Achievements of One Decade

2018-2019 Annual Report of Pollution Information Transparency Index (PITI) for 120 Cities

公众环境研究中心
Institute of Public & Environmental Affairs

NRDC
自然资源保护协会
NATURAL RESOURCES DEFENSE COUNCIL

Institute of Public and Environmental Affairs (IPE)

The Institute of Public & Environmental Affairs (IPE) is a registered non-profit environmental research organization based in Beijing. Since its establishment in May 2006, IPE has developed the Blue Map Database (wwwen.ipe.org.cn), as well as the Blue Map app, the first Chinese environmental mobile app to track real-time pollution data, which went live in June 2014. IPE works to promote environmental information disclosure, public participation, and effective environmental governance strategies.

Natural Resources Defense Council (NRDC)

The Natural Resources Defense Council (NRDC) is an international nonprofit environmental organization with more than 3 million members and online supporters. Since 1970, our lawyers, scientists, and other environmental specialists have worked to protect the world's natural resources, public health, and the environment. For two decades, NRDC has been a thought leader and trusted adviser to our partners in China. With a highly effective team of more than 30 people based in our Beijing office, NRDC China Program have worked hard at both the national and local levels to recommend, develop, and help implement innovative laws, policies, technologies, and market tools that conserve natural resources, curb pollution and accelerate China's transition to a clean, low-carbon economy.

Authors:

Institute of Public and Environmental Affairs (IPE): MA Jun, RUAN Qingyuan, GUO Ye, CHEN Yiting, HE Fanghui, ZHU Huaning, ZHU Li, GUO Huaxin, LI Zhenshan, LI Qingfeng, MA Yingying, DING Shanshan, CHEN Qifeng.

Natural Resources Defense Council (NRDC): WANG Yan, WU Qi, ZHANG Xiya, YANG Jia, Lena Suponya, Elizabeth Weinlein, QI Bokai

English Translation：QI Bokai, Elizabeth Weinlein, DING Shanshan, WU Qi, RUAN Qingyuan

Design：CHEN Shuangli

Table of Contents

Introduction

Since the first PITI report was published in 2009, we have evaluated China's pollution source information disclosure for ten years.

Throughout the ten years of continuous data collection and evaluation, we are fortunate to witness the historic progress of China's environmental information disclosure: from the first issue of "Breaking the Ice", to the fourth issue of "New Mindsets, Innovative Solutions", to the ninth issue "Moving towards Normalization", to today's "Achievements of One Decade", the ten titles of the PITI reports reflect the magnificent twists and historic progress of pollution information disclosure in China.

The decennial achievements are directly reflected in the increase of data quantity.

In 2006, our environment database, the Blue Map Database, could only collect about 2,000 corporate environmental violation records. When the PITI evaluation was launched in 2008, the records rose to 24,000. After ten years of collection and accumulation, the total number of records today is more than 1.6 million, and the total number of enterprise online emissions monitoring data exceeds 1.8 billion. A number of leading cities are achieving "what should be public needs to be made public."

The decennial achievements are clearly reflected by the improvement on data quality.

Compared with the beginning of environmental information disclosure in China, most cities have switched from issuing a simple directory or list to issuing a complete administrative penalty decisions; greatly improving the integrity of information disclosure. Most of the information is released in a timely manner, and the real time automatic monitoring data from 23,000 companies is released to the public in real time. At the same time, the disclosure of pollution source information tends to be platformized, which is easier for the public to utilize.

Behind the decennial achievements is the institutionalization of information disclosure through laws and regulations.

From "Measures for the Disclosure of Environmental Information (Trial)" in 2008, to the "Measures for the Self-Monitoring Information Disclosure by State Monitored Enterprises (Trial)" in 2013, real-time and large-scale online data disclosure was implemented for the first time in the world. Additionally, the new Environmental Protection Law made an unprecedented section dedicated to information disclosure and public participation, establishing China's pollution source supervision information disclosure as comparable to the world's leading information disclosure

regulations. "Openness is the norm, non-disclosure is the exception," has not only been established as a principle, but has also been gradually implemented through regulatory mechanisms.

The decennial achievements can also be observed from the perspective of data applications and utilizations.

With the strengthening of pollution source environmental supervision, the improvement of information disclosure and the public awareness of the importance of environmental protection, multiple aspects of pollution source information has begun to be applied on a large-scale. From the perspective of IPE and the green supply chain, a number of large-scale brands intensively cooperated with IPE and Green Choice Alliance (GCA) partners. In the past ten years, they have promoted thousands of companies to effectively rectify violations and achieve pollution reductions. From the perspective of social supervision, the Blue Map cooperated with Lvse Jiangnan and other partners to follow tens of thousands of key enterprises, and prompted more than 2,000 companies to publicly explain why they had violated the standards as revealed by online monitoring data. From the aspect of green finance, banks and financial institutions began to adopt big data-based dynamic corporate environmental credit evaluation systems and the banking financial industry has also begun to show great potential in promoting green transformation and low-carbon development.

At present, in the face of complicated situations such as the trade wars and economic downturns, we should take into consideration of local situations, instead of "one size fits all" type of polices. We should also prevent deregulation as it may cause bad performers to drive out good performers. There is an urgent need to find innovative solutions that balance environmental protection and economic development. Environmental data is the foundation for new ideas such as differentiated management and precision pollution control, as well as new technological approaches such as artificial intelligence and financial technology.

Looking forward to the next ten years, environmental information disclosure needs to continue to expand on the basis of today's solid foundation.

First, it needs to expand from disclosure of government supervision information to disclosure of corporate environmental information; from disclosure of monitored density to total emissions; from disclosure of general pollutants to particular pollutants; from disclosure of major local pollutants to energy and carbon emissions information; from State Monitored Enterprises to more general companies; from stationary sources to mobile sources.

In response to new needs and changes in disclosure methods, our information disclosure evaluation will also restart to a new stage. Starting in 2020, we plan to expand the evaluation to include more provinces and cities in a more digital way, focusing on reaching wide-ranging populations so that environmental supervision and emission information can better support the green development of China and the world!

Chapter I

The Origin:
Where PITI Began

In April 2007, the State Council promulgated the "Open Government Information Regulation of the People's Republic of China", followed by the former State Environmental Protection Administration promulgating the "Measures for the Disclosure of Environmental Information (Trial)" (hereinafter referred to as the "Measures"). The "Measures", which came into effect on May 1, 2008, initiated the institutionalization of environmental information disclosure in China. To clarify the baseline during the first year of environmental information disclosure, record every step of China's progress, identify and promot positive local practices, and advocate for the disclosure of environmental information, the Institute of Public and Environmental Affairs (IPE) and the Natural Resources Defense Council (NRDC) jointly developed the Pollution Information Transparency Index (PITI). The first evaluation results were released in June of 2009 and this year's report is the tenth issue.

In our PITI project, in addition to IPE's assessment on the disclosure of pollution source supervision information in 120 cities nationwide (mainly key environmental protection cities), environmental organizations around the country are also actively conducting regional assessments, including Green Anhui, Green Qilu (Shandong Province), Fujian Green Home, Lvse Jiangnan (Jiangsu Province), Jiangxi Environmental Communication Centre (Jiangxi Province), Xingche Environment (Hubei), etc.[1]

---

1. Green Stone Environmental Protection Center (Nanjing), Green Hunan and Green Hebei, and Nanjing University have also participated in PITI evaluation work.

Figure 1 PITI Assessment Scope

Assessment Groups		Cities of Assessment
IPE		**120 cities nationwide (mainly key environmental protection cities)**
Partners	Green Anhui	Bengbu, Huainan, Huaibei, Tongling, Anqing, Huangshan, Bozhou, Fuyang, Chuzhou, Lu'an, Xuancheng, Chizhou, Suzhou
	Green Qilu	Liaocheng, Dongying, Binzhou, Linyi, Heze, Dezhou
	Fujian Green Home	Longyan, Nanping, Sanming, Ningde, Putian, Zhangzhou
	Lvse Jiangnan	Suqian, Taizhou, Huai'an
	Jiangxi Environmental Communication Centre	Jingdezhen, Pingxiang, Xinyu, Yingtan, Ganzhou, Ji'an, Yichun, Fuzhou, Shangrao
	Hubei Xingche Environment	Xianning, Huanggang, Enshi, Suizhou, Huangshi, Shiyan, Xiangyang, Ezhou, Jingmen, Xiaogan

Figure 2 Cities Covered by PITI Assessment
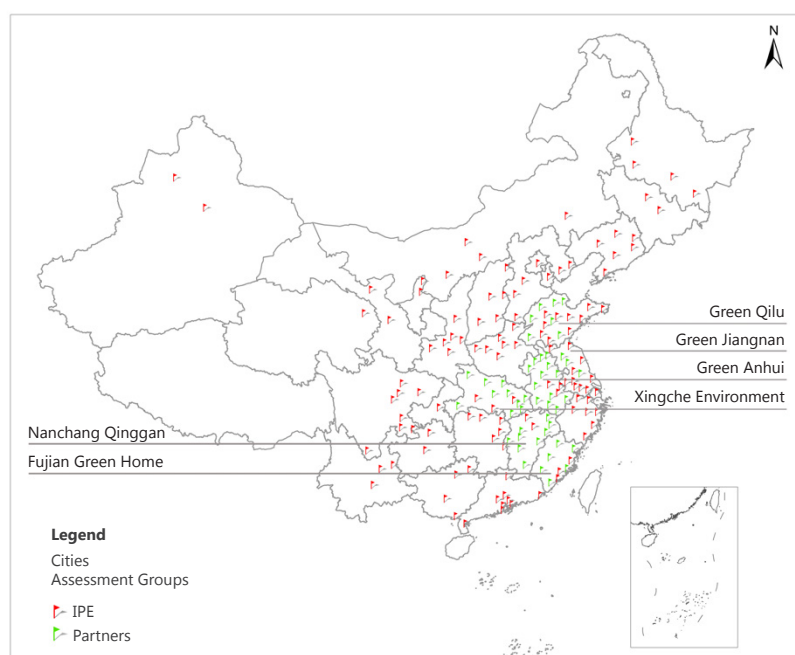
This integrated evaluation system includes five primary indicators: environmental supervision information, pollution source self-disclosure, interactive response, enterprise emission data and environmental impact assessment (EIA) information, as well as eight secondary indicators. Each indicator is measured from four dimensions: systematicness, timeliness, completeness, and user-friendliness.

Figure 3 Assessment Indicators

Indicators	Environmental Supervision Information		Pollution Source Self-Disclosure		Interactive Response		Enterprise Emission Data	EIA Information
	Disclosure of Excess Emissions and Other Daily Violation Records	Disclosure of Enterprise Environmental Performance/ Credit Ratings	Disclosure of Automatic Monitoring Data	Disclosure of Key Polluting Entities Information	Disclosure of Central Environmental Supervision and Complaints	Disclosure Upon Request	Disclosure of Emission Data of Key Enterprises	EIA Information
Score Distribution	25%	5%	20%	6%	7%	8%	14%	15%

Chapter II

Ten-year Assessment:
Ratings for 120 Cities over the Years

No.	Province	City	Average Score	2008	2009-2010	2011	2012	2013-2014	2014-2015	2015-2016	2016-2017	2017-2018	2018-2019
1	Zhejiang	Ningbo	74.3	72.9	82.1	83.7	85.3	65.9	69.1	72.8	70	77.7	69.0
2	Beijing	Beijing	68.0	49.1	43.5	72.9	72.9	58.7	67	77.1	75.7	79.6	76.0
3	Zhejiang	Wenzhou	67.8	53.3	56.5	72.7	70.4	53.2	69.3	72.7	78.1	81	69.2
4	Shandong	Qingdao	66.3	38.4	37.7	70.6	74.4	55.8	66.8	74.8	75.1	78.5	78.8
5	Zhejiang	Hangzhou	65.0	48	36.8	60.2	70.8	53.1	65.2	75.9	72.5	75	78.8
6	Shanghai	Shanghai	65.0	56.5	67.2	68.8	65.6	53	64.6	66.2	71.6	66.4	67.5
7	Zhejiang	Taizhou	63.8	48.4	66.6	75.4	58.1	43.4	59.4	67.7	66.5	74.3	71.2
8	Guangdong	Shenzhen	63.7	51.1	74.5	83.3	73.1	35.4	47.6	64	69	65	68.8
9	Jiangsu	Changzhou	63.5	56.8	65.8	76.8	60.3	47.6	52.5	59.8	63	70.3	72.7
10	Guangdong	Guangzhou	62.4	44.4	51.9	61.2	71.4	34	46	71.9	76.9	67.5	80.8
11	Fujian	Fuzhou	61.6	63.7	62.5	68.1	67.4	41.8	55.4	51	57.6	66.3	71.9
12	Guangdong	Zhongshan	61.2	42.9	66.4	76	63.8	33.8	40.4	67.4	73.4	71.6	68.5
13	Guangdong	Dongguan	61.1	34.3	58.5	72.1	74.9	30.3	52.6	55.6	70.2	76.3	73.8
14	Anhui	Hefei	60.7	66.6	56.8	55.2	57.1	38.9	60.1	53.2	67.3	63.7	74.3
15	Guangdong	Foshan	60.4	44.4	70.3	74.6	53.5	26.4	48.5	59.3	69.8	68.4	74.4
16	Shandong	Yantai	60.3	44.5	48.7	37.3	51.3	42.8	68.9	65.4	66	75	81.4
17	Jiangsu	Suzhou	60.1	47	60.3	60.1	63.8	42.5	60.3	67.8	72.2	59.5	63.7
18	Jiangsu	Nanjing	59.4	47.2	58.4	62.7	65.5	50.9	66.5	55.7	63.6	64.5	59.1
19	Jiangsu	Nantong	58.7	56.2	61.9	63.1	63.8	36.8	62.3	58.3	61.6	61.9	60.1
20	Jiangsu	Wuxi	58.4	51.6	54.3	60.3	57.7	42.1	54.3	54.5	59.3	72.8	68.0
21	Fujian	Quanzhou	57.5	50.6	65.8	58.4	65.4	37	58.8	47.1	53.1	63.7	66.0
22	Zhejiang	Jiaxing	56.8	25.7	54.5	49.4	66.9	38	55.5	70.7	69.9	67.5	63.2
23	Shandong	Jinan	56.8	36.2	43.5	30	38.7	37.9	64.5	69.3	72.6	75.2	78.2
24	Zhejiang	Shaoxing	56.0	52.6	49.8	50.1	47.8	38.3	52.1	68.8	70.7	70.8	57.4

No.	Province	City	Average Score	2008	2009-2010	2011	2012	2013-2014	2014-2015	2015-2016	2016-2017	2017-2018	2018-2019
25	Jiangsu	Zhenjiang	56.0	——	——	——	——	55.3	60.2	52	52.4	59.9	56.0
26	Shandong	Zibo	55.6	46	45.4	30.8	40.2	34.1	62.5	60.9	67	76.1	74.2
27	Fujian	Xiamen	54.5	26.6	37.6	29.4	27	37.7	62.3	67.6	73.3	73.4	82.4
28	Shandong	Weihai	54.2	45.4	51.1	43.8	42.7	31.2	62.1	59.2	55.2	64.9	70.1
29	Jiangsu	Yangzhou	53.3	44.3	52.7	45.4	73	43.7	49.3	57.8	51.4	56.3	56.4
30	Liaoning	Shenyang	52.4	38.8	35.6	39.3	52	31	53.5	62	74.8	55	67.2
31	Sichuan	Chengdu	52.0	34.2	36.5	36.7	47.8	37.9	47.9	57.2	65.7	64.3	71.9
32	Hebei	Shijiazhuang	51.7	29.5	34.2	55	50.4	31.9	48.2	54.4	56.6	63.7	72.6
33	Anhui	Maanshan	51.7	37.9	44	57.1	44.9	42.9	54	57.7	53.8	49.2	63.8
34	Shandong	Weifang	50.7	22.2	34.2	38.8	24	38.4	58.5	57.7	59.2	68.7	78.2
35	Liaoning	Dalian	50.6	51.7	47.1	53.7	39.7	30.8	42.4	54.6	66.9	53.6	58.2
36	Zhejiang	Huzhou	50.1	40.4	28	40.9	49.1	32	53.6	51.9	60.2	63.4	65.7
37	Hebei	Baoding	49.8	39.7	43.1	49.2	31.2	25.3	51.6	44.3	55.5	69.9	69.2
38	Hebei	Handan	49.8	29.5	31.2	34	40.8	30.7	47.8	54.5	65.4	69.1	72.4
39	Tianjin	Tianjin	49.6	25.2	26.2	50	57.5	38.3	43.2	48.7	59.2	60.4	68.7
40	Jiangsu	Yancheng	49.4	33	37.7	41.3	42	34.2	63.8	47.7	63.9	56.2	62.1
41	Chongqing	Chongqing	49.0	56.7	53.9	67.1	70.7	18.8	39.7	44	50.1	45.4	46.4
42	Hubei	Wuhan	49.0	61.2	48	56	52.5	34.9	52.4	51.3	60.3	38.5	42.0
43	Jiangsu	Lianyungang	48.7	27	33.3	27.9	42.9	39.6	66.6	48	64.8	60.4	62.5
44	Jiangsu	Xuzhou	48.0	32.6	36.4	35.3	45.2	36.2	50.6	54.5	62.7	52	61.1
45	Henan	Zhengzhou	47.7	32.6	50	38.4	49.1	25.4	30.3	56.2	51.2	63.6	63.8
46	Hebei	Tangshan	47.0	26.6	41.5	34.7	38.3	32.5	44.7	54.1	43	59.1	71.1
47	Shandong	Jining	46.9	17.8	18.8	22.6	24.2	30.6	60.7	57.7	60.4	69.4	77.1
48	Henan	Luoyang	46.6	27	37.2	55.8	57.1	18.6	34.2	45.9	48	59.4	64.5
49	Sichuan	Zigong	45.7	——	——	——	——	18.1	37.3	52.5	44.6	51.4	58.0
50	Guangdong	Zhuhai	45.7	33.4	37.2	39.4	30.2	23.7	30.5	56.7	62.1	53.8	67.6
51	Shandong	Rizhao	45.5	22.3	20.4	23.2	39.1	32	40.1	66.6	66.2	62.3	64.0
52	Anhui	Wuhu	45.4	24.6	34	30.6	34.6	38.7	51.4	53.6	56.4	52.9	61.2
53	Shandong	Taian	44.8	15.6	15.6	17.6	25.6	36.8	54.6	48.7	63.9	78.6	67.9
54	Jiangxi	Nanchang	44.8	23.2	24.4	26	38.2	32.3	46.1	56.4	61	55	65.1
55	Guangxi	Nanning	44.6	39.2	36.9	55.8	47.7	26.7	48.3	44.4	48.6	46.2	48.3
56	Guangdong	Shantou	44.5	42.6	46.9	56.7	36.5	16.4	26.2	47.7	55	47.2	57.2

No.	Province	City	Average Score	2008	2009-2010	2011	2012	2013-2014	2014-2015	2015-2016	2016-2017	2017-2018	2018-2019
57	Henan	Sanmenxia	44.3	——	——	——	——	24	38.9	40.2	42.6	39.8	62.1
58	Henan	Jiaozuo	43.6	36.1	36.9	42.9	52.6	31.3	35.9	38.9	36.7	57.4	55.5
59	Shanxi	Taiyuan	43.4	55.4	40.8	48.3	48.7	23.4	26.8	47.9	38.1	46.6	50.5
60	Shandong	Zaozhuang	43.2	18.6	20.4	22.8	12	34.8	55.1	62.4	58.6	61.8	64.5
61	Guangxi	Beihai	43.1	21	33.8	45.3	34.2	23.6	49.5	65.2	58.5	43	50.0
62	Guangxi	Guilin	43.0	26.1	33.8	43.2	36.6	24.5	41.1	57.3	49.8	44.6	58.1
63	Guangdong	Zhanjiang	42.9	10.6	32	39	45.6	24.5	36.5	46.5	55.1	54.7	63.7
64	Yunnan	Kunming	42.7	49.4	34.6	45	49.6	13.8	30.2	43.4	48.7	45.6	54.5
65	Ningxia	Yinchuan	42.3	28.9	37.6	53.7	39.4	27.9	47	51.4	48.2	43	44.1
66	Shaanxi	Xi'an	42.1	25.4	31	30.6	35.8	29.2	51.2	41.3	55.7	33.2	65.0
67	Shaanxi	Weinan	42.1	——	——	——	——	23.4	42.6	36.4	39.4	36.8	58.0
68	Sichuan	Deyang	42.1	——	——	——	——	13	31.4	43.1	38.9	49.7	59.2
69	Xinjiang	Urumqi	42.0	32.7	37.9	35.8	37.6	23.4	33.3	47.8	52.1	40.3	60.8
70	Hubei	Yichang	41.5	33.7	52.2	54.7	67.9	27.9	37.3	39.7	38.6	36.5	34.0
71	Shanxi	Changzhi	41.2	42.9	30	51	39.1	23.8	39	50.8	43.5	44.1	44.8
72	Hunan	Changsha	40.7	26.8	35.8	27.5	32	25	47.7	38.2	47.6	59.5	53.6
73	Guangxi	Liuzhou	40.4	15.8	34.6	32.3	55.7	28.1	39.5	42.9	56.9	41.4	48.7
74	Hubei	Jingzhou	39.1	40	38.7	39.2	51.4	24.6	36.3	42.3	41	35	41.0
75	Hunan	Changde	38.9	24.4	34	40.4	32.5	22.4	41.4	50.4	45.5	46.3	45.4
76	Sichuan	Luzhou	38.9	19.2	39.8	31.4	33.1	26.1	37.5	34.4	48.1	49.5	54.2
77	Guizhou	Guiyang	38.8	24.9	22.4	43.2	35	21.2	50.5	55.8	41.7	32	50.2
78	Hebei	Qinhuangdao	38.7	21.2	20	24	28.4	20	32.4	45.3	54.3	49.8	65.2
79	Heilongjiang	Harbin	37.7	38.1	39.8	32.6	28.2	13.5	39.4	49.4	41.7	37.2	47.1
80	Shaanxi	Baoji	37.6	14	24.4	20.4	40	28.2	50.2	46.4	45.1	42.1	51.7
81	Sichuan	Mianyang	37.4	12.4	26.5	14.8	50.8	25.3	41.1	39	42.9	57.9	50.3
82	Shaanxi	Yan'an	37.3	18.8	25.6	19	27.7	23.2	33.4	34.5	35.7	50.6	70.9
83	Guangdong	Shaoguan	37.1	18.4	18.8	25.6	54.6	12.2	20	39.1	47.8	45.9	62.7
84	Hunan	Xiangtan	37.0	14	20.4	39.6	41.8	30	50.6	41.6	49	42.8	38.9
85	Sichuan	Nanchong	37.0	——	——	——	——	14.6	27.8	29.6	44.7	47.2	47.6
86	Shaanxi	Tongchuan	37.0	25.4	23.7	36.5	24.5	18.6	29.2	41.9	44.8	42.8	59.8
87	Jilin	Changchun	36.7	21.7	23.4	23.2	20	15.8	37.9	44.1	56.5	48.7	56.3
88	Inner Mongolia	Huhhot	36.6	19.4	22	16.6	26.3	23.2	48.9	46.4	63.7	35.4	50.6

No.	Province	City	Average Score	2008	2009-2010	2011	2012	2013-2014	2014-2015	2015-2016	2016-2017	2017-2018	2018-2019
89	Henan	Kaifeng	36.5	16.2	17.2	29.1	33.8	30.9	49.9	30.8	32.6	45.3	58.0
90	Ningxia	Shizuishan	36.4	14.4	19.4	36.2	32.4	20.2	35.7	44.5	47.9	49.1	50.5
91	Yunnan	Yuxi	36.3	——	——	——	——	9	21.8	38.2	42.3	48	47.4
92	Hunan	Yueyang	35.8	21.2	25.4	22.2	36.4	22.5	52.6	45.4	45.2	42.3	40.3
93	Jiangxi	Jiujiang	35.7	16.2	17.4	20.8	30.7	27.6	43.3	46.9	51.1	43.4	47.7
94	Henan	Anyang	35.3	21	36.3	26.3	27.2	15.6	39.3	32.6	35.3	51.1	51.8
95	Guizhou	Zunyi	35.3	12.4	15.2	13.4	27.2	30.6	46.6	53.5	43.4	39.5	53.0
96	Henan	Pingdingshan	34.9	25.2	30.2	28.4	33.4	21.2	22	40.9	41	36.4	52.5
97	Shaanxi	Xianyang	34.7	23.3	21	24.6	19	23	43	39.4	38.8	31.8	58.8
98	Hunan	Zhuzhou	34.3	25.2	21.2	25.2	31.9	23	35.8	44.3	44.7	43.5	41.2
99	Inner Mongolia	Baotou	34.2	14	25.2	28.8	27.4	26.8	42.2	52.8	49.3	40.4	34.9
100	Yunnan	Qujing	34.1	24.8	18.9	19	30.9	15.3	28.8	35.8	46.9	52	51.2
101	Liaoning	Fushun	33.7	21.6	21	24.1	41.5	21.6	30.4	36.9	40.7	48.3	42.2
102	Inner Mongolia	Chifeng	33.3	24.1	14.4	13.2	30	22.5	36.3	57	51.4	34.6	41.4
103	Liaoning	Anshan	33.3	16.2	30.6	40	25.2	17.2	36.4	45.6	43.4	37.4	37.1
104	Heilongjiang	Daqing	33.1	30	41.5	39.1	30.7	20.1	17.1	28	32.8	41.6	41.8
105	Qinghai	Xi'ning	32.9	10.2	25	30.7	53.6	21.1	21.7	34.6	42	26.2	48.3
106	Inner Mongolia	Ordos	32.8	18.2	19	20.8	22.6	28.1	45.6	52.5	36.6	39.8	39.0
107	Jilin	Jilin	32.5	10.2	21.8	20.8	20.2	11.3	38.6	51.2	46.1	48.4	44.4
108	Sichuan	Yibin	32.0	14.4	18.7	18.3	23.6	20.5	39.8	47.3	48	47.3	37.3
109	Heilongjiang	Mudanjiang	31.8	38.8	30.4	49.7	51.9	17.2	35.5	34.2	29	19.3	21.7
110	Gansu	Lanzhou	31.7	16.6	28.5	32.6	26	15.2	43.1	38.4	33	24.6	45.4
111	Heilongjiang	Qiqihar	31.1	17.2	27.6	21.6	29.4	19.6	29.4	39.7	40.8	35.8	40.7
112	Sichuan	Panzhihua	29.9	18	19.6	21.2	30.6	17.7	24.6	30.7	41.9	43.1	40.5
113	Liaoning	Jinzhou	29.1	20.4	14	15.4	22	13.2	36.8	44.4	32.2	35.6	43.1
114	Shanxi	Yangquan	28.9	19	19	26.7	21.8	8.4	32.4	30.4	34.4	31.9	47.1
115	Gansu	Jinchang	28.4	14.4	17	19.6	28.6	15.3	36.7	36.9	33.7	42.4	34.0
116	Liaoning	Benxi	27.4	12	24	38	46.2	18.2	16.8	22.4	31.5	25	33.8
117	Shanxi	Linfen	27.3	14	17.2	22	26.8	13.6	19.4	26.5	23.6	31.5	52.8
118	Hunan	Zhangjiajie	27.2	12.8	19	15.6	21.6	14.2	31.6	33.8	33.6	36	40.5
119	Shanxi	Datong	22.5	12.6	29.4	20.4	12.2	8.3	20.5	15.6	24.2	19.1	42.7
120	Xinjiang	Karamay	22.5	11.2	14.8	18.4	19	21.4	19.2	28.7	30	28.7	27.8

Chapter III

Ten-year Comparison:
Historic Progress in Environmental Information Disclosure

Since the implementation of the Environmental Information Disclosure Measures in 2008, with the improvement of environmental legislation, the strengthening of supervision and enforcement, and the advancement of environmental informationization, with the common attention and promotion of all sectors of society, the disclosure of China's pollution source supervision information has made great progress in the dimensions of systematicness, timeliness, completeness, and user-friendliness.

1.Moving towards Full Disclosure of Pollution Source Supervision Information

Among the four dimensions of the PITI index evaluation, the first is about whether the information is fully and systematically disclosed. Early data was quite limited. The basis of the first PITI evaluation was 24,345 environmental supervision records published in 2008.

Following the new Environmental Protection Law of 2014, the basic data of the PITI evaluation reached 42,569. In 2016, the Central Government Environmental Protection Inspection began to roll out, and the data jumped to 69,355. In 2017, it further increased to 162,548. In 2018, the number reached 338,651.

Today, China's environmental information disclosure has gradually formed a principle of "disclosure is the norm, and non-disclosure is the exception". The official websites of many local and national environmental protection departments have established public information disclosure sections for pollution sources, and systematically carried out relevant work on information disclosure.
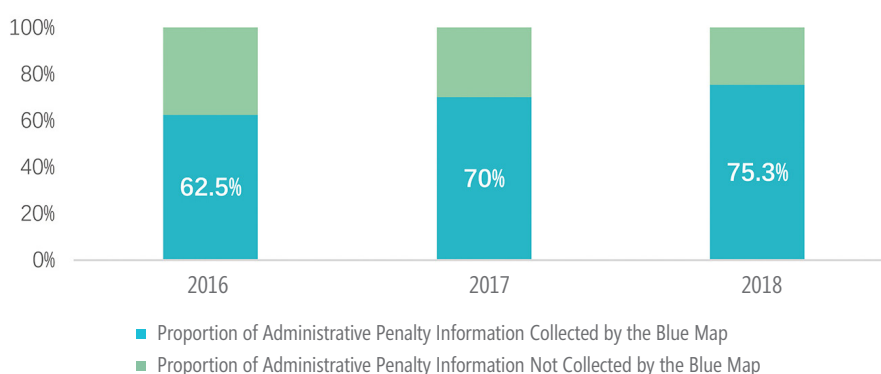
As a result, the categories and quantity of information available to the Blue Map based on official regulatory information disclosure have shown a surge in growth. As of October 2019, the Blue Map includes a total of 1.56 million corporate environmental violation records issued by environmental agencies of various levels throughout the country, of which more than 310,000 were obtained from January to October of 2019.

Figure 4 Cumulative of Annual Pollution Source Supervision Records[2]
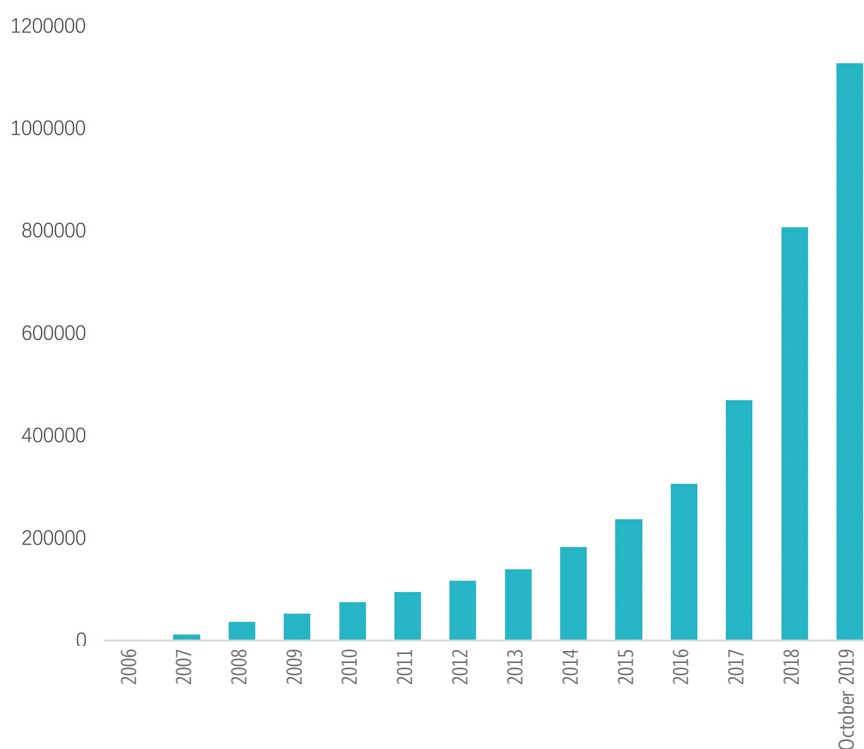
In January 2019, Minister LI Ganjie, at the 2019 National Working Conference on Ecological and Environmental Protection, stated that in 2018, 186,000 administrative penalty cases were imposed in China. As of November 12, 2019, the Blue Map had collected data a total of 257,000 pollution source violation records in 2018, of which 140,000 were administrative penalties, accounting for 75.3% of the number of national administrative penalties disclosed by the Ministry of Ecology and Environment. The acquisition rate had increased compared to the previous two years.

---

2. The data on the cleanup of environmental protection violations projects released in 2016 in a centralized manner was not included in the statistics.

Figure 5 Proportion of Information on Administrative Penalties for Pollution Sources Nationwide

Legend:
- ■ Proportion of Administrative Penalty Information Collected by the Blue Map
- ■ Proportion of Administrative Penalty Information Not Collected by the Blue Map

In early evaluations, the supervision information released by most cities was far from reaching the "estimated amount of pollution source supervision information.[3]" In the last three evaluations, this situation has improved. In 2016, the actual number of publicly available regulatory records in seven cities exceeded the theoretical amount that should be made public. In 2017, it reached 18 cities. Although the number fell to 15 cities in 2018, with the Fenwei Plain becoming the focus of governance, some areas with large emissions but large disclosure gaps significantly improved their level of information disclosure, including the provinces Shanxi, Shaanxi, Henan, and Anhui.

3. Estimated Pollution Source Supervision Information is calculated based on the amount of industrial pollutant emissions in each city and the level of information disclosure of leading cities.

Figure 6 Pollution Source Supervision Information Disclosed by Cities

Chart 1 callout labels: Shenzhen, Quanzhou, Dongguan, Yantai, Zhengzhou, Foshan, Zhongshan, Chengdu, Weinan

Chart 1 city axis: Zaozhuang, Yantai, Weifang, Jining, Tai'an, Rizhao, Weihai, Kaifeng, Zhengzhou, Luoyang, Pingdingshan, Anyang, Jiaozuo, Sanmenxia, Wuhan, Yichang, Jingzhou, Changsha, Zhuzhou, Xiangtan, Yueyang, Changde, Zhangjiajie, Guangzhou, Shaoguan, Shenzhen, Zhuhai, Shantou, Foshan, Zhanjiang, Zhongshan, Dongguan, Nanning, Liuzhou, Guilin, Beihai, Chongqing, Chengdu, Zigong, Panzhihua, Luzhou, Deyang, Mianyang, Nanchong, Yibin, Guiyang, Zunyi, Kunming, Qujing, Yuxi, Xi'an, Tongchuan, Baoji, Xianyang, Weinan, Yan'an, Lanzhou, Jinchang, Xining, Yinchuan, Shizuishan, Urumqi, Karamay

Chart 2 callout labels: Weifang, Jining, Yantai, Guangzhou, Dongguan, Foshan, Zhongshan, Chengdu

Chart 2 city axis: Zaozhuang, Yantai, Weifang, Jining, Tai'an, Rizhao, Weihai, Kaifeng, Zhengzhou, Luoyang, Pingdingshan, Anyang, Jiaozuo, Sanmenxia, Wuhan, Yichang, Jingzhou, Changsha, Zhuzhou, Xiangtan, Yueyang, Changde, Zhangjiajie, Guangzhou, Shaoguan, Shenzhen, Zhuhai, Shantou, Foshan, Zhanjiang, Zhongshan, Dongguan, Nanning, Liuzhou, Guilin, Beihai, Chongqing, Chengdu, Zigong, Panzhihua, Luzhou, Deyang, Mianyang, Nanchong, Yibin, Guiyang, Zunyi, Kunming, Qujing, Yuxi, Xi'an, Tongchuan, Baoji, Xianyang, Weinan, Yan'an, Lanzhou, Jinchang, Xining, Yinchuan, Shizuishan, Urumqi, Karamay

Chart 3 callout labels: Guangzhou, Foshan

Chart 3 city axis: Zaozhuang, Yantai, Weifang, Jining, Tai'an, Rizhao, Weihai, Kaifeng, Zhengzhou, Luoyang, Pingdingshan, Anyang, Jiaozuo, Sanmenxia, Wuhan, Yichang, Jingzhou, Changsha, Zhuzhou, Xiangtan, Yueyang, Changde, Zhangjiajie, Guangzhou, Shaoguan, Shenzhen, Zhuhai, Shantou, Foshan, Zhanjiang, Zhongshan, Dongguan, Nanning, Liuzhou, Guilin, Beihai, Chongqing, Chengdu, Zigong, Panzhihua, Luzhou, Deyang, Mianyang, Nanchong, Yibin, Guiyang, Zunyi, Kunming, Qujing, Yuxi, Xi'an, Tongchuan, Baoji, Xianyang, Weinan, Yan'an, Lanzhou, Jinchang, Xining, Yinchuan, Shizuishan, Urumqi, Karamay

Legend:
■ Number of polluters who disclosed enforcement records
■ Difference with projected number of polluters with enforcement records

2. Timely Disclosure of Pollution Source Supervision Information

Earlier PITI evaluations found that there was a considerable delay in the disclosure of regulatory information on pollution sources in various places. At that time, the mass disclosure of regulatory records by the leading cities of information disclosure was considered good practice, but its frequency was limited to a half year or annual update.

After the results of the first PITI evaluation were released, the city of Ningbo actively responded to the delayed disclosure issue and implemented the timely release of pollution source supervision information. Since then, evaluation cities in Guangdong and other provinces have begun to timely release information on pollution source supervision, particularly administrative penalty decisions.

In 2013, the "Measures for the Self-Monitoring Information Disclosure by State Monitored Enterprises (Trial)" was issued, which required "state monitored enterprises" to conduct self-monitoring and publicly disclose the monitoring results. The content, frequency, and channels of automatic monitoring data disclosure were standardized, which is a breakthrough in corporate environment self-monitoring information disclosure. The unprecedented measures also helped promoted the timely disclosure of pollution source supervision information.

"The Law of the P.R.C. on the Prevention and Control of Atmospheric Pollution" and "The Law of the P.R.C. on the Prevention and Control of Water Pollution", which were subsequently revised, further required key polluting entities to "install automatic monitoring equipment and connect with environmental protection authorities" to conduct self-monitoring.

Figure 7 Automatic Monitoring System of Pollution Sources of Hebei Province

The Blue Map has been collecting automatically monitored pollution source data from various environmental department platforms since 2013. In the last six years, the number of companies with online monitoring data that can be accessed through public platforms has grown from more than 6,000 in 2014 to more than 20,000 at present.

Figure 8 Annual Change in the Number of Companies with Online Automatic Monitoring Data Which can be Collected by the Blue Map[4]
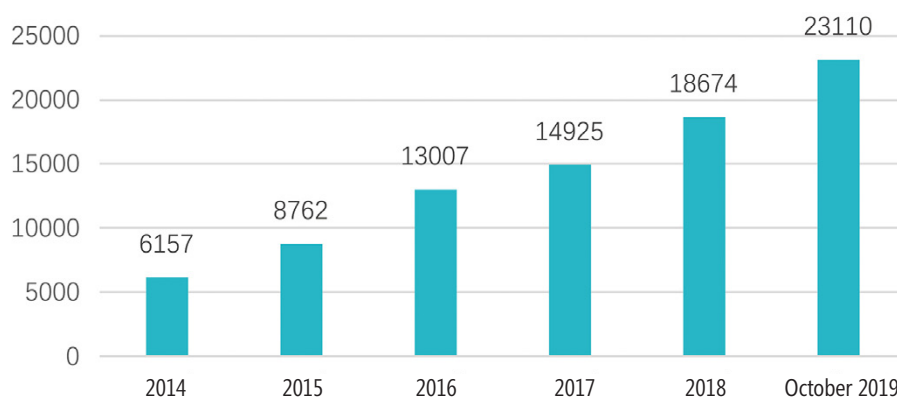
Figure 9 Best Practice - Information Disclosure of Key Polluting Entities in Shandong[4]

On September 9, 2019, the Shandong Provincial Department of Ecology and Environment issued the "Regulations on the Establishment of Shandong Key Polluting Entities List and the Management of the Pollution Sources Automatic Monitoring Network" (LU Environment [2019] No. 134).

✓ Defined the screening conditions for key polluting entities on water and atmospheric issues, and clarified the basic information of each pollutant discharge unit, such as industry categories, major sewage outlets, main monitoring indicators, implementation standards, emission limits on key polluting entities, and the release of data to public.

✓ All sewage outlets that meet certain requirements should be installed with automatic monitoring equipment. Before the automatic monitoring equipment and the monitoring platform can be connected to the supervision network, some performance tests should be completed. After the system is connected to the network, the automatic monitoring data can be identified as valid and can be used as the basis for environmental law enforcement and management.

The auto-monitored data of key polluting entities connected to the supervision network has been released through the Shandong Provincial Department of Ecology and Environment's APP and its official website, where the public can easily obtain relevant information.

环 境 随 身 带

---

4. "Regulations on the Establishment of Shandong Key Polluting Entities List and the Management of the Pollution Sources Automatic Monitoring Network" (LU Environment [2019] No. 134), the Shandong Provincial Department of Ecology and Environment, 2019/9/9 http://xxgk--sdein--gov--cn---z59ccwww--hunan--gov--cn.ipv6.hunan.gov.cn/zfwj/lhf/201909/t20190917_2375139.html

3. Complete Disclosure of Pollution Source Supervision Information

In the four dimensions of the PITI index evaluation, the integrity of the information, "completeness," has received low score for a long time.

Taking environmental administrative penalty decisions as an example, in the early years, we only had access to the list of punished companies, which lacked specific violation facts, the legal basis for penalties, data on fines. Sometimes, even the companies' names were hidden by code.

With the strengthening of the disclosure of environmental supervision information on pollution sources, starting in Beijing and other cities, the full text of the penalty decision is now available and includes the name of the violator, their legal representative, unified social credit code, address, detailed violation facts (including pollutants' names, monitored densities, multiples of exceeding the standard, etc.), punishment basis, and enforcement opinions.

Figure 10 Example of Detailed Administrative Penalty Decision

行政处罚决定书

京环境监察罚字〔2019〕54号

当事人名称：北京燕山石化橡塑化工有限责任公司

法定代表人：李刚

统一社会信用代码：91110304582551119T

营业执照注册号：91110304582551119T

地址：北京市房山区燕山岗南路1号

我局于2019年3月26日对你单位进行了调查，并委托北京市环境保护监测中心对丁基橡胶焚烧炉出口工艺废气非甲烷总烃进行监测。该中心于2019年4月23日出具了报告编号为CC19030的检测报告，结果显示非甲烷总烃折算浓度为48mg/m³，超过了《炼油与石油化学工业大气污染物排放标准》（DB11/447-2015）规定的排放限值（非甲烷总烃排放限值为20mg/m³）。以上事实，有现场检查笔录、调查询问笔录、营业执照复印件、授权委托书、身份证复印件、检测报告等证据为凭。你单位的上述行为违反了《中华人民共和国大气污染防治法》第十八条的规定。我局于2019年7月4日告知你单位违法事实、处罚依据和拟作出的处罚决定，并告知你单位有要求听证

In the early PITI index evaluation, the disclosure of emission concentration data was extremely rare. Since 2013, the situation has changed, and the public can learn about the emission concentration data of key monitored enterprises through the quarterly regulatory/supervisory monitoring reports released by local environmental bureaus in various cities. This year's evaluation found an increasing number of key polluting entities' monitoring data disclosure has become systematic and platform based.

Figure 11 Zhejiang Supervisory Monitoring Data Platform

In the past, environmental impact assessment information only had the simple requirement of being publicize for review Since 2013, the complete environmental impact assessment reports or forms are required to be publicized and made available to the public.

4. Disclosure of Pollution Source Supervision Information to be Platformized; Ecological and Environmental Public Services to be More User-Friendly

The disclosure of polluting source information enables the public to access data and information. In spite of this, international experiences have illustrated that not all bureaus who are in charge of information disclosure are willing to make it easy for public to access and use.

Earlier PITI evaluations found that some of the evaluated cities didn't even have an official environmental protection website. Most of the regions that had an official website did not have a separate column for corporate regulatory information release. The query and retrieval of pollution source regulatory information was like looking for a needle in a haystack.

With the advancement of government Internet access projects and the construction of big data on ecological environment, all PITI-assessed cities now have official environmental protection websites, and subsequently opened columns to publish pollution source supervision information, supporting search tools to further facilitate public information retrieval. Cities of Beijing, and from Zhejiang, Shandong, Guangdong provinces are leaders in innovative and informative website design.

With the advancement of environmental informatization construction, the release of various types of environmental data in China tends to be platform-based and systematic. Common environmental data platforms include, but are not limited to: real-time air quality release platform, dual publicity platform for administrative penalty and approval results, supervisory monitoring information release platform, key monitored enterprises online data disclosure platform, 12369 Hotline complaint reporting platform, environmental impact assessment information publicity platform, enterprise and public environmental disclosure platform.

The platform-based information release form has the advantages of highly integrated information and convenient retrieval /query, which greatly facilitates public access to environmental information.

Figure 12 Guangdong Administrative Penalty Data Inquiry Platform

Moving into the mobile Internet stage, a number of the leading cities have also turned to social media for polluting source information disclosure. Weibo, Wechat and Mobile APP have reduced the threshold for the public to obtain data and promoted user friendly interaction.

Figure 13 APP: Jinan Environment

Chapter IV

IV. Ten-year Application:
Information Disclosure and Innovative Environmental Governance Tools

The decennial achievements, can also be observed from the perspective of data applications and utilizations.

With the strengthening of environmental supervision, the improvement of information disclosure, and the improvement of public awareness, environmental information of pollution sources has begun to be applied on a larger scale, in multiple directions, such as in supply chain management and public supervision. In the direction of green supply chain, more innovative solutions are being formed based on information disclosure; in the direction of green finance application, with the application of big data-based corporate environmental credit dynamic evaluation system, the huge potential to promote green transformation and low-carbon development will gradually be explored.

1. Information Disclosure: Making the Green Supply Chain More Effective

Being the 'world factory', China has witnessed the deterioation of the environment for the past decades. When the predecessor of the Blue Map, Pollution Map, was released in 2006, it was identified that a number of Fortune 500 Companies had environmental violations in their factories in China. To promote solutions, in March 2007, IPE and 20 other environmental organizations jointly launched the "Green Choice Initiative," which advocates "large brands and retailers to green their supply chains." In the early days of the initiative's launch, the regulatory information that Blue Map could collect was quite limited, and the number of companies promoting the improvement was no more than a few dozen a year.

Since 2013, three major environmental protection campaigns, for air, water and soil, have been initiated. In 2016, the Central Government Environmental Protection Inspection campaign was rolled out across the country. In 2018, the blue-sky defense battle and the pollution battle were began, and the environmental supervision and information disclosure have been greatly improved.

With the transformation of corporate violation risks into supply chain risks, green choice supply chain projects based on the disclosure of environmental regulatory data have also generated more impacts on companies along the supply chain. As of 2019, more than 10,000 companies have improved their environmental performance or have made public disclosures following the requirement of their brand customers.
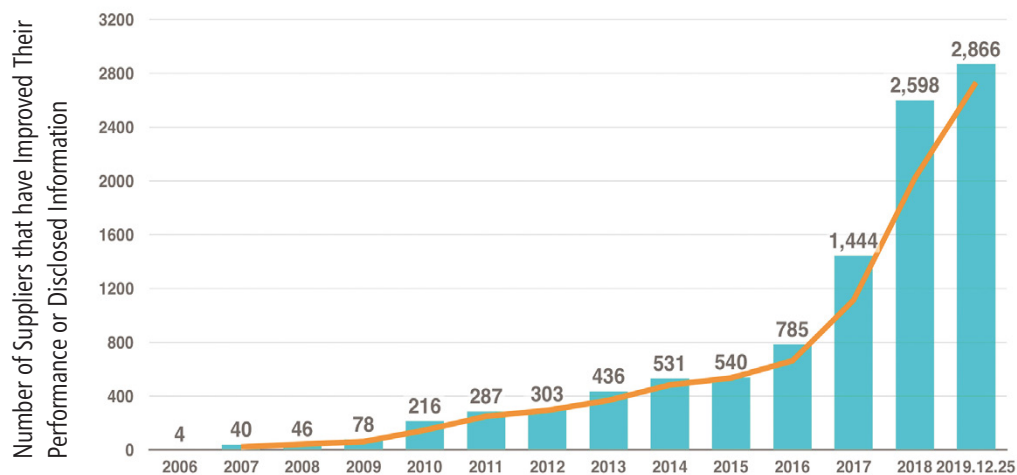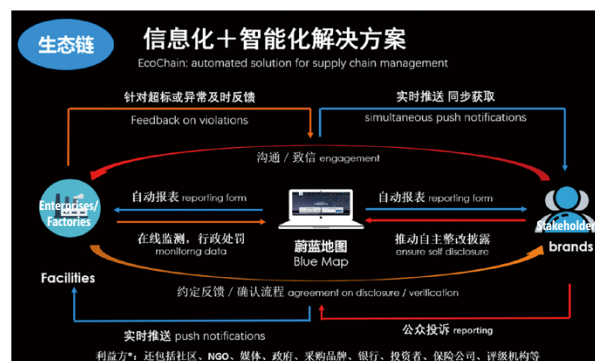
Figure 14 Green Supply Chain Drives Companies to Improve Environmental Performance

Figure 15 Blue EcoChain

In a manner similar to the blockchain, the Blue EcoChain will not only enable brands and suppliers to get connected based on data but also provide new approaches to data-based environmental management solutions. Environmental group Lvse Jiangnan for example, has pushed hundreds of industrial facilities to register for corporate accounts and keep track of their environmental performance. Lvse Jiangnan has also made connection with local environmental enforcement bureaus. (See Case Study in Figure 18: Lvse Jiangnan)

2. Information Disclosure: Realizing Dynamic Assessment of Enterprise Environmental Performance

In 2013, the former Ministry of Environmental Protection, the National Development and Reform Commission, the People's Bank of China, and the China Banking Regulatory Commission issued the "Measures for Enterprise Environmental Performance Rating (Trial)," which was carried out for enterprises with large total pollutant emissions, high environmental risks, and large environmental impact, and through joint construction of a "trustworthy incentives, disciplinary punishment" mechanism, to urge companies to continuously improve behaviors.

At present, many provinces and cities have carried out relevant evaluations and conducted practical applications in areas such as green credit and government procurement. Shandong Province has pioneered the application of dynamic scoring methods with a scope of facilities from across the province. It has also established a write-off mechanism to restore the environmental credit, with aim of motivating facilities to rectify their violations in a timely manner.

In 2016, seven ministries and commissions issued the "Guiding Opinions on Building a Green Financial System," encouraging third-party professional institutions to participate in the collection, research, and release of corporate environmental information and analysis reports. As a member of the Green Finance Commission, Blue Map started to develop a model, called "The Dynamic Environmental Credit Risk Assessment Model." The model is based on the 1.8 billion environmental data on the Blue Map. After all the data is structured and analyzed, the model is quantified and scored in a dynamic evaluation manner, drawing a real-time portrait of the environmental performance for the enterprise, and providing users with a quantification of the environmental risks of the pollution source evaluation result.

This tool is now being applied to green supply chain and green finance projects. Brands and financial units can quickly screen for major risks through the evaluation results and adopt measures such as promptly promoting the rectification of polluting enterprises to avoid and reduce operational risks and achieve a win-win situation for economic and environmental interests.

Figure 16 Dynamic Environmental Credit Risk Assessment Model
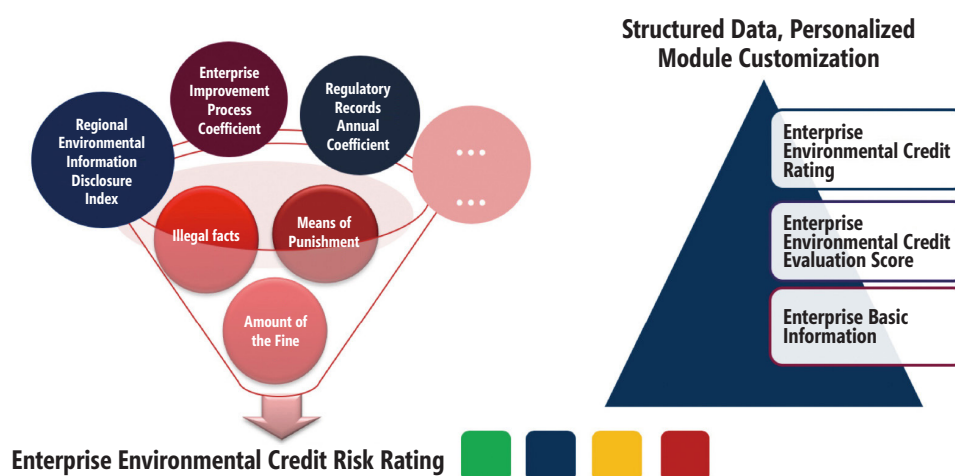
IPE is developing a green supply chain dynamic risk management system "DERA" in cooperation with industry experts. In addition to focusing on the company's own environmental compliance risks, DERA also includes policy planning, regulatory conditions, infrastructure and environmental quality in the region, providing users a big data-based comprehensive risk assessment tool.

3. Information Disclosure: Promote Public Supervision towards a Larger Scale and Longer Term

In the era of big data, the rise of smartphones has diversified information distribution channels, which greatly facilitated the public's access to information. This convenient access to information has also encouraged the public to express their environmental concerns through online movements such as "#pollution" and "#blue-sky". In addition, in the information era, the government has also launched a new "Internet +" service model. The emergence of government operated environmental microblogs, WeChat accounts, and 12369 Hotline reporting platforms has also greatly stimulated the public's enthusiasm for participating in the supervision and reporting of polluting enterprises.

Among them, the Blue Map mobile app contains an "Easy-informant" reporting section where more than 2,000 companies have responded to their online data excessive emissions more than 3,000 times. The environmental organization Lvse Jiangnan has conducted a strong supervision of pollution sources based on this data. In 2017, Lvse Jiangnan reported a total of 921 emission

violation companies online, of which 274 provided feedback, and 37 illegal emission companies were investigated and punished by the according environmental department. In 2018, Lvse Jiangnan made even greater breakthroughs in the supervision of heavy pollution sources, reporting that 1,559 companies had exceeded their standards, and 72% of the reports were responded to and verified. Among them, 191 illegal emission companies were ordered by the appropriate environmental department to make corrections, pay the administrative penalties, or file a case for investigation.[5]

Figure 17 The Amount of Complaints Reported by "Micro Report" on the Blue Map
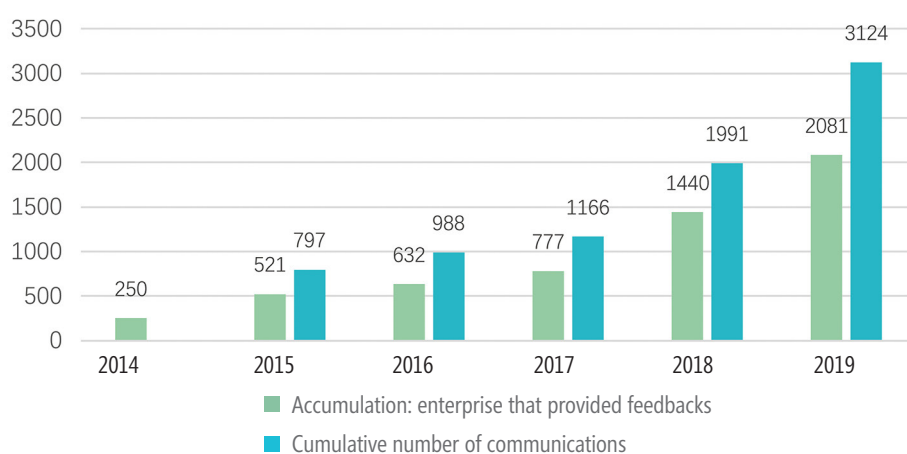
Figure 18 Case Study of Lvse Jiangnan: Eco-chain stimulates benign interactions among multiple parties [6]

The Lvse Jiangnan Public Environment Concerned Center (hereinafter referred to as "Lvse Jiangnan") was established in September 2012 and has long focused on the prevention and control of industrial pollution. In the early years of its establishment, Lvse Jiangnan mainly focused on the areas of Suzhou and the Yangtze River Delta, conducted arduous field surveys, and exposed pollutions through the Internet and social media. Effective supervision has been formed on local major emission source companies, and some serious pollution problems have been resolved.

But this kind of working method also has several shortcomings: firstly, there are the likelihood of rebounds from enterprises and pressure from local governments; secondly, it is difficult to expand the scale of industrial pollution supervision. In order to solve these problems, Lvse Jiangnan cooperated

5. How do environmental protection organizations "assist" in environmental governance? GUO Xueping, China Environment Network, http://www.zhhjw.org/a/qkzz/zzml/201910/gy/2019/1028/7291.html?from=timeline&isappinstalled=0
6. Information provided by Lvse Jiangnan.

with the Blue Map to try to improve the efficiency of supervision through innovative information-based solutions, and at the same time, establish communication channels with enterprises and environmental agencies.

In 2014, China's first-ever online monitoring of major pollution sources in the world was made public, and Lvse Jiangnan began to apply online data in its work. After several years of exploration, Lvse Jiangnan was able to expand the scope of supervision to 13,000 heavy control pollution sources nationwide, based on the application of the heavy pollution control source disclosure platforms in various provinces and the "Blue Map APP" data platform.

Through the customization function of the Blue Map, once any online data of a company exceeds the standard, Lvse Jiangnan can quickly find and follow up. In the early days, Lvse Jiangnan mainly released those violations through Weibo, and @ the official weibo account of local environmental bureaus. The advantages of this method include openness, transparency and social impact; but the disadvantage is that it is only effective in some areas where government affairs and Weibo are active, while the regulatory authorities in other areas can choose to remain silent.

In 2018, Lvse Jiangnan adjusted its work method and began to report through the 12369 Hotline in addition to Weibo. Significant progress has been made by this approach. By the end of 2018, Lvse Jiangnan had reported over 1,500 over-standard emission companies to environmental agencies online, whle in 2019, the number exceeds 5,000.

12369 Hotline has the significant advantage as the official channel; what's more, after Lvse Jiangnan applied this method on a larger scale, it also received feedback from environmental authorities in some regions saying that "the reports place them under great pressure." At the same time, this process consumes a lot of administrative resources. To this end, the local environment agencies hopes to find a solution.

Lvse Jiangnan creatively proposed that with the help of "the Blue EcoChain" function on the Blue Map, enterprises can get early warnings of environmental risks, and can easily and freely respond to them; for companies willing to take the initiative to follow up and disclose in time, environmental organizations do not have to initiate reports. This method is in line with the Ministry of Ecology and Environment's emphasis on the main responsibility of corporate pollution control, and has therefore been recognized by the local environmental agencies.

Since 2019, Lvse Jiangnan has increasingly been recognized by more and more companies. Through the Blue Map platform, companies can obtain reminders of environmental risk information, so that they can publicly respond to an issue in a timely manner, thereby reducing complaints or negative press, and at the same time repairing damaged environmental credit and enhancing the image of corporations social responsibility.

Today, with Lvse Jiangnan's efforts, the eco-chain solution based on the environmental big data

platform has attracted manufacturers, environmental social organizations, international and domestic procurement brands, financial institutions, investors and research institutions. Some local environmental agencies have also expressed a willingness to join in order to monitor in real time whether companies with pollution problems in their jurisdictions can make timely and effective disclosures and take responsibility for controlling their pollution.

The successful practice of Lvse Jiangnan provides precious takeaways for the establishment of a large-scale environmental management pattern of government supervision, corporate participation, and public supervision in the information age.

Chapter V

Ten-year Impact:
Enhance Social Trust and Foster Green Development

During the ten year evaluation period, the gradual and transparent disclosure of information has played a positive role in improving the progress of government environmental governance, strengthening public trust in the government, and resolving social conflicts. In the meantime, the environmental quality has also been improved.

1. Information Disclosure, an Acceleration of Environmental Governance

Since the launch of the Air Pollution Control Plan, the quality of the atmospheric environment for key areas across the nation has improved significantly. The communiqués of National Environmental Conditions over the years show that the rate of compliance with urban air quality standards has been steadily increased from 4.1% in 2013 to 35.8% in 2018.[7]

Figure 19 Air Quality Map on the Blue Map
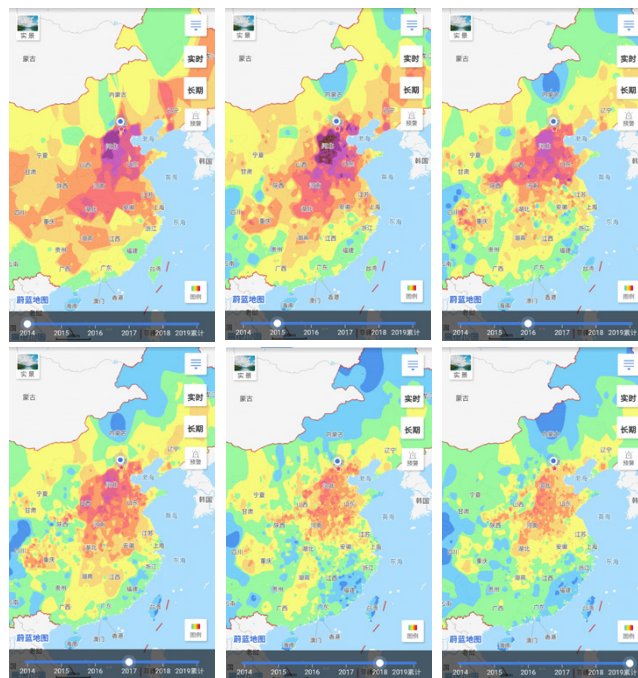
7. The number of cities carrying out PM2.5 monitoring varies in different years, 74 cities in 2013, 161 cities in 2014, and 338 cities in 2015, 2016, 2017 and 2018.

Changes in air quality and changes in information disclosure require more in-depth correlation analysis. The project team only made a preliminary comparison of the synchronization of changes in the two major areas.

The project team selected PITI cities[8] in Shandong, Hebei, and the Fenwei Plain for comparison to evaluate the disclosure of urban pollution source supervision information and the annual PM 2.5 average.[9] From 2013 to 2018, the average PITI index in Shandong and Hebei showed a steady upward trend. In Fenwei Plain, the assessment cities of pollution sources publicly stagnated during the period from 2014 to 2017.

In contrast, PM 2.5 concentrations in Shandong and Hebei showed a steady decline trend, while the PM 2.5 concentrations [10] in PITI's designated cities in the Fenwei Plain fluctuated and even rebounded.
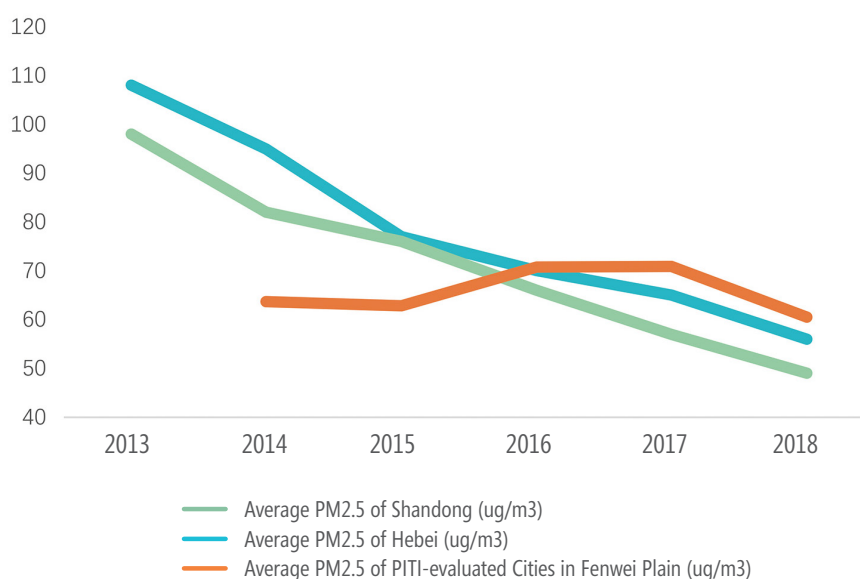
Figure 20 PITI Scores and PM2.5 Annual Average in the three regions

PITI Average Score of Shandong
PITI Average Score of Hebei
PITI Average Score of Evaluated Cities in Fenwei Plain

---
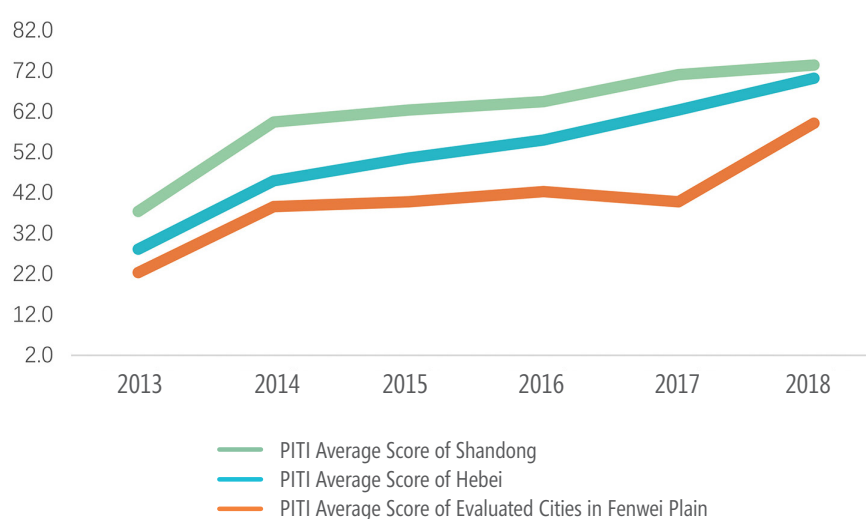
8. Among the 11 cities in the Fenwei Plain, 8 cities including Linfen, Luoyang, Sanmenxia, Xi'an, Tongchuan, Baoji, Xianyang, and Weinan are in the scope of PITI evaluation.

9. The annual average of PM 2.5 in Hebei and Shandong comes from the annual environmental state bulletins of each province. The average annual PM2.5 value of the Fenwei Plain is calculated from real-time monitoring data of urban air quality obtained from the Blue Map . The data has not been reviewed for validity and is for reference only, please refer to official statistics.

10. The comparison results are only comparing observation data, and the correlation analysis needs further academic research.

Average PM2.5 of Shandong (ug/m3)
Average PM2.5 of Hebei (ug/m3)
Average PM2.5 of PITI-evaluated Cities in Fenwei Plain (ug/m3)

2. Information Disclosure, to Enhance Compliance and Promote Corporate Responsibility

According to information released by the Ministry of Ecology and Environment, in 2014 there were only 83,000 environmental administrative penalties nationwide. By 2017, the number of administrative penalties had increased to 233,000, and in 2018 it was 186,000. The number of penalties dropped slightly compared to 2017. From January to October of 2019, there were 124,500 environmental administrative punishment cases nationwide, with a total fines of RMB 9.277 billion and RMB 74,500 on average, a drop of 14.23%, 21.57%, and 8.56% respectively[11] Under the current supervision intensity, the decline in environmental punishment cases has also confirmed that more and more companies are increasingly becoming environmentally compliance.

---

11. Law Enforcement Bureau of the Ministry of Ecology and Environment respond to reporters' questions on environmental administrative law enforcement punishment, MEE, 2019/12/25, http://www.mee.gov.cn/xxgk/hjyw/201912/t20191225_753424.shtml

Figure 21 Environmental Administrative Penalties Nationwide (in 10,000) [12]
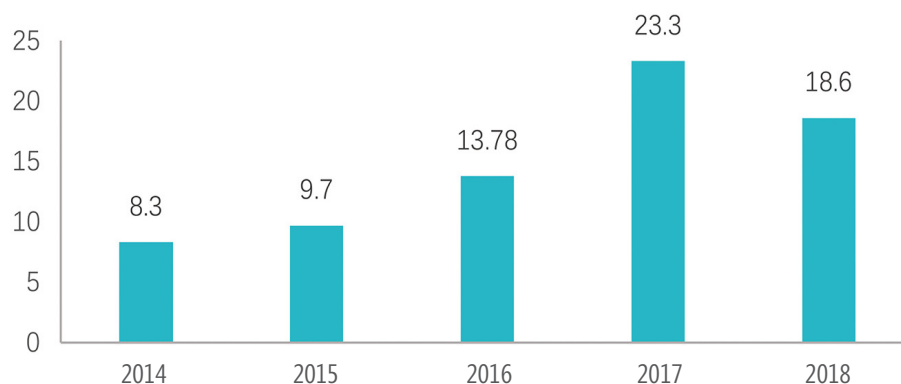
The improvement of corporate environmental compliance stems from the top-down restrictions represented by the central environmental supervision and special supervision by the Ministry of Ecology and Environment; on the other hand, as mentioned in the previous chapter, it also stems from the bottom up efforts of green supply chain, green finance, and social supervision. With the current downward pressure on the economy and the emphasis on "reforms to streamline administration, delegate powers, and improve regulation and services", bottom-up supervision and promotion will play a more important role in preventing deregulation, achieving differentiated management and accurate pollution control. The foundation of all these advances is the full disclosure of pollution source monitoring /supervision information.

Figure 22 Case Study on Accurate Pollution Control: Social Supervision Assists Government's Differential Supervision

In 2018, Jiangsu Province issued the "Measures for the Emergency Management and Control of Off-Peak Production and Heavy Pollution Weather in Jiangsu Province (Trial)," which granted the "Environmental Protection Standouts" the rights of "Exemption from Production Restriction". By adopting differentiated environmental management and control measures to protect the rights and interests of legal and compliant enterprises, The Measures also provides positive incentive mechanism to fully advance the level of corporate pollution control. The method was revised in January 2019. According to the revised version, the exemption list implements a dynamic management model. If an enterprise receives environmental violations or related administrative penalties, then the exemption should be canceled by the competent ecological environment agencies in the district or city.

12. The data for 2014 and 2018 comes from "The fourth press conference of protecting the green water and the green mountains and casting the golden mountains and the silver mountains to celebrate the 70th anniversary of the founding of New China", http://www.mee.gov.cn/xxgk/hjyw/201909/t20190930_736364.

The data for 2015, 2016 and 2017 comes from "The Ministry of Ecology and Environment Held National Environmental Law Enforcement Work Conference"

In addition to Jiangsu Province, Shandong, Hebei and other provinces have also introduced corresponding policies to implement refined management to avoid "the Policy of Uniformity." However, the implementation is currently chaotic as there are interference factors in the creation of some local government policies which cause the implementation effect to deviate from the ultimate goal of the policy. Therefore, it is necessary to use the power of public supervision to accurately control pollution through transparent information.

By collecting the publicly released list of environmentally exempted companies in various provinces and cities, and cross-checking with the environmental data on the Blue Map, it was found that some companies received environmental violations in 2019 and were punished by local environmental agencies. According to the "Measures for the Emergency Management and Control of Off-Peak Production and Heavy Pollution Weather in Jiangsu Province (Trial)," these enterprises should be disqualified. Accordingly, in September 2019, the Lvse Jiangnan Public Environment Concerned Center (PECC) and the Institute of Public & Environmental Affairs (IPE) jointly submitted feedback to the environmental bureas of 8 cities, namely Nanjing, Suzhou, Wuxi, Changzhou, Xuzhou, Suqian, Lianyungang, and Yancheng regarding the list of companies exempted from production stop and limit in autumn and winter and in severe polluted weather emergency management and control, inquiring:

✓ Has the "exempted enterprises" in 2019 completed their rectification regarding their environmental violations?

✓ Should an enterprise that has not completed rectification be disqualified?

It is suggested that the enterprises that have rectified their violations should publish the rectification and confirmation instructions and certification materials to accept public supervision.

By the end of October 2019, our project team had received replies from the eight urban environment agencies, all of which have adopted the project team's recommendations to cancel the exemption of the violating enterprises from the autumn and winter limited production suspension this year. In response to the projects involving people's livelihood, Suqian Eco-Environment Bureau stated in its response that comprehensive consideration is required, but promised that in the new list, the applicants will be subject to provincial and city (county) qualification examinations in strict accordance with the requirements of provincial documents.

In response, Changzhou and Xuzhou Eco-Environment Bureau provided rectification materials for illegal enterprises. They also stated that, although the enterprises had completed the rectification, in accordance with the "Measures for the Emergency Management and Control of Off-Peak Production and Heavy Pollution Weather in Jiangsu Province (Trial)" Article 8, "if the enterprise has been subjected to administrative penalties for environmental violations," the exemption will still be canceled.

Figure 23 Excerpts from the reply to "Feedback on Xuzhou's Exemption List of the Emergency Management of Production Staggered Production and Heavy Pollution Weather"

二、取消企业豁免资格情况

根据省大气办《关于修订江苏省秋冬季错峰生产及重污染天气应急管控停限产豁免管理办法（试行）的通知》（苏大气办〔2019〕1号）第八条相关要求，对于企业存在环境违法行为被行政处罚的取消企业豁免资格。2019年8月起，我市组织各地开展对2018-2019年秋冬季错峰生产及重污染天气应急管控停限产豁免企业复核工作，根据豁免办法要求及县区复核意见，取消上述2家企业豁免资格。

3. Information Disclosure, to Promote Social Trust

As Professor MA Liang from Renmin University and YU Wenxuan from Xiamen University co-authored in the article "Subjective and Objective Air Quality in Urban China: The Moderating Effect of Environmental Transparency," the government's vigorous release of various environmental information reflects strong transparency and accountability, which can win people's trust in the government. If government agencies dare to proactively disclose various types of environmental information, the public will think that the government will take practical and effective measures to prevent environmental pollution. [13]

The disclosure of environmental information by companies also helps to win the trust of the public and bridge the gap between them. Taking the household waste, sewage and industrial hazardous waste disposal projects that frequently face NIMBYism as examples, many enterprises in the early stage still lack the awareness of basic environmental responsibility and cannot even comply with environmental laws. The rough environmental management and lax pollution prevention and control have brought serious distress and impact to the local community, causing many residents to have an attitude of resistance.

How to solve the "Not in My Backyard (NIMBY-ism)" problem? Judging from domestic and international experience, in addition to strengthening government supervision, corporate compliance, emission reduction, and popularization of science, it is particularly critical for companies to establish a responsible image and build trust with local communities and the public.

Opening up environmental protection facilities, including household waste and sewage treatment facilities, to the public, is an important measure to protect the public's environmental

---

13. Ma, L., & Yu, W. (2018). Subjective and objective air quality in urban China: The moderating effect of environmental transparency. China Policy Journal, 1(1), 85-109.

rights and interests. This is a starting point for building social trust and is significant for the long-term development of the environmental protection industry itself.

In September 2018, the "Notice on Further Opening of the National Environmental Protection Facilities and Urban Sewage Waste Treatment Facilities to the Public," jointly issued by the Ministry of Ecology and Environment and the Ministry of Housing and Urban-Rural Development, deployed and arranged the opening of environmental protection facilities in stages. By promoting the opening up of environmental protection facilities, more and more facilities changed from "staff only" facilities to "urban living rooms" for the residents, ensuring public's rights to know, participate, and supervise. "Seeing is believing," which increased the public's trust in the government and enterprises, and effectively solved the NIMBY-ism dilemma. [14]

Figure 24 The Blue Map's Displayed Facilities Opened for the Public

On December 13, 2019, under the guidance of the Ministry of Ecology and Environment, 13 waste incineration companies took the lead in making environmental compliance and information disclosure commitments to the society. The implementation of such measures included the installation and real-time disclosure of online monitoring equipment.

---

14. Beautiful China Pioneer List (2) | Jiangsu Changzhou Waste-to-energy Project Innovative Practices: From "Employee Only" to "Urban Living Room", Ministry of Ecology and Environment's Website, 2019-08-14

According to the "Administrative Regulations on the Application of Automatic Monitoring Data for Domestic Waste Incineration Power Plants," from January 1, 2020, "the ecological environment agencies can use automatic monitoring systems as evidence of environmental violations." Starting from 2020, 401 domestic waste incineration power plants across the country will disclose the daily average values of five conventional pollutants, which include particulate matter, nitrogen oxides, sulfur dioxide, hydrogen chloride, and carbon monoxide. The incineration plants will also disclose automatic monitoring data of incinerator furnace temperatures and accept social supervision.[15]

Figure 25 Waste Incineration Company Makes Environmental Compliance Commitments

4. Information Disclosure, to Promote Green Transition and Development

In the face of economic downturns, strong environmental protection measures may encounter more obstacles in the implementation stage, leading to the failure of local government's environmental management; however simple market mechanism have failed in solving environmental problems,[16] and the market has long been in the situation of "bad money drives out good."

The comprehensive and transparent disclosure of pollution source information will not only force the company to abide by the law, but more importantly, it can overcome the misguided driving mechanism of "bad money drives out good". Additionally, pollution disclosure will help form a more equitable competition environment and gradually transform the company's own environmental performance into the company's internal demand, helping the green transformation

---

15. Tighter supervision promotes transformation of domestic waste incineration power generation industry, China Environment News, 2019/12/24, https://www.cenews.com.cn/news/201912/t20191224_923202.html

16. Causes and Countermeasures of Local Government Environmental Management Failure, LIU Yao, Modern Economic Research, Volume 10 (2018).

and sustainable development of society and the economy.

In June 2016, SEE Foundation, CURA, China Real Estate Chamber of Commerce (CRECC), Vanke and Landsea jointly launched a green supply chain initiative[17] in the real estate industry. Blue Map was invited as a third-party professional organization to develop a whitelist of real estate green chains based on environmental big data. As of September 5, 2019, 3,662 companies from steel, cement, building materials, and home improvement and other upstream industries have been enlisted in the green chain action whitelist. For the first time in 2019, CURA will apply the "Real Estate Green Chain White List" in their joint purchases.

Landsea Group, one of the founder, said at the 2019 Green Supply Chain Forum that it has continuously traced environmental issues of 181 suppliers through the Blue Map database platform and has included environmental compliance requirements in bidding documents, required suppliers to complete screening before bidding, and will gradually extend their influence to upstream suppliers. Landsea bluntly stated that "this work has not increased the cost of our purchase. Instead, it allows us to identify which partners in the industry chain have more standardized, stable and sustainable production management."

Figure 26 Real Estate Green Supply Chain

---

17. The action calls on real estate companies to jointly establish a classified procurement plan from the "environmental impact" dimension, manage the supply chain from raw material mining, production processes to end-consumption, improve environmental efficiency and resource utilization efficiency, and take responsibility for social development and environmental protection.

Chapter VI

Outlook:
Great Potential for Information Disclosure

The disclosure of pollution source supervision information has effectively promoted multiple stakeholders' acknowledgement and participation, which has effectively advanced pollution reduction and environmental quality improvement. At present, in the face of complicated situations such as the trade wars and economic downturn, we should take into consideration of local situations, instead of "one size fits all" type of polices. We should also prevent deregulation as it may cause bad performers to drive out good performers. There is an urgent need to find innovative solutions that balance environmental protection and economic development. Environmental data is the foundation for new ideas such as differentiated management and precision pollution control, as well as new technological approaches such as artificial intelligence and financial technology.

Looking forward to the next decade, protecting the ecological environment and public health, as well as achieving a green transition and low-carbon development, will require more comprehensive disclosure of environmental information on pollution sources. The rapid development of IT technology and information infrastructure all mean that China's environmental information disclosure has strong potential.

1. From Government Information Disclosure to Enterprise Information Disclosure

In January 2019, Minister LI Ganjie pointed out at the National Conference on Ecological Environmental Protection that in 2018, 186,000 administrative penalties were imposed in China, down from 233,000 in 2017. No matter if it's 186,000 or 233,000 penalties, compared to the total number of manufacturing enterprises in the country, they account for only a small fraction. Therefore, relying solely on government supervision and law enforcement information hardly meets the needs of society for information on pollution sources in the information era.

Article 55 of the newly revised "Environmental Protection Law of the People's Republic of China" stipulates mandatory information disclosure requirements for key pollutant discharging entities. "Pollutant discharging entities under intensified supervision shall honestly disclose to the public the names of their major pollutants, the discharge methods, the concentration and

total volume of pollutants discharged, any discharge beyond the approved quota, and the construction and operation of pollution prevention and control installations to receive supervision from the general public." Article 42 of the "Administrative Measures for Emission Permits (Trial)" (Ministerial Decree No. 48) stipulates that, "discharging entities shall publicize the relevant emission information, and consciously accept public supervision." Under the requirements of relevant laws and regulations, key pollutant discharge entities have carried out relevant self-monitoring disclosure work, and some regional government departments have also actively established platforms as channels for corporate self-disclosure.

The environmental information of pollution sources that society can obtain has been expanded from government regulatory information disclosure to corporate self-disclosure. The future coverage and information breadth are worth looking forward to.

Figure 27 Corporate Self-disclosure of Environmental Information in Ningbo

2. From Key Enterprises to More General Companies

In 2016, the People's Bank of China, the Ministry of Finance, the National Development and Reform Commission, the Ministry of Environmental Protection (formerly), the China Banking Regulatory Commission, the China Securities Regulatory Commission, and the China Insurance Regulatory Commission jointly issued the "Guiding Opinions on Building a Green Financial System" (PBOC [2016] No. 228), which requires the gradual establishment and improvement of the mandatory environmental information disclosure system for listed companies and bond issuers. In 2017, the "Implementation of the 'Guiding Opinions on Building a Green Financial System' " was launched, and included plans to establish a mandatory disclosure of environmental information system by listed companies in a step-by-step manner: the first step is to revise the content and format guidelines of listed companies' voluntary reports by the end of 2017; in the second step,

semi-mandatory disclosure requirements are implemented for all listed companies while those who are key pollutant entities have mandatory disclosure requirement (explanations are required for non-disclosure) (March 2018); the third step, mandatory requirements for all listed companies (before December 2020[18]). In addition to mandatory information disclosure, listed companies are also encouraged to voluntarily disclose relevant information that is conducive to ecological protection, pollution prevention and environmental responsibility.

At the 2018 Beijing Green Finance International Forum, CHEN Yulu, deputy governor of the PBOC, said that in the future, China will further study and promote the mandatory environmental information disclosure of various market entities, and establish uniform standards for the content, format, and scope of information disclosure to continuously improve the green financial markets.[19]

Figure 28 Green Securities Column on the Blue Map

3. China's First Large-scale Real-time Disclosure, Consolidation and Expansion on the Way

The "Measures for the Self-Monitoring Information Disclosure by State Monitored Enterprises (Trial)" requires State Monitored Enterprises to conduct real-time disclosure of online monitoring data. In the nearly six years since the implementation of the "Measures", relevant disclosure platforms and mechanisms have been gradually established in various places. Later amendments to the "Law of the People's Republic of China on the Prevention and Control of Atmospheric Pollution" and the "Law of the People's Republic of China on Prevention and Control of Water Pollution" further required key pollutant discharging entities to "install automatic monitoring equipment and network with monitoring equipment of environmental authorities." According to our observations, some regions have already carried out the installation and networking of automatic monitoring equipment for key pollutant discharging entities.

---

18. How are listed companies' environmental information disclosed? China Environment News, 2018-07-25
19. CHEN Yulu, Deputy Governor of PBOC: China will study the mandatory environmental information disclosure of various market entities, JIANG Fan from CLS, https://www.jiemian.com/article/2605194.html

Automatic monitoring has the advantage of continuous online operation. It is a "cutting-edge guard" that monitors the discharge behavior of pollutant discharge units, which is helpful in removing blind spots and dead ends in environmental supervision.[20] Online monitoring of pollution sources shows that China's environmental monitoring of pollution sources has shifted from manual to automatic, from coarse to precise, from decentralized to centralized and integrated linkage.[21] The information disclosed is of great significance to the public's knowledge and participation in environmental protection. However, there are two problems with the disclosure of automatic monitoring data of pollution sources:

- Due to technical issues such as new information disclosure requirements and platform integration and transition, the online monitoring data disclosure of the former "State Monitored Enterprises" in Hubei, Hunan, Sichuan, Guizhou and other regions has regressed.

- Except for Shandong, Zhejiang, Beijing and other leading regions of information disclosure, the automatic monitoring and networking data of key pollutant discharge entities has not been fully disclosed to the society, which is not conducive to public supervision. In this issue of PITI evaluation statistics, 22% or 1,369 out of 6,318 key gas-related pollutant discharge entities (excluding the original state-controlled ones) from the 120 cities under evaluation published their online monitoring data. Although an increase from 12%[22] in the first year of the implementation of the new Law of Atmospheric Pollution Control, the rate requires further improvement.

Figure 29 Proportion of key Gas-related Pollutant Discharge Entities (Non-state-controlled) that with Publicly Accessible Online Monitoring Data
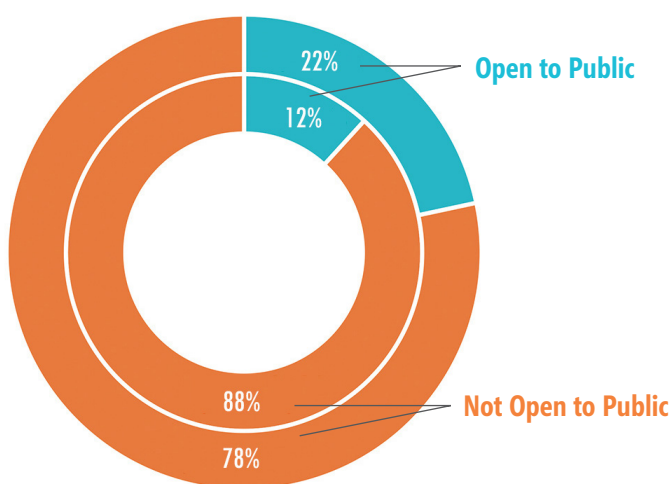
20. Management Incineration Power Plant Enters a New Stage¬ -- "Administrative Regulations on the Application of Automatic Monitoring Data for Domestic Waste Incineration Power Plants" Explained, MEE, 2019/12/02, http://www.mee.gov.cn/xxgk2018/xxgk/xxgk15/201912/t20191202_744963.html

21. Retrospect and Prospect of China's Ecological Environment Monitoring Reform in the Past 40 Years, CHEN Shanrong, Environmental Protection, 2018, 46(20).

22. 2016-2017 PITI Report, http://wwwoa.ipe.org.cn//Upload/201711210239414636.pdf

The expansion of enterprises that install automatic monitoring equipment and the disclosure of relevant information to the society will further facilitate government departments to fully grasp the pollutant discharge situation in their jurisdictions, use environmental information to make precise environmental decisions and management, and help the market develop corresponding innovative environmental governance mechanisms to assist pollution control and encourage public supervision on pollution reduction.

4. From General Pollutants to Characteristic Pollutants

Reducing pollutant emissions is the fundamental means for improving the quality of the environment, and information disclosure on pollutant emissions helps to achieve this goal.

The "Measures for the Self-Monitoring Information Disclosure by State Monitored Enterprises (Trial)" issued in 2013 requires State Monitored Enterprises to conduct self-monitoring and promptly disclose information on pollutant emissions, including the annual discharge of wastewater and exhaust gas pollutants; the new "Environmental Protection Law of the People's Republic of China" highlights the important status of information disclosure and public participation as a management tool. Article 55 clearly states that key pollutant discharge entities need to disclose information on their total pollutant emissions to the public; the newly revised "Law of the People's Republic of China on Prevention and Control of Water Pollution" Article 32 stipulates that "enterprises and institutions and other manufacturers and operators that discharge toxic and harmful water pollutants specifically listed in the preceding paragraph shall monitor the sewage outlets and the surrounding environment, assess environmental hazards, investigate hidden environmental risks, disclose information on toxic and harmful water pollutants, and take effective measures to prevent environmental risks." The above provisions have laid a legal basis for the disclosure of pollutant information from pollutant discharge entities in China.

According to the regulations above, our project team surveyed 20,866 key pollutant discharge entities from the 120 evaluation cities and obtained annual reports from 9,478 companies through Internet channels, accounting for 45.42% of the companies surveyed. Among them, 5,550 annual reports disclosed information on total pollutant emissions, accounting for 26.6% of the total number of surveyed companies; 2,008 annual reports had information about total emissions of characteristic pollutants, accounting for 9.62% of the total number of surveyed companies; 1,487 annual reports disclosed hazardous waste generation / discharge information, accounting for 7.13% of the total number of surveyed companies. Compared to previous years, this is progress, but there remains a large room to improve.

Figure 30 Information Disclosure of Total Pollutant Emissions by Enterprises
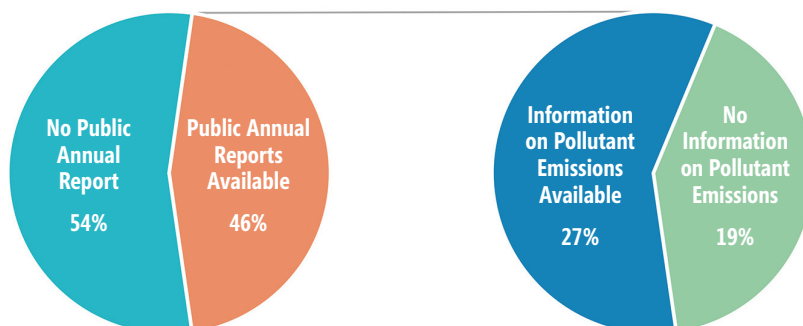
5. From Local Pollutant Disclosure to Carbon Emissions Information Disclosure

In recent years, the disclosure of carbon emissions data has also begun. The latest "Interim Measures for the Administration of Carbon Emission Permit Trading (Draft for Soliciting Opinions)" released this year has not yet included the emission data and quota allocation of key emission entities into the scope of information disclosure. Although the "13th Five-Year Plan" for controlling greenhouse gas emissions (before 2020) has yet to achieve the goal of "establishing a company's greenhouse gas emissions disclosure system", it has been observed that since 2018, Shaanxi Province has taken the lead in requiring enterprises to disclosure carbon emissions information [23]. Sichuan and Jiangxi provinces have also put forward clear requirements for corporate carbon disclosure. The IPE Climate Change Database currently includes greenhouse gas emissions data from nearly 200 companies, including companies with an annual GHG emissions of more than one million tons from the power, petrochemical, chemical, steel, and cement industry.

Figure 31 Carbon Database on the Blue Map

---

23. Notice of Shaanxi Provincial Development and Reform Commission on Carrying Out the Disclosure of Greenhouse Gas Emissions of Key Enterprises (Shannxi DRC Climate [2018] No. 132), Shaanxi Provincial Development and Reform Commission, http://sndrc. shaanxi.gov.cn/html/100345/1027911.html

6. From Stationary Sources to Mobile Sources

The Ministry of Ecology and Environment recently released the "China Mobile Sources Environmental Management Annual Report (2019)". The report shows that pollution from mobile sources such as motor vehicles has become an important source of air pollution in China. In addition, the contribution of non-road mobile sources such as engineering machinery, agricultural machinery, ships, aircraft, and railway locomotives to air quality cannot be ignored.[24] The importance of mobile source pollution prevention and the need for information disclosure, such as supervision, are increasingly prominent.

In November 2018, 11 ministries, including the Ministry of Ecology and Environment, the National Development and Reform Commission, the Ministry of Industry and Information Technology, the Ministry of Public Security, and the Ministry of Transport, jointly released the "Action Plan to Fight Against Diesel Trucks Pollution," and proposed to achieve the goal of "significantly improving the ability and level of motor vehicle emissions supervision... a green, low-carbon, clean and efficient transportation system has begun to take shape". The action plan will build and improve the integrated vehicle emission monitoring system, and promote the construction of road remote sensing monitoring of motor vehicles and remote online monitoring systems for heavy-duty diesel vehicles.

According to our observations, environmental agencies and maritime departments in some regions have started to disclose information about environmental violations such as motor vehicles and ships to the public. In June of this year, the Beijing Municipal Bureau of Ecology and Environment issued a 170 million yuan fine[25] for Anhui Jianghuai Automobile Group Co., Ltd. for "improperly replacing qualified emission inspection products with inferior and ill-equipped pollution control equipment." In addition, some regions have also released remote sensing monitoring data for motor vehicles to the public.

Figure 32 Guangzhou Announcement of Over-Emission Motor Vehicles

---

24. "China Mobile Sources Environmental Management Annual Report (2019)," Ministry of Ecology and Environment, 2019-09-04, http://www.mee.gov.cn/xxgk2018/xxgk/xxgk15/201909/t20190904_732374.html

25. Beijing Eco Auto Fine [2018] No. 19, Beijing Ecological Environment Bureau, 2019-06-28, http://services.bjepb.gov.cn/eportal/ui?pageId=132318#

Annex

Assessment Results

Figure 33 2018-2019 PITI Average Scores of Provinces
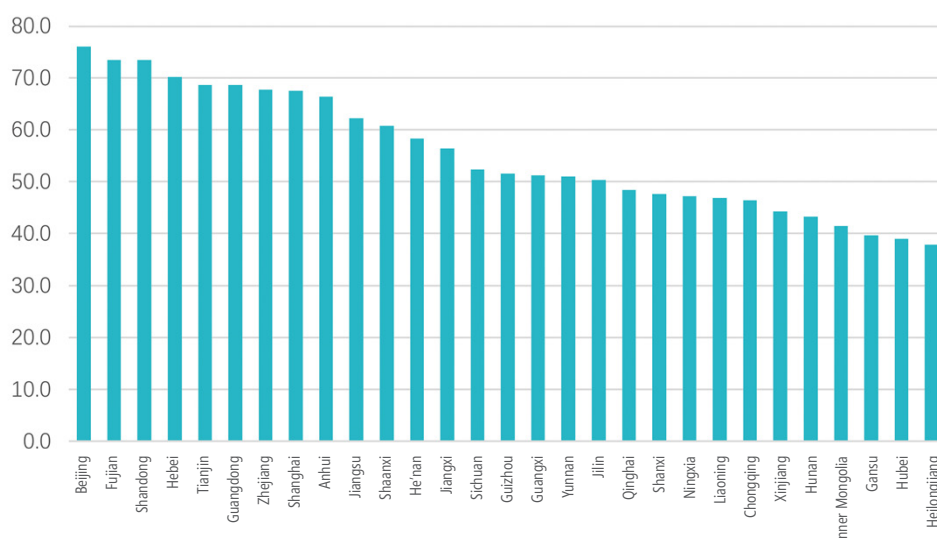
Figure 34 PITI Average Scores of Seven Geographic Regions
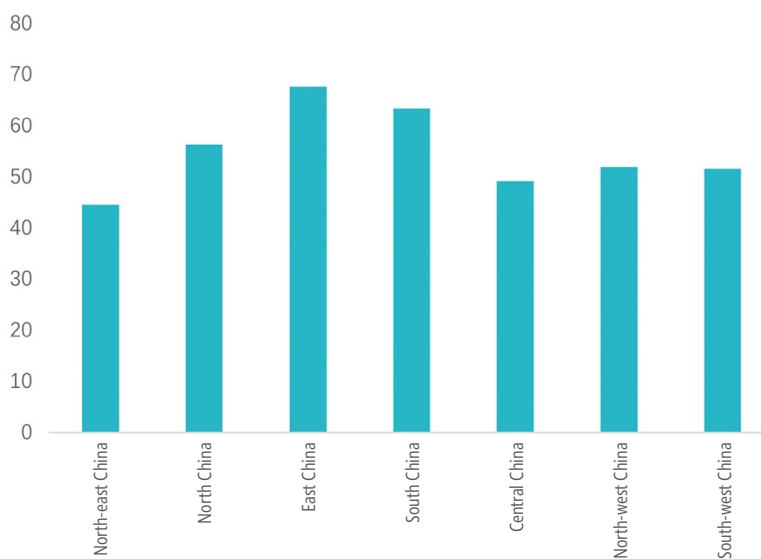
The Blue Map

The Blue Map Wechat Account