext that they "do not need it".

Case 5. Inner Mongolia Baotou Steel Union Co., Ltd. (stock code: 600010.SH)



According to the IPE's Green Stocks database, subsidiaries of Inner Mongolia Baotou Steel Union Co., Ltd. have 18 environmental supervision records. Results of supervisory monitoring conducted multiple times show that iron works, steel works and thermal power plants under this company have seriously breached discharge standards for atmospheric pollutants.

Table 7 Details of environmental supervision records for waste gas emissions of subsidiaries under Inner Mongolia Baotou Steel Union Co., Ltd. (2012-2014)

Subsidiary	Region	Year of Violation	Type of Violation Result of Punishment	Source of Record
Iron Works of Inner Mongolia Baotou Steel Union Co., Ltd.	Baotou	2013, 2014	The supervisory monitoring results in the 2nd and 3rd quarters in 2013 and the 1st, 2nd and 3rd quarters in 2014 showed that multiple pollutant indexes (sulfur dioxide, particulate matter and fluoride) at multiple discharge outlets in this iron works exceeded the standards, with some (PM) exceeding the standards by up to 9.4 times (PM) and 20 times (fluoride).	Environmental Protection Department of Inner Mongolia Autonomous Region
Steel Works of Inner Mongolia Baotou Steel Union Co., Ltd.	Baotou	2013, 2014	The supervisory monitoring results in the 2nd quarter in 2013 and in the 1st and 3rd quarters in 2014 showed that the emission of PM and nitrogen oxide in this works exceeded the standards, with some (PM) exceeding the standards by up to 13 times (PM).	Environmental Protection Department of Inner Mongolia Autonomous Region
Coking Plant of Inner Mongolia Baotou Steel Union Co., Ltd.	Baotou	2014	2The supervisory monitoring results in the 1st and 3rd quarters in 2014 showed that the emission of sulfur dioxide and nitrogen oxide in this plant exceeded the related standards.	Environmental Protection Department of Inner Mongolia Autonomous Region
Thermal Power Plant of Inner Mongolia Baotou Steel Union Co., Ltd.	Baotou	2013, 2014	The supervisory monitoring results in the 4th quarter in 2013 and in the 2nd and 3rd quarters in 2014 showed that the emission of nitrogen oxide and soot in this plant exceeded the standards.	Environmental Protection Department of Inner Mongolia Autonomous Region

Online Data Violations:

The self-monitoring and information disclosure platform of key enterprises under national monitoring in Inner Mongolia Autonomous Region shows that there was a serious violation of discharge standard for concentration of sulfur dioxide in waste gas from the heads of the sintering machines in the No.3 sintering plant and phase II project of the No.4 sintering plant under Iron Works of Inner Mongolia Baotou Steel Union Co., Ltd. After further checking the reasons for halted production as detailed on the platform, we found that the No.3 sintering plant in this enterprise carried out the overhaul on the desulfurization system on July 1 to November 13, while the sintering machine and its gas desulfurization system in phase II project of the No.4 sintering plant were frequently serviced. We hope that several sintering plants in this iron works will undergo the transformation of desulfurization system as soon as possible, thus reaching the discharge standard.

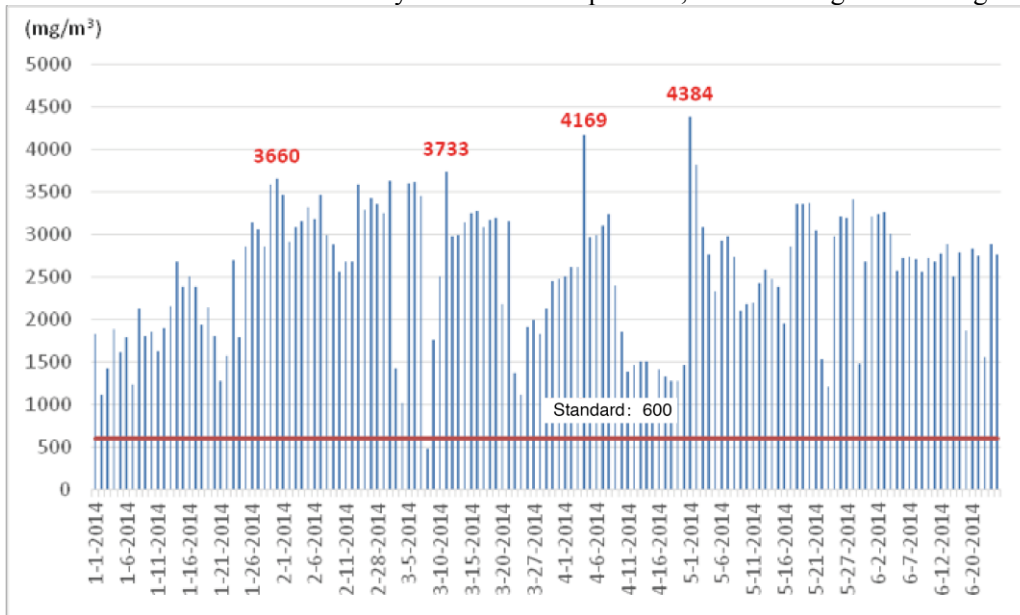


Figure 14. Monitoring of daily average concentration of sulfur dioxide at the head of the sintering machine in No.3 Iron Works of Inner Mongolia Baotou Steel Union Co., Ltd. sintering plant (January to June 2014)

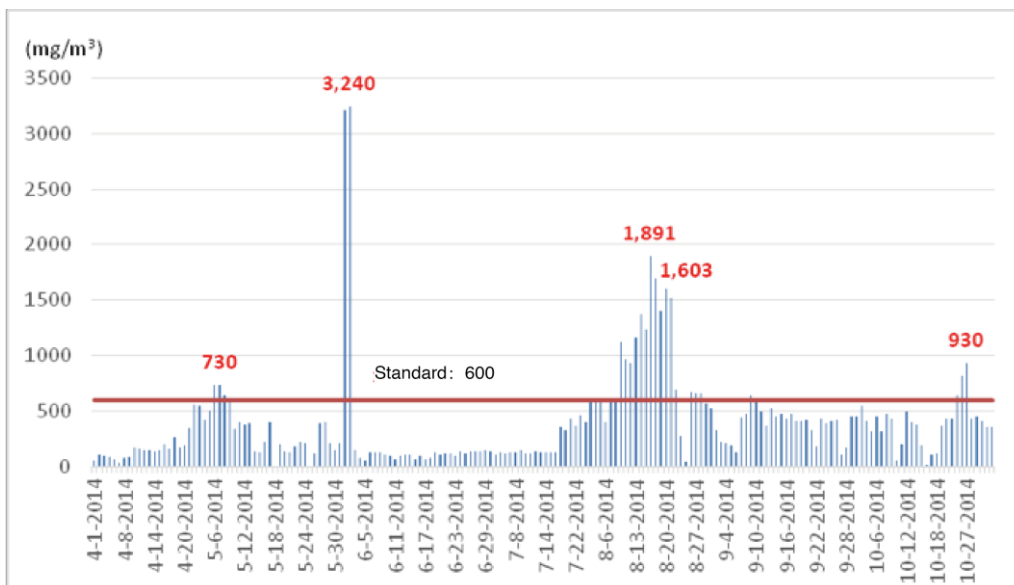


Figure 15 Monitoring of daily average concentration of sulfur dioxide at the head of the sintering machine in phase II project of the No.4 sintering plant under Iron Works of Inner Mongolia Baotou Steel Union Co., Ltd. (April to October 2014)

The same platform shows that Inner Mongolia Baotou Steel Union Co., Ltd.'s Thermal Power Plant breached the discharge standard for nitrogen oxide at the outlets of No.1 and No.2 desulfurization systems for a long time. According to the reasons detailed for halts in production, the No.1 desulfurization system was shut down to undergo repair on September 9 to October 30. However, the daily average concentration of nitrogen oxide at this discharge outlet still exceeded the standard by several times in November after this system resumed operation.

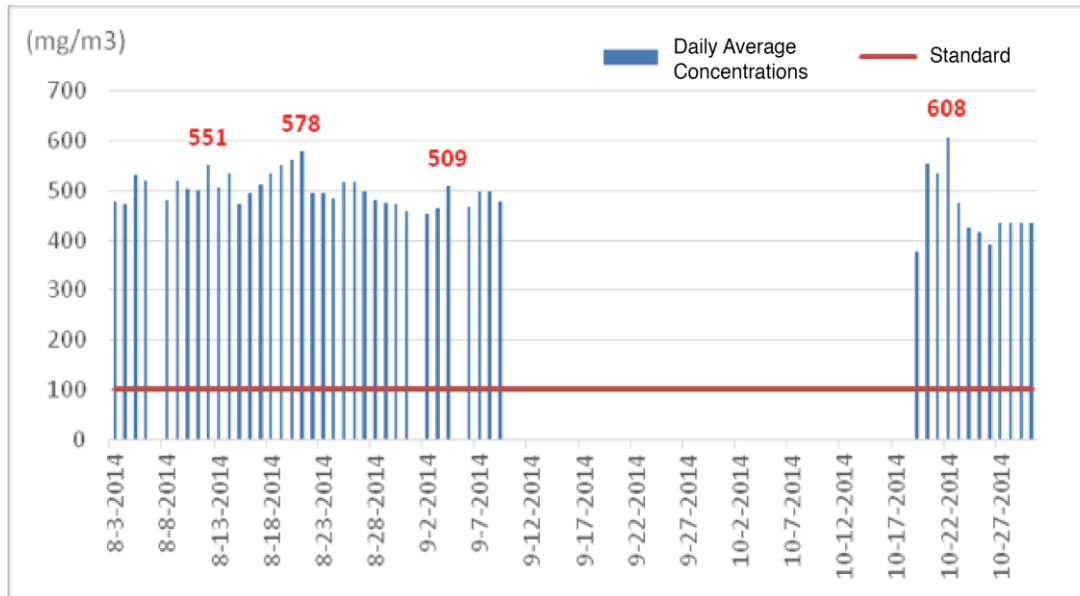


Figure 16. Online monitoring of nitrogen oxide concentration in smoke at the outlet of the No.1 desulfurization system in Inner Mongolia Baotou Steel Union Co., Ltd.'s thermal power plant (August to October 2014)

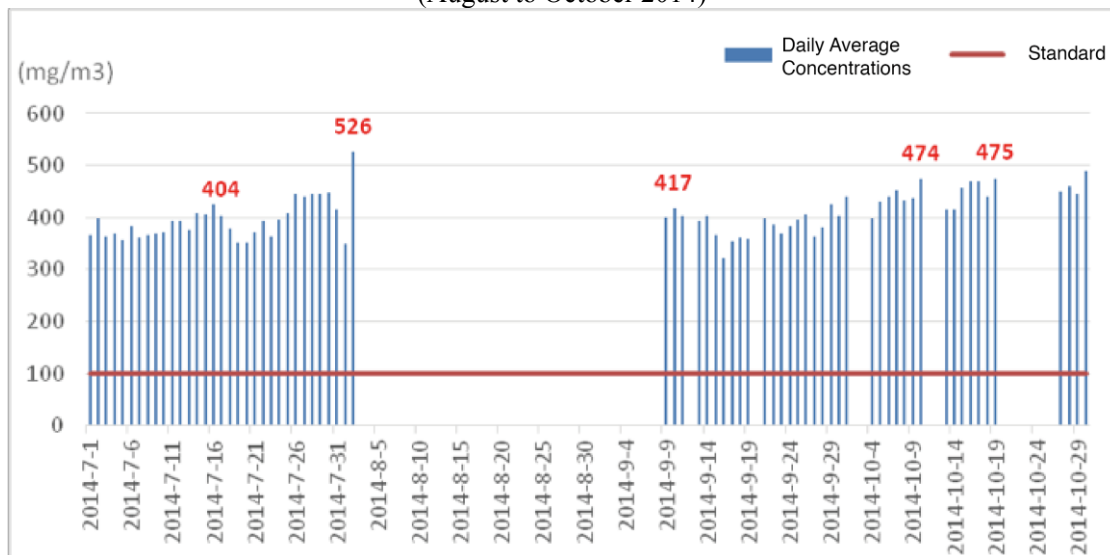


Figure 17. Online monitoring of nitrogen oxide concentration in smoke at the outlet of Inner Mongolia Baotou Steel Union Co., Ltd. Thermal Power Plant's No.2 desulfurization system (July to October 2014)

Case Study 6. Hunan Valin Steel Co., Ltd. (stock code: 000932.SZ)

According to the IPE's Green Stock database, some subsidiaries of Valin Steel have eight environmental supervision records, which involve such violation types as excessive air emissions, and abnormal operation of pollutant treatment facilities.

Table 8 Details of environmental supervision records of subsidiaries under Valin Steel in recent years (2011-2014)

Subsidiary	Region	Year of Violation	Type of Violation Result of Punishment	Record of Source
Hunan Valin Lianyuan Iron & Steel Co., Ltd.	Loudi	2014	In this company, the storage sites of blast furnace gas dust, precipitator dust containing zinc, tar residue and so on did not comply with the requirements of the “Standard for Pollution Control on Hazardous Waste Storage”, with scattering and loss of such substances.	Loudi Municipal Environmental Protection Bureau
		2011	Without consent and approval, this company stopped the operation of flue gas desulfurization facility, thus violating the “Law of the People's Republic of China on the Prevention and Control of Atmospheric Pollution”. For this, the environmental protection bureau filed the case and investigated this company, seriously criticized and educated the related person in charge of this company.	Loudi Municipal Environmental Protection Bureau
Hunan Valin Xiangtan Iron & Steel Co., Ltd.	Xiangtan	2012	The supervisory monitoring result in the 2nd quarter in 2012 showed that the soot emission exceeded the standard at the outlet of the desulfurization facility in this company.	Environmental Protection Department of Hunan

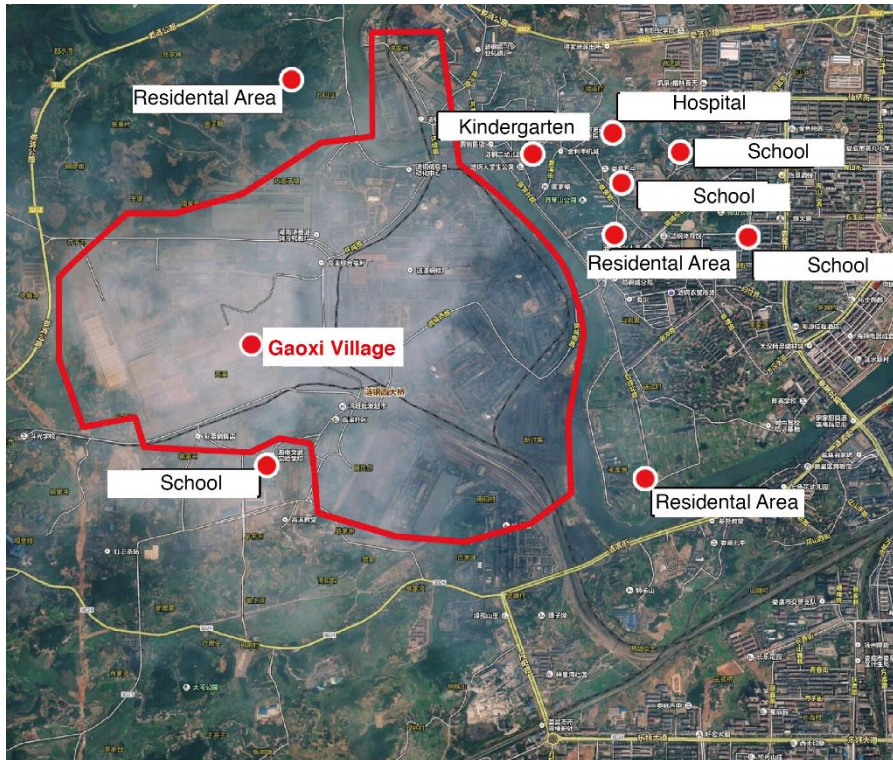
Field Research: Hunan Valin Lianyuan Iron & Steel Co., Ltd. (hereafter referred to as “LY Steel”), a subsidiary of Valin Steel

In August and September 2014, staff from the environmental protection organization Green Hunan went to Loudi city. In Loudi, they observed and recorded the condition of waste gas emission of LY Steel, and interviewed residents around the company to understand what they thought about the change in local air quality.

Gray was the first impression the city made on this research team, “As soon the research team entered the downtown area of Loudi on August 3, they found that the city was cloaked in a thick shroud of heavy smog. They felt uncomfortable breathing when the car window was opened.”

The largest industrial emission source there is LY Steel, which is based in the heart of the Loudi urban area.

When driving in the LY Steel area, the research team witnessed a shocking scene of very high emissions, “Some large chimneys greeted us in succession, along with dense, rolling smoke. Transport vehicles ran without interruption one after another. The more deeply we entered the factory area, the dirtier the street sides became. All buildings appeared to be covered with a layer of cloth. We found that LY Steel was a ‘forest of chimneys’. In whichever direction or from any perspective we looked at LY Steel, there was always grey smoke in the sky, and large chimneys never disappeared from our sight. Countless chimneys, big and small, were emitting green, white, grey or black soot of all kinds, filling the whole sky.”



How did local residents feel about the emission and worsening environment? With this question, the research team drove to the famous Gaoxi Village to interview local residents. From this map, we can see that Gaoxi Village, surrounded by LY Steel on three sides, is a community that sits completely at the heart of the factory and emission area of this company.



Figure 18 Field research on the state of emissions from LY Steel (November 14, 2014, photographer: Liu Ke)

Resident Interview 1: Mr. Yan, who runs a grocery store in the community

Mr. Yan has spent his whole life in Gaoxi Village. From the end of the 1950s, when LY Steel was established, he has seen worsening air quality year by year. In recent years, in particular, his family members, particularly children, always coughed continuously for inexplicable reason. Every dusk and early morning is a period LY Steel concentrates on emitting black smoke. At the moment, there is much black ash at home, which needs to be cleaned several times a day, even if the door and the window are closed tightly. When Yan gets up in the morning, he often sees a gray world around his house, with low visibility.

Resident Interview 2: Mr. Zhang, a resident at Gaoxi Village

Mr. Zhang is not a native of Gaoxi Village and has lived there for less than five years. According to Mr. Zhang, air quality has become worse in the past five years so that now it's often difficult to see the road clearly in the daytime, and there is a strong smell in the air. This only improved slightly in 2013 when the city initiated a "clean city" period.

When he washes his face, Mr. Zhang added, he always finds that the inside of his nose is black and he sometimes also finds black and gray matter in his spit. He won't allow his grandson to come Gaoxi to visit him.

According to his observation of LY Steel, the period from 12:00 a.m. to 6:00 or 7:00 a.m. is when LY Steel emits the most soot. The only corresponding environmental protection measure is that a watering cart from LY Steel comes to sprinkle water on the street once at 8:00 a.m. or 9:00 a.m. every day.

Online emission data shows that the emission at multiple waste gas discharge outlets in LY Steel has breached the related standard.

According to information on the self-monitoring and information disclosure platform of national key monitored enterprises of Hunan province,¹⁶ the emission concentration of sulfur dioxide at the discharge outlets of No.1 coking furnace and the head of the 360 sintering machine in LY Steel has exceeded the legal standard limit for a long time.

Discharge outlet: No.1 coking furnace
Period: September 1 to October 31, 2014

Pollutant: daily average concentration of sulfur dioxide (standard: 100 mg/m³)
 Days of violation: 54 days



Figure 19. Online monitoring of daily average concentration of sulfur dioxide at LY Steel's No.1 Coking Furnace (September to October 2014)

Discharge outlet: head of 360 sintering machine
 Period: April 1 to October 31, 2014
 Pollutant: daily average concentration of sulfur dioxide (standard: 600 mg/m³)
 Days of violation: 72 days

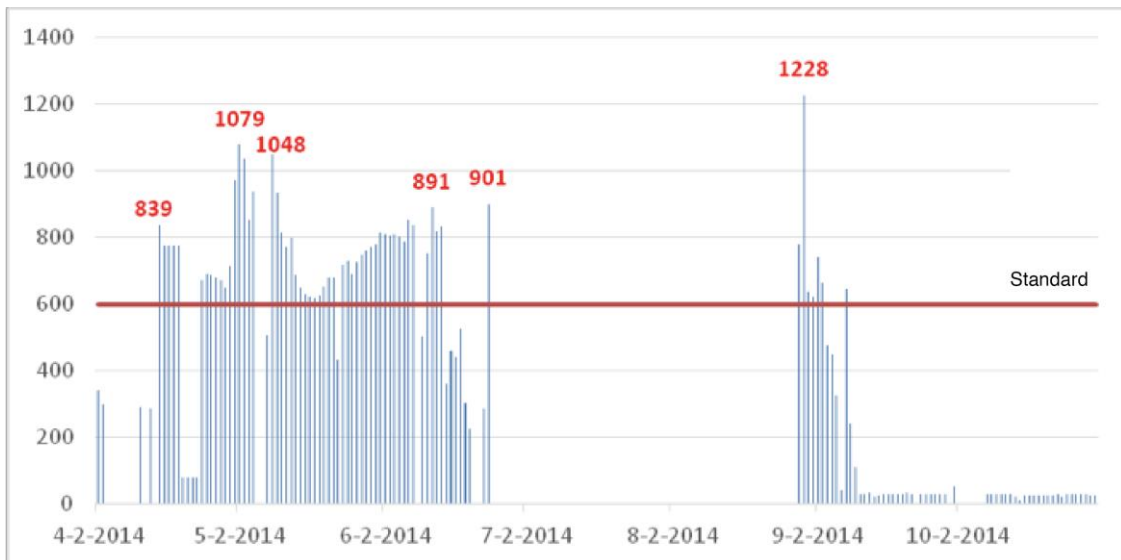


Figure 20. Monitoring of daily average concentration of sulfur dioxide from LY Steel's 360 sintering machine (April to October 2014)

According to the corporate social responsibility (CSR) report¹⁷ published on the official website of Valin Steel, “In 2013, the company saw the qualification ratio for integrated discharge of main pollutants with control indexes exceed 99%, with the synchronous operation ratio of environmental protection facility reaching over 99.80%.” However, after comparison between this description and online monitoring data of long term violations, we find that such a statement seems very hard to believe.



Figure 21. Screenshot of CSR report 2013 on the official website of Valin Steel

Have government environmental protection subsidies helped Valin Steel's half-year performance and turned it from a loss-maker into a profitable operation?¹⁰

According to the 2014 half-year report disclosed by Valin Steel, this company obtained government subsidies worth 79.4054 million yuan in the first half of this year, which was 4.17 times its disclosed net profits. Here, these subsidies included the rebates of VAT of comprehensive resource utilization of 68.7881 million yuan. When interviewed by a reporter from the “21st Century Business Herald”, Yang Xianghong, secretary of board of directors, also indicated that this company obtained such subsidies on the ground that “this company did well in completing environmental protection work this year, and the subsidies beyond the 68.7881 million yuan set out in the announcement were related to the implementation of environmental protection work.”

Valin Steel has attracted overseas strategic investors to become its shareholders

Arcelormittal, the world's No.1 iron and steel enterprise, has purchased a stake from Valin Steel. According to the introduction on the Arcelormittal website¹⁹, Arcelormittal become a partner of Valin Steel from October 2005, and as of October 27, 2014, it still held a 10% stake.

On November 12, 2014, the environmental protection organization Green Hunan sources submitted a “Proposal for Strengthening the Self-Monitoring Supervision of Key Waste Gas Pollution Sources under National Monitoring Program in Hunan Province” to the Environmental Protection Department of Hunan. This proposal pointed out that in September 2014, eight enterprises, including Hunan Valin Lianyuan Iron & Steel Co., Ltd. failed to discharge pollutants in accordance with the relevant regulations. The group hoped that the provincial environmental protection department would be able to supervise and urge these enterprises to respond to their standard violations and carry out rectification. Upon receipt of this proposal, the provincial environmental protection department immediately conducted checks and arranged the corresponding work without delay, and promised to give a written reply on the results in the near future.

¹⁰ <http://money.21cbh.com/2014/8-20/wNMDA0MDRfMTI3NjIwNg.html> Massive Bailout of the Steel Industry: Valin Steels Subsidies Four Times net Profits

2.2.4 Chemical Industry

Description of air pollutants discharged by the chemical industry. This section focuses mainly on the analysis of coking processes.

Air pollutants generated by the coking process contain such toxic and harmful substances as PM, and multiple inorganic and organic pollutants. In particular, polycyclic aromatic hydrocarbons (PAH), of which Benzo[a]pyrene (BaP) is representative of, are mostly carcinogenic and have a massive impact on the environment and human health.¹¹ Furthermore, over three quarters of China's BaP is discharged in the coking industry only.¹²

Main links generating pollution in the coking process include the coking, coke quenching and gas purification processes. Besides these concentrated discharge sources, some intermediate links, which have dissipation of harmful pollutants (fugitive discharge), are one of the high-risk factors for the environment in the coking industry.

There are 572 supervision records among 112 listed companies.

Case study 7. Kingboard Chemical Holdings Ltd. (stock code: 148.HK)

According to the IPE's Green Stock database, subsidiaries of Kingboard Chemical Holdings Ltd. have as many as 20 environmental supervision records and have been penalized or supervised by environmental protection supervision departments. Their violation types include the secretive and excessive discharge of pollutants, online monitoring data fraud, serious fugitive emission of smoke, and failure to mark hazardous waste.

Kingboard (Hebei) Cokechem Co., Ltd., a wholly-owned subsidiary under Kingboard Chemical Holdings Ltd., (00148.HK) was reportedly fined 1.45 million yuan and had 1 million yuan proceeds from illegal behavior confiscated by Xingtai Municipal Environmental Protection Bureau for such serious violations as secretive discharge and excessive discharge, thus creating the highest fine in the history of local environmental law enforcement. Because of being suspected of illegal discharge of toxic substances relating to air pollution, three personnel from Kingboard (Hebei) Cokechem Co., Ltd. were arrested, and this became the first environmental criminal case on air pollution in Hebei province.

According to the investigation by the public security department,¹³ "Even though he knew that the sewage treatment plant's activated sludge had died and wastewater from ammonia distillation could not be treated to the relevant standard, the person surnamed Zhang, manager of Engineering Department under Kingboard (Hebei) Cokechem Co., Ltd. continued to supplement wastewater not treated up to the standard to the quenching tower after reporting to General Manager surnamed Wang; as a result, the toxic substance, volatile phenol, in wastewater (this substance is phenol that is formed by steaming with vapor at a boiling point of 230°C) was directly emitted into the atmosphere at the time of quenching coke, and was found to exceed the national standard by 138 times, causing serious pollution." Furthermore, the person in charge of the company's online monitoring equipment for measuring soot discharge adjusted the equipment every evening to ensure the data value range was within that stipulated by the environmental protection department, thus achieving the purpose of deceiving or misleading the environmental protection inspection.

¹¹ According to the "Guidelines on best available pollution abatement technology available for coking processes in the steel industry", page 2 and page 4 table 1.

¹² Polycyclic aromatic hydrocarbon contamination and human exposure health risk assessment methods, Duan Xiaoli, China Environmental Science Press, October 2011.

¹³ http://news.xinhuanet.com/energy/2014-06/30/c_126691335.htm Hebei filed the first legal case for air pollution against three workers from Kingboard Chemical for fabricating data.

However, these severe economic and criminal punishments have not had the desired effect. In an inspection two months later, the Xingtai Municipal Environmental Protection Bureau unexpectedly found that Kingboard (Hebei) Cokechem Co., Ltd. was breaking the rules and engaging in production, illegally discharging pollutants and polluting the environment, greatly affecting the local environmental air quality and resulting in a fall in the air quality index.

Although this subsidiary showed such poor performance in environmental protection, the 2014 interim performance posted by Kingboard Chemical Holdings Ltd. (00148.HK) showed that the company made profits of HKD 1.409 million, an increase of 51% over the same period the previous year; shareholders of this company even included some known international investment institutions like Fidelity Management & Research Company (held a stake of 9.99%) and the JP Morgan Chase & Co. (held a stake of 11.85%).

Table 9. Details of environmental supervision records of subsidiaries under Kingboard Chemical Holdings Ltd. (2012-2014)

Subsidiary	Region	Year of Violation	Type of Violation and Result of Punishment	Source of Record
Kingboard (Hebei) Cokechem Co., Ltd.	Xingtai	2014	This company performed the following secret discharge acts in violation of the environmental law: high-concentration coking waste water, which had not been treated, was directly used for coke quenching, and was typically malicious secret discharge. Here, the coking furnace discharged excessive pollutants, and the coal-fired boiler involved the online monitoring data fraud, with excessive discharge of soot. Punishment: this company was fined 1.45 million yuan, and 1 million yuan of illegal obtained proceeds was confiscated, shut down the coking furnace and coal-fired boiler having performed secret discharge; it was required to carry out the rectification within a time limit and to change the flue gas online monitoring system; the related personnel were investigated responsibility for breach of law according to law.	www.cenews.com.cn
		2013	This company used the pollutant treatment facility abnormally, with sewage overflow in the sewage pipe network. The handling and punishment conditions were: 1. land with sewage outflow was all replaced with new soil; 2. only two observation holes in the sewage pipe network were reserved, and the remaining ones all sealed; 3. this company was fined fifty thousand yuan only.	Department of Environmental Protection of Hebei Province
		2013	This company was supervised and handled for some environmental events: this company breached the discharge standard for sewage, met the waste water overflow in the inspection shaft, severely polluting the ambient environment. Requirements of supervision and handling were: press the Neiqiu County government to order the enterprise to carry out rectification within a time limit, and punish it according to law; formulate the overall control scheme, evaluate the environmental pollution damage of the polluted area, and conduct the remediation within a time limit; investigate the responsibility of the local government and related department according to law.	www.hebnews.cn

Subsidiary	Region	Year of Violation	Type of Violation and Result of Punishment	Source of Record
Kingboard (Hebei) Chemical Co., Ltd.	Xingtai	2013	This company was supervised and handled for some environmental events: this company breached the discharge standard for sewage, met the waste water overflow in the inspection shaft, severely polluting the ambient environment. Requirements of supervision and handling were: press the Neiqiu County government to order the enterprise to carry out rectification within a time limit; formulate the overall control scheme, evaluate the environmental pollution damage of the polluted area, and conduct the remediation within a time limit; investigate the responsibility of the local government and related department according to law.	www.hebnews.cn
Hengyang Kingboard Chemical Co. Ltd.	Hengyang	2013	This company was placed on the list of the enterprises with environmental risk for excessive discharge of pollutants.	Environmental Protection Department of Hunan
Elec & Eltek (Guangzhou) Electronic Co., Ltd.	Guangzhou	2013	Violating the “Law of the People’s Republic of China on the Prevention and Control of Environmental Pollution Caused by Solid Waste”, this company failed to set the identification mark of hazardous wastes and was fined 30,000 yuan.	Guangzhou Municipal Environmental Protection Bureau
Shiyou Chemical (Yangzhou) Co., Ltd.	Yangzhou	2012	This company was given a yellow card warning in the credit rating of environmental protection of enterprises in Jiangsu province.	Yizheng Municipal Environmental Protection Bureau

Case Study 8. Sinochem International Corporation (stock code: 600500.SH)

According to the 2014 half-year report posted by Sinochem International Corporation (600500.SH), the net profits attributable to shareholders of this listed company reached 553 million yuan, rising 46.7% from a year earlier. For such a listed company with attractive profit data, its subsidiaries attracted multiple complaints about environmental pollution. Data shows that this corporation's affiliated company, Sinochem Zhenjiang Coking Co., Ltd., has seen multiple complaints about waste gas pollution. In March 2013, some netizens complained that the coking plant section on the road along the river was “stinking” for months on end, and that it was no use even if the car window was closed tightly, because the smell was too strong!



Figure 22. Online complaint screenshot of waste gas pollution from Sinochem Zhenjiang Coking Co., Ltd.

When you search the map for “Sinochem Zhenjiang Coking Co., Ltd.,” you will first be greeted by the large chimney emitting white smoke in the lower right corner.



Figure 23. Satellite image of Sinochem Zhenjiang Coking Co., Ltd.

Emission remains as before after two visits in two years

To really understand the emission condition of Sinochem Zhenjiang Coking Co., Ltd., the environmental NGO, Lvse Jiangnan, visited this plant in August 2012 and July 2014, witnessing the emission scene of the enterprise.



Picture Taken by Lvse Jiangnan on August 8, 2012



Picture Taken by Lvse Jiangnan on July 9, 2014

Figure 24. Field research on the emission of Sinochem Zhenjiang Coking Co., Ltd. by Lvse Jiangnan

During field research, Lvse Jiangnan observed that there were multiple chimneys in the factory of Sinochem Zhenjiang Coking Co., Ltd., with yellow, black and grey smoke emitted, and that the flue collection in particular (wet quenching tower) saw the highest emission level. Repeated testing on the site showed that the emission at the discharge outlet of the quenching tower continued for five minutes and occurred once every 25 minutes.



Discharge Outlet of the Flue Collector (wet quenching tower)



Multiple Chimneys



Yellow Soot Emitted



Black Soot Emitted

Figure 5. Field research on the emission of Sinochem Zhenjiang Coking Co., Ltd. by Lvse Jiangnan

Serious pollution caused by the wet coke quenching process makes surrounding residents suffer

Common coke quenching processes fall into the coke dry quenching process and the coke wet quenching process. The coke dry quenching means that residual heat of coke is recycled through the waste heat boiler after coke is cooled by air blown under the help of inert gas circulation; the coke wet quenching means that red-hot coke is cooled by contacting coke quenching water, accompanied by evaporation of lots of quenching water and the dissipation of gaseous pollutants, including phenol, sulfide, cyanide, carbon monoxide, polycyclic aromatic hydrocarbon (PAH), and especially the confirmed carcinogenic substances benzo[a]pyrene (BaP) and Benzene-Soluble Organics (BSO). Further research shows that harmful pollutants resulted from coke wet quenching may spread for several kilometers and severely pollute ambient air.

Compared with the coke dry quenching, the conventional coke wet quenching contains some disadvantages, including being unable to recycle residual heat of from the coke, being uneven in the coke moisture after coke quenching, polluting environment by a great number of dissipated substances. Therefore, the coke dry quenching is the technology that is being popularized by China.

From the pictures taken on the site and public information, we can comprehensively decide that the large discharge outlet of Sinochem Zhenjiang Coking Co., Ltd. is used to emit flue gas from the coke wet quenching process.



Figure 26. Flue gas emitted by the wet coke quenching tower of Sinochem Zhenjiang Coking Co., Ltd. (picture taken by Lvse Jiangnan on July 9, 2014)

Lvse Jiangnan paid a field visit to Gaoziying Village, which is situated less than 300m from Sinochem Zhenjiang Coking Co., Ltd. to the southeast. As soon as the company was mentioned, villagers there began to voice their complaints.

According to some villagers, Sinochem Zhenjiang Coking Co., Ltd. moved to Gaozi Town seven or eight years ago from Zhengjiang. Since the appearance of this company, the villagers in this village have led a life common people could not bear. They have to face pollution from dust, smell and noise every day. They dare not open their own doors and windows because a layer of dust will settle on the tables or on the ground if they do so. Such dust, containing tar, must be cleaned only by using detergent. Moreover, people dare not readily take clothes and foods to dry outdoors. They cannot continue this life at all.

Some villagers said that over 10 residents among over 200 households in Gaoziying Village have suffered cancer (lung cancer, lymph cancer, esophagus cancer, gastric cancer, liver cancer,

laryngocarcinoma, skin cancer, breast cancer, and uterine cancer), and most of them are at the age of 20 to 50, with few aged over 50.

Villagers explained that the pollution from the coking plant was affecting the surrounding environment in the following ways: the water surface in the riverway in the village is covered with a layer of black tar, a layer of tar on leaves, vegetables planted by villagers fail to grow well, and they gradually wither; such vegetables cannot be cleaned; green beans do not get plump; villagers here do not know whether they can eat such vegetables and whether such vegetables will do harm to their bodies.

An elder woman demonstrated that a tissue became black after she cleared her nostrils with it. She indicated that she is sickened when getting a bad tar smell in air every day. Now, even the child she held in her arms has two black nostrils too. A member of the family of a patient with laryngocarcinoma stated that as coke is produced, gas emitted by the coking plant seems bad like a smell from a dead pig and makes this village really unlivable for people. Any villager who can find an opportunity has left the village for another place and only the old and weak remain.

According to complaint from some villagers, Sinochem Zhenjiang Coking Co., Ltd. generates such extremely large production noise particularly in the nighttime that villagers here cannot take a rest at all and often have a headache. A resident said, "I cannot bear to live in this home at all. Nor can I bear to lead a life here. We will not live for too long. We cannot eat the vegetables, nor clean oil and dust, nor bear great hardship. We are old, aged over 70. But when will our later generations stop suffering such hardship?"



Figure 27. Residents of the village voicing their complaints

According to complaint records disclosed on the website²³ of the Environmental Protection Department of Jiangsu Province in December 2012, Sinochem Zhenjiang Coking Co., Ltd. took wastewater from production as coke quenching water for the quenching tower and thus generated a smell. Given that there was a great change in the process of wastewater utilization and the requirement of environmental impact assessment in this company, the Environmental Protection Bureau of Dantu District issued the "Notice on Rectification of Environment-related Violations within a Time Limit", ordering this company to revise the environmental impact assessment report again and ensure the stable discharge up to the standard within three months.

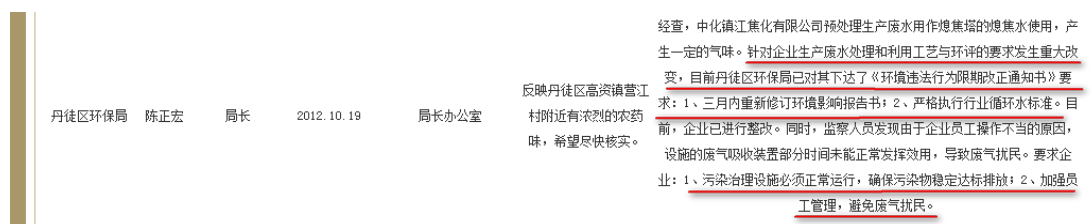


Figure 28. Complaint records disclosed on the website of environmental protection department of Jiangsu Province in December 2012

In February 2013, Zhengjiang Municipal Environmental Protection Bureau gave a written reply on the complaints about Sinochem Zhenjiang Coking Co., Ltd. lodged by netizens, indicating that this enterprise was formulating the rectification scheme of coke quenching circulating water treatment facility, which was expected to be completed later in June that year.



Figure 29. Zhengjiang Municipal Environmental Protection Bureau’s reply on the complaints about Sinochem Zhenjiang Coking Co., Ltd. made by netizens

As of November 22, 2014, however, we had not found any public information on the revision of environmental impact assessment submitted by this enterprise after checking the websites of Zhengjiang Municipal Environmental Protection Bureau and Environmental Protection Bureau of Dantu District. On November 26, the environmental protection organization received the public reply as per the application from Zhengjiang Municipal Environmental Protection Bureau and this reply showed that this plant had not submitted a new environmental impact assessment for process change, and that no rectification scheme for quenching circulating water treatment existed.

Attractive profits and hazardous emission

The 2014 half-year report from Sinochem International Corporation showed that the net profits attributable to the shareholders of this listed company in just January to June reached 553 million yuan, rising 46.7% from a year earlier. According to the 2013 annual report from the company, Sinochem International obtained cash bonuses worth over 16 million yuan from operating activities of its affiliated enterprise Sinochem Zhenjiang Coking Co., Ltd. However, hazardous emissions were hidden behind such attractive profits. We can’t help asking whether Sinochem International has performed responsibly in managing its subsidiaries in addition to obtaining profits.

14. 长期股权投资



2013年

	占成本	年初数	本年增减	年末数	持股比例 (%)	表决权比例 (%)	减值准备	本年计提减值准备	本年现金红利
权益法-									
股权投资									
上海北海船舶重工有限公司	53,378,537.90	402,628,458.99	8,098,808.15	408,727,267.12	20.00%	20.00%	-	-	87,208,708.21
江苏国际信托有限公司	3,715,925.90	3,715,925.90	-	3,715,925.90	28.00%	28.00%	3,715,925.00	-	-
南通江石石化化工有限公司	501,568,229.13	502,408,249.87	78,543,828.83	579,952,078.70	25.15%	20.15%	-	-	3,244,306.80
中化国际石油储运(天津)有限公司	108,968,708.97	481,348,844.86	244,853,218.16	726,202,063.02	54.85%	44.85%	-	-	18,838,732.24
中化国际(天津)有限公司	31,828,433.21	163,268,368.81	(163,268,368.81)	-	54.85%	44.85%	-	-	-
中化国际(天津)有限公司	28,821,258.00	74,708,958.00	12,203,233.61	86,912,191.61	28.00%	28.00%	-	-	18,405,828.31
中化国际(天津)有限公司	48,306,910.00	48,306,910.00	708,816.25	49,015,726.25	35.00%	35.00%	-	-	-
Falcao Co., Ltd.	28,958,242.15	18,557,234.50	13,963,342.58	32,520,577.08	45.00%	45.00%	-	-	-
连云港港口船舶石化港务有限公司	8,806,900.00	8,806,918.90	30,482,047.08	39,288,965.98	48.00%	48.00%	-	-	-
江苏中化石化有限公司	1,818,824,943.25	1,888,878,218.20	41,322,811.45	1,930,201,029.65	48.93%	48.93%	-	-	-

Figure 30. Profit condition of Sinochem Zhenjiang Coking Co., Ltd. disclosed in the 2014 half-year report from Sinochem International Corporation

The IPE’s Green Stocks database contains 17 environmental supervision records of subsidiaries of Sinochem International. Their violation types involve: the waste gas absorption equipment fails to normally play an effective role, causing waste gas to disturb people; pollutant discharge exceed the related standards; the comparison results of automatic monitoring equipment are false.

Table 10. Environmental supervision records of subsidiaries of Sinochem International Corporation

Subsidiary	Region	Year of Violation	Type of Violation and Result of Punishment	Source of Record
Sinochem Zhenjiang Coking Co., Ltd.	Zhengjiang	2012	Sinochem Zhenjiang Coking Co., Ltd. pretreated production waste water as coke quenching water for the quenching tower, thus producing a smell. As for a great change in the treatment and utilization process of waste water from production in this enterprise, the Environmental Protection Bureau of Dantu District issued the "Notice on Rectification of Environment-related Violations within a Time Limit", requiring this company to: 1. revise the environmental impact assessment again within three months; 2. strictly execute the standard for circulating water in this industry. At present, this company has carried out rectification. Meanwhile, the supervisory personnel found that the waste gas absorption facility sometimes failed to normally operate, thus causing waste gas to disturb residents. They required this enterprise to: 1. surely operate the pollution control facility normally so as to ensure the stable discharge of pollutants up to the standard; 2. strengthen staff management and prevent waste gas from disturbing residents.	www.jshb.gov.cn
Jiangsu Yangnong Chemical Group Co., Ltd.	Yangzhou	2013	(1) The comparison of monitoring results of the automatic monitoring equipment in the 3 rd quarter in 2013 showed that the comparison results of PM, nitrogen oxide, chemical oxygen demand (COD) and ammonia nitrogen in this company were disqualified; (2) this company was fined 45,057 yuan for excessive discharge of water pollutants; (3) the supervisory monitoring of the pollution source in this company exceeded the standard (ammonia nitrogen emission exceeded the standard in the 4 th quarter of 2013).	Yangzhou Municipal Environmental Protection Bureau
Jiangsu Yangnong Chemical Group Co., Ltd.	Yangzhou	2012	(1) According to the circular on the operation (key enterprises under national monitoring) of the ecological environmental monitoring system in the first half of 2012 by Environmental Protection Department of Jiangsu Province, Jiangsu Yangnong Chemical Group saw online data seriously exceed the standard by up to 1.54 times in May, with excessive discharge of pollutants occurring 261 times in the first half of that year. (2) This company was given a notice of criticism due to a prominent problem in the pollution emission reduction in 2011. It was required to prepare and complete the rectification scheme and submit this scheme to the local environmental protection department for record within 15 working days upon receiving such a notice, and to complete such rectification by the end of September 2012.	Environmental Protection Department of Jiangsu Province
Nantong Jiangshan Agrochemical & Chemical Co., Ltd.	Nantong	2013	The supervisory monitoring in the 2 nd quarter of 2013 showed that this company breached the discharge standards for volatile phenol and aniline in waste water.	Environmental Protection Department of Jiangsu Province
Nantong Jiangshan Agrochemical & Chemical Co., Ltd.	Nantong	2012	This company was given a yellow card warning in the environmental credit rating in 2012.	Environmental Protection Department of Jiangsu Province

3. Regulation and Supervision are currently being tightened - Raises Risks for Listed Companies that are Discharging Pollutants

3.1 Risk 1: The emission standards for major smog-causing industries are being tightened across the board

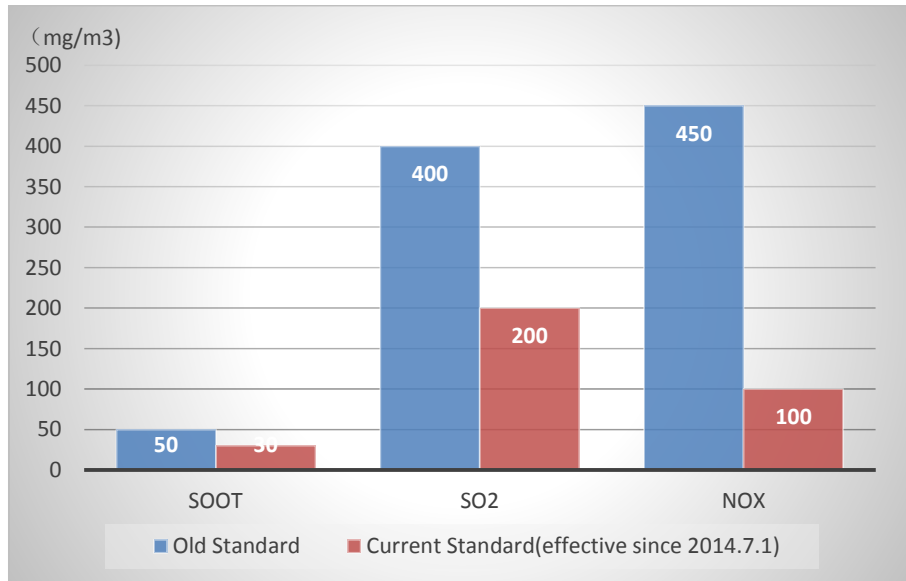


Figure 31. Comparison of the “Emission Standards of Air Pollutants for Thermal Power Plants”¹⁴

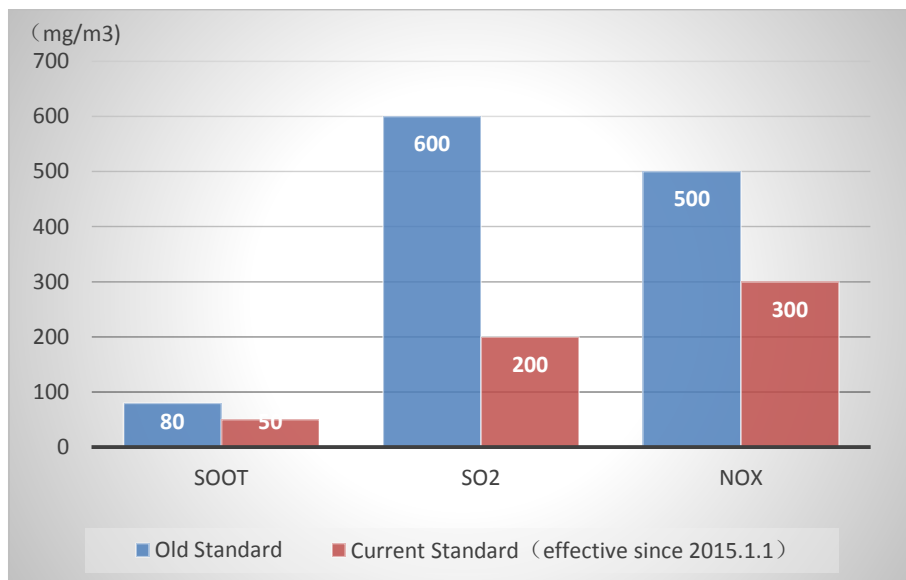


Figure 32. Comparison of the “Emission Standards of Air Pollutants for Sintering and Pelletizing of Iron and Steel Industry”¹⁵

14 Compared only coal-fired boilers. The old standard is based on the stage 3 period.

15 Compared only sintering machine pellet roasting equipment.

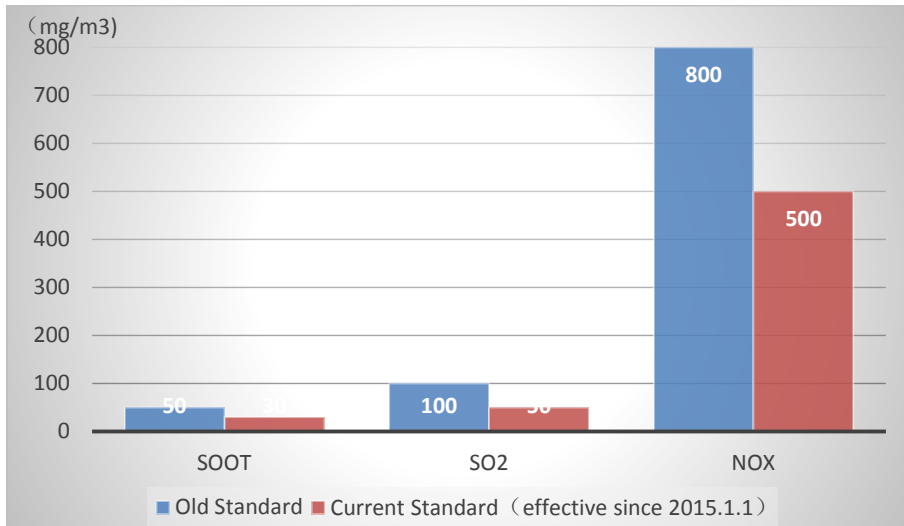


Figure 33. Comparison of the “Emission Standards of Pollutants for Coking Chemical Industry”¹⁶

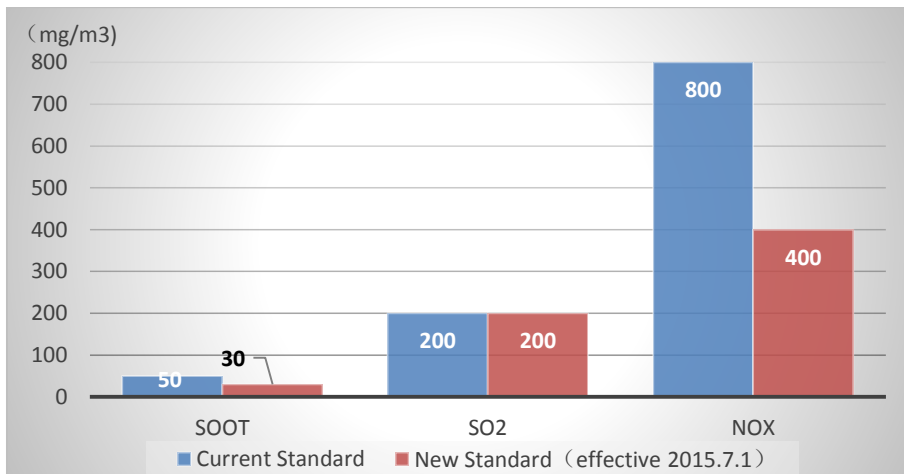


Figure 34. Comparison of the “Emission Standard of Air Pollutants for Cement Industry”¹⁷

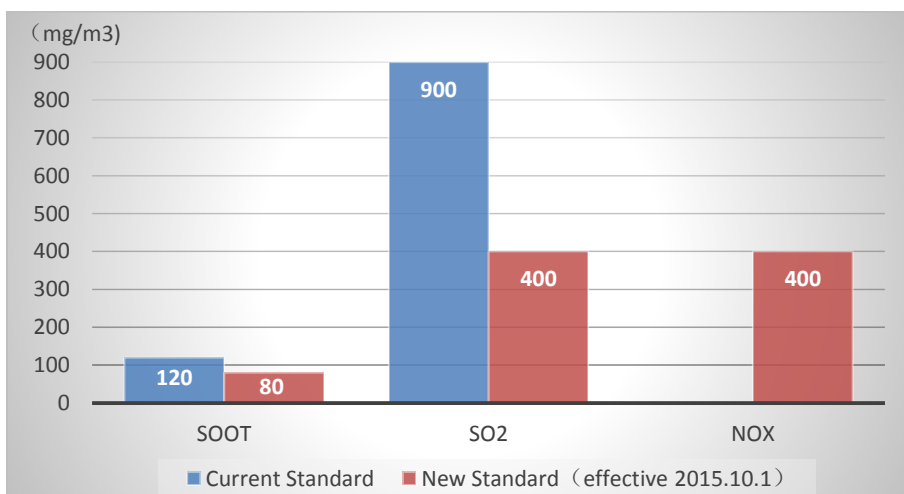


Figure 35. Comparison of the “Emission Standard of Air Pollutants for Boiler”¹⁸

16 Compared only the coking machine and coking furnace chimney.

17 Compared only cement kilns and grinding machines

18 Compared only coal-fired boilers. The old standard is based on second and third type areas, second stage.

3.2 Risk Two: Increasing penalties by introducing daily fines

Historically, the low penalties imposed on the emission of pollutants have been the biggest stumbling blocks in the eradication of such behavior. That trend is now seeing a reverse, with stringent enforcement and penalties increasingly becoming the norm. For example, the above-mentioned Kingboard Chemical Inc. in Xingtai has been fined 2.45 million Yuan, the largest in history, by the local environmental protection bureau. But even the largest possible environment fines fail to achieve the necessary deterrence effect when faced with corporations that have profits in the hundreds of millions. We believe this makes the new daily fines introduced by China's new environmental law even more necessary.

Case Study: Shaanxi Weidian Ltd. (Part of China Travel Service Hong Kong Ltd. 308.HK)

In 2013, the financial statements of China Travel Service disclosed profits to shareholders of approximately HKD 1.152 billion, of which HKD 276 million can be attributed to the 51% stock ownership in Weidian Ltd. According to the August records of the Environmental Protection Bureau¹⁹²⁰, Weidian Ltd. lacks denitrification facilities and is guilty of excessive emissions of nitrogen oxides. As such, Weidian was fined for 500,000 Yuan (620,000 HKD), the maximum allowed punishment under Shaanxi province's environmental law.



Figure 36. Records of punishment imposed on Weidian Ltd. by the Ministry of Environmental Protection

Following the fines, the environmental protection bureau ordered the shutdown of Weidian Ltd.'s 5th production unit in August 24, 2014 until denitrification and dust removal facilities can be constructed. In addition, the unit was to remain shut down until such time when the necessary improvements have been made. Despite that, Weidian Ltd.'s 5th production unit began operating again on October 14, 2014 with seemingly no improvement. In the period from October 15 to 31,

¹⁹ http://www.mep.gov.cn/zhxx/gzdt/201408/t20140828_288391.htm

²⁰ http://www.ipe.org.cn/pollution/com_detail.aspx?id=186639

emission of nitrogen oxide remained on average 0.07 to 15.3 times higher than the maximum allowed amount. In this scenario, one is forced to ask whether a single heavy fine for corporations with annual profits in the hundreds of millions really achieves the intended deterrent effects.

Consider an alternative scenario where instead of simply being fined a maximum amount, Weidian Ltd. would be fined for everyday they exceeded the emission limits. Using the previous maximum of 500,000 Yuan, the month of October alone could cost them up to 8 million Yuan (500,000 multiplied by 16 days), or about 34% of the company's monthly profits. It is only with the introduction of stiff penalties (such as the implementation of daily fines) that companies can be incentivized to invest in pollution control facilities. An official of the Ministry of Environmental Protection summed it up by saying, "In extreme cases, the new law means that companies can be punished repeatedly until they stop their illegal behavior."²¹

With the introduction of the new law, it was natural that the mechanics and implementation of the daily fines will become the focus. In our opinion, we believe that a combination of daily fines, transparent disclosure of emissions, as well as public participation and supervision will be instrumental in tackling the existing problems discussed above.

In Article 36 of the Environmental Administrative Penalties introduced in 2010, there was already mention of such environmental data being used as basis for determining illegal emissions. From January 1st of this year, real time online publication of emission amounts has now been formally enshrined as a regulatory requirement. With some regions already possessing protocols for using these real time data, it is not hard to see a future where such data are used effectively in legal enforcement.

From the limited data of the IPE, China currently has four provinces/municipalities and five cities that have developed and published details regarding the use of such data in assessing environmental penalties. From this, we can draw two conclusions:

1. There is an avenue where emission data can become an integral part of environmental enforcement.
2. The majority of locations that utilize such data assess fines depending on the cumulative (or continuous) rate at which emissions exceed the allowed amount. Xinjiang is notable for introducing laws that take into account both the period of time as well as the magnitude of violations in determining penalties.²²

In fact, as early as 2009, Chongqing already experimented with a rudimentary form of on-line monitoring and daily fines that together achieved remarkable results. According to media reports, "Chongqing has managed to achieve a sharp rise in the effectiveness of enforcement through the use of their monitoring system. Once the system detects an excessive discharge of pollutants, it will automatically send off an alert to the appropriate agencies for enforcement action.

The first step following such alerts will be to issue a "Notice of Excessive Pollution", requiring the corporation to find the cause and take corrective measures to address the problem. Second, following three hours of continued pollutant discharge, daily fines will begin to be assessed depending on the severity of the problem. Since 2007, Chongqing has documented more than 500 cases of excessive pollutant discharge and imposed fines totaling more than 30 million Yuan. In addition, the automation and refinement of the process created a strong incentive for corporations to reduce pollutant discharge and drastically reduced the costs of monitoring and

²¹ http://www.legaldaily.com.cn/index_article/content/2014-11/19/content_5851567.htm?node=5955

²² For more information, please see Appendix 1

enforcement.

One particular company for instance, invested 100 million in 2009 and 180 million in 2011 respectively to acquire desulfurization facilities in their factories in order to comply with environmental laws.

In the months of July and August of 2014 alone, Chongqing's Bureau of Environmental Protection recorded 17 instances of violations and fines resulting from published online data.²³²⁴

Trial Calculation Cases for “Daily Fines” that could be levied on Listed Companies

Foreseeably, as environmental supervision constantly tightens, along with the public supervision rising, those pollutant discharge enterprises that ignore their environmental responsibilities will be confronted with higher punishment costs than ever before. This risk is very likely to be converted into substantial economic risk. In this chapter, we select several listed companies with that have excessive discharge of pollutants for long periods and conduct the trial calculation of the fine amount possibly resulted from the implementation of the daily fines.

We aim to remind investors that, under strict punishment rules on environmental protection, investment in listed companies with excessive discharge of pollutants for long periods may incur higher economic risk. Investors should pay attention to and actively identify this risk.

The IPE has established the trial calculation method for daily fines on the basis of comprehensive referral to such regulations and practical means as “Interim Procedures for Continuous Punishment by the Day on Environmental Protection” (a draft for discussion), the use of online monitoring data across the country for the environmental law enforcement, and the method of environmental discretion implementation, and from consulting experts.²⁵ We have conducted the trial calculation on the following three cases with this method. The trial calculation method for daily fines is detailed in Appendix II.

²³ <http://www.cepb.gov.cn/gsx/hbxzcfzfy/73079.htm> (Chongqing Environmental Protection Bureau July Records)

²⁴ <http://www.cepb.gov.cn/gsx/hbxzcfzfy/73976.htm> (Chongqing Environmental Protection Bureau August Records)

²⁵ IPE would like to thank Wu Qi from NRDC and Dr. Yan Houfu from Beijing Normal University for their valued suggestions on the methodology for the trial calculation of daily fines.

Case 1: Qingdao Soda Ash Industrial Co., Ltd. (stock code 600229.SH)

Financial Data	<ul style="list-style-type: none"> ● The annual report 2013 of Qingdao Soda Ash Industrial Co., Ltd. disclosed that the net profits of this company were around 17 million yuan in 2013. ● The net profits were, on average, estimated to be around 1.4 million yuan monthly.
Condition of Continuous Excessive Discharge of Pollutants	<ul style="list-style-type: none"> ● According to online monitoring data, Qingdao Soda Ash Industrial Co., Ltd. continuously discharged excessive pollutants on August 1 to October 31, 2014, with the exceeding standard rate being 100%. ● Multiple waste gas outlets were involved: (5-6), (7), (8), and (9) in Qingdao Alkali Industry Co., Ltd.
Trial Calculation and Risk of Fine for Excessive Discharge of Pollutants	<ul style="list-style-type: none"> ● Supposing that the environmental protection department checked and re-checked continuous excessive discharge of pollutants of this plant in this period, as per the methods in Appendix II, the trial calculation results of fine were as follows: <ul style="list-style-type: none"> ● Method 1: the total fine was 9.2 million yuan, with the average monthly fine being 3.06 million yuan, accounting for around 220% of this listed company's net profits. ● Method 2: the total fine was 8.28 million yuan, with the average monthly fine being 2.76 million yuan, accounting for around 200% of this listed company's net profits.

Table 11. Excessive discharge of pollutants and trial punishment calculation result for Qingdao Soda Ash Industrial Co., Ltd. (August to October 2014)

Period of Excessive Discharge of Pollutants	Number of Days of Continuous Excessive Discharge of Pollutants (day)	Date of Initial Excessive Discharge of Pollutants		Fine for Initial Excessive Discharge of Pollutants (10,000 yuan)		Total Fine (10,000 yuan)	
		Hourly Period of Excessive Discharge of Pollutants (time)	Average excess multiple	Method 1	Method 2	Method 1	Method 2
August 1 to October 31, 2014	92	17	2.82	10	9	920	828
Total						920	828

Case 2: Qian'an Sinochem Coal Chemical Industry Co., Ltd. (affiliated to Kailuan Energy Chemical Co., Ltd. 600997.SH)

Financial Data	<ul style="list-style-type: none"> ● The annual report 2013 of Kailuan Energy Chemical Co., Ltd. disclosed that the net profits attributable to the parent company were around 252 million yuan in 2013. ● The net profits were, on average, estimated to be around 21 million yuan monthly. ● Qian'an Sinochem Coal Chemical Industry Co., Ltd. is a subsidiary of Kailuan Energy Chemical Co., Ltd. and has a 49.82% stake held by the listed company.
Condition of Continuous Excessive Discharge of Pollutants	<ul style="list-style-type: none"> ● According to online monitoring data, Qian'an Sinochem Coal Chemical Industry Co., Ltd. discharged excessive pollutants on August 1 to October 31, 2014 continuously, with the exceeding standard rate being 100%. ● Multiple waste gas outlets were involved: chimney outlets of No.1 to No.6 coke furnaces.
Trial Calculation and Risk of Fine for Excessive Discharge of Pollutants	<ul style="list-style-type: none"> ● Supposing that the environmental protection department checked and re-checked continuous excessive discharge of pollutants of this plant in this period, as per the methods in Appendix II, the trial calculation result of fine were as follows: ● Method 1: the total fine was 9.2 million yuan, with the average monthly fine being 3.067 million yuan; the fine attributable to the listed company was: $3.067 \times 49.82\% = 1.53$ million yuan, accounting for about 7.3% of the listed company's net profits. ● Method 2: the total fine was 8.28 million yuan, with the average monthly fine being 2.76 million yuan; the fine attributable to the listed company was: $2.76 \times 49.82\% = 1.375$ million yuan, accounting for about 6.5% of this listed company's net profits.

Table 12. Excessive discharge of pollutants and trial punishment calculation result of Qian'an Sinochem Coal Chemical Industry Co., Ltd. (August to October 2014)

Period of Excessive Discharge of Pollutants	Number of Days of Continuous Excessive Discharge of Pollutants (day)	Date of Initial Excessive Discharge of Pollutants		Fine for Initial Excessive Discharge of Pollutants (10,000 yuan)		Total Fine (10,000 yuan)	
		Hourly period of excessive discharge of pollutants (time)	Average excess multiple	Method 1	Method 2	Method 1	Method 2
August 1 to October 31, 2014	92	19	1.78	10	9	920	828
Total						920	828

Case 3: Zhangzhou Kibing Glass Co., Ltd. (affiliated to Zhuzhou Kibing Group Co., Ltd., stock code: 601636.SH)

Financial Data	<ul style="list-style-type: none"> ● The annual report 2013 of Zhuzhou Kibing Group disclosed that the net profits attributable to shareholders of the listed company were around 387 million yuan in 2013, rising 96.19% from a year earlier. ● The net profits were, on average, estimated to be 32.25 million yuan monthly. ● Zhangzhou Kibing Glass Co., Ltd. is an affiliated company of Zhuzhou Kibing Group Co., Ltd. and has a 100% stake held by the listed company.
Condition of Continuous Excessive Discharge of Pollutants	<ul style="list-style-type: none"> ● According to online monitoring data, Zhangzhou Kibing Glass Co., Ltd. continuously discharged excessive pollutants on August 1 to October 31, 2014, with the exceeding standard rate being 96.7%. ● Multiple waste gas outlets were involved: 600T-3 and 600T-2.
Trial Calculation and Risk of Fine for Excessive Discharge of Pollutants	<ul style="list-style-type: none"> ● Supposing that the environmental protection department checked and re-checked continuous excessive discharge of pollutants of this plant in this period, as per the methods in Appendix II, the trial calculation result of fine were as follows: ● Method 1: the total fine was 4.35 million yuan, with the average monthly fine being 1.45 million yuan, accounting for about 7.8% of the listed company's net profits. ● Method 2: the total fine was 7.83 million yuan, with the average monthly fine being 2.61 million yuan, accounting for about 14.0% of this listed company's net profits.

Table 13. Excessive discharge of pollutants and trial punishment calculation result for Zhangzhou Kibing Glass Co., Ltd. (August to October 2014)

Period of Excessive Discharge of Pollutants	Number of Days Continuous Excessive Discharge of Pollutants (day)	Day of Initial Excess Discharge of Pollutants		Fine for Initial Excessive Discharge of Pollutants (10,000 yuan)		Total Fine (10,000 yuan)	
		Hourly period of excessive discharge of pollutants (time)	Average excess multiple	Method 1	Method 2	Method 1	Method 2
August 3-18, 2014	16	24	0.89	5	9	80	144
August 20 to September 17, 2014	29	24	0.91	5	9	145	261
September 19-21, 2014	3	24	0.82	5	9	15	27
September 23 to October 31, 2014	39	24	0.87	5	9	195	351
Total						435	783

3.3 Risk Three: Poor environmental performance worsens the NIMBY effect.

In recent years, there have been frequent mass incidents due to a fear that the initiation of some construction projects will trigger environmental and ecological changes. We see that the construction parties of some projects are even strong listed state-owned key enterprises or state-owned enterprises (for example, Kunming-based PX project of PetroChina), but the public have misgivings about, and even worry about, the startup of these projects. For such situations, no full information disclosure at the early stage of these projects or unimpeded channels for public participation constitutes one of the important reasons for which the public knew nothing about and did not trust the projects. Another major reason is that the public felt doubtful about whether those large enterprises with a history of poor environmental records could honor their commitments and carry out the strictest environmental management on their subsidiary projects.

Case: Pingjiang thermal power project of China Huadian Corporation Hunan Subsidiary²⁶

In May 2013, Pingjiang County Government signed an agreement with China Huadian Corporation's Hunan Subsidiary to construct a large thermal power plant. The project went through some twists and turns and was collectively opposed by the public twice. Finally, on September 2014, the county party committee and county government of Pingjiang County issued a public notice, announcing that they were halting the thermal power project of China Huadian Corporation in Pingjiang; cancelling the command of preliminary work on the project; abolishing the documents on the thermal power project, and terminating all work on this thermal power project.

According to the media, Pingjiang Thermal Plant of China Huadian Corporation was ranked No.1 in the appraisal results for large thermal power projects of Hunan province in 2014. This means that the comprehensive assessment of Pingjiang Thermal Plant has gained high acceptance of the appraisal experts in multiple respects such as the design scheme and environmental protection measures. Under the circumstances where there is conflicting information, the "No.1" result caused the local masses who hold a dissenting opinion to become more worried. Moreover, the negative information on China Huadian Corporation – the cooperation party of Pingjiang Thermal Power Plant - increased the anxiety of the opponents.

Public reports show that on July 1-15, 2014, China Huadian Corporation was criticized by name in three supervision reports from the National Energy Administration and National Development and Reform Commission because its subsidiaries engaged in illegal construction and secret discharge of pollutants. "We fear that after arriving in Pingjiang, this thermal power plant will similarly secretly discharge pollutants, polluting our beautiful environment," said an opponent.

²⁶ <http://leaders.people.com.cn/n/2014/1124/c58278-26078310.html> Hunan Pingjiang County Secretary resigns because of public opposition to the power plant, Beijing News.



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华电集团连登“黑榜” 15天被3次通报

陈相乐

2014年07月21日10:17 来源: 新华网 手机看新闻

打印 网摘 纠错 商城 分享 推荐 人民微博 关注 字号 + -

原标题: 华电集团连登“黑榜” 15天被3次通报

如果“上榜”是可以有所选择的话, 中国华电集团公司(下称“华电集团”)或许会考虑近期不要再继续“榜上有名”了。

从7月1日到7月15日, 仅仅15天的时间, 华电集团的名字接连出现在两个国家机构下发的3份“黑榜”当中。

连登“黑榜” 旗下企业超标、违建、脱硫擅停

7月1日, 国家能源局发布《电力企业大气污染防治驻点河北监管报告》(下称“《报告》”)。隶属于华电集团旗下最重要上市公司——华电国际的河北华电石家庄裕华热电有限公司因相关数据不符合逻辑, 以及CEMS(“烟气在线监测系统”)台帐中数据超标而被能源局公开通报。

Figure 37. Screenshot from media report (source: www.xinhuanet.com)

In fact, the IPE's Green Stock Database contained as many as 122 environmental supervision records of subsidiaries under the listed company Huadian Power International Corporation Limited (600027.SH), in which 36 records were related to excessive discharge of pollutants over the past three years (2012-2014).

Table 14. Details of environmental supervision records for subsidiaries under Huadian Power International Corporation Limited (2012-2014)

Subsidiary	Region	Year of Violation	Type of Violation and Result of Punishment	Source of Record
Huadian Weifang Power Generation Co., Ltd.	Weifang	2014	This company was punished for discharge of pollutants in the atmosphere in excess of national and local standards. The punishment results were: 1. complete the control within 90 days, and surely deliver the discharge up to the standard within this control period; 2. fined eighty thousand yuan only.	Weifang Municipal Environmental Protection Bureau
		2014	The soot emission in this company exceeded the standard by 0.49 time, according to the supervisory monitoring of the first batch of units with installed capacity of over 300,000 KW each in Shandong in the 1 st quarter in 2014.	Environmental Protection Department of Shandong Province
		2013	The supervisory monitoring of key pollution sources under national monitoring program in Shandong	Environmental Protection Department of

Subsidiary	Region	Year of Violation	Type of Violation and Result of Punishment	Source of Record
			province in the 2 nd and 4 th quarters in 2013 showed that the nitrogen oxide emission in this company exceeded the standard by 0.5 to 6 times, soot emission exceeding the standard by 0.3 time.	Shandong Province
		2014	The supervisory monitoring of the first batch of units with installed capacity of over 300,000 KW each in Shandong in the 1 st and 2 nd quarters in 2014 showed that the nitrogen oxide emission in this company exceeded the standard by 1.03 to 6.39 times.	Environmental Protection Department of Shandong Province
Lai Cheng Power Plant of Huadian Power International Corporation Limited	Laiwu	2013	The supervisory monitoring of key pollution sources under national monitoring program in Shandong province in the 4 th quarter in 2013 showed that the nitrogen oxide emission in this company exceeded the standard by 1.2 to 2.3 times.	Environmental Protection Department of Shandong Province
		2012	The supervisory monitoring of key pollution sources under national monitoring program in Shandong province in the 2 nd quarter in 2012 showed that the emission of nitrogen oxide and sulfur dioxide in this company exceeded the standard.	Environmental Protection Department of Shandong Province
		2014	The monitoring of key pollution sources under national monitoring program in Zaozhuang city in the 1 st quarter in 2014 showed that the nitrogen oxide emission in this company exceeded the standard by 6.2 times.	Zaozhuang Municipal Environmental Protection Bureau
Shiliquan Power Plant of Huadian Power International Corporation Limited	Zaozhuang	2013	The supervisory monitoring of key pollution sources under national monitoring program in Shandong province in the 2 nd and 4 th quarters in 2013 showed that the nitrogen oxide emission in this company exceeded the standard by 1.8 to 6.1 times.	Environmental Protection Department of Shandong Province
		2013	The monitoring of key pollution sources under national monitoring program in Zaozhuang city in the 3 rd quarter in 2013 showed that the nitrogen oxide emission in this company exceeded the standard by 3.2 times.	Zaozhuang Municipal Environmental Protection Bureau
		2014	The waste gas monitoring of enterprise pollution sources under national monitoring program in Yantai city in April 2014 showed that the nitrogen oxide emission in this company exceeded the standard, to varying degrees, by up to 5.7 times.	Yantai Municipal Environmental Protection Bureau
Shandong Bainian Electric Power Development Company Limited	Yantai	2014	The monitoring of enterprises of waste gas pollution sources under national and provincial monitoring programs in Yantai city in February and March 2014 showed that the nitrogen oxide emission in this company exceeded the standard, to varying degrees, by up to 5.07 times.	Yantai Municipal Environmental Protection Bureau
		2013	The supervisory monitoring of key pollution sources under national monitoring program in Shandong province in the 4 th quarter in 2013 showed that the nitrogen oxide emission in this	Environmental Protection Department of Shandong Province

Subsidiary	Region	Year of Violation	Type of Violation and Result of Punishment	Source of Record
			company exceeded the standard by 2.9 to 3.8 times.	
		2014	The monitoring of key pollution sources under national monitoring program in Zaozhuang city in the 1 st quarter in 2014 showed that the nitrogen oxide emission in this company exceeded the standard by 5.3 times, soot emission exceeding by the standard by 0.4 time.	Zaozhuang Municipal Environmental Protection Bureau
Huadian Tengzhou Xinyuan Thermal Power Plant Co., Ltd.	Zaozhuang	2014	The supervisory monitoring of key pollution sources under national monitoring program in Shandong province in the 2 nd quarter in 2014 showed that the nitrogen oxide emission in this company exceeded the standard by 4.7 times, soot emission exceeding the standard by 0.5 time.	Environmental Protection Department of Shandong Province
		2013	The supervisory monitoring of key pollution sources under national monitoring program in Shandong province in the 2 nd and 4 th quarters in 2013 showed that the nitrogen oxide emission in this company exceeded the standard by 3.8 to 5.1 times.	Environmental Protection Department of Shandong Province
		2013	The monitoring of key pollution sources under national monitoring program in Zaozhuang city in the 3 rd quarter in 2013 showed that the nitrogen oxide emission in this company exceeded the standard by up to 5.2 times.	Zaozhuang Municipal Environmental Protection Bureau
Huadian Laizhou Power Generation Co., Ltd.	Yantai	2014	The nitrogen oxide emission in this company exceeded the standard by 2.17 times, according to the supervisory monitoring of the second batch of units with installed capacity of over 300,000 KW each in Shandong in the 1 st quarter in 2014.	Environmental Protection Department of Shandong Province
		2014	The nitrogen oxide emission in this company exceeded the standard by 4.31 times, according to the supervisory monitoring of the second batch of units with installed capacity of over 300,000 KW each in Shandong in the 1 st quarter in 2014.	Environmental Protection Department of Shandong Province
Huadian Qingdao Power Generation Co., Ltd.	Qingdao	2013	The supervisory monitoring of key pollution sources under national monitoring program in Shandong province in the 2 nd , 3 rd and 4 th quarters in 2013 showed that the nitrogen oxide emission in this company exceeded the standard by 1.6 to 6.8 times.	Environmental Protection Department of Shandong Province
Huadian Zhangqiu Electric Power Generation Co., Ltd.	Zhangqiu	2014	The supervisory monitoring of key pollution sources in Jinan city in February and April 2014 showed that the nitrogen oxide emission in this company exceeded the standard by 1.5 times and 1.1 times respectively.	Jinan Environmental Protection Bureau
Shandong Huadian Zibo Thermal Power Plant Co., Ltd.	Zibo	2013	The waste gas monitoring of key pollution sources under national monitoring program in Zibo city in the 3 rd quarter in 2013 showed that the nitrogen oxide emission in this company exceeded the standard by 0.5 time.	Zibo Municipal Environmental Protection Bureau
Zou County Power	Jining	2014	The supervisory monitoring of key	Environmental

Subsidiary	Region	Year of Violation	Type of Violation and Result of Punishment	Source of Record
Plant of Huadian Power International Corporation Limited			pollution sources under national monitoring program in Shandong province in the 1 st and 2 nd quarters in 2014 showed that the soot emission in this company exceeded the standard slightly, the nitrogen oxide emission exceeding the standard by 1.6 to 6.7 times	Protection Department of Shandong Province
		2013	The supervisory monitoring of key pollution sources under national monitoring program in Shandong province in the 1 st , 2 nd , 3 rd and 4 th quarters in 2013 showed that the nitrogen oxide emission in this company exceeded the standard by 0.5 to 5.9 times.	Environmental Protection Department of Shandong Province
		2012	The supervisory monitoring of key pollution sources under national monitoring program in Shandong province in the 2 nd quarter in 2012 showed that the nitrogen oxide emission in this company exceeded the standard slightly.	Environmental Protection Department of Shandong Province
Shaoguan Pingshi Power Plant Ltd (plant B)	Shaoguan	2012	The supervisory monitoring of pollution sources of thermal power plants under national monitoring program, with installed capacity of over 300,000 KW each in Guangdong province in the 1 st quarter in 2012, showed that the nitrogen oxide emission of No.3 unit in this plant exceeded the standard by up to 0.8 time.	Guangdong Environmental Protection public network (www.gdep.gov.cn)

3.4 Risk Four: Real-time disclosure and social media communication create more “micro reports” as a form of social supervision

As mentioned in the preceding paragraph, most provinces and regions in China have, since 2014, begun to carry out real-time disclosure on the online monitoring data of key enterprises under a national monitoring program. For the purpose of assisting the public in obtaining real-time monitoring data more conveniently and faster, the IPE has developed a cell phone app, called the “Pollution Map”. The user can use this app to view the real-time monitoring data at each waste gas outlet of key pollution sources at any time, which is released by the self-monitoring data platform of enterprises in each province and region. Such data includes the pollutant concentration, standard limit, excess multiple and gas emission level. The user can also re-tweet such data through such social media as Weibo and WeChat.

Real-time disclosure and public supervision increases the risks to polluting enterprises, which to some extent, can curb their meddling in environmental law enforcement. The environmental protection departments in places such as Shandong, Zhejiang, and Jiangsu provinces, have followed up on enterprise pollution problems reported by netizens through the pollution map app and #PollutionMap. Among such departments, the Environmental Protection Department of Shandong Province is particularly active: they require enterprises with excessive discharge of pollutants to rectify within a time limit and also call on the public to provide more supervision and point out the enterprises with excessive discharge by name through the pollution map app. They treat problems reported by netizens as complaint reports, and then the provincial, city, prefecture and county level administration concerned will actively follow up and handle these problems.

As of November 28, 221 enterprises had explained their excessive discharge of pollutants as shown by the online monitoring data, most of them did so through local environmental protection departments on their behalf. Of these enterprises, 92 were subsidiaries of state-owned enterprises and even state-owned key enterprises. The fact that the public are able to push state-owned enterprises and state-owned key enterprises to confront their pollution problems, indicates that enterprises in the smog-causing industries face greater risk of social supervision in the age of internet and social media.

The enterprises that provided response included subsidiaries of a group of listed companies. Among them, multiple power plants under China Huaneng Group in Shandong, Jiangxi responded to the questions raised by the public.



Figure 38. Screenshots from the Pollution Map app showing commitments to rectifications made by enterprises

3.5 There is a higher risk for high-emission listed enterprises in regions worst hit by smog

What impact on local air quality do high-intensity industrial discharge sources have? In regions worst hit by smog, particularly during periods of heavy smog, those large listed companies who continue to excessively discharge pollutants, will face greater regulatory and supervisory pressure due to their inadequate efforts to reduce emissions, which means they are higher risk.

In Hebei province, for example, multiple cities suffered serious smog pollution in October 2014. We selected Tangshan, Shijiazhuang and Handan to schematically compare the daily average concentration curve of local air pollutants with pollutant emission levels of high-intensity industrial discharge sources for each city. The method was as follows:

- Data source: the self-monitoring public platform of key enterprises under national monitoring program in Hebei province. We roughly calculated the pollutant emission level of each key discharge source with the following formula: Emission level = \sum hourly converted concentration X Flue gas flow
- Data index: We selected the main precursor sulfur dioxide of secondary PM_{2.5} as a research factor.
- Research limitation: In the observation period, there was deficiency in the flue gas flow of each enterprise, so the calculation result might be lower than the real emission level. Research method: We found those enterprises whose emission levels of sulfur dioxide rank among the worst in their cities respectively, and mainly identified which enterprises engaged in the high emission in heavy pollution weather. Then, we compared their high emissions with the daily average concentration curve of local PM_{2.5} air quality, and

observed the correlation between both.

Our main findings were as follows:

- There were subsidiaries under many listed companies among high-emission enterprises;
- Subsidiaries under some listed companies still had a high emission level during periods of heavy pollution indicating that they did not make adequate efforts to reduce emissions.

In our view, the direct impact on local air quality by changes in the emission level of main industrial sources is worth further investigation.

Table 15. Tangshan's top three sulfur dioxide emitters in October and their parent listed companies

	Tangshan's Top Three Sulfur Dioxide Emitters in October	Listed Company	Emission Level of Sulfur Dioxide (ton)
1	Hebei Jinxi Iron & Steel Group Co., Ltd.	China Oriental Group Company Limited 581.HK	545.1
2	Tangshan Ganglu Iron & Steel Co., Ltd.	Non-listed	371.7
3	China Resources Power Tangshan Caofeidian Co., Ltd.	China Resources Power Holdings Company Limited 836.HK	355.1

These top three enterprises contributed around 30% of sulfur dioxide emitted from local key industrial sources.

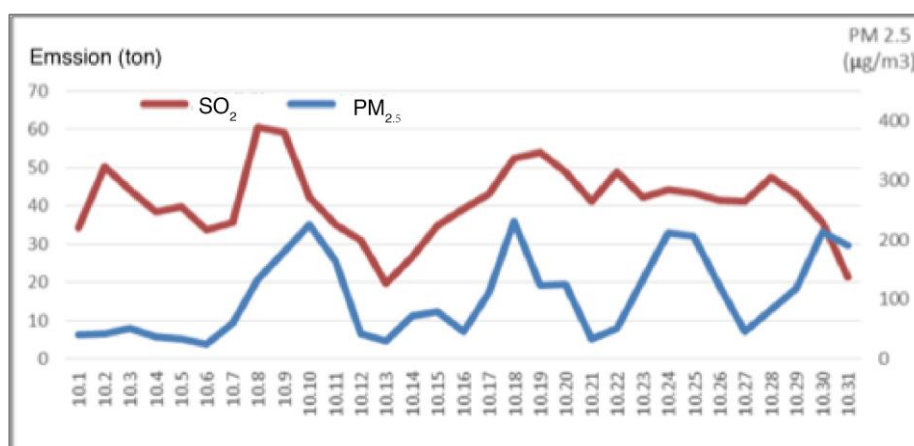


Figure 39. Comparison between sulfur dioxide emission levels from top three sulfur dioxide emitters and the daily average concentration of PM_{2.5} in Tangshan in October

Table 16. Handan's top three sulfur dioxide emitters in October and their parent listed companies

	Handan's Top Three Sulfur Dioxide Emitters in October	Listed Company	Emission Level of Sulfur Dioxide (ton)
1	Datang Wu'an Power Generation Co., Ltd.	Jizhong Energy Resource Co., Ltd. 000937.SZ	1842.8
2	Handan Thermal Power Plant of GD Power Development Co., Ltd.	GD Power Development Co., Ltd. 600795.SH	1438.7

3	Handan Iron and Steel Group Co., Ltd.	Non-listed	1245.5
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The top three enterprises contributed around 55% of sulfur dioxide emitted from local key industrial sources.

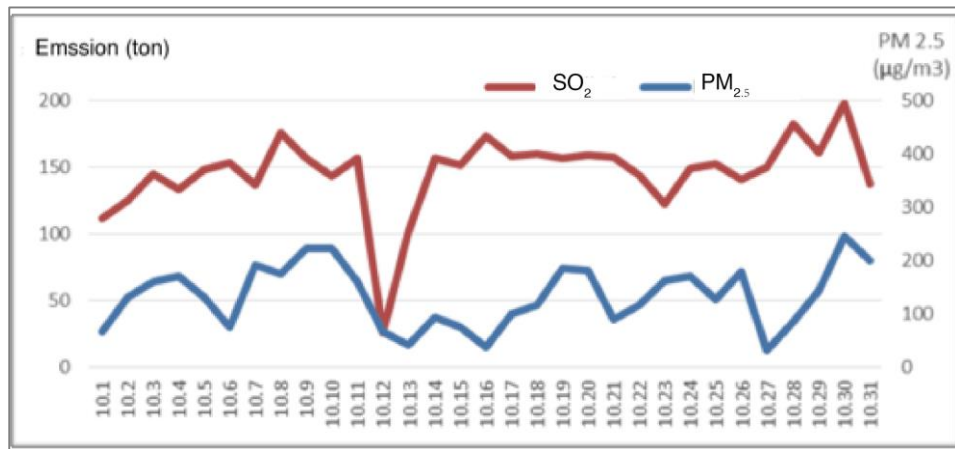


Figure 40. Comparison between sulfur dioxide emission levels from the top three sulfur dioxide emitters and the daily average concentration Curve of PM2.5 in Handan in October

Table 17. Shijiazhuang's top three sulfur dioxide emitters in October and their parent listed companies

	Handan's Top Three Sulfur Dioxide Emitters in October	Listed Company	Emission Level of Sulfur Dioxide (ton)
1	Hebei Jingye Steel Co., Ltd.	Non-listed	702.3
2	Shang'an Power Plant of Huaneng Power International Co., Ltd.	Huaneng Power International Co., Ltd. 600011.SH	341.4
3	Hebei Xibaipo Power Generation Co., Ltd.	HCIG Energy Investment Co., Ltd. 000600.SZ	238.8

The top three enterprises contribute around 74% of sulfur dioxide emitted from local key industrial sources.

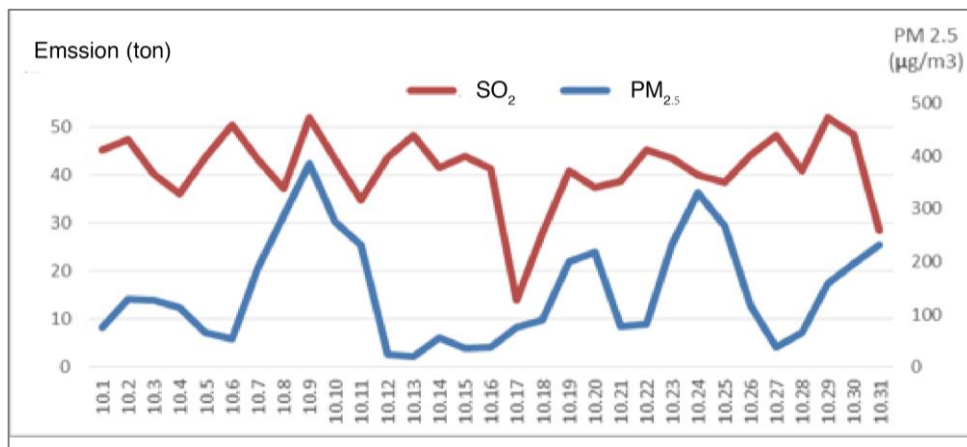


Figure 41. Comparison between sulfur dioxide emission levels from top three sulfur dioxide emitters and the daily average concentration curve for PM2.5 in Shijiazhuang in October

4. A group of listed companies are not prepared to respond to some questions about smog

Enterprise responses to “micro report” on excessive discharge of pollutants stimulated by social media, as mentioned above, are actually mostly enterprises passively explaining their problems. These explanations were not made by the headquarters of their parent listed companies, and were not active communications with interested parties.

To understand what listed companies with large scale emission think about the smog impact of their subsidiaries, in November 2014, IPE wrote to 34 listed companies about waste gas emissions. IPE was hoping that listed companies would respond to the environmental compliance problems of their subsidiaries and also wanted to learn about the emission reduction plans that large listed companies have implemented in response to smog problems.

As of December 8, three listed companies, including Youngor and Baoshan Iron & Steel Co., Ltd. positively responded to the questions raised; the headquarters of other listed company groups (for example, Aluminum Corporation of China, and China National Building Materials Group Corporation) gave a reply stating they had received the letters but have so far made no substantial response. Moreover, the public communication channels announced by some listed companies were not smooth, and external liaison staff of their securities departments indicated that they could not accept the inquiries about environmental protection problems.

Shandong Iron & Steel Company Ltd, located in a region seriously affected by smog, even explicitly refused to answer the questions about excessive discharge of pollutants. After the several attempts to communicate with this company by telephone were made, their receptionist responded by saying, “For us, the smog problem is not very important for us”, and immediately ended the phone call.

These listed companies generally failed to effectively respond to the questions about smog, highlighting their inadequate perception of the smog’s impact on themselves and of the concerns that society has. This situation itself shows a major risk for related enterprises.

Table 18. Summary of communication with 34 listed companies (up to December 8, 2014)

Communication	Listed Company	Communication Record
Positive Response	Youngor Group Co., Ltd. (600177.SH)	We sent a letter to Youngor Group Co., Ltd. on November 18, 2014, and received a written reply from Youngor on December 1, 2014. This reply explained the excessive discharge of pollutants carried out by Youngor’s subsidiary, Ningbo Changfeng Thermal Power Co., Ltd. This plant is ready to move to another place for new construction and transformation. After that, it will adopt the highly efficient and environmentally friendly gas turbine for its unit to ensure that its environmentally friendly discharge comes up to the national standard. Youngor further indicated that, to ensure discharge of pollutants up to the standard during the move transition period, it would invest over 12 million yuan in transforming the boiler flue gas control system; it was expected to complete the transformation of one main boiler in December 2014 and to finish all the transformation in February 2015.
	Baoshan Iron & Steel Co., Ltd. (600019.SH)	On November 28, 2014, we sent a letter to Baoshan Iron & Steel Co., Ltd. On December 2, 2014, staff of environmental protection department of this company called us to begin communication. During this call, they responded to the past excessive discharge of pollutants of the unit at Power Plant of Baoshan Iron & Steel Co., Ltd., and fed back the improvement plan for unit denitrification control facility and the project progress.

	TCC International Holdings Limited (1136.HK)	On November 18, 2014, we sent a letter to TCC International Holdings Limited and also called them on November 19. This company indicated that it had received the email and forwarded it to a general manager and the environmental protection department. During the communication by telephone, TCC said that, as a listed company, it focused on environmental protection very much and expressed thanks to us for sending material to it, and that it always took measures to control the discharge, raw materials and dust emission during transit shipment at its subsidiary cement plants. It also said that it would first investigate and collect material available, discuss the improvement plan and schedule, and give a formal reply as soon as possible. It indicated that, for a listed company like TCC, investment in environmental protection was not huge, but was of great significance to improving environment and health of residents around this company.
Refusal to respond	Shandong Iron & Steel Company Ltd. (600022.SH)	On November 18, 2014, we sent a letter to Shandong Iron & Steel Company Ltd. Later, we telephoned this company multiple times to explain our intentions and to look forward to receiving confirmation on receipt of the letter. But the staff from the company said that they could not confirm that the letter had been received because the person responsible for checking and receiving emails and faxes was absent. Moreover, the staff responded by asking if the inquiry was urgent. We explained that society focused highly on the air pollution and smog problems and that there was something wrong with waste gas emission of subsidiaries under some listed companies, so we carried out communication by letter. Then, the staff from the company further asked what we would do after communicating with them. We indicated that we wanted to understand whether related listed companies had begun to rectify these problems and that we would like to learn about rectification progress. But the staff from the company finally hung up shortly after saying that the problem was not very important for this company.
The HQ received the letter but made no substantial response	Anhui Conch Cement Company Limited (600585.SH)	On November 18, 2014, we sent a letter to Anhui Conch Cement Company Limited. Later, we telephoned the company and got confirmation that its environmental protection department had received the letter and forwarded it to the superior leader. Staff of its environmental protection department said that Anhui Conch improved actively all along and endeavored to upgrade. They expressed their helplessness because they believed that the problems mentioned in this letter were all related to historical violations of regulations and that they did not know how to answer the historical problems.
	Shandong Huatai Paper Co., Ltd. (600308.SH)	On November 18, 2014, we sent a letter to Shandong Huatai Paper Co., Ltd. Later, we telephoned the company and an employee of Office of the Secretary of the Board of Directors answered the call, saying that he would notify his colleague to check the email and give a reply. The employee claimed that the company had carried out rectification and installed environmental protection equipment after learning that there was information on the excessive discharge of pollutants of the company on the website of the environmental protection department. On December 8, we called again to communicate with this company over the continued excessive discharge of pollutants in the latest online monitoring data. But the staff member of the company said that he did not know about this.
	Hunan Valin Steel Co., Ltd. (000932.SZ)	On November 19, 2014, we sent a letter to Hunan Valin Steel Co., Ltd., and later called the company and got confirmation that the letter had been received. During the communication, the company said that the environmental information on Valin Steel had been disclosed in the annual report of the company and that it was impossible to conduct one-to-one communication over concerns or to disclose information as per the mode of the environmental protection organization. When we asked whether Valine as a locally large listed company would probably set up a direct communication channel with the local NGO, the company indicated that it would not consider this.

<p>Kailuan Energy Chemical Co., Ltd. (600997.SH)</p>	<p>On November 28, 2014, we sent a letter to Kailuan Energy Chemical Co., Ltd. and then telephoned its securities department. When mentioning the excessive discharge of pollutants related to a subsidiary under this company, this employee answering the call said, "Our company does very well in environmental protection. I am not clear about this problem. Let me first have a look at the email you sent." As this employee questioned data source, we explained that the data came from online data on the public website of the environmental protection department of Hebei province. Then, the employee said that he would look into this matter.</p>
<p>China Oriental Group Company Limited (581.HK)</p>	<p>On December 1, 2014, we sent a letter to China Oriental Group Company Limited., and later telephoned the company and got confirmation that the letter had been received. The staff from the company asked whether it was necessary to give a reply and what they should do. We explained that, after reading the data of excessive discharge of pollutants from the public platform, we were concerned about high-emission enterprises under listed companies and wanted to understand the existence of such breaches of discharge standards in these enterprises and what they had done to rectify the problem. The HK parent listed company of this company did not know much about online information released domestically, said the operator, he could send the contact information of their subsidiary Hebei Jinxi Iron & Steel Group Co., Ltd. to us, and thus we could directly contact this subsidiary to confirm the data and environmental protection problems. We had not received any email up to December 8, 2014.</p>
<p>China National Building Materials Group Corporation (3323.HK)</p>	<p>We sent a letter to China National Building Materials Group Corporation on November 18, 2014, and telephoned the company and got confirmation on the following day that the letter had been received. Staff from the company said that this letter had been forwarded to the related department for follow-up.</p>
<p>Aluminum Corporation of China (601600.SH, 2600.HK)</p>	<p>We sent a letter to Aluminum Corporation of China on November 18, 2014, and telephoned them the following day. Staff from the company said that the letter had been received and would be processed as per the internal procedure of this company.</p>
<p>China Travel Service (Holdings) Hong Kong Ltd. (308.HK)</p>	<p>On November 18, 2014, we sent a letter to China Travel Service (Holdings) Hong Kong Ltd. Later, we telephoned the company. Staff from the company promised to convey this matter to the related department, check the email and give a reply.</p>
<p>Yanzhou Coal Mining Company Ltd. (600188.SH)</p>	<p>On November 18, 2014, we sent a letter to Yanzhou Coal Mining Company Ltd. Later, we telephoned the company. An employee from the company said that he would check this email and give a reply.</p>
<p>Kingboard Chemical Holdings Ltd. (148.HK)</p>	<p>On November 19, 2014, we sent a fax to Kingboard Chemical Holdings Ltd. and got confirmation that the fax had been received.</p>
<p>Hebei Iron and Steel Co., Ltd. (000709.SZ)</p>	<p>On November 19, 2014, we successfully sent a fax to Hebei Iron and Steel Co., Ltd.</p>
<p>Maanshan Iron and Steel Company Limited (600808.SH)</p>	<p>On November 18, 2014, we sent a letter to Maanshan Iron and Steel Company Limited. Later, we telephoned the securities department of the company and got a reply that they must be able to receive the letter if it was sent to the public mailbox, but the related personnel was recently busy and might not give a reply. To understand the specific situation, said the operator, we could inquire 114 information desk and forward this letter to the environmental protection department for further communication.</p>
<p>China Resources Power Holdings Company Limited (836.HK)</p>	<p>On November 19, 2014, we sent a letter to China Resources Power Holdings Company Limited. The next day we dialed the switchboard of this company and were told that the email must be received because this mailbox was watched by special personnel, and that the company would contact us if necessary. We were also informed of that the mail sent by express delivery had been signed for.</p>
<p>Huaneng Power International Co., Ltd. (600011.SH)</p>	<p>On November 19, 2014, we sent a letter to Huaneng Power International Co., Ltd. Later, we telephoned the company and were told by the switchboard that the real-name should be needed before</p>

		the call was switched but could not be switched to any external communication department. On November 21, 2014, the mail by express delivery was signed for.
	Huadian Power International Corporation Limited (600027.SH)	On November 21, 2014, the mail by express delivery was signed for.
	GD Power Development Co., Ltd. (600795.SH)	On November 21, 2014, the mail by express delivery was signed for.
Unreliable communication channel	Pangang Group Steel Vanadium & Titanium Co., Ltd. (000629.SZ)	On November 18, 2014, we sent a letter to Pangang Group Steel Vanadium & Titanium Co., Ltd. The next day we telephoned the company. After learning about this matter, an employee from the company advised us to send the letter to the environmental protection department, and said that it was no use resorting to them because they were securities department. We later dialed the environmental protection department but nobody answered the call.
	Sinochem International Corporation (600500.SH)	On November 18, 2014, we sent a letter to Sinochem International Corporation. On December 8, we dialed the switchboard of the company. The employee from the company said that we should contact the person in charge of EHS. Later, we called the EHS department but the calls went unanswered.
	Inner Mongolia Mengdian Thermal Power Co., Ltd. (600863.SH)	On November 18, 2014, we sent a fax to Inner Mongolia Mengdian Thermal Power Co., Ltd. Later, we telephoned the company. As soon as they learned that the call was from an environmental NGO, the operator quickly hung off after saying that the company only answered calls from its shareholders and refused to accept other inquiries.
	Tangshan Jidong Cement Co., Ltd. (000401.SZ)	On November 18, 2014, we sent a letter to Tangshan Jidong Cement Co., Ltd. The next day we telephoned the company and were told that the email had not been received. After resending the email, we attempted to contact the company several times and found nobody answered the call.
	China Shanshui Cement Group Limited (691.HK)	On November 18, 2014, we sent a letter to China Shanshui Cement Group Limited. Later, we telephoned the company, but the operator said that he failed to confirm the receipt of the email, and would follow up with the matter. Afterward, we tracked the matter by telephone, only to get no reply.
	Shandong Jinjing Science & Technology Co., Ltd. (600586.SH)	On November 18, 2014, we sent a letter to Shandong Jinjing Science & Technology Co., Ltd. Later, we telephoned the company several times and found nobody answered the call. We made an attempt to send a fax but failed.
	Inner Mongolia Baotou Steel Union Co., Ltd. (600010.SH)	On November 18, 2014, we sent a letter to Inner Mongolia Baotou Steel Union Co., Ltd. Later, we dialed the company several times and found nobody answered the call. We made an attempt to send a fax but there was no response.
	Shijiazhuang Dongfang Thermoelectric Co., Ltd. (000958.SZ)	On November 19, 2014, we sent a letter to and telephoned Shijiazhuang Dongfang Thermoelectric Co., Ltd. An employee from the company said that they would check the letter. Later, we telephoned the company several times but found nobody answered the call.
	Tongling Nonferrous Metals Group Co., Ltd. (000630.SZ)	On November 18, 2014, we sent a letter to Tongling Nonferrous Metals Group Co., Ltd. Later, we telephoned this company several times but such calls were not answered. On December 8, we made a call to this company again. A woman answered the call, asked the name of mailbox and the letter title. When we answered her questions one by one, the woman hung up. Subsequently, we continuously dialed the company but the calls went unanswered.
	Qingdao Alkali Industry Co., Ltd. (600229.SH)	On November 18, 2014, we sent a letter to Qingdao Soda Ash Industrial Co., Ltd. Later, we dialed the switchboard several times, but such calls went unanswered.
	Shandong Helon Co., Ltd. (000677.SZ)	On November 18, 2014, we sent a letter to Shandong Helon Co., Ltd. Later, we telephoned the company. The operator said that he had not received the email. But he added that the three public email addresses we sent the letter to were not the mailbox of the company. When questioned which email we should send an email to, he said that he was not clear about this. On December 8, 2014,

	we sent a fax to Shandong Helon Co., Ltd., which was automatically received, signifying successful delivery.
Zhuzhou Kibing Group Co., Ltd. (000677.SZ)	On November 18, 2014, we sent a letter to Zhuzhou Kibing Group Co., Ltd. Later, we dialed the company and the operator said that he could not receive the email but would remind his boss to check the emails.
Shandong Sun Paper Industry Joint Stock Co., Ltd. (002078.SZ)	On November 18, 2014, we sent a letter to Shandong Sun Paper Industry Joint Stock Co., Ltd. Later, we telephoned the company. After knowing our intention, the operator asked us to directly dial the environmental department of the company. But the call to the environmental department went unanswered.
Befar Group Co., Ltd. (601678.SH)	On November 18, 2014, we sent a letter to Befar Group Co., Ltd. On December 8, we telephoned the company but the call was not answered.

5. Recommendation: All parties should make a concerted effort to push forward green investment

From the above analysis, we can see that some listed enterprises seriously breached standards and regulations for waste gas emissions and thus deteriorated the state of atmospheric pollution in the regions where they are located. In other words, huge investment has resulted in aggravating smog. Therefore, only when the listed companies that violate discharge standards again feel some risk from their behavior can the listed companies in major smog-causing industries be stimulated to carry out large-scale emission reduction on the basis of the rule of law. This will also help to solve the severe overcapacity in the related industries through survival of the fittest. For this, we recommend that environmental protection departments strengthen the enforcement of environmental law and continue to expand information disclosure so that social supervision can promote the implementation of such strong measures as “daily fines”.

Facing the public’s urgent requirement for smog control and the government’s expanding information disclosure, negative and unresponsive large-scale pollutant emitters will not only take risks themselves, but will also create a real investment risk. We recommend that listed companies in smog see the severe situation clearly and move toward large-scale emission reduction from merely compliance with environmental laws. We also recommend that investors pay close attention to the discharge condition and coping capacity of listed companies, evade smog risks and drive smog control in China through responsible investment.

To jointly promote the establishment of an investment mechanism conducive to energy conservation and emission reduction to guide green production through green investment, we make the following specific recommendations to governments, enterprises, investors and the public:

<p>Recommend listed companies:</p> <ul style="list-style-type: none"> ● Strengthen smog risk awareness, and actively respond to questions from society ● First rectify breaches of discharge standards and regulations, and disclose online data in a timely fashion ● Set the goals of energy conservation and emission reduction, and continuously improve environmental performance
<p>Recommend investors:</p> <ul style="list-style-type: none"> ● Identify the enterprises that cause smog, and understand the government supervision condition ● Pay attention to real-time online data, and follow complaints being made by the public ● Follow up with rectification progress of the related enterprises and judge their long-term improvement capabilities
<p>Recommend environmental supervision departments:</p> <ul style="list-style-type: none"> ● Intensify supervision of smog-causing industries, and continue to expand information disclosure ● Actively follow up with reports made by the public, and steadfastly implement daily fines ● Supervise the disclosure of environmental risks, and break down and implement the goal of emission reduction
<p>Recommend environmental protection organizations and the public:</p> <ul style="list-style-type: none"> ● Focus on smog-causing industries, and report pollution from listed enterprises ● Promote rectification of breaches of discharge standards and regulations, and facilitate the implementation of daily fines ● Assess the environmental risk of listed companies, and supervise and implement energy conservation and emission reduction

Appendix I - Detailed Rules for Environmental Administrative Punishment using Automatic Monitoring Data of Pollution Sources

Region	Statistical Period	Basis for Punishment Initiation (applicable to discharge data of atmospheric pollutants only)	Document and Effective Beginning Date
Foshan, Guangdong	Daily	Three hourly-average values all exceed the standard on a given day.	“Detailed Rules for Implementing Environmental Administrative Punishment for Automatic Monitoring Data of Pollution Sources in Foshan City”, August 1, 2014
Nanjing	24 consecutive hours	<p>Article 22 Where the automatic equipment for monitoring and controlling pollution sources is in the normal operational state, its monitoring data may become the basis for which the competent department of environmental protection carries out environmental management and law enforcement according to the law such as the report and examination of pollutant discharge, the appraisal and determination of pollutant discharge level, the granting of pollutant discharge license, the control and management of total quantity, environmental statistics, the collection and appraisal of pollutant discharge fees, and administrative punishment.</p> <p>Article 23 If the automatic equipment for monitoring and controlling pollution sources is not found any abnormality in the operation, but sees the hourly average emission concentration of waste gas exceed the standard three times within 24 hours running, the competent department of environmental protection department shall identify such emission to have breached the discharge standard, and place this case on record for investigation and prosecution.</p>	Government Decree No.302 of the “Administrative Measures for Automatically Monitoring and Controlling Environment in Nanjing City”, May 1, 2014
Xinjiang	Monthly	<p>It is explicitly stipulated that if any excessive discharge of waste gas pollutants in automatic monitoring data exists, the related enterprise shall be ordered to carry out rectification within a stated time and to undergo administrative punishment in accordance with specific methods as specified in the form (see the next page), and shall be fined 10,000 to 100,000 yuan on the basis of the numbers of hours of excessive discharge and of excess multiple.</p> <p>If the enterprise refuses to make rectification, it shall be punished continuously by the day in accordance with the original punishment amount from the next day after the date when it is ordered to make rectification.</p>	The “Interim Measures for Environmental Administrative Punishment of Automatic Monitoring Data of Pollution Sources in Xinjiang Uygur Autonomous Region”, July 14, 2014
Shanghai	Half-monthly: two statistical periods, namely, from the 1 st day to the 15 th day of the month, and from the 16 th to the end of the month	In a statistical period, if the compliance rate of the hourly average value for automatic monitoring data of atmospheric pollutants is less than 95%, or the hourly average value exceeds the standard by over 50%, or three days running see the hourly average value exceed the standard by over 30% (the on-site check shows that the automatic monitoring facility of the pollutant discharge unit operates normally).	The “Regulations on the Operation Supervision of the Automatic Monitoring Facility and the Law Enforcement Application of Automatic Monitoring Data of

			Pollution Sources in Shanghai City”, January 1, 2014
Shenyang	Half-monthly	See "Shanghai" section.	The “Circular on Issues concerning Law Enforcement Application of Automatic Monitoring Data of Pollution Sources in Shenyang City”, January 1, 2014
Liaoning	Half-monthly	In a statistic period, the automatic monitoring data of atmospheric pollutants (sulfur dioxide and soot) has the following circumstances: <ol style="list-style-type: none"> 1) If excessive discharge of pollutants occurs over five times totally, the related enterprise will be fined 10,000 to 100,000 yuan according to accumulative times (excessive discharge of pollutants occurs over 80 times totally); 2) If excessive discharge of pollutants occurs over three times running, the related enterprise will be fined 30,000 to 100,000 yuan (excessive discharge of pollutants occurs over 10 times running); 3) If the same discharge outlet sees excessive discharge of multiple pollutants concurrently, the related enterprise will be punished respectively, but the maximum fine is 100,000 yuan in total. 	The “(Interim) Measures for Environmental Administrative Punishment of Automatic Monitoring Data of Pollution Sources in Liaoning Province”, August 1, 2010
Chifeng	Monthly	Chifeng is similar to Liaoning in this respect. In a statistical period, the automatic monitoring data of atmospheric pollutants (sulfur dioxide and soot) has the following circumstances: <ol style="list-style-type: none"> 1. If excessive discharge of pollutants occurs over five times totally, the related enterprise will be fined 10,000 to 100,000 yuan according to accumulative times (excessive discharge of pollutants occurs over 160 times totally); 2. If excessive discharge of pollutants occurs over six times running, the related enterprise will be fined 30,000 to 100,000 yuan (excessive discharge of pollutants occurs over 20 times running); 3. If the same discharge outlet sees excessive discharge of multiple pollutants concurrently, the related enterprise will be punished respectively, but the maximum fine is 100,000 yuan in total. 	The “(Interim) Measures for Environmental Administrative Punishment of Automatic Monitoring Data of Pollution Sources”, December 1, 2013
Hangzhou	Monthly	The No. of times that excessive discharge of pollutants has occurred is considered to be once when the effective time-average value of flue gas (converted concentration) reaches 120-150% (inclusive) of the discharge standard, twice when it is 150-200% (inclusive), and 3 times when it is over 200% (inclusive). The case will be placed on file for investigation if: in an appraisal period, excessive emission of waste gas occurs 10 times and above in total, or five times and above consecutively.	The “Work System for Operation Supervision of Automatic Monitoring System of Pollution Sources in Hangzhou City”, November 1, 2011
Shanxi	Daily	If the automatic monitoring system shows that a company discharging pollutants breaches the discharge standards with the emission of waste gas pollutants exceeding the standard for four hours running, the monitoring platform will send a remote audible and visual warning to the company; if the emission of waste gas pollutants exceeds the standard for 24 hours running or a total of 48 hours in seven days, along with the daily average value of waste water pollutants	The “Administrative Measures for Automatic Monitoring System of Pollution Sources of Environmental Protection Department of Shanxi Province”,

exceeding the standard, the monitoring platform will establish the "Case Registration Form of Environmental Administrative Punishment", and impose an administrative punishment on the company. December 10, 2012

Form from Article 8 of the "Interim Measures for Environmental Administrative Punishment of Automatic Monitoring Data of Pollution Sources in Xinjiang Uygur Autonomous Region"

Excess Multiple in Hourly Data	Total Time of Excessive Discharge of Pollutants	Punishment Amount
0 to 0.2 (inclusive)	1 to 12 hours	10,000 to 20,000 (inclusive) yuan
	12 to 24 hours	20,000 to 40,000 (inclusive) yuan
	24 to 36 hours	40,000 to 60,000 (inclusive) yuan
	36 to 48 hours	60,000 to 80,000 (inclusive) yuan
	48 hours and above	80,000 to 100,000 (inclusive) yuan
0.2 to 0.4 (inclusive)	1 to 12 hours	20,000 to 40,000 (inclusive) yuan
	12 to 24 hours	40,000 to 60,000 (inclusive) yuan
	24 to 36 hours	60,000 to 80,000 (inclusive) yuan
	36 hours and above	80,000 to 100,000 (inclusive) yuan
0.4 to 0.6 (inclusive)	1 to 12 hours	40,000 to 60,000 (inclusive) yuan
	12 to 24 hours	60,000 to 80,000 (inclusive) yuan
	24 hours and above	80,000 to 100,000 (inclusive) yuan
0.6 to 0.8 (inclusive)	1 to 12 hours	60,000 to 80,000 (inclusive) yuan

	12 hours and above	80,000 to 100,000 (inclusive) yuan
Over 0.8	1 hour and above	80,000 to 100,000 (inclusive) yuan

Appendix II - Explanation of the Trial Method for Calculating “Daily Fines”

1. Given that daily fines have not been calculated using online data as yet and environmental law enforcement from place to place involves different inspection procedures, we introduce the following assumptions into the trial calculation method and describe them one by one here:
 - a) It is assumed that online monitoring data issued on provincial platforms is all effective and available for environmental law enforcement;
 - b) We have comprehensively referred to rules across various regions and the existing practice in Chongqing. If, according to online data, excessive discharge of pollutants continues for three hours, then the enterprise can be considered to have performed one illegal environmental act, and therefore the environmental protection department can immediately enforce the law and order the enterprise with excessive discharge to carry out rectification;
 - c) Supposing that the environmental protection department conducts a recheck and investigation on the final day of every continuous excessive discharge period (the calculation and punishment are based on the maximum of continuous excessive discharge period) Note: the cases selected are related to long continuous excessive discharge (more than one month).
2. Data source: provincial self-monitoring disclosure platforms for key state monitored enterprises
 Scope of statistics: subsidiaries under listed companies, who breached discharge standards for pollutant discharge from August to October 2014
3. Defining an excessive discharge day: If an enterprise sees discharge concentration exceed the standard for **three hours running** as per online data for pollutants at a single discharge outlet, that day will be classed as a day of excessive discharge for that enterprise.

Excess multiple = (excessive discharge of pollutants value – standard value)/standard value;

Average excess multiple: Excess multiple in all hourly periods of excessive discharge of pollutants at a single discharge outlet is calculated, and then the average value is taken.

If concentration of multiple pollutants at multiple discharge outlets exceeds the standards on the same day, the maximum average excess multiple on that day will become a basis for calculating the fine for excessive discharge of pollutants.

4. Determining the fine for initial excessive discharge of pollutants: According to the provisions of the current “Law of the People's Republic of China on the Prevention and Control of Atmospheric Pollution”, any company discharging atmospheric pollutants in excess of the standards may be fined 10,000 to 100,000 yuan. The newly revised draft “Law of the People's Republic of China on the Prevention and Control of Atmospheric Pollution”³⁵ stipulates that, “for any excessive discharge act of atmospheric pollutants, the related company may be fined **the amount two to five times the control fees for illegal discharge of pollutants**”. Once this draft is passed, the fine amount for excessive discharge of atmospheric pollutants may be by far higher than the maximum of 100,000 yuan in the current regulations. Considering that there are different provisions on the discretion of environmental law enforcement in various regions, we have comprehensively referred to documents on detailed rules of some regions. We calculate the fine for initial excessive discharge act using two methods in the trial calculation:
- Method 1 (refer to Article 26 of the discretion of Changde Municipal Environmental Protection Bureau³⁶): In the case of average excess multiples being less than one, the fine will be 50,000 yuan; in the case of average excess multiple being one and above, the fine will be 100,000 yuan.
 - Method 2 (refer to the form in Article 8 of the “Interim Measures for Environmental Administrative Punishment of Automatic Monitoring Data of Pollution Sources in Xinjiang Uygur Autonomous Region”²⁷)

Total Time of Excessive Discharge of Pollutants	Excess Multiple (times)	Punishment Amount (10,000 yuan)
1 to 12 hours	0 to 0.2 (inclusive) time	10,000 to 20,000 (inclusive) yuan, the median of 15,000 yuan
	0.2 to 0.4 (inclusive) time	20,000 to 40,000 (inclusive) yuan, the median of 30,000 yuan
	0.4 to 0.6 (inclusive) time	40,000 to 60,000 (inclusive) yuan, the median of 50,000 yuan
	0.6 to 0.8 (inclusive) time	40,000 to 60,000 (inclusive) yuan, the median of 70,000 yuan
	Over 0.8 time	80,000 to 100,000 (inclusive) yuan, the median of 90,000 yuan
12 to 24 hours	0 to 0.2 (inclusive) time	20,000 to 40,000 (inclusive) yuan, the median of 30,000 yuan
	0.2 to 0.4 (inclusive) time	40,000 to 60,000 (inclusive) yuan, the median of 50,000 yuan
	0.4 to 0.6 (inclusive) time	40,000 to 60,000 (inclusive) yuan, the median of 70,000 yuan
	0.6 to 0.8 (inclusive) time	80,000 to 100,000 (inclusive) yuan, the median of 90,000 yuan
	Over 0.8 time	80,000 to 100,000 (inclusive)

27 <http://www.changde.gov.cn/flash/0/1309300926508087.swf>

		yuan, the median of 90,000 yuan
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5. Daily fine = Fine for initial illegal act X (the number of days of continuous excessive discharge of pollutants – 1)

Total fine = Fine for initial illegal act + Fine calculated by the day = Fine of initial illegal act X Number of days of continuous excessive discharge of pollutants