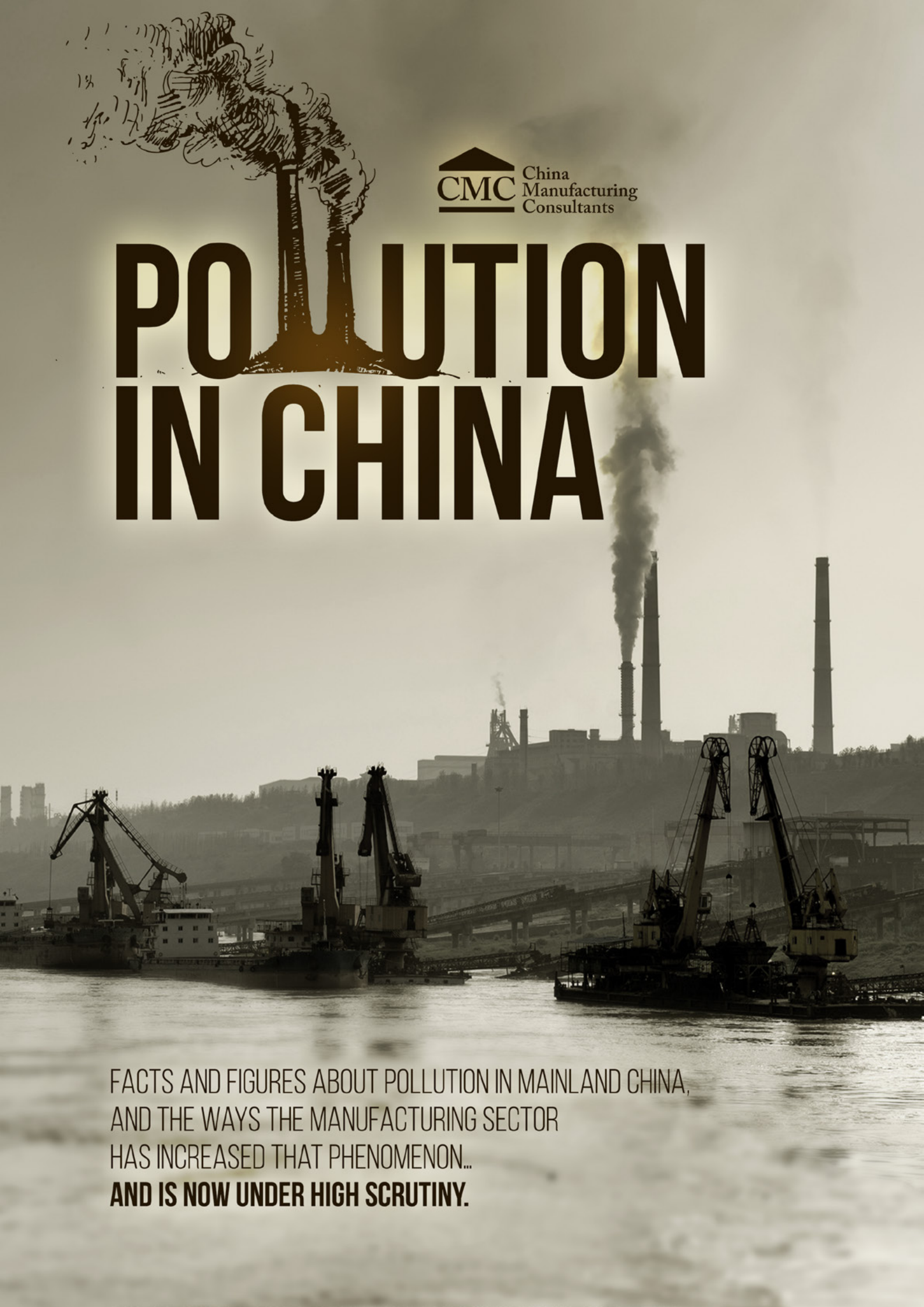


CMC China Manufacturing Consultants

POLLUTION IN CHINA

FACTS AND FIGURES ABOUT POLLUTION IN MAINLAND CHINA,
AND THE WAYS THE MANUFACTURING SECTOR
HAS INCREASED THAT PHENOMENON...
AND IS NOW UNDER HIGH SCRUTINY.

Contents

Introduction

The purpose of this whitepaper is to reveal:

- **Critical data about pollution in China, especially that connected to the manufacturing industry**
- **What the Chinese government's efforts to combat different types of pollution are and some of their results**
- **Emerging Chinese sectors which are a sign of people's concerns over pollution, such as domestic air purifier sales**

By the end of this whitepaper, you will be better equipped to protect your Chinese supply chain from tougher new EPL regulations, as well as understanding China's political and environmental landscape as we head further into the 21st Century.

Please note, much of this information is translated from Chinese, so the English translation may be imperfect in places

Facts made public by the Chinese government

The Chinese Environmental Protection Law[1]

- In 2014, the Chinese Government tightened the Environmental Protection Law (EPL), with substantial changes to become effective as of January 2015.
- Further amendments were made in the beginning of 2016, with early indications that the government was gearing up its enforcement actions including the following changes:
- Higher penalties and fines for polluters and more power for environmental protection authorities.
- Studies have shown that before the 2016 amendments, the cost of compliance with the EPL was higher than the cost of non-compliance.
- Companies, therefore, have often chosen to pay penalties over compliance, for economic reasons.
- Due to the amendments, the harsher penalties and higher fines will no longer support this approach.
- Provisions on required increased transparency and protection of whistle blowers.
- Increased accountability on provincial and local officials to effectively enforce EPL compliance.
- Expanded scope of eligible parties to environmental public interest litigation.
- This resulted in several environmental protection social organizations filing public interest litigation just months after the amendments took effect.

Outcomes

- In the past five months, environmental audits and inspections have taken place, starting in the Hebei region around Beijing, extending to four major municipalities and ten provinces as of August. Many sectors have been hit including: textiles, rubber, leather, mining, chemicals, carbon, metal, coating and plastics.
- As reported on the Chinese Ministry of Environmental Protection (MEP) website, over half of 40,000 Chinese enterprises in the Beijing-Tianjin-Hebei region were found to be in violation of environmental regulations including:

1 http://www.china.org.cn/english/government/207462.htm

- Pollution **(7,180 factories)**
- Excessive emissions **(67)**
- Absence of wastewater treatment **(2,480)**
- Fake monitoring data **(4)**
- As a result, many factories have been closed without clarity on remediation plans or steps to take to be allowed to reopen, leaving their customers uncertain about their current and planned orders.
- Even factories who are in compliance may be hit with uncertainty, as their suppliers could be among those that have been closed, leaving them incapable to deliver a finished product.

Why are factories shutting down? [2]

The number of Chinese factories that are shut down by the government because of their environmental impact keep growing. More and more supply chains get disrupted. Some companies that relied mostly/solely on one source are seriously hit.

> *"Even stricter environment regulation and inspections on both mines and smelters/refineries curbs a certain amount of refined lead production," said Jianbin Meng, the director of economics and environment at the International Lead and Zinc Study Group, in an email.*

Result[3]

Some 18,000 polluting companies have been punished, fines of 870 million yuan (S$180 million) issued and more than 12,000 officials disciplined, as government teams fan out to complete inspections of environmental protection across China, according to the Straits Times.[4]

The results of the checks by teams led by ministerial-level officials have affected the promotion prospects of thousands of officials, sending others to act quickly to shut down problematic factories before the inspectors arrive.

Front-month lead futures on the ShFE have gained 26 percent since their lowest close of 2017 on May 19 and last traded at 19,445 yuan ($2,977.70) a ton Meanwhile, China still facing "huge pressure" to meet politically crucial 2017 air quality targets, even as it spelled out more details of a six-month plan to cut smog this winter. China has promised to close twice as many factories and enforce bigger emissions cuts in coming months in a bid to avoid a repeat of the near-record levels of choking smog that enveloped key northern regions at the start of the year.

The two party agencies involved in the inspections, the graft-busting Central Commission for Discipline Inspection and the Central Organization Department, are seen as having a big say in determining officials' promotion prospects.

2 https://qualityinspection.org/china-environmental-inspections/
3 https://qualityinspection.org/china-environmental-inspections/
4 http://www.straitstimes.com/asia/east-asia/china-punishes-18000-companies-for-pollution

Reasons Chinese factories are polluting more than they are allowed [5]

First, most Chinese entrepreneurs are short-term focused and uncertain about the future. Second, many factory owners have been able to escape any significant fines for years by playing buddies with local officials or by paying bribes to inspectors. They see this as cheaper than full compliance. Third, China-based manufacturers are often simply not aware of all the ways they can reduce pollution and save money at the same time.

Possibilities of Industries needing to take steps:

Most factories that would relocate to another Asian country to focus on keeping costs low would still need to buy most of their components from China… and would therefore still be exposed to production delays caused by anti-pollution measures.[6]

What's next? [7]

Although the fourth inspection round is officially the last one, its force has confirmed just how much of a priority anti-pollution has become for China's central leadership. Local officials turning a blind eye on environmental problems have faced unprecedented public criticism and demotion. International businesses can expect:

- An ongoing and increasingly strict enforcement of environmental regulations
- The relocation of highly polluting activities to less-populated locations
- Industry consolidation, as smaller players who don't have access to required permits, are pushed out
- Growing demand for energy saving and environmentally sustainable industrial products and systems The Chinese Government has said that audits and inspections will continue, nationwide.
- The government has clearly decided to step up enforcing compliance with the EPL, and because of its structure it has the ability to do this at an unprecedented speed and scale. The seriousness of this effort is also illustrated by the fact that state-owned factories are equally targeted.
- Factories who have not invested in environmental compliance are potentially being caught during an audit, which could result in fines, being barred from obtaining loans, having sewage treatment licenses revoked or even being refused business licenses.

At the Tenth Meeting of the Coordination Mechanism on Air Pollution Control, a new round of environmental inspection has been proposed in the Periphery of Beijing-Tianjin-Hebei Province. The inspection focuses on the regional river basins where the environmental quality is deteriorating and the rectification, with emphasis on supervision by the masses Environmental legislation and legislation changes and so on. One of the basin remediation projects include the supervision and inspection of garment manufacturers or enterprises.

According to the recent statistics, 377 dyeing factories and textile mills in Zhejiang Province were forced to shut down, 140 were relocated, 54 relocation agreements were signed, 1631 were cut off, and 2577 "three-no" enterprises were all closed in September. In Guangdong Province, 623 dyeing factories and textile mills were closed, 265 relocated, and there were 4263 power-offs. All "three-no" enterprises there would be closed in October.

5 http://www.straitstimes.com/asia/east-asia/china-punishes-18000-companies-for-pollution
6 https://thediplomat.com/2017/02/which-asian-country-will-replace-china-as-the-worlds-factory/
7 http://www.fiducia-china.com/en/news/chinas-green-push-is-here-to-stay

China's Industrial Outcome in 2017

China's industrial output slowed in October 2017, as authorities fought smog by clamping down on pollution produced by heavy industries. According to the National Bureau of Statistics (NBS), output at factories and workshops expanded 6.2 per cent on-year slowing from 6.6 per cent in September.[8]

The government has moved to wind down production at some steel factories and smelters in a drive to clean up the country's smog-ridden cities. Factories also closed during September-October's Communist Party congress, during which President Xi Jinping called for more efforts to protect the environment. The government is also pushing to make domestic demand a growth driver of the world's second largest economy and make China less reliant on manufacturing and exports.

The clean-air policy, which has been stepped up going into the winter when pollution worsens, has led to tighter supplies and in in turn lifted prices. According to NBS data, growth in retail sales slowed to 10 per cent in October, down 0.3 percentage points from September and also short forecasts of 10.5 per cent. [9]

Air pollution, a public health issue in mainland China

Air Pollution in China

The 2016 World Health Statistics report states that 9 out of every 10 people in the world breathe polluted air. The rapid development of China's economy has led to breakneck industrialization and urbanization which has exerted an unhealthy impact on the living environment including air pollution, desertification, loss of biodiversity, and water pollution. Few popular cities in China such as Xingtai, Shijiazhuang and Baoding have significant levels of air pollution - daily average PM2.5 levels of 155.2, 148.5 and 127.9 respectively. By contrast, the worst city for air pollution in the United States, Bakersfield California, has a daily average PM2.5 level of just 18.2.[10]

At the beginning of 2017, a toxic haze area of 1.88 million square kilometres swept over half of China. The pollution of PM10 and PM2.5 suspended solids in the air received unprecedented concerns. Scientific studies have shown that they are the primary pollutants currently endangering public health.

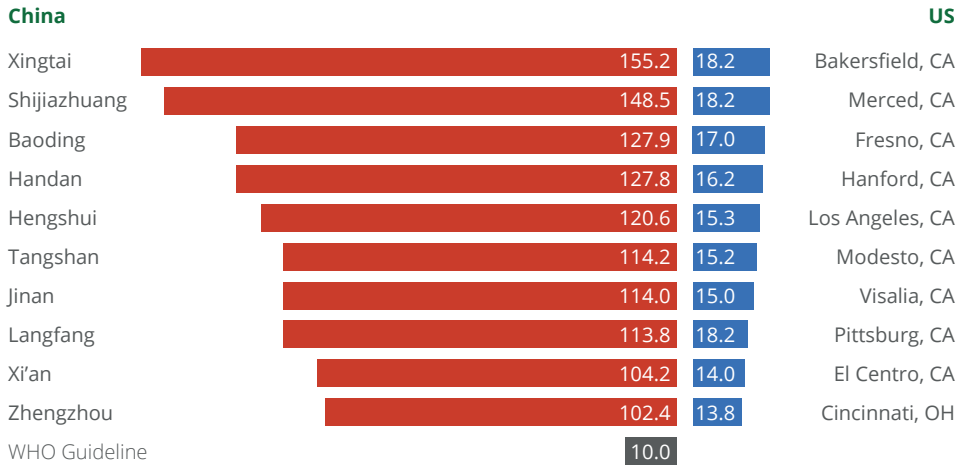
In 2017, the latest study, based on air quality data from 154 cities in China from 1981 to 2012, further analyzes the evidence by expanding the scope of the study. The main conclusions drawn from this study show that the loss of lifetime of northern residents to those in the south due to PM10 pollution is about 3.1 years. After a lapse of five years, the two reports, though different in caliber, show the same direct relationship between air quality

8 http://www.channelnewsasia.com/news/business/china-factory-output-slows-as-government-cracks-down-on-pollution-9404608
9 http://indianexpress.com/article/world/china-factory-output-slows-as-government-cracks-down-on-pollution-4936697/
10 https://www.statista.com/chart/3161/air-pollution-levels-in-perspective/

and the life expectancy of residents, which cannot be ignored. Over the past five years, a series of policies on haze control and a huge haze determination by the Central Government have also been striving to bring a better respiratory environment and a longer life expectancy to the people of the entire country, including the northern residents.[11]

Air Pollution Levels in Perspective: China and US

Daily average particulate pollution (PM2.5) in the 10 worst Chinese and US cities



*Anything over 10 micrograms per cubic meter of PM2.5 considered hazardous to health by WHO

The Health Care Issue

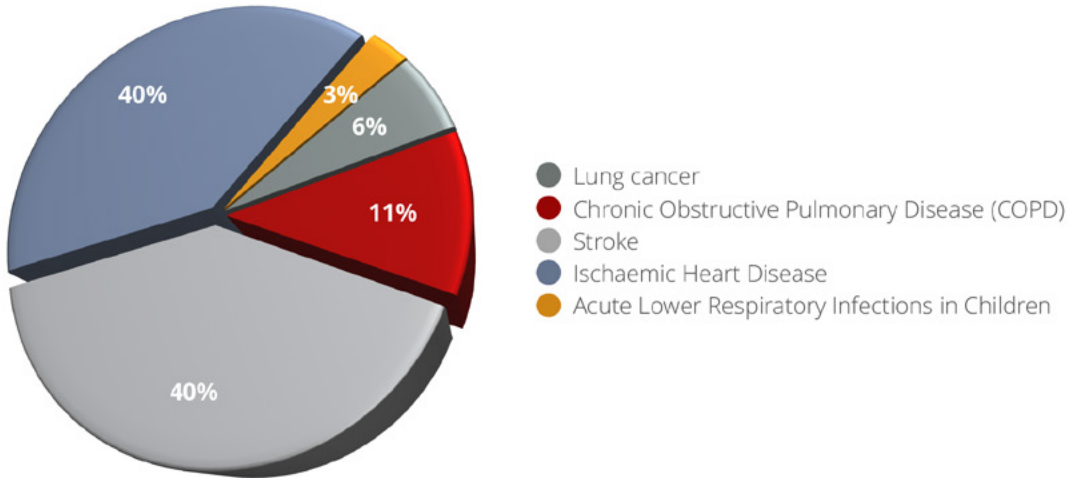
Air pollution has attracted public concern because of its harmful effects on health. In addition to adverse environmental impacts, industrialization also is linked to adverse health impacts on children. For example, according to the World Health Organization, 36 per cent of deaths among children worldwide are attributable to environmental problems, and 43 per cent of the total environmental burden of disease falls on children younger than 5 years old[12]. **In China, exposure to air pollution has been associated with increased prevalence of chronic cough, persistent phlegm, and current asthma; wheezing, daytime and nocturnal attacks of breathlessness; and asthma, bronchitis symptoms, and chronic cough**. With stunning (but typically Chinese) speed, the government has built a nationwide network of monitors tracking levels of PM2.5—the tiny combustion particles that penetrate deep into the body, causing not only breathing problems but also heart attacks, strokes and neurological ailments.

The impact of smog on health has drawn much attention. The prediction of the long-term impact of PM2.5 on cardiovascular health in China remains bleak. Professor Gu Dongfeng at Fuwai Hospital of the Chinese Academy of Medical Sciences, have reports of China's air pollution disease burden and the impact on death, but it did not take into account the prevalence of cardiovascular risk factors in China. In his study, not only the complex

11 http://huanbao.bjx.com.cn/news/20170914/850010.shtml
12 http://www.sciencedirect.com/science/article/pii/S0022347616310848

computer models such as Markov's Monte Carlo and state transition were used to consider the above factors, but also through innovative research, it was found that reducing PM2.5 level and improving air quality can bring about a decrease of hypertension. Similar to the dramatic health benefits of tobacco control, it provides quantitative evidence of the health benefits of air pollution control in China from a public health perspective. In addition, limited by ethics and methodology, clinical trials cannot assess the long-term effects and macroeconomic impacts of air pollution on health from a national perspective. The successful application of this computer simulation study is also of great significance in building "Healthy China 2030" It provides innovative research ideas on the cardiovascular health of Chinese people[13].

Deaths Related to Outdoor Air Pollution – Breakdown by Disease[15]

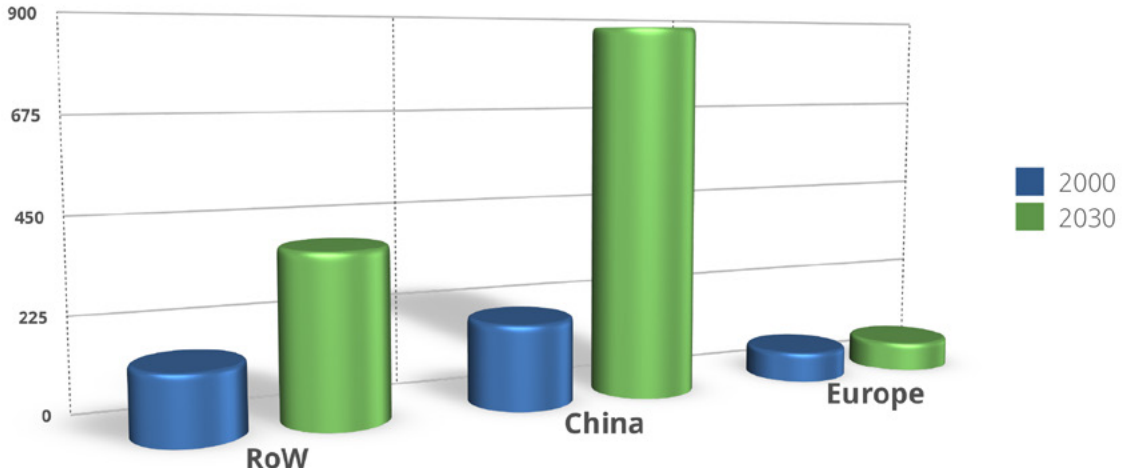


In the above graph, one can see the quantity of people whose deaths were associated with different air pollution caused diseases. Ischaemic Heart Disease and Stroke are the major causes of death due to air pollution. In one of the epidemiological study conducted in the developing world, researchers found that as exposure to particulate air pollution in 272 Chinese cities increased, so did the rate of deaths from cardiovascular and respiratory diseases.

The below graph shows that with respect to premature death from particulate matter air pollution in China, it can be estimated that in 2030 there will be 872 premature death from particulate matter air pollution in China out of each 1,000 people.

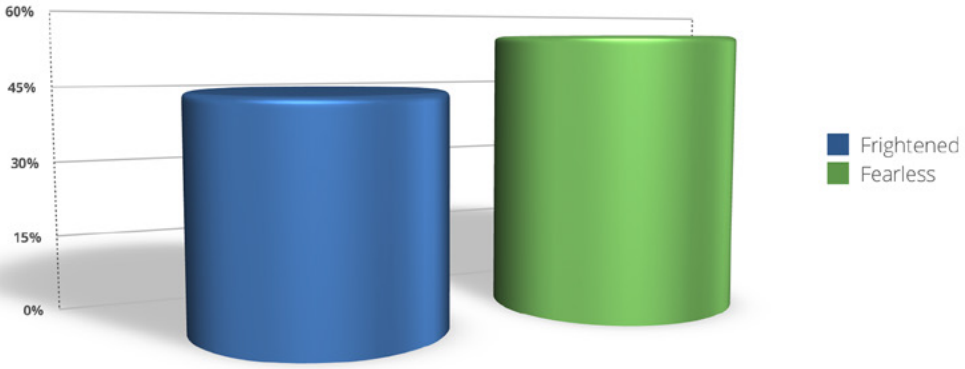
13 http://news.sciencenet.cn/htmlnews/2017/9/387636.shtm
14 http://thecityfix.com/blog/china-clean-air-challenge-health-impacts-transport-emissision-pollution-sustainable-su-song/

Premature Deaths from particulate matter air pollution in cities



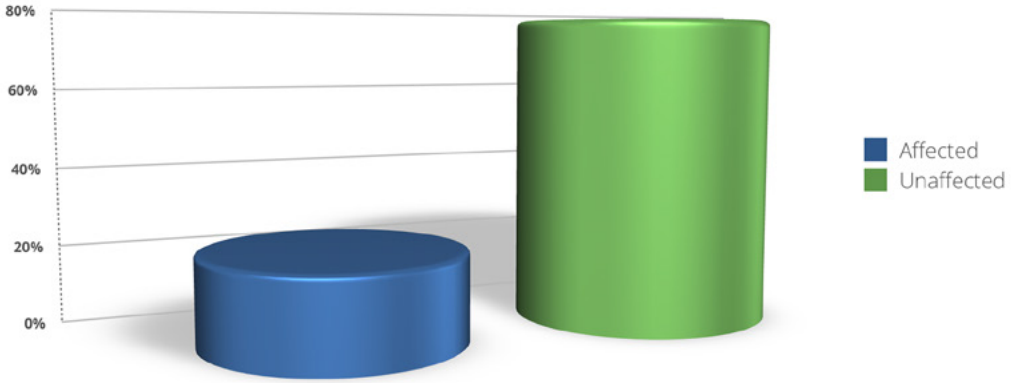
Smog Depression Chart

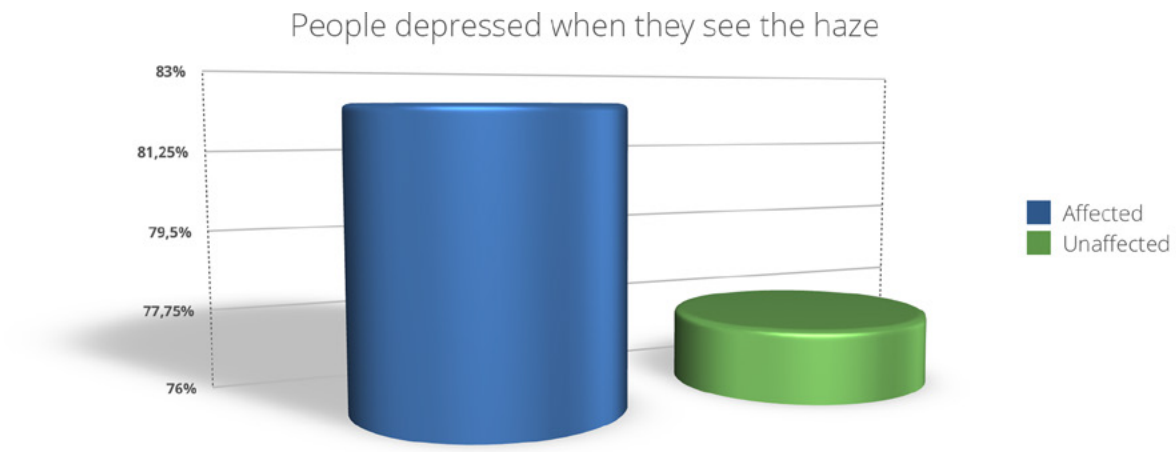
People feel frightened when they see the haze



An online survey of domestic portals shows that **44.87%** of people feel frightened when they see the haze.

People feel anxious and irritable when they see the haze





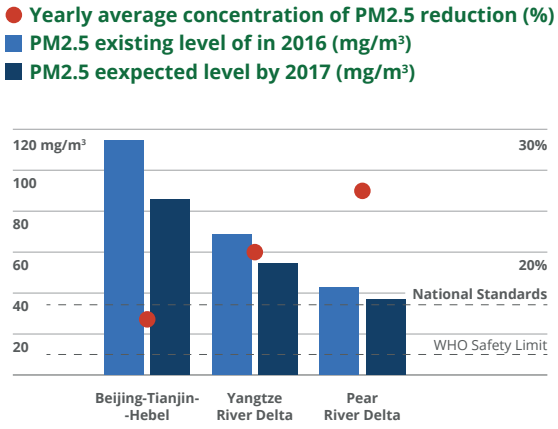
An online survey of domestic portals shows that **82.29%** people think they will feel depressed in the foggy day.

Major Polluted Area of China

Three major city clusters around Beijing, Shanghai and Guangzhou have been told to reduce levels of PM2.5 - the tiny airborne pollutants most harmful to human health and a major cause of smog - by 25, 20 and 15 per cent respectively between 2013 and 2017, according to the plan issued by the State Council. Beijing-Tianjin-Hebei, the Yangtze River Delta and the Pearl River Delta - key industrial regions - should "strive for a reduction in total coal consumption", the plan said, and no new coal-fired power plants would be approved in these regions. Beijing, which was shrouded in thick smog for months last winter, has a specific goal to limit its yearly average of PM2.5 to around 60mg per cubic metre by 2017. This is still well above the national standard of 35, and the safe limit of 10 recommended by the World Health Organisation[15]. As a major measure to improve energy and economic structure, the plan aims to cut coal consumption in the total energy mix to below 65 per cent by 2017, down from 66.8 per cent in 2012.

Cleaning the Air

2017 targets to reduce PM2.5 pollutants

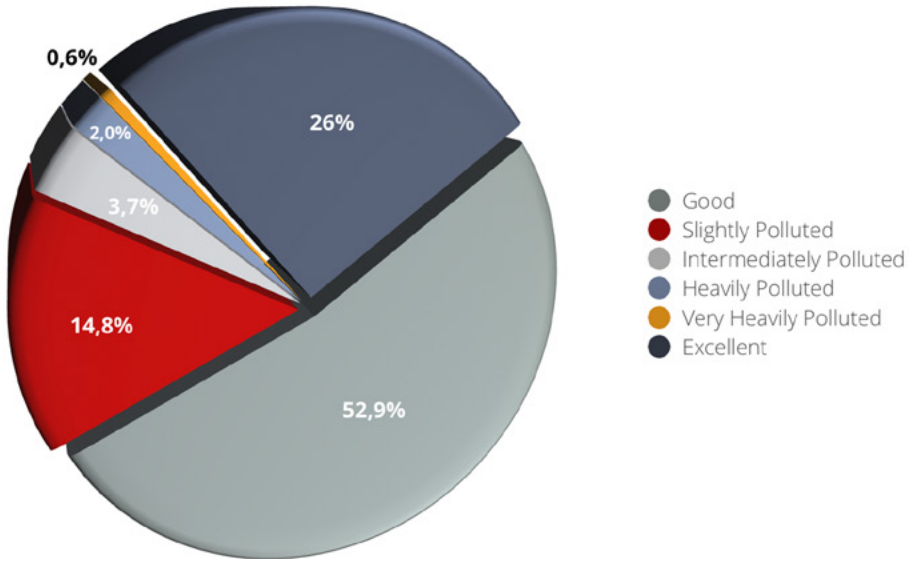


15 http://www.scmp.com/news/china/article/1308794/china-unveils-tough-measures-combat-air-pollution

Atmospheric Environment

According to a report published by Ministry of Environmental Protection The People's Republic of China, major cities are at or above prefecture level (APL). In 2016, all 338 APL cities across the country conducted environmental monitoring. The monitoring results show that 84 cities met national air quality standard, accounting for 24.9 percentage, 254 cities failed to meet national air quality standard, taking up 75.1 percent. The average percent of attainment days on air quality of the 338 cities was 78.8 percentage, up by 2.1 percentage points compared with that of 2015. The amount of nonattainment days took up 21.2 percentage. The percent of attainment days on air quality of 8 cities was 100 percent. The percent of attainment days on air quality of 169 cities was 80%~100%. The percent of attainment days on air quality of 137 cities was 50 percentage~80 percentage and the percent of attainment days on air quality of 24 cities was less than 50 percentage[16]

The percentage of air quality standards of 338 cities in 2016



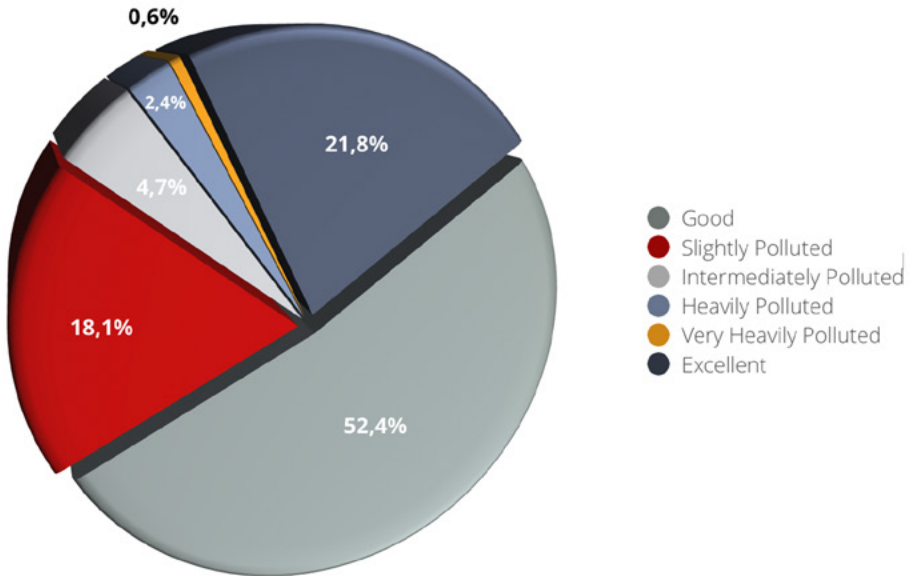
In 338 cities, 2,464 days were under heavy pollution and 784 days were under very heavy pollution. Among them, days with PM2.5 as the primary pollutant took up 80.3 percentage and those with PM10 as the primary pollutant took up 20.4 percentage and with O3 as the primary pollutant took up 0.9 percentage. There were 32 cities suffering from more than 30 days under heavy or very heavy pollution, and they were distributed in Xinjiang (some cities here were influenced by sandstorm), Hebei, Shanxi, Shandong, Henan, Beijing and Shaanxi.

In 2016, monitoring results of 74 cities under Stage I monitoring based on the newly amended ambient air quality standard (including APL cities in key regions such as Beijing-Tianjin-Hebei, the Yangtze River delta and Pearl River delta, municipalities, provincial capital cities and cities under separate plan of the State Council) (the 74 cities) show that the percentage of days of the 74 cities meeting air quality standard was 74.2 percentage, up

16 https://www.cmc-consultants.com/hubfs/pollution_whitepaper_2017/Environment%20in%20China%202016.pdf

by 3.0 percentage points compared with that of 2015. The average amount of days failing to meet the standard took up 25.8%. The attainment rate was 80 percentage~100 percentage for 26 cities, 50 percentage~80% for 42 cities. The nonattainment percent of 6 cities was less than 50 percentage. The amount of days with PM2.5 as the primary pollutant took up 57.5 percentage of the total non-attainment days, the amount of days with O3 as the primary pollutant took up 30.8 percentage, the amount of days with PM10 as the primary pollutant took up 10.5 percentage, the amount of days with NO2 as primary pollutant took up 1.6 percentage and the amount of days with SO2 as primary pollutant took up 0.1 percentage.

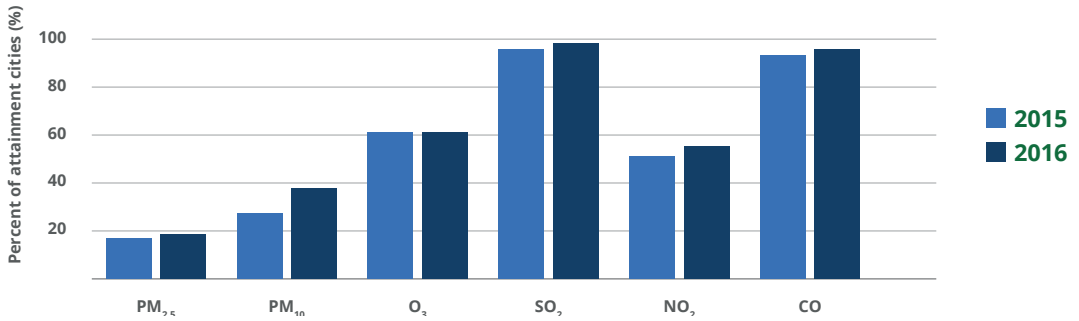
The percentage of air quality standards of 74 cities in 2016



The analysis results of air quality comprehensive index show that the top 10 cities with poor air quality (from No.74 to No. 65) in the 74 cities were Hengshui, Shijiazhuang, Baoding, Xingtai, Handan, Tangshan, Zhengzhou, Xi'an, Jinan and TaiYuan. The top 10 cities with relatively good urban air quality (from No.1 to No.10) were Haikou, Zhoushan, Huizhou, Xiamen, Fuzhou, Shenzhen, Lishui, Zhuhai, Kunming and Taizhou.

No.	City	Comprehensive Index	The Biggest Index	Primary Pollutant	No.	City	Comprehensive Index	The Biggest Index	Primary Pollutant
1	Haikou	2.55	0.67	O3	38	Harbin	5.22	1.49	PM2.5
2	Zhoushan	3.05	0.86	O3	38	Huai'an	5.22	1.51	PM2.5
3	Huizhou	3.25	0.83	O3	40	Chongqing	5.24	1.54	PM2.5
4	Xiamen	3.29	0.8	PM2.5	40	Hangzhou	5.24	1.40	PM2.5
5	Fuzhou	3.35	0.77	PM2.5	42	Zhenjiang	5.28	1.43	PM2.5
6	Shenzhen	3.44	0.84	O3	43	Yangzhou	5.30	1.46	PM2.5
7	Lishui	3.46	0.94	PM2.5	44	Suzhou	5.32	1.31	PM2.5
8	Zhuhai	3.47	0.9	O3	45	Taizhou	5.40	1.57	PM2.5
9	Kunming	3.71	0.8	PM2.5	46	Suqian	5.45	1.60	PM2.5
10	Taizhou	3.81	1.03	PM2.5	47	Hefei	5.56	1.63	PM2.5
11	Zhongshan	3.83	0.96	O3	48	Nanjing	5.58	1.37	PM2.5
12	Lasa	3.86	1.14	PM10	49	Hohhot	5.67	1.36	PM10
13	Nanning	3.95	1.03	PM2.5	50	Wuhan	5.69	1.63	PM2.5
14	Guiyang	4.00	1.06	PM2.5	51	Changzhou	5.71	1.51	PM2.5
15	Dongguan	4.09	1.04	O3	52	Wuxi	5.79	1.51	PM2.5
16	Jiangmen	4.14	1.01	O3	53	Qinhuangdao	5.87	1.31	PM2.5
17	Zhaoqing	4.23	1.06	PM2.5	54	Shenyang	6.09	1.54	PM2.5
18	Quzhou	4.35	1.20	PM2.5	55	Xining	6.18	1.61	PM10
19	Ningbo	4.41	1.09	PM2.5	56	Chengdu	6.38	1.80	PM2.5
20	Foshan	4.45	1.09	PM2.5	57	Xuzhou	6.54	1.71	PM2.5
21	Guangzhou	4.47	1.15	NO2	58	Yinchuan	6.63	1.60	PM2.5
22	Zhangjiakou	4.50	1.19	PM10	59	Tianjin	6.65	1.97	PM2.5
23	Wenzhou	4.52	1.09	PM2.5	60	Lanzhou	6.79	1.89	PM10
24	Yancheng	4.53	1.23	PM2.5	61	Beijing	6.81	2.09	PM2.5
25	Dalian	4.60	1.11	PM2.5	62	Urumchi	6.95	2.11	PM2.5
26	Jinhua	4.61	1.31	PM2.5	63	Langfang	7.11	1.89	PM2.5
27	Nanchang	4.70	1.23	PM2.5	64	Cangzhou	7.13	1.97	PM2.5
28	Shaoxing	4.76	1.31	PM2.5	65	TaiYuan	7.66	1.89	PM2.5
29	Shanghai	4.80	1.29	PM2.5	66	Jinan	7.77	2.17	PM2.5
30	Jiaxing	4.85	1.26	PM2.5	67	Xi'an	7.82	2.17	PM2.5
31	Huzhou	5.02	1.31	PM2.5	68	Zhengzhou	7.96	2.23	PM2.5
32	Nantong	5.04	1.31	PM2.5	69	Tangshan	8.27	2.11	PM2.5
33	Changsha	5.06	1.51	PM2.5	70	Handan	8.56	2.34	PM2.5
34	Qingdao	5.09	1.31	PM2.5	71	Xingtai	8.85	2.49	PM2.5
35	Lianyungang	5.11	1.31	PM2.5	72	Baoding	9.05	2.66	PM2.5
36	Changchun	5.17	1.31	PM2.5	73	Shijiangzhuang	9.30	2.83	PM2.5
36	Chengde	5.17	1.16	PM10	74	Hengshui	10.44	3.43	PM2.5

Year-on-year comparison of the percent of cities with attainment of the six pollutants meeting national air quality standard in 74 cities in 2016



Is it a concern for Chinese people?

Urbanization and Healthcare

Even though urbanization in China has in some cases led to better healthcare and improved quality of life, it has also led to increased health risks resulting from environmental factors such as air pollution, occupational and traffic hazards, and water contamination. The current situation surrounding air pollution in mainland China raises concerns for public health policymakers and practitioners. Developing appropriate prevention strategies aimed at reducing health risks from air pollution and creating safe living environments—environments in which children and adolescents safely can partake in physical activity without having to worry about the air they are breathing and/or otherwise compromising their health. Exposure to air pollution among children and adolescents is a serious public health dilemma in China[17].

In a monitoring network conducted by a nationwide study to evaluate short-term associations between PM2.5 and daily cause-specific mortality in China, the researchers found:

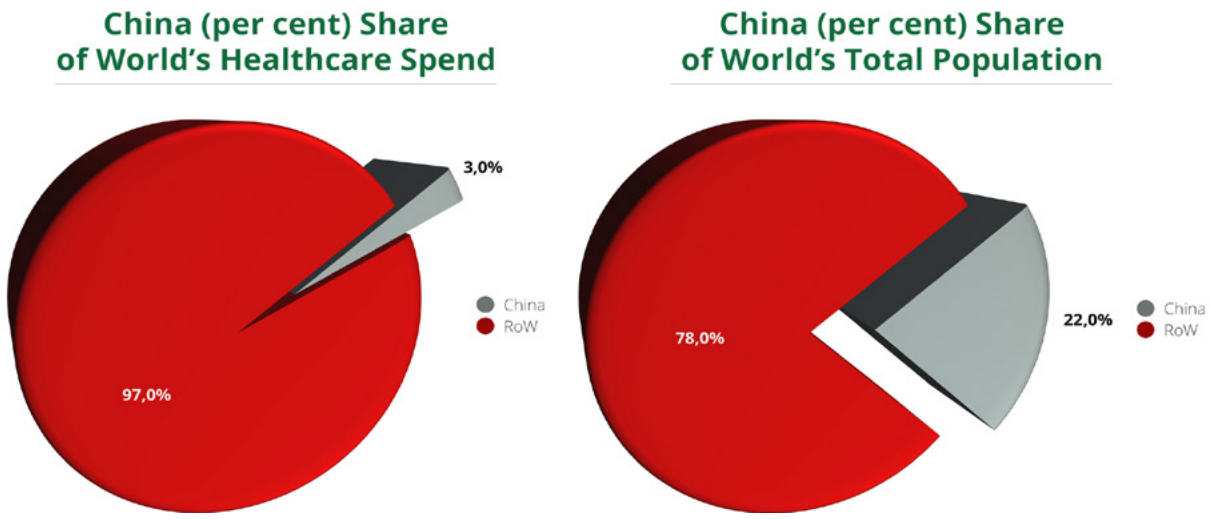
1	**The average annual exposure to PM2.5 in the Chinese cities was 56 micrograms per cubic meter which is above the World Health Organization air quality guidelines of 10g/m3**
2	**Each 10 µg/m3 increase in air pollution was associated with a 0.22 per cent increase in mortality from all non-accident related causes.**
3	**Each 10 µg/m3 increase in air pollution was associated with a 0.29 per cent increase in all respiratory mortality and a 0.38 per cent increase in chronic obstructive pulmonary disease (COPD) mortality.**
4	**Mortality was significantly higher among people age 75 and older and among people with lower levels of education.**
5	**The association between PM2.5 levels and mortality was stronger in cities with higher average annual temperatures**

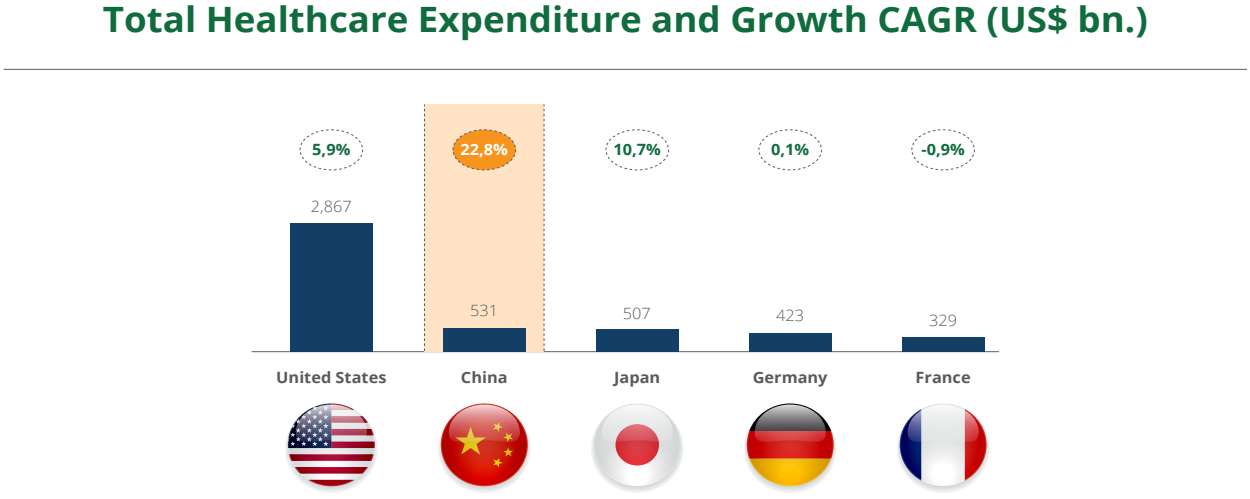
17 https://www.sciencedaily.com/releases/2017/02/170210084550.htm

The researchers speculate that differences in educational attainment may result in environmental health inequalities and access to health care that affect mortality. In warmer cities, the authors hypothesize residents may spend more time outdoors and open windows, increasing their exposure to PM2.5.

[18]In a medical journal "Circulation" published online the research results of Fu Wai Hospital of Chinese Academy of Medical Sciences, the study found that from 2017 to 2030, the national annual mean particulate air (PM2.5) would drop from 61 micrograms per cubic meter to 55 micrograms (equivalent to PM2.5 in Beijing during the Olympic Games), allowing 84-year-old urban residents to reduce the risk of death from 667,000 cardiovascular diseases.

The researchers said their study suggests a weaker association between increases in PM2.5 and mortality than studies conducted in Europe and North America.





18 http://news.sciencenet.cn/htmlnews/2017/9/387636.shtm

Across more than 100 cities in mainland China, there were, **on average, 29.9 smoggy days (i.e., days with high air pollution) during both 2013 and 2014**. When extremely poor air quality was reported (i.e., ambient air quality index values 201-300 or >300), many outdoor school physical activities and physical education classes had to be cancelled in cities such as Beijing, Harbin, and Nanjing.

Coupled with declining physical activity levels and the increasing prevalence of obesity and being overweight among children and adolescents in mainland China, this raises a significant constellation of public health issues requiring urgent attention (e.g., understanding the beneficial effects of physical activity in conjunction with the detrimental effects of air pollution)

For example, efforts to increase levels of MVPA (Moderate to vigorous physical activity) among children include school-based sports and/or exercise activities, which typically occur in outdoor settings (e.g., playgrounds, running tracks), where sustained exposure to air pollution during physical activity can lead to serious health consequences, such as reduced lung function and asthmatic symptomatology. With the need to increase the level of physical activity among children and adolescents on the one hand and concerns about air quality on the other, China faces a distinctive public health challenge.

In an article published in 2017, it is stated that the Children and adolescents in mainland China are facing two serious and conflicting public health threats: ongoing exposure to air pollution and an increasingly sedentary lifestyle with little regular physical activity outside school. Many cities and countries around the world grapple with air pollution issues, but there is particular concern for children growing up in China in part because they tend to commute more on foot or bike and their playgrounds and sports fields are often found near busy streets or highways[19].

In a 2017 survey, it is found that, very few Chinese children today are participating in moderate or vigorous physical activity outside of school, and the number of overweight and obese children in China has more than doubled in the last 25 years.

19 https://www.sciencedaily.com/releases/2017/01/170110194647.htm

University in China and a former visiting scholar at OSU, suggest the two problems should be addressed together in four ways.

The Government's Efforts

Chinese cities are pressing residents to give up coal stoves and furnaces at home. Officials have required higher-quality gasoline and diesel for vehicles. Car emissions standards set to take effect in 2020 will be comparable to European and American ones.

The government has made the data from those monitors publicly available. It has done the same with measurements taken outside thousands of factories. Anyone with a smartphone in China can now check local air quality in real time, see whether a particular facility is breaching emissions limits, and report violators to local enforcement agencies via social media. The level of information compares favorably to what's available in the U.S. Leaders order temporary factory closures to clear the air ahead of high-profile events like international summits. They close factories for weeks in November and December so the city won't exceed its annual pollution limit.

Air pollution often worsens during China's winter months due to a rise in heating demand by residents dependent on coal-fired power stations for power[20].

In an Article published on Feb, 2017, the Air quality in 338 of China's largest cities on average was said to have deteriorated in the first six months, with 74.1 per cent of all days during the period experiencing clean air, down 2.6 per cent points from a year earlier. But 55.3 per cent of the January-to-June period were good days, down 5.8 per cent points.[21].

20 https://www.reuters.com/article/us-china-environment/chinas-air-quality-deteriorates-due-to-winter-pollution-official-idUSKBN1A50F1
21 https://www.reuters.com/article/us-china-environment/chinas-air-quality-deteriorates-due-to-winter-pollution-official-idUSKBN1A50F1

Almost all major public construction projects in Beijing will be halted this winter (2017) in an effort to improve the city's notorious air quality, according to official media, citing the municipal commission of housing and urban-rural development. It added that the city government will step up supervision of dust control at any construction sites that do remain operational and implement restrictions on the use of machinery with high emissions.[22].

The country's leadership has realized that quality of life is just as important as the material benefits of GDP and job creation. But the task ahead calls for a much greater commitment.[23]

China has pledged to cut average concentrations of airborne particles known as PM2.5 by more than 15 per cent year on year in 28 northern cities from October to March to meet key smog targets, the environment ministry said.

In a 143-page winter smog "battle plan" posted on the website, the Ministry of Environmental Protection said the new target would apply to Beijing and Tianjin, along with 26 other cities in the smog-prone provinces of Hebei, Shanxi, Shandong and Henan.

China's efforts to control pollution have often roiled prices for steel, iron ore and coal as regulations frequently result in cuts of output of these and other commodities.

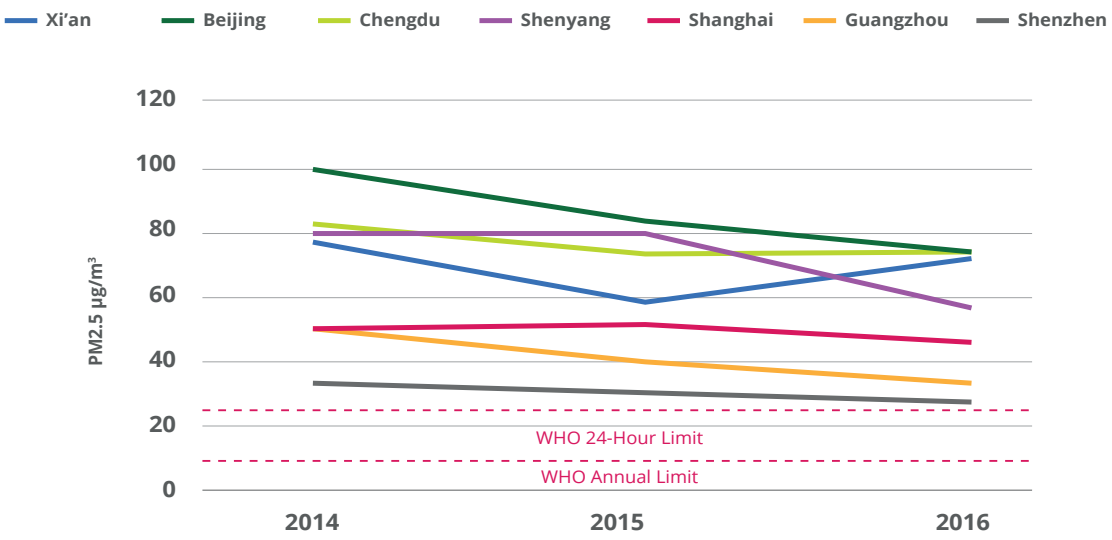
China is under pressure this year to meet politically important 2017 air quality targets. It aims to cut 2012 levels of PM2.5 by more than a quarter in the Beijing-Tianjin-Hebei region and bring average concentrations down to 60 micrograms per cubic metre in the Chinese capital. But analysts said China was still on course to meet the 2017 targets set out in a groundbreaking air quality action plan published by the government in 2013[24]. The

22 http://www.scmp.com/news/china/economy/article/2111548/beijing-slaps-ban-winter-construction-bid-improve-air-quality
23 http://www.scmp.com/comment/insight-opinion/article/2114460/fighting-pollution-crucial-growth
24 http://www.scmp.com/news/china/policies-politics/article/2108109/china-vows-big-winter-air-pollution-cuts-northern

Beijing-Tianjin-Hebei region has pledged to cut PM2.5 levels by more than quarter over the 2012-2017 period. Beijing is also under pressure to cut average concentrations to less than 60 micrograms for the whole of 2017[25].

Recently a group of Chinese special-operations soldiers moved netizens with their commitment to environmental protection. The soldiers carried homemade dustbins on their back during long-distance run, 81.cn reported on Jan. 19. The brigade commander explained that the troops pass through many towns and cities during their training. In order to avoid leaving garbage along the route, the soldiers carry dustbins made from old cartons[26].

PM2.5 Air Pollution in Major Chinese Cities 2014-2016[27]



Seems that with respect to 2014, the air pollution level decreased in 2016 in major Chinese cities. The slope of every individual lines is negative, which indicates that air pollution controls are working.

Environmental inspectors are intended to focus on the prominent environmental issues that the central authorities are paying close attention to: the mass reaction of the masses, and the adverse social impact, as well as the handling of the environmental problems. The inspection focuses on the regional river basins where the environmental quality is deteriorating and the rectification of them, with emphasis on supervision by the masses, Environmental legislation, and legislation changes and so on. One of the basin remediation projects is the supervision and inspection of **garment manufacturers or enterprises.**

The front-shop and back-end factory platforms are also trying their best to make point-to-point transactions between the stores and manufacturers. They push the small purchases of many shops into more manufacturers to scale production, which increases the chances and options for manufacturers to obtain production and operation elements.

25 https://www.reuters.com/article/us-china-pollution/northern-china-air-quality-worsens-in-january-july-ministry-idUSKCN1AW0QG
26 https://defence.pk/pdf/threads/china-environ-prot-ep-industry-technology-solid-waste-mgt-liquid-treat-news-discussions.432593/page-7
27 https://www.quora.com/How-bad-is-air-pollution-in-Shenzhen-compared-to-other-cities-in-China

Direct docking between the two parties will reduce the number of stakeholders and intermediate links, ensure accurate and efficient transactions, shorten the production and sales chain, improve the ecological environment of commodity circulation, save costs and increase profits[28].

Relevant case studies:[29]

In Dongguan, Jufeng Rubber Products Co., Ltd. located in Liaobu Changshan Dafeng Industrial Zone, is a rubber and plastic products business. In the foam workshop, there is white dust and a strong choking smell everywhere. The flue gas on the first floor leads directly to a rudimentary exhaust passage on the roof. Without any treatment, the unpleasant white gas drifts around in the air, and there is a residential building around just 100 meters away from the discharge port. When provincial-level environmental inspection organization climbed up to the top of the shop to look further into the exhaust gas treatment facilities, they could not find any control equipment. The exhaust gas collected from the plant was directly discharged on the roof.

In Guangzhou, Guangzhou Xintang Town, Guangzhou Malata Paper Products Co., Ltd. An inspector found that in the corner of the company's factory there is a drain allowing wastewater to freely flow into the river outside the wall. In this regard, the factory staff explained that a sewage collection pond was built outside in the yard. However, to collect all the wastewater here it would need to be at least 20 cubic meters in size, but this pool could not even contain 3 cubic meters, and most of the sewage failed to lead to the collection pool in any case. The sticky brown waste residue piles into a two or three meters tall "hill," while at the bottom seeps out black waste, which has been flowing to the factory wall 10 meters away and then into the river.

A special inspection of the province's air and water pollution prevention is launched. The largest provincial-level environmental inspection organization at the provincial level has covered 9 cities including Guangzhou, Shenzhen, Foshan, Dongguan, Zhongshan, Jiangmen, Zhaoqing, Qingyuan and Yunfu. Provincial Environmental Pro-

28 http://www.sohu.com/a/165569871_401190
29 http://www.gd.gov.cn/ywdt/zfjg/201706/t20170620_253882.html

tection Department said that after two weeks of inspection found that the current “small casualties” of serious pollution of enterprises highlighted the need to vigorously do a good job around the remediation to improve land use efficiency and reduce environmental pollution, forcing through the strengthening of environmental protection upgrades. The inspection found that the existing problems mainly focused on the improper use of pollution treatment facilities (116 cases), construction project environmental impact assessment (96 cases), non-construction of pollution treatment facilities (80 cases), water and sewage disposal (64 cases), and violation of the construction project “three simultaneous” system (62 cases). The main problems discovered were ‘small and scattered pollution,’ and the environmental protection facilities of large-scale manufacturers were relatively perfect.

The inspector’s on-site inspection will be completed in a real-time Enforcement App. On-site inspection of the situation, to be confirmed by the inspection team, will immediately be uploaded to the platform. “Internet + Environmental Protection” promoted by Guangdong has helped to promote environmental law enforcement and make it more transparent and fair. “When using this App, ask the inspectors to open the GPRS positioning, to ensure that law enforcement information is uploaded immediately after on-site inspection.” The site law enforcement pictures, videos and illegal facts and other information cannot be changed on their own upload.

The Ministry of Environmental Protection of the People’s Republic of China (MEP) has adopted a series of measures ranging from “stubborn deployment” to intensifying inspection and rectification of the “scattered pollution-polluting enterprises” in order to effectively improve air quality and achieved initial success. Since March 2017, ambient air quality in Beijing, Tianjin and surrounding areas has continued to improve with the best results since 2013. The average concentration of PM2.5 from March to August 2017, in Beijing was only 49 μg / m3. The same period in 2016 decreased by about 25%, the monthly average concentration is the lowest since 2013.

However, the monitoring data shows that, the overall air quality in Beijing, Tianjin and surrounding areas has been continuously improving in following years. However, the improvement in air quality in autumn and winter is not significant. In particular, the average PM2.5 concentration in the heating season during 2016-2017 is lower than a year earlier. Rebound, severe and above pollution reduction is not obvious. To this end, the MEP, in conjunction with the relevant departments, provincial and municipal governments, on the basis of existing policies and measures, studied and promulgated the "Action Plan for the Comprehensive Management of Air Pollution in the Autumn and Winter of 2017-2018 in Beijing, Tianjin and the Neighboring Areas" +6 "package program. Storming problem-oriented actions, focusing on "scattered pollution" enterprises and cluster comprehensive improvement and elevated sources of compliance discharge standards, increase coal reduction, standardization transformation, and peak production measures efforts. In particular, it is an important breakthrough to properly handle heavily polluted weather. While setting targets for improving air quality throughout the country, the ratio of declining days with heavy pollution is clearly defined, urging local governments to fully respond to the heavily polluted weather.

In order to properly handle heavily polluted weather, the MEP starts from four aspects with a multi-pronged approach and comprehensive measures.[30].

1. **Reinforce the emergency measures to reduce emissions**
   The MEP issued "re-classification of heavily polluted weather warning standards and emergency measures to amend emission reduction work" requires 2 +26 cities as soon as possible to improve the heavy pollution weather emergency plan, the main unification of different levels of early warning and pollutants emission reduction ratio. The emission reduction measures will be implemented on the list, so that a policy to ensure emergency measures achieves tangible results.
2. **Improve the ability of forecasting**
   Greatly improve the forecasting platform computing capacity, enhance the ability of forecasting and forecasting from 7 days to 10 days, and provide sufficient time to take effective measures.
3. **Strengthen supervision**
   In the event of heavily polluted weather, strengthen the inspection team to conduct emergency inspections in accordance with the list of special inspections to ensure that emissions reduction measures are in place.
4. **Carrying out regional emergency response**
   Once regional heavy pollution is predicted, the MEP will push ahead with the warning message to the relevant cities according to the result of the regional pollution monitoring. The cities in the region will start the relevant warning in time according to the warning message measures to reduce the overall level of regional pollution emissions, reduce the accumulation of pollutants, and reduce the impact of heavily polluted weather.

   In addition, the 35th Meeting of the Leading Group for Overall Deepening Reform of the Central Government has examined and approved the "Pilot Scheme for Trans-regional

30 http://www.gansu.gov.cn/art/2017/9/8/art_5308_321154.html

Environmental Protection Organizations". The MEP will, in accordance with the requirements of the Central Government's approval, do a good job in the pilot work and run as soon as possible the atmospheric and environmental management of Beijing-Tianjin-Hebei Institutions, assisting work to deal with heavily polluted weather in autumn and winter.

An interesting indicator: sales of air purifiers[31,32,33]

Market Overview

The air purification systems market size is estimated to grow from USD 14.46 Billion in 2015 to reach USD 20.65 Billion by 2020, at a CAGR of 7.38 per cent. The air purification systems market comprises companies such as Honeywell International Inc. (U.S.), 3M Company (U.S.), Sharp Corporation (Japan), Daikin Industries, Ltd. (Japan), and Air Products and Chemicals, Inc. (U.S.). At present, China's air purifier industry is in the initial stage of development, after years of market cultivation, the market situation is thriving. In 2016, the annual sales volume of air purifiers in China reached 5.2 million units. It is estimated that by 2017, the market will sell nearly 10 million units.

According to Technavio's market research report, the residential air purifier market in China is expected to grow at a steady rate and post a CAGR of close to 9 per cent during the forecast period. Product innovation in terms of cleaning technology, features, and design that stimulate higher selling price will drive the growth prospects for the residential air purifier market in China during the forecast period. To launch new and better residential air purifiers, a large number of manufacturers are increasingly focusing on improving their clean air delivery rate (CADR), incorporating nanotechnology, increasing energy efficiency, and reducing noise levels[34].

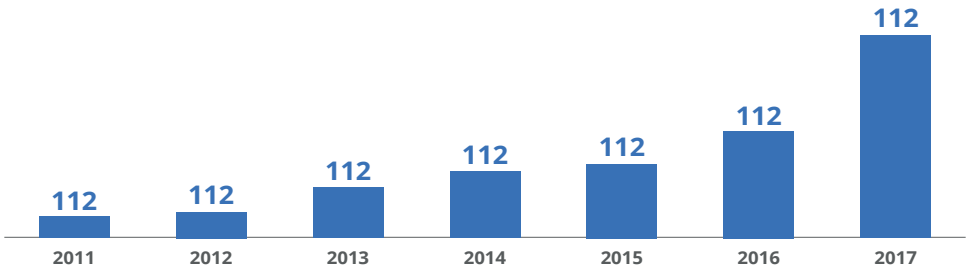
31 http://en.people.cn/90882/8549468.html
32 http://www.scmp.com/business/companies/article/2062014/sales-top-end-face-masks-and-air-purifiers-soar-smog-continues
33 https://www.newstatesman.com/politics/uk/2017/10/i-just-made-spaghetti-why-brands-are-selling-millennials-twee-vision-adulting
34 https://www.technavio.com/report/residential-air-purifiers-market-in-china-2017-2021

According to AVC data statistics, in the first half of 2017, the sales volume of air purifier reached 7.9 billion yuan, an increase of 47.3% over the same period of previous year, making it the second-highest selling category of the home appliance market. China's air purifier market has reached 5.74 million units, and in the future China's air purifier sales will keep a 30% to 35% growth rate. In this view, the annual sales of air purifiers this year is expected to exceed 15 billion.

In addition, in terms of brand development, "the first half of 2017 home appliance online shopping analysis" shows that in the first half of this year, the market share of overseas brands in the online market exceeded 60%, but domestic brand sales growth faster than foreign brands, an increase of up 81.7%. Compared with the end of 2016, the market share of foreign brands is slightly reduced, and domestic brands are gradually gaining the market share of foreign brands.

Not only are the domestic brand sales rising, China's air-cleaning industry in the next few years will also have rapid development, at the same time the products will also quickly go into millions of households. GF Securities Research estimates 2017 to 2021, air purifier sales and sales compound annual growth rate will reach 17.8% and 20.8% respectively, by 2021, the air purifier market is expected to reach 985 million units. Sales of 43.1 billion yuan. And there are predictions that the next few years, the air purifier is expected to become the fifth most important home appliance after the color TV, refrigerators, air conditioners, and washing machines.[35].

China's air purifier market sales forecast



China's air purifier transactions are increasing year on year. China's air purification market capacity continues to grow, and the air purifier is very likely to become China's fifth largest selling home appliance. This can be seen in the above bar graph. Initially it was 112 in 2011, which increases up to 982 in 2017.

According to the forward industry research institute "China's air purifier industry market demand forecast and investment analysis report's" finishing data show that China's air purifier market has reached 5.74 million units, the retail sales and retail sales were achieved year on year respectively 19.3% and 23.6 % Of the rapid growth. The future of China's air purifier sales will remain 30% -35% growth rate is expected in 2017 sales up to 100 billion yuan in 2020 up to 300 billion yuan.[36].

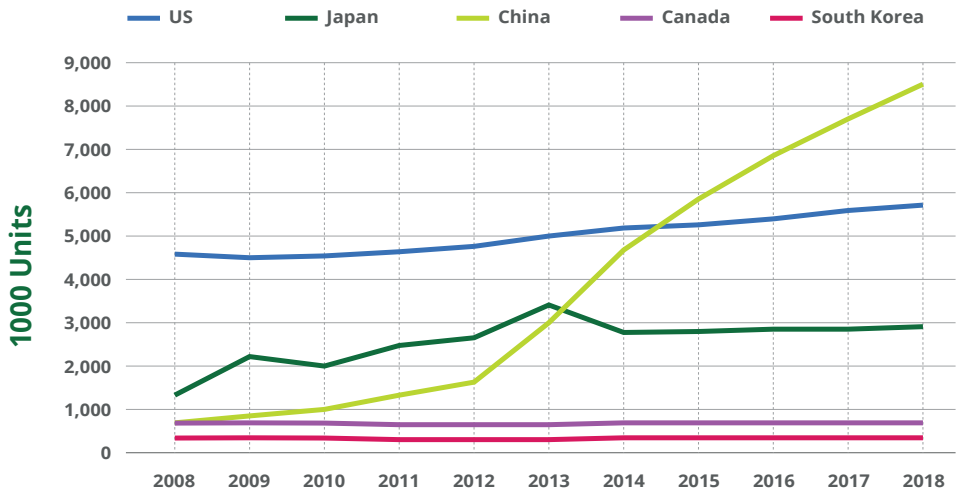
35 http://tech.sina.com.cn/e/2017-09-19/doc-ifykymue7066519.shtml
36 https://bg.qianzhan.com/report/detail/459/170814-31a6d928.html

The analysts forecast the residential air purifier market in China to grow at a CAGR of 8.56% during the period 2017-2021.

Residential Air Purifier Market in China 2017-2021, has been prepared based on an in-depth market analysis with inputs from industry experts. The report covers the market landscape and its growth prospects over the coming years. The report also includes a discussion of the key vendors operating in this market. Smart and connected air purifiers are becoming popular in Chinese market. The increasing preference for smart air purifiers is a trend in the residential air purifier market in China. These can be easily operated through smartphones and tablets. Many players are offering such smart air purifiers, which can be connected through a simple mobile application available on different operating systems such as Android and iOS that can be controlled through wireless technologies such as Wi-Fi and Bluetooth.

The air purifier market in China is growing due to awareness initiatives on the impact of air pollution on health, deteriorating air quality, rapid urbanization in developing countries, and increasing vehicular emissions. China's air pollution has worsened over the last few years, due to which, adults as well as children have started developing health problems like frequent headaches, lung cancer, heart problems, strokes, and chronic and acute respiratory diseases such as asthma[37].

Top Five Countries for Air Purifier Volume Sale 2008-2018[38]



Air purifiers can cost Chinese consumers the equivalent of hundreds, even thousands of dollars, with foreign brands such as Siemens, Philips, and Daikin the top sellers. During the period 2017-2018, China is expected to become the leading country for air purifier sales globally.

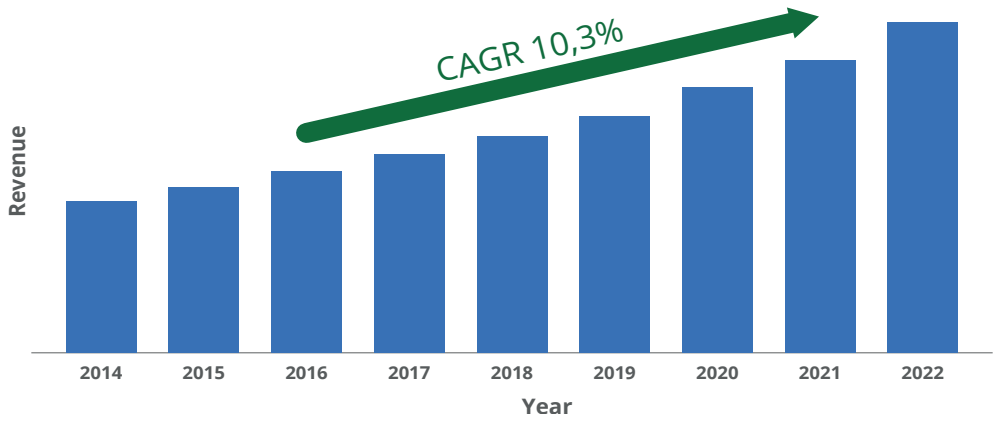
37 http://www.businesswire.com/news/home/20170707005412/en/Residential-Air-Purifier-Market-China-2017-2021
38 http://globalriskinsights.com/2016/01/meet-the-companies-cashing-in-on-chinas-pollution-crisis/

Air Purifiers Market Trends

Sales of face masks have also risen dramatically in 2014 with many retailers in Beijing reporting that they had sold out stock during the city's most recent bout of smog. **Chinese state media reported that 217,000 people bought masks in seven days on the online retail platform Tmall.com in 2014 after reporting about China air condition.** One manufacturer, 3M, which sells its products on Tmall, sold out of 26 of its 29 products. **Then sales of air purifiers and face masks on Alibaba's Tmall cross-border market place more than tripled during November 2016 as tens of millions of residents across the country – particularly in Beijing** – readied themselves to battle against toxic air, a time now annually dubbed the "smog season."[39]

Sales of air purifiers and face masks are booming in China as citizens attempt to protect themselves from the lung-choking smog that plagues many of the country's cities.

China in-vehicle air purifier market revenue, 2014 - 2022



With the air quality still deteriorating, Chinese households have been shelling out on more-sophisticated appliances from the US and Europe to filter out particulate air matter from their homes and offices, said Tmall.

The highest concentration and risk of PM2.5 was observed in the Beijing–Tianjin–Hebei economic belts, and Shandong, Henan, Shanxi, Hubei and Anhui provinces. Nevertheless, the highest concentration of O3 was irregularly distributed in most areas of China. A high-risk distribution of PM10, SO2 and NO2 was also observed in these regions, with the high risk of PM10 and NO2 observed in the Hebei and Shandong province, and high-risk of PM10 in Urumchi. The high-risk of NO2 distributed in Beijing-Yangtze River Delta region-Pearl River Delta region-central[40].

39 https://www.theguardian.com/environment/2014/mar/07/china-pollution-smog-air-purifiers-masks
40 https://bmcpublichealth.biomedcentral.com/articles/10.1186/s12889-017-4130-1

AIR QUALITY INDEX

Air Quality Index (AQI) Values	Levels of Health Concern	Health Effects
0 to 50	Good	Little or No Risk
51 to 100	Moderate	Acceptable Quality
101 to 150	Unhealthy for Sensitive Groups	General Public not likely affected
151 to 200	Unhealthy	All May Experience Some Effects
201 to 300	Very Unhealthy	All May Experience More Serious Effects
301 to 500	Hazardous	Emergency Conditions

Beijing has a four-tier alert system, using blue, yellow, orange and red to indicate the air pollution level.

Under the orange alert, manufacturing plants suspended or cut production, building work was halted and barbecues were not allowed. Beijing removed its orange alert for heavy air pollution at midnight on Feb, 2014.

Dec 2016, the Chinese capital was blanketed in a grey haze that saw schools shut and vehicle use limited as its first "red-alert" was issued – an air reading deemed "hazardous" by United States standards.

But on the street during a red alert it is still commonplace to see ordinary people wearing a scarf over their mouth and nose, rather than a protective mask.

China is in the fourth year of a "war on pollution" designed to reverse the damage done by decades of untrammeled economic growth, and allay concerns that hazardous smog, and widespread water and soil contamination are causing hundreds of thousands of early deaths every year[41].

The Minnesota-based company said it has sold over 8,500 packs of signature "KN95" respirators on Tmall in the past month, regardless of it being almost 10 times more expensive than a regular mask sold at local Chinese convenient stores.

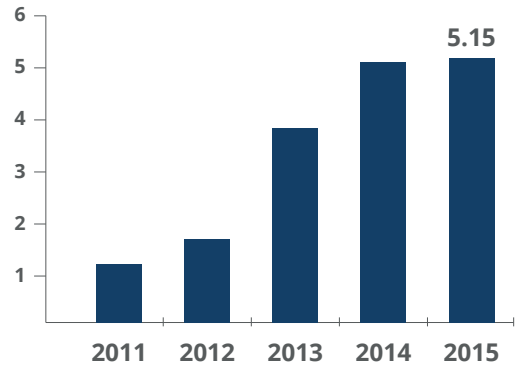
Over the years, there has not been much change in the number of air purifier brands, with about 20 active in the China market, including Boneco from Switzerland, Philips from Holland, along with Panasonic and Sharp from Japan. The majority of the active brands are foreign, coming mainly from European countries that have been industrialised for many years.

According to Grand View Research Inc., the global indoor air purification market is poised to almost double within ten years to US$21.82 billion by 2024, with China singled out as a pre-eminent driver behind the growth.

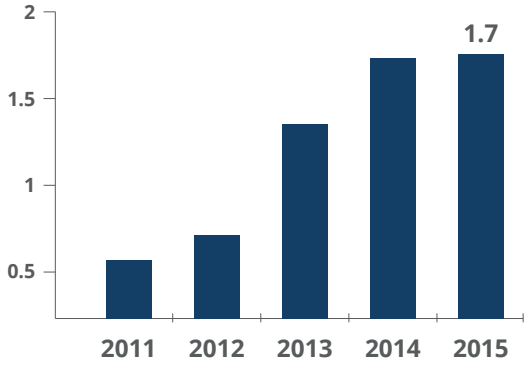
According to the analysis by PIM, the sale volume of air purifiers increased up to 47 per cent CAGR over the past 5 years and the market size reached US$1.7 billion in 2015. Today, air pollution will still require several years to be improved.

41 http://www.scmp.com/news/china/economy/article/2111548/beijing-slaps-ban-winter-construction-bid-improve-air-quality

Sales Volume of Air Purifiers (million)



Sales Volume of Air Purifiers (Billion, USD)



Source: **China Market Monitor, PIM Consulting**

The annual National People's Congress, the parliamentary gathering attended by nearly 3,000 regional delegates from across China, will open in Beijing on 5 March, 2017. Smog will be at the top of its agenda. There are three reasons for this: the public health issue, international environmental commitments and the threat that toxic air poses to China's political stability.

Air purifiers have huge market potential in China because, along with industrial development, environmental pollution and air quality deterioration problems are increasingly acute. In recent years the country's smog problem has become serious, particularly for inland areas like Beijing. In the last three to four years, as the government pays increasing attention to air quality problems, the general public also have higher awareness of air quality. Xiang said: "As the government is not particularly successful with managing outdoor air quality at the moment, citizens have to resort to finding ways to improve indoor air quality by themselves."- Xiang Yong, a Sales Engineer with AAVI China.

Xiang believes that, as the economy develops, people have higher awareness of environmental protection and will have an increasing demand for air purifying products. Therefore, air purifiers will become the fifth most sought-after home appliance in China after air-conditioners, refrigerators, washing machines and TVs[42].

"It really has reached a point where concern over air pollution throughout the country is threatening China's social stability," Barbara Finamore of the Center for Strategic and International Studies (CSIS) said in a question and answer session in May.

42 http://economists-pick-research.hktdc.com/business-news/article/Research-Articles/Huge-Market-Potential-for-Air-Purifiers-in-China/rp/en/1/1X000000/1X0ABF4N.htm

There were 200,000 air purifiers sold in China in 2010, according to Daxue Consulting. That number spiked to 2 million four years later. Demand is expected to reach 4 million annually by 2018, according to Huidian Research, a Chinese consulting and marketing firm[43].

Is water & land pollution a public health issue in mainland China?

China's water pollution problems

The major contributors to China's water pollution problems include poor sewerage systems, industrial spills, extensive use of agricultural fertilizers and pesticides, and toxic dumping. Two hundred million tons of wastewater from industrial production and households are discharged into urban rivers on a daily basis. In a country where water is already scarce, 60 per cent of China's water shortages are attributed to water pollution. The problem is exacerbated by the fact that water pollution takes more time, money and expertise to address than comparable problems such as air pollution.

China's 'river chiefs' are cleaning the country's polluted waterways. A pilot 'river chief' scheme is rolling out nationwide now. The lakeside town of Jiapu is interlaced with small rivers, including the Qinjiabanggang. Presently it looks dark green, but over the years locals have seen its water range from jet black to a milky white. They say their town is the most polluted in the county. For years, appeals to local officials were bounced from one department to another. But responsibility for the Qinjiabanggang river now rests with just two men, town "river chief" Weng Jianwei and Changping village river chief Jiang Jinlin, whose names and contact details are posted next to the river. If a passer-by spots floating garbage, an algal bloom or a pipe pumping waste into the water it's their numbers they call.[44]

43 http://edition.cnn.com/2017/01/15/health/china-beijing-smog-tale-of-two-cities/index.html
44 http://www.scmp.com/news/china/society/article/2111824/how-cleaning-chinas-polluted-rivers-got-personal

There were about 200,000 “river chiefs” like Weng and Jiang across China, according to the Ministry of Water Resources. Millions more are expected to be installed nationwide, after the top leadership decided late last year to give every waterway in the country a specific steward. A similar programme for China’s bay areas, launched this year, is being expanded from five pilot schemes.

It found that the haze led to a high-north-south average life expectancy in China: the average life expectancy of residents in the north has been shortened by more than 5.5 years.

The cities shown are the locations of the Disease Surveillance Points. Cities north of the solid line were covered by the home heating policy.

In China, as the latitude from south to north changes, the level of air pollution also changes, with the changes that are relatively complex and smooth. However, near the Huaihe River, there is a level of air pollution.

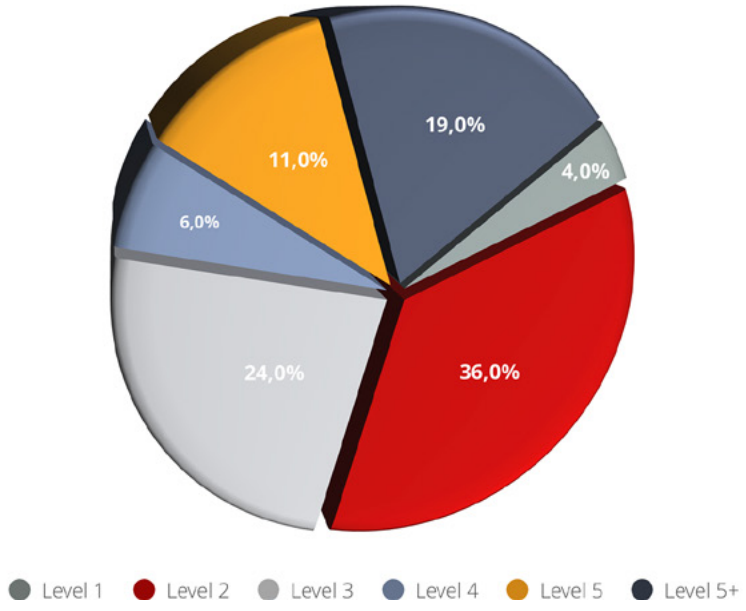
The main reason is that the heating policy in China is different from north to south, while the Huaihe River is the watershed in the north-south heating policy. Due to the large amount of coal-fired heating in winter, total suspended particulates in the northern Huai River air jumped 200 micrograms / cubic meter more than the adjacent south bank. The researchers also found that when the income levels and other factors that affect the health did not jump difference, the relevant factors to be controlled, the health differences between the two sides of the Huaihe River may be subject only to differences in heating North and South of the Huaihe River.

Rating the water body:

The analysis used by the Chinese government's own water quality grading system, in which grades I-III are safe for consumption, grade IV is for industry, grade V is for agriculture, while anything less has no functional use.

In eight provinces, more than half of water in major rivers was grade IV or below — meaning it is unsuitable for human contact as of 2015. China's largest cities fare worst, with 85 per cent of Shanghai's river water graded IV and below, 95 per cent of Tianjin's similarly unfit for purpose. In Beijing 40 per cent of total surface was worse than grade V, and in Hebei that number was 30 per cent.

Water Pollution Levels of China's Major Rivers



Level 1: Good quality for drinking, may need simple processing. Found in pristine nature reserves

Level 2: Lightly polluted, but may be used for drinking after treatment

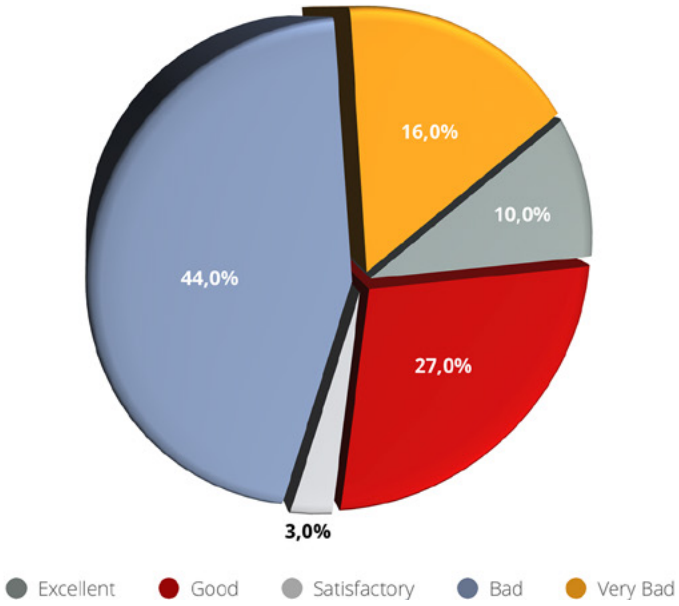
Level 3: Can be used for drinking after processing. Can be used for fishing and swimming

Level 4: Can be used for industrial purpose as there is no direct human contact

Level 5: Can be used for irrigation and in urban parks

Level 5+: Severely polluted and unsuitable for any use

Water Pollution Level of China's Groundwater Sources



As shown in figure one and two, over 95 per cent of China's rivers and 90 per cent of groundwater sources are polluted to some degree. This has become an issue of growing social discontent, and public awareness has risen considerably in the past decade, resulting in public protests and demonstrations that have been quickly shut down by authorities. In response to public concerns and to the increasing economic risk of not taking action to secure its water resources, the government has made addressing the water pollution problem a priority.

The Huangpu's cavalcade of swine follows on the heels of a recent factory spill in Shanxi province that resulted in nine tones of the potential carcinogen aniline being dispersed in the Zhuozhang River. Factory officials waited five days to report the spill, forcing neighboring Handan city to temporarily cut off drinking water to a million people.

As much as 70 per cent of Chinese rivers and lakes are polluted from industrial facilities like chemical and textile plants. "Cancer villages" have sprouted along waterways across the country, by-products of the ugly reality that 300 million Chinese in rural areas lack access to safe drinking water. Perhaps even more unnerving are the findings of a recent report by the China Geological Survey estimating that 90 per cent of Chinese cities are tapped into polluted groundwater supplies; groundwater in two-thirds of those cities is considered "severely polluted".

Pollution, however, is only half of the country's water problem. Not only is China's water toxic, it is also comparatively scarce.

The country's most industrial regions are some of the driest, with 45 per cent of the country's gross domestic product produced in water-scarce provinces such as Hebei, Shandong and Shanxi. Some 24,000 villages have been abandoned because of the desertification effects of the Gobi desert advancing eastwards. Moreover, water scarcity is not unique to China's arid western provinces. In Beijing, the amount of water available per person

is just one-tenth of the UN standard of 1,000 cubic metres; across the country more than two-thirds of cities have water shortages.

Furthermore, chronic droughts in important agricultural regions are complicating the government's focus on assuring food security. Beijing has long tried to maintain a balancing act between the spread of industry, continued support for agriculture and ensuring a clean supply for consumption by 1.3 billion people. As water supplies dwindle, competition may arise over which is given priority. All three are needed to ensure stability.

Beijing is not short of bold strategies to try to tackle the problem. Over the next decade, China plans to quadruple its desalination capacity. Even more ambitious, and controversial, is the government's south-to-north water diversion project which aims to channel 44.8 billion cubic metres of water a year from southern rivers to drier northern provinces.

Beyond increasing supply, Beijing has also committed billions to promoting water conservation in agriculture through sustainable irrigation practices. Industry is also pulling its weight by fitting new factories with mandatory water recycling systems and by participating in water rights transfers with farmers. China is also investing heavily in renewable energy sources such as wind and solar power, and sea-water-cooled nuclear plants, which are less water-intensive than traditional coal plants. Moreover, China already has many of the regulations needed to stop the adulteration of its rivers and lakes. Unfortunately, most have been rendered toothless by a bureaucratic culture riven with corruption[45].

In Beijing, 39.9 per cent of water was so polluted that it was essentially functionless. In Tianjin, northern China's principal port city and home to 15 million people, a mere 4.9 per cent of water is usable as a drinking water source.

45 http://www.scmp.com/comment/insight-opinion/article/1199574/chinas-deadly-water-problem

Debra Tan, director of the NGO China Water Risk, said:

> *"Finally, a report card on provincial pollution targets which allows us to track local government performance on improving water quality. While it's good to see that half the provinces have met the targets, there is clearly still a long way to go. Local efforts and enforcement must be stepped up if we are to make headway in the 'war on pollution' by 2020."*

Ground Water

In 2016, the national land and resource department had monitored water quality of groundwater of 6,124 monitoring wells (sites) (1,000 of them were national monitoring sites) of 225 administrative regions at prefecture level in 31 provinces (autonomous regions or municipalities) with groundwater aquifer system as a unit and shallow groundwater, which mainly consists of phreatic water, and middle deep groundwater, which mainly consists of confined water, as the targets. The assessment results show that the main nonattainment pollution indicators included manganese, iron, total hardness, total dissolved solids, "three kinds of nitrogen" (nitrite nitrogen, nitrate nitrogen and ammonia nitrogen), sulfate, fluoride and so on. There were the occurrence of nonattainment of heavy metals such as arsenic, Pb, mercury, hexavalent chromium and cadmium in individual monitoring sites.[46].

In 2016, the Water Department monitored the groundwater quality of key regions in Songliao Plain, the Huanghuaihai Plain, Shanxi Province, the basin and plain areas of northwest China and Jianghan Plain, which basically covered all the areas under intensive development or heavy pollution. The main monitoring target was shallow groundwater. The assessment results of the data of 2,104 monitoring sites show that the overall water quality was poor. The percent of monitoring sites with excellent, good, poor and very poor water quality was 2.9 percent, 21.2 percent, 56.2 percent and 19.8 percent respectively; there was no site with relatively good water quality. The main nonattainment pollution indicators included total hardness, total dissolved solids, manganese, iron and fluoride, which were relatively high due to possible relatively high background value of hydrogeological chemistry. In addition, the "three kinds of nitrogen" pollution was relatively heavy, and there was certain pollution of heavy metals and toxic organic pollutants in some regions.

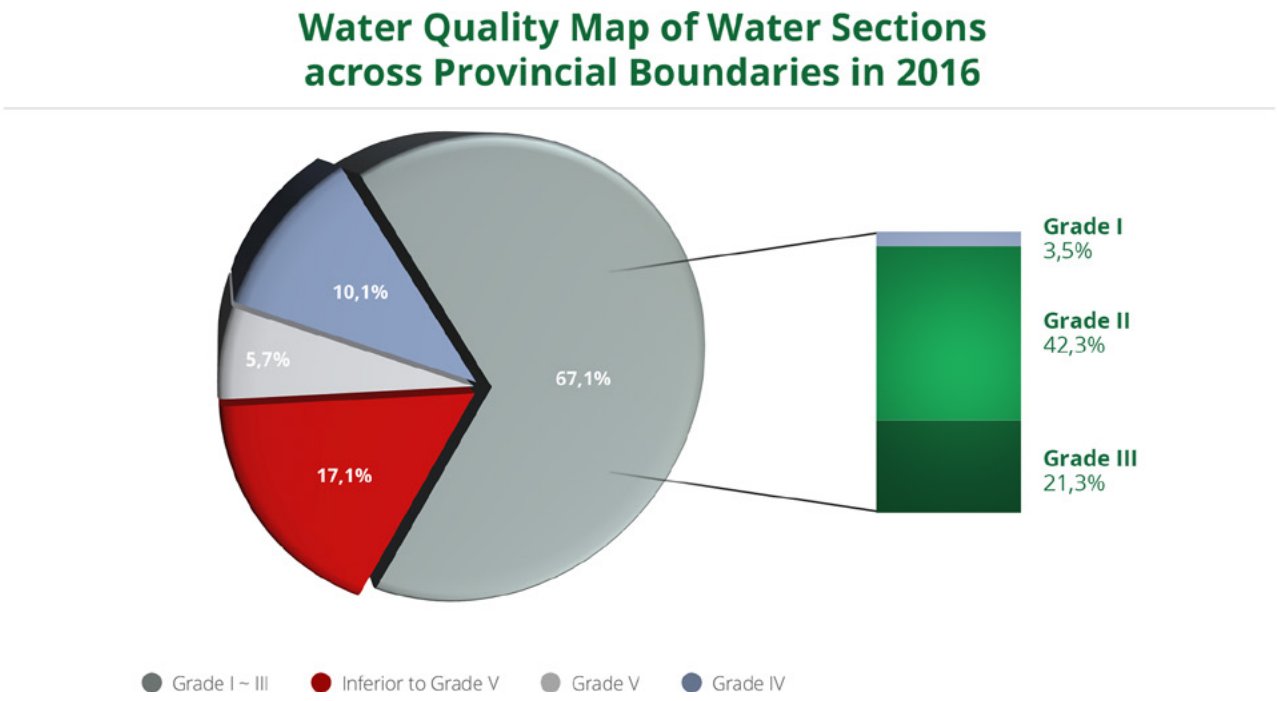
The Groundwater Quality of Different River Basins in 2016

River Basin	The percentage of monitoring sites (%)		
	Excellent, Good	Poor	Very Poor
Songhua River	12.9	72	15.1
Liaohe River	10.6	60.6	28.8
Haihe River	31.1	52	16.9
Yellow River	25.5	44.1	30.5
Huaihe River	25.1	65.4	9.5
Yangtze River	20	65.7	14.3
Inland Rivers	26.1	48.6	25.4
Nationwide	24	56.2	19.8

46 https://www.cmc-consultants.com/hubfs/pollution_whitepaper_2017/Environment%20in%20China%202016.pdf

Centralized drinking water source areas of APL (Above Prefecture Level) cities

In 2016, among 897 monitoring sections (sites) of the centralized drinking water source in 338 APL cities across the country, 811 met water quality standard for the whole year, taking up 90.4% of the total. Among them, 563 were surface drinking water source areas, 527 of which met water quality standard for the whole year, taking up 93.6%. Major pollution indicators for nonattainment were TP, sulfate and manganese. There were 334 ground-water drinking water source areas, 284 of which met water quality standard for the whole year, taking up 85.0% with major nonattainment pollutants of manganese, iron and ammonia nitrogen.



In 2016, the monitoring results of 544 important trans-province boundary waters across the country show that the percentage of sections meeting Grade I, Grade II, Grade III, Grade IV, Grade V and inferior to Grade V standard was 3.5 percent, 42.3 percent, 21.3 percent, 10.1 percent, 5.7 percent and 17.1 percent respectively. Major pollution indicators were COD, ammonia nitrogen and TP. The percentage of sections meeting Grade I~III was up by 2.3 percentage points and 0.8 percentage point reduction was witnessed for the sections failing to meet Grade V standard compared with that of 2015 (514 comparable trans-province boundary sections).

Marine Environment

The marine areas meeting Grade I standard took up 95% of total marine area under jurisdiction of PRC in spring and summer of 2016. The marine areas failing to meet Grade IV standard were 42,430 km2 and 37,420 km2 respectively, 9,310 km2 and 2,600 km2 less than those of 2015 respectively.

Marine area	Season	Marine area of different grades (km²)			
		Grade II	Grade III	Grade IV	Inferior to Grade IV
Bohai Sea	Spring	11,660	6,670	2,340	3,050
	Summer	9,950	5,690	3,130	5,000
Yellow Sea	Spring	7,310	9,980	5,060	6,420
	Summer	12,160	7,440	3,260	2,530
East China Sea	Spring	19,510	17,040	8,590	27,770
	Summer	22,740	8,070	8,060	21,950
South China Sea	Spring	6,780	8,730	1,840	5,190
	Summer	4,460	9,820	3,320	7,940
All Sea Areas	Spring	45,260	42,420	17,830	42,430
	Summer	49,310	31,020	17,770	37,420

In 2016, water quality of nearshore marine water remained stably good.

Among 417 nearshore marine water monitoring sites under national monitoring program, 32.4 percent met Grade I water quality standard, down by 1.2 percentage points compared with that of 2015; 41.0 percent met Grade II standard, up by 4.1 percentage points; 10.3 percent met Grade III standard, up by 2.7 percentage point; 3.1 percent met Grade IV standard, down by 0.6 percentage point; 13.2 percent failed to meet Grade IV standard, down by 5.1 percentage points compared with that of 2015. Major pollution indicators were inorganic nitrogen and active phosphates.

Other than heavy urbanization the simultaneous cause of water pollution is Coal consumption in China

China's water problem extends beyond urban pollution. Vast swathes of the country are facing severe water shortages, and yet their diminished supplies are fueling coal power plants, even as an overcapacity crisis bites.

Coal plants in China consume 7.4 billion m3 of water annually, and hundreds more are in pipeline despite recent government efforts to crackdown on unnecessary projects.

Last year reported, that nearly half of the then-proposed coal fired-power plants were slated for construction in 'water over-withdrawal' areas. Those plants could consume an extra 1.8 billion m3 of water, equivalent to the amount needed to meet basic needs of almost 100 million people.

Indeed a more recent analysis shows that trend continued into 2016, when half of all capacity (11GW) permitted was located in high water stress areas, while only 4GW of approved capacity in high water stress areas was suspended[47].

The government's efforts

In 2014 Premier Li Keqiang declared war on water pollution with a war chest worth $US330 billion ($450 billion), with the goal of reducing water pollution by 30 to 50 per cent by prioritizing safe drinking water, and dealing with the increased wastewater pressures from urbanization. Three "red lines" were set up to support the stringent and effective management of water resources with targets set for 2015, 2020 and 2030 that covered total water usage, water usage efficiency and pollution controls.

In April 2015 the State Council of the People's Republic of China issued the much anticipated Water Pollution Prevention and Control Action Plan, or "Water Ten" plan that draws upon the input and co-ordination of multiple government ministries and departments and is China's most comprehensive water policy to date.

In 2016 the thirteenth Five Year Plan (FYP13) was released and while the FYP13's purpose is to outline China's general policy direction, it also sets specific goals related to water consumption and water quality. Primarily, it hopes to reduce water consumption by 23 per cent from 2015 levels by 2020 to ease the impact of water pollution. The plan further outlines the development and upgrade of urban sewage facilities, aiming to increase rates of wastewater treatment to 95 per cent in urban areas and 85 per cent in non-urban areas.
Water Pollution Prevention and Control Plan for Major River Basins (2016-2020): In the recent year 2017,

47 https://www.theguardian.com/global-development-professionals-network/2017/jun/02/china-water-dangerous-pollution-greenpeace

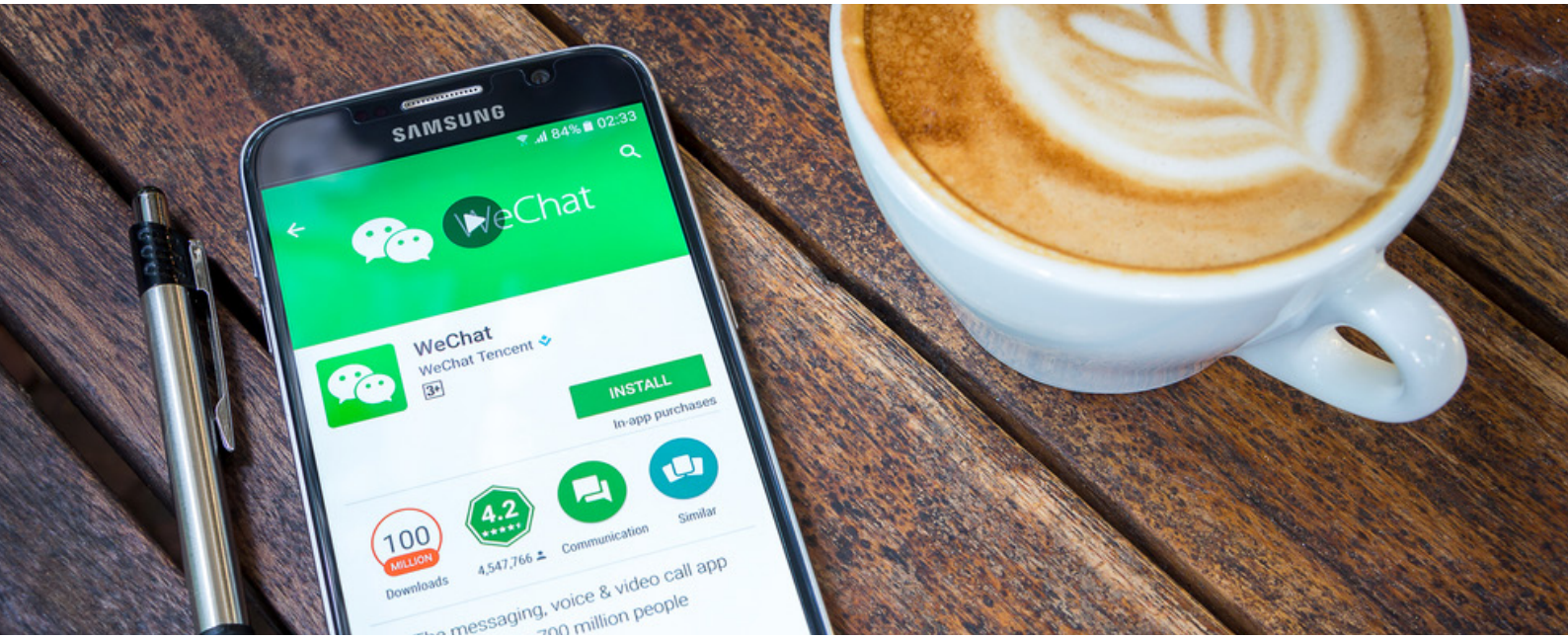
The Ministry of Environmental Protection of the People's Republic of China (MEP), National Development and Reform Commission (NDRC), and Ministry of Water Resources of the People's Republic of China (MWR) jointly printed and distributed the Water Pollution Prevention and Control Plan for Major River Basins (2016-2020)[48].

As the fifth-phase specific five-year plan targeting water pollution in major watersheds, the Plan provides guidance for local water pollution control, based on the previous achievements and experience accumulated in a long time in water pollution control in China. The aim is to break down and implement the targets, requirements, tasks, and measures provided for by the Action Plan for Prevention and Control of Water Pollution, and the emphasis is placed on the improvement of water environment quality. The Plan holds on to the systematic thinking of implementing holistic solutions to the protection of the mountains, waters, forests, farmlands, lakes, and grasslands and makes overall plans for the preservation of water resources, water ecology, and water environment. Also, based on the control unit, it provides for the tiered, and zoning-and category-specific management of river basins.

The Plan accounts for the seven major waters (Yangtze River, Yellow River, Zhujiang River, Songhua River, Huaihe River, Haihe River, and Liaohe River) for which water pollution control planning is needed under the aforementioned Action Plan, in addition to the rivers in Zhejiang and Fujian provinces, and the rivers in southwest and northwest China. It breaks down the water quality targets set forth by the Action Plan and allocates them to the specific basins, and defines the priorities for water pollution control in those basins. Moreover, it specifies the priorities for water environment protection of the Beijing-Tianjin-Hebei region and Yangtze River Economic Belt. It is the first plan targeting water pollution in all of the major river basins across China. The Plan screens out 580 priority control units out of a total of 1,784 ones, with 283 of them destined for improving water quality and the remaining 297 ones for preventing further water deterioration. It provides for the main control tasks of priority control units and implements graded and category-specific delicacy management.

48 http://english.mep.gov.cn/News_service/news_release/201710/t20171027_424220.shtml

The Plan lays out five key tasks ranging from prevention and control of industrial pollution, municipal pollution, agricultural and countryside pollution, ecological conservation of river basins, and environmental security of drinking water sources. Also, it identifies five categories of major projects ranging from tackling water pollution at drinking water sources, from industries, agricultural sector and in the countryside, to municipal wastewater treatment infrastructure development, and integrated water environment management.



Social Media Support

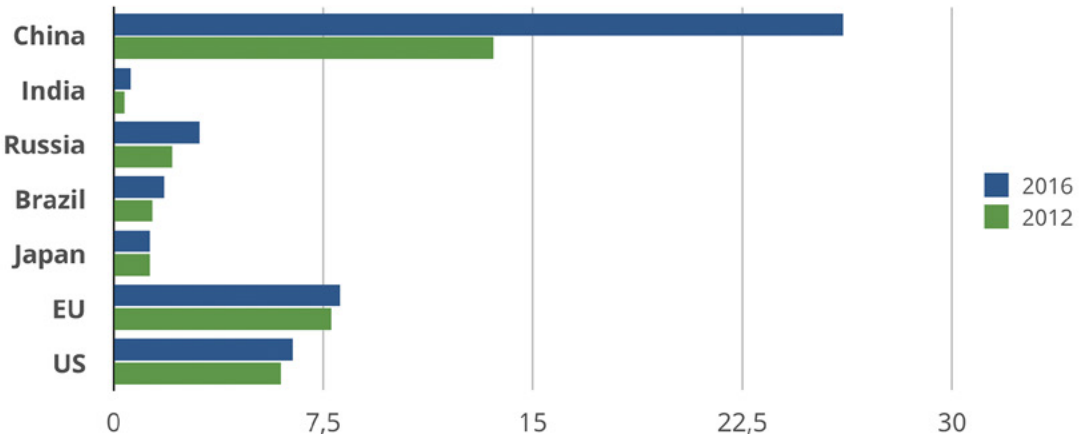
In support of these policies are taxes levied from water prices, subsidies for high performers and the soon to be installed 2017 emissions trading scheme. In contrast to the chiefly political and economic measures taken in the past, public participation is a social method that taps into the power of citizens through education, transparency and feedback mechanisms. Public participation measures are important to the success of Chinese water pollution policies because it is the people who directly suffer the immediate and worst effects of an unmitigated water pollution crisis. Social media provides the right networked environment to develop frameworks for public participation and citizen interactions that can be designed in support of centralized water pollution policies[49].

In 2016, 21 major water projects were started. China also started 15 new major water conservation projects in 2017 amid efforts to boost investment and stabilize growth. Total investment in major water projects under construction should exceed 900 billion yuan ($131.3 billion) by the end of this year, compared with the current level of 800 billion yuan, said Wu Xiao, an official with the National Development and Reform Commission (NDRC), at a conference.[50].

49 http://www.futuredirections.org.au/publication/managing-water-pollution-china-social-media/
50 https://defence.pk/pdf/threads/china-environ-prot-ep-industry-technology-solid-waste-mgt-liquid-treat-news-discussions.432593/page-7

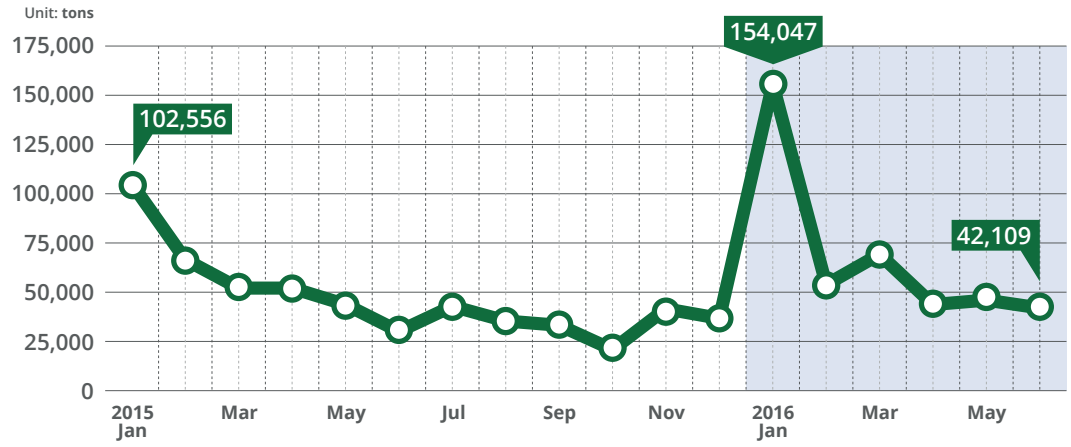
Sales of organic food, imported baby food, etc.

Retail sales forecast of baby food in Selected Markets



The highest growth market is predicted to be China, where sales are expected to double and to become the single most valuable market outstripping the developed economies by 2016[51]. Newly done research from Mintel predicts that **the market volume of infant milk formula in China will grow by a CAGR of 5.4 per cent between 2016 and 2021. The organic options may be the driving force behind this growth, as 75 per cent of Chinese mums feed their babies organic infant milk formula.** Younger mums in particular are interested in organic formula options, with 79 per cent of mums aged 25-34 using this product[52]. Consumption of baby food in China rose by 23 per cent since 2010 in terms of volume. Market value rose by 78 per cent between 2010 and 2016. Revenue from China climb to $62 million last year, according to its annual report for 2016, Mintel has pre-

China's Imports of Milk Powder



Resource: **Wind Information** **China Daily**

51 http://www.chinadaily.com.cn/business/2016-08/20/content_26542346.htm
52 http://www.mintel.com/press-centre/food-and-drink/three-in-four-chinese-mums-feed-their-baby-organic-infant-milk-formula

dicted that infant formula volumes will grow by 5.4 per cent between 2016 and 2021, with organic options set to be one of the fastest-growing areas. It's now estimated that 75 per cent of Chinese mothers feed their babies organic infant formula, as the quality of products and the amount that parents will spend on their children's nutrition[53].

Research from the Mintel Global New Products Database showed that the UK and US led in liquid infant milk formula activity with 41.7 per cent of launches in 2016, while there were none launched in China.
Mintel research finds that half of mums (49 per cent) say they choose organic infant milk formula because they are "willing to pay more for their baby's food". This is also the main driver for them to choose other niche products, such as goat IMF (41 per cent).

Tables below show the cost per 100 grams of baby milk powder in Singapore, China and Malaysia by stage:[54]

Per price 100 grams of stage 1 formula milk in Singapore, China, and Malaysia (SGD)

		Brand					
		Similac	Frisco	Nan H.A.	S26	Mamil	Enfa
Country	Singapore	7.05	6.56	7.45	6.36	6.41	6.66
	China	4.79	5.58	9.06	4.25	4	5.67
	Malaysia	3.92	3.54	4.29	4.13	3.51	4.12

Per price 100 grams of stage 2 formula milk in Singapore, China, and Malaysia (SGD)

		Brand					
		Similac	Frisco	Nan H.A.	S26	Mamil	Enfa
Country	Singapore	6.41	6.11	6.83	5.97	5.63	6.19
	China	4.48	4.03	7.21	3.80	3.03	4.21
	Malaysia	3.66	3.14	4.09	3.57	3.26	3.85

53 https://www.foodbev.com/news/organic-products-driving-growth-in-chinese-infant-formula-study/
54 https://www.theonlinecitizen.com/2017/05/29/css-findings-on-pricy-milk-powder-hardly-address-the-issue-of-why-prices-are-high/

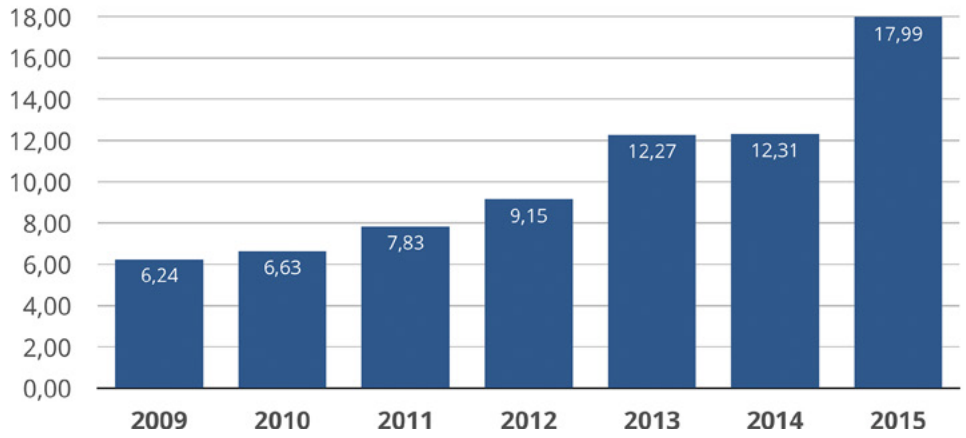
Per price 100 grams of stage 3 formula milk in Singapore, China, and Malaysia (SGD)

		Brand					
		Similac	Frisco	Nan H.A.	S26	Mamil	Enfa
Country	Singapore	5.29	5.00	6.08	4.93	4.69	5.03
	China	3.58	3.71	6.81	3.33	2.78	3.62
	Malaysia	2.40	2.24	3.09	2.49	2.33	2.66

Import, Export and Consumption of China's Infant and Young Child Nutritionals 2009-2015, 2017

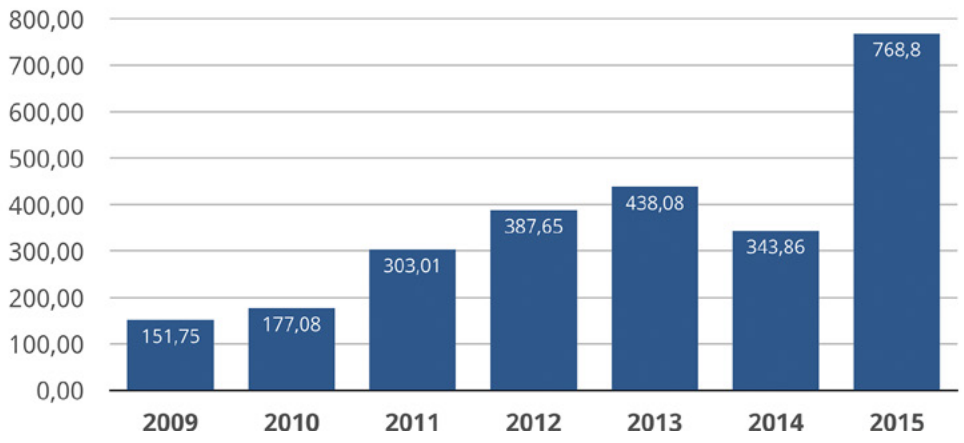
In 2009, the import of retail packaged food for infants and young children in China was 62,400 tons and the export volume was 151.75 tons. In 2015, China's retail packaged food for infants and children the import volume reached to 179,900 tons and the export volume was 768.8 tons[55].

2009-2015 China's Imported Quantity of Retail Food for Infants and Toddlers (Tons)



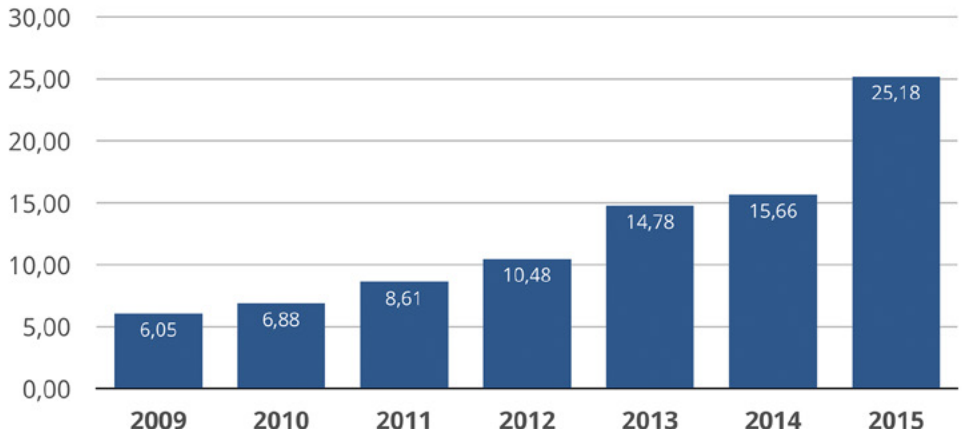
55 http://www.chyxx.com/industry/201708/549960.html

2009-2015 Analysis of China's Exports of Retail Food for Infants and Toddlers (Tons)



In 2009, the import of retail packaged food for infants and young children in China was 605 million U.S. dollars and the export volume was 876 thousand U.S. dollars. In 2015, China's retail packaging for infants and children Food imports amounted to 2.518 billion U.S. dollars and exports amounted to 8,413 U.S. dollars.

2009-2015 Analysis of China's Imported Retail Food Prices for Infants and Toddlers (USD)



Years	Product Name	Exports (kg, thousands of United States dollars)		Import (kg, thousands of United States dollars)	
		Quantity	Amount	Quantity	Amount
2009	Retail packaged foods for infants and young children, Dairy products containing less than 40% of total cocoa, cocoa powder, starch or wheat, or <5%	151,753	876	62,442,124	604,595
2010	Retail packaged foods for infants and young children, Dairy products containing less than 40% of total cocoa, cocoa powder, starch or wheat, or <5%	177,077	985	66,322,651	687,708
2011	Retail packaged foods for infants and young children, Dairy products containing less than 40% of total cocoa, cocoa powder, starch or wheat, or <5%	303,009	2,069	78,256,723	860,989
2012	Retail packaged foods for infants and young children, Dairy products containing less than 40% of total cocoa, cocoa powder, starch or wheat, or <5%	387,647	3,610	91,486,998	1,048,112
2013	Retail packaged foods for infants and young children, Dairy products containing less than 40% of total cocoa, cocoa powder, starch or wheat, or <5%	438,075	2,993	122,734,096	1,477,569
2014	Retail packaged foods for infants and young children, Dairy products containing less than 40% of total cocoa, cocoa powder, starch or wheat, or <5%	343,862	5,240	123,075,689	1,565,896
2015	Retail packaged foods for infants and young children, Dairy products containing less than 40% of total cocoa, cocoa powder, starch or wheat, or <5%	768,803	8,413	179,945,207	251,802

In 2017, 143.1 tons of all type of dairy products imported between 1-7 months, an increase year on year 7.5%. The total value is 48.76 billion, an increase of 30.9%. Among them, the import of dry milk products 108.89 tons, an increase year on year 13.7%. The total value is 44.28 billion, an increase of 33%. The import of liquid milk is 34.82 tons, an increase year on year 8.1%. The total value is 4.48 billion, an increase of 13.3%[56].

56 http://www.niu305.com/uploads/soft/170913/1091-1F9131T552.pdf

Chinese dairy imports 2017 (1-7 months)

Unit: 10,000 tons, Ten thousand U.S. dollars, %

	Quality				Money			
	7 month	With ratio%	1-7 month	With ratio%	7 month	With ratio%	1-7 month	With ratio%
Dairy	21.47	20.1	143.71	7.5	74,869.90	40.9	487,588.43	30.9
Dry Dairy Products	15.76	26.5	108.89	13.7	66,882.10	41.6	442,772.22	33.0
Infants with powder	2.40	18.6	14.58	27.1	31,670.49	16.8	196,302.95	25.3
Condensed Milk	0.23	50.0	1.41	29.3	412.24	49.0	2,536.39	21.7
Milk Power	6.71	77.3	49.68	11.5	19,643.69	121.6	147,062.17	37.2
Cheese	0.88	-14.5	6.74	20.7	4,101.44	-4.5	30,033.16	26.4
Cream	0.86	7.3	5.58	6.9	4,765.43	67.2	27,609.90	46.6
Whey	4.69	0.3	30.91	11.1	6,288.81	64.3	39,227.66	60.2
Liquid Milk	5.71	5.4	34.82	-8.1	7,987.80	35.0	44,816.21	13.3
Yogurt	0.34	149.0	1.62	42.4	655.41	108.6	3,206.92	31.3
Milk	5.37	1.7	33.19	-9.7	7,332.39	30.9	41,609.30	12.1

Foreign Milk Powder Companies in China

After the melamine incident, the use of melamine in milk in 2008 killed six babies and made 300,000 ill, foreign milk powder quickly seized the Chinese market[57]. From 2008-2015, the foreign milk powder companies have experienced significant growth, however, in the last two years the growth was weaker.[58]

Since the melamine incident in 2008 hit the domestic dairy industry, foreign milk powder market share in China has been high. Southern Weekend learned from the General Administration of Customs that the milk powder imported into China via customs channels increased from 98,000 tons in 2007 to 826,000 tons in 2016 and the market value has more than doubled.

The melamine incident in 2008 was a watershed in China's dairy industry. The domestic milk powder brands suffered a heavy blow. The foreign milk powder was waiting to rise. According to Nielsen, a well-known market research firm, the market share of foreign milk powder brands Dumex, Mead Johnson and Wyeth in China's infant milk powder market in 2009 was only 14.2%, 11.6% and 8% respectively. Since then, Abbott, Nestle, Mead Johnson, Wyeth and other brands almost monopolized the high-end milk powder market in first-tier cities. Between 2008 and 2013, the price of foreign milk powder went through the process of "you up and up again". Such as Nestle, by 2012, compared to 2008, the price of its products per can rose by at least 50 yuan, and many

57 http://www.bbc.com/news/world-asia-pacific-11372917
58 http://www.sohu.com/a/193549634_118392

by more than 100 yuan. Until July 2013, the National Development and Reform Commission started an antitrust investigation on a number of milk powder companies, claiming that there was evidence that the prices of these enterprises' products in the Chinese market were high, and the price increase rate had reached 30% since 2008, a vertical monopoly.

In addition to price increases, foreign milk powder brand are still building a domestic R & D and production base. In 2009, Abbott established Shanghai R & D Center and is also building Abbott's 12th nutrition factory in Guangzhou. In June 2010, Mead Johnson established the first research center in Guangzhou dedicated to infant nutrition in China, which is the first wholly-owned subsidiary of the infant formula milk powder brand. In 2014, Wyeth also officially established Wyeth Nutrition Science Center in China.

Cross Border Purchasing

Accompanied by the rise of foreign milk powder and the development of the Internet, cross-border shopping has also developed. The Overseas purchasing model developed the cross-border purchasing market earlier. In 2014, it was called "the first year" of cross-border e-commerce by the industry. Song Liang, a senior dairy analyst, cited a series of data for Southern Weekend: China's traditional trade import channels in 2014 saw an average of 121,400 tons of infant formula, 176,000 tons in 2015 and 220,000 tons in 2016; The growth rate of overseas purchasers is equally rapid: 100,000 tons in 2015 and 150,000 tons in 2016.

According to the industry analysts, due to the development of cross-border purchases, the price system of foreign investment in China is also influenced by the international price system. For example, a US brand milk powder sells for 300 yuan in China and 150 yuan in the United States, so bought cross-border the price is lower than China, which inflates the domestic price.

Bulk purchasing of milk powder to bring across the border from Hong Kong into China has caused local concern in both places. Hong Kong implemented this Restricted Order in March 2013: In the absence of a declaration, people over the age of 16 who leave Hong Kong should not bring infant formula with a total net weight of more than 1.8 kg per day - equivalent to an ordinary two can 900 Grams of milk. Germany, New Zealand, Australia and other countries also issued restrictions on the purchase of milk powder by Chinese people.

Market Competitors Momentum

With the strong momentum of foreign milk powder, some domestic enterprises chose to invest overseas and build factories. As early as 2010, Bright Dairy controlled 51% of New Light Dairy for NZ $ 82 million (now around RMB 390 million). In March 2011, AUO invested 16 million euros (now about 120 million yuan) to acquire a 51% stake in the Dutch milk company Hai Punuo Kai Dairy Group. Mengniu, Erie, Bein America, flying crane, San Yuan also have to invest overseas, building factories and R & D centers. Therefore, some consumers are worried that more and more imported milk powder has a Chinese background and real foreign milk powder is getting harder and harder to buy.[59].

Foreign companies are also actively entering "marriages" with Chinese enterprises. In October 2014, the Dutch dairy company Royal Friesland and Huishan Dairy set up a joint venture to produce, market and sell infant formula in China, each holding a 50% equity interest in the joint venture. This model was also followed by Danone. In May 2015, Fonterra acquired 18.8% stake in Beyinmei as its second largest shareholder.

However, in the busy Chinese market, some foreign milk powder chose to withdraw. In October 2013, Japanese milk powder giant Meiji Dairy temporarily stopped selling milk powder in China. The company said in a statement that due to intensified competition in the milk powder market and rising raw material costs in recent years, it is difficult to secure a steady return. In March 2016, Danone's best-selling brand of powdered milk in China suddenly announced its withdrawal from the Chinese market. The official website said: "Ruikang gold is one of the premium product lines, and still continues to be sold in the local market in New Zealand."

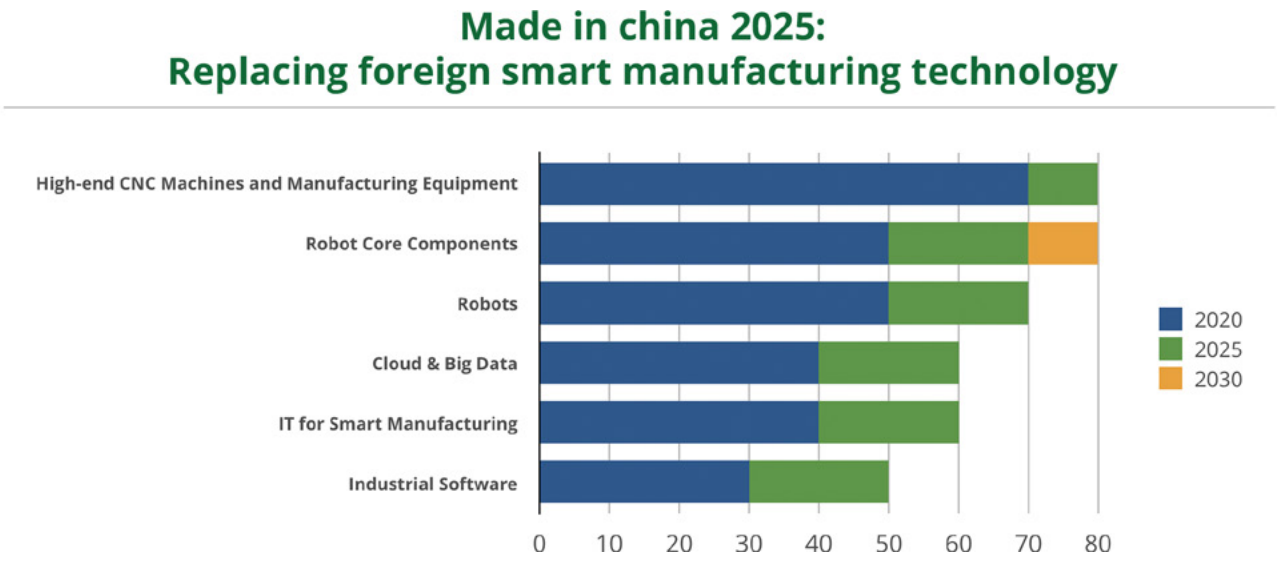
59 http://www.sohu.com/a/193549634_118392

China's subsidies into technologies that are environmentally friendly

Made in China 2025

Made in China 2025" is an initiative to comprehensively upgrade Chinese industry. The plan was developed jointly by National Development and Reform Commission (NDRC) and Ministry of Science & Technology (MOST), with supplemental input from MIIT and other ministries. There are clear and specific measures for innovation, quality, intelligent manufacturing, and green production, with benchmarks identified for 2013 and 2015 and goals set for 2020 and 2025[60]. Based on the State Council document summarizing the plan released last week, "Made in China 2025" has clear principles, goals, tools, and sector focus. Its first guiding principles is to have manufacture innovation-driven, emphasize quality over quantity, achieve green development, optimize the structure of Chinese industry, and nurture human talent[61].

As the graphic shows, the Chinese government aims to replace foreign smart manufacturing technology to a very large extent until 2025.



China is attempting to meet the goals laid out in its "Made in China 2025" proposal, which aims to boost manufacturing innovation and promote home-grown products. The plan was introduced in May 2015 and implementation guidelines were completed last month by the Ministry of Industry and Information Technology, with the participation of more than 20 State Council departments.

60 https://www.csis.org/analysis/made-china-2025
61 https://www.csis.org/analysis/made-china-2025

The program aims to increase the domestic content of core materials to 40 per cent by 2020 and 70 per cent by 2025. At present, domestic content is relatively low for high-tech goods, with foreign content comprising more than 50 per cent in these products on average[62].

Recent research and studies show that Chinese consumers are becoming more interested in environmentally friendly practices and products. The Greendex Survey, sponsored by the National Geographic Society and Globescan Inc., measures green consumer behaviour by scoring people's responses about their consumption of housing, transportation, food, and goods.

Practices

Fujitsu group has developed environment-friendly products to approach to global environmental issue. They established the original regulations called "product environment green assessment" to develop the environment-friendly products considering low energy consumption, 3R design and technology, and non-use of hazardous substance, materials and technology[63].

> *What started with inspections in the Hebei region around heavily polluted Beijing—and where 176,000 small businesses could be forced to close by the end of September—was extended to all four major municipalities and 10 provinces as of Aug. 2, 2017[64].*

Present Scenario

During the first half of 2017, Beijing had 99 days in which the city's air quality conformed with government regulations—eight days fewer than last year, according to multiple news reports. However, levels of sulphur dioxide, which can come from vehicle exhausts, fell by 15 percent during that period.

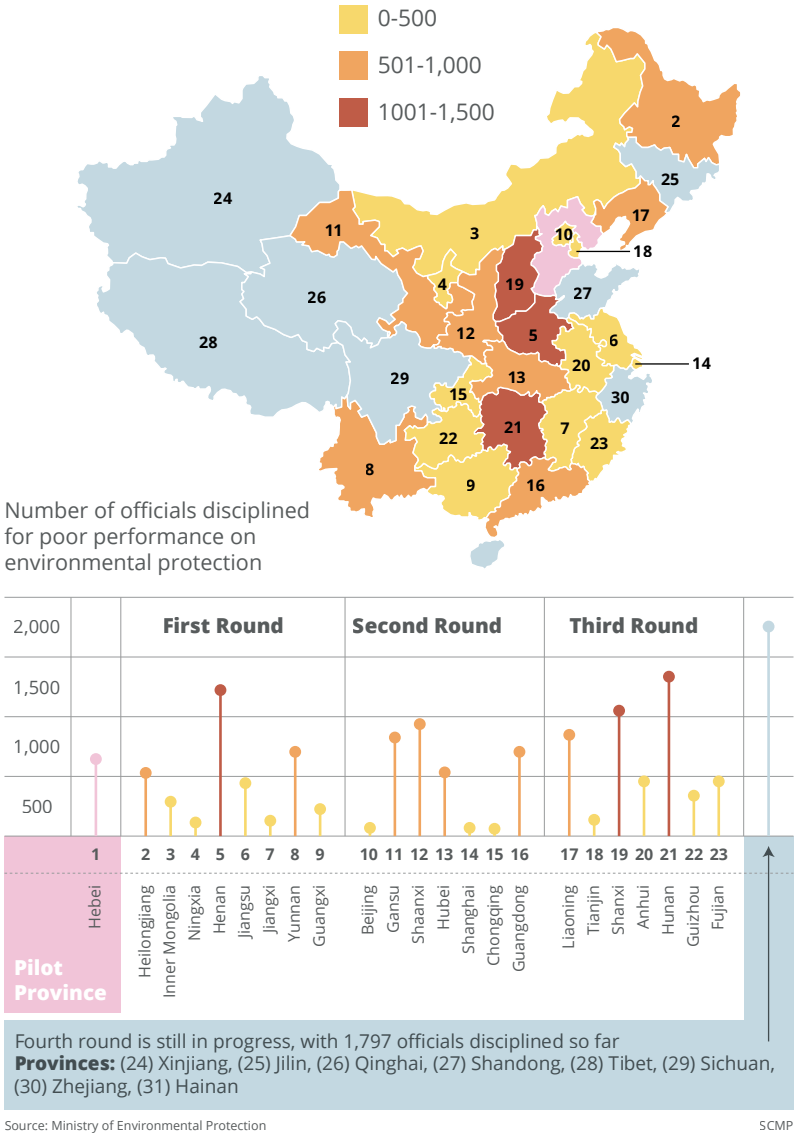
Green products in China have become intensely successful in the past few years. Despite China's highly polluting environment, the green voice is gaining increasing attention. Awareness of pollution and healthcare problems have transformed consumer's habits significantly. The Chinese market is integrating this new pattern into their strategy and paying more attention to this global phenomenon, shifting towards green products at a very high pace. A recent regional research survey highlighted that on average **84 per cent of consumers are prepared to pay 27 per cent more for green products in China[65].** This awareness is arising from the 3,500 environmental NGOs in China that have been blooming lately. The NGO, Friends of Nature is playing a major role and is precisely orientating consumers in choosing a green product, creating "blacklists" and developing concrete awareness actions.

Technological developments are moving fast, and what's available in stores now can be seen as predictors of what's on the horizon[66]. From the Ministry of Environmental Protection, the Communist Party's anti-graft

62 https://www.forbes.com/sites/sarahsu/2017/03/10/foreign-firms-wary-of-made-in-china-2025-but-it-may-be-chinas-best-chance-at-innovation/#128d05bd24d2
63 http://www.fujitsu.com/cn/en/products/devices/semiconductor/fsp/memory/fcram/eco/
64 http://jacobyount.com/china-factory-closures-pollution-review/
65 http://daxueconsulting.com/green-products-china/
66 http://www.scmp.com/native/lifestyle/topics/premier-living/article/2114233/fast-forward-robots-sense-stimulating

watchdog and its personnel arm, began the first of four rounds of inspections in July last year after an earlier pilot project in Hebei province. The fourth round, which began last month, will complete coverage of mainland China's 31 provincial-level regions[67].

Inspectors Call



67 http://www.scmp.com/news/china/policies-politics/article/2109342/top-level-china-pollution-inspections-wrapping

Around 12,000 officials were disciplined and 18,000 companies punished in China's sweeping crackdown against pollution. The teams, made up of officials from the Ministry of Environmental Protection, the Communist Party's anti-graft watchdog and its personnel arm, began the first of four rounds of inspections in July last year after an earlier pilot project in Hebei province[68]. Some 18,000 polluting companies have been punished so far, with fines totalling more than 870 million yuan (US$132.2 million) handed out, and more than 12,000 officials disciplined. The two party agencies involved in the inspections, the graft-busting Central Commission for Discipline Inspection and the Central Organisation Department, are arguably the two most important in determining officials' promotion prospects.

This trend is visible in every field, surveys over the market show how the Chinese have learnt to protect the environment by daily attention. The habit of saving water, food, and electricity is increasingly practiced in households. Easy and effective actions are routinely undertaken. The survey also found out that business ethics are ranked amongst the top three items that customers pay attention to when choosing a product. However this comes from the fact that the Chinese are purchasing green products in order to protect their own health and safety since scandals concerning the food and medical industry frequently occur. The environmental sustainability characteristic of a product is only ranked after personal health and safety. A perfect example to this statement is the French premium water, Evian that has been extremely successful those last years by branding themselves with health and purity regardless of the expenses and pollution of transportation.

68 http://www.scmp.com/news/china/policies-politics/article/2109342/top-level-china-pollution-inspections-wrapping

The National Survey on Environmental Protection Industry presented that in China the proportion of environmental products sales revenues was essentially hold by the water and the air pollution control products. They account for 80.2 per cent of the sales revenues together. Those results show the main concerns of the Chinese are water and air, which are the most common and wildly spread danger for their health. For the moment, many sectors are waiting to awaken and set off with the population awareness concerning pollution and the global challenge of global warming[69].

According to the Hebei Province Environmental Protection Bureau, Steel enterprises must reach state and province-level emission restrictions by Sept. 1 or they will be shut down. City governments should "leave no dead ends" when it comes to removing firms that fail to comply with the pollution switch measures. Heavily industrial Hebei, which surrounds China's capital Beijing, was home to six of the country's 10 most polluted cities last year and has been on the front line of a nationwide "war on pollution". The area produces a quarter of the country's steel and promised to reduce at least 60 million tonnes of its massive 286 million tonne annual production capacity during the 2013-2017 period. It also swore last year to execute "special emissions restrictions" on the steel sector as it tries to meet tough 2013-2017 pollution targets. To impose those limitations, authorities cut the amount of emissions permits granted to steel firms, forcing them to make extra efforts to upgrade technology and clean up their production processes.[70]

Since June of 2017, China's new Ministry of Environment is taking a hard stance against Chinese factories that are "heavy polluters'. In fact, in the most recent round of factory audits, China's environmental clampdown has shut down tens of thousands of Chinese factories with no end in sight. The effects of decades of huge trade growth has taken its toll on the environment. Now China has some of the most polluted cities in the world. Air purifying equipment and anti-pollution masks often sell out. Groundwater is polluted making safe drinking water a big concern. Now the government is doing something about it. What's different this time is that a hard stance is being taken in making sure that factories are compliant with environmental laws. Previously when policies were passed there was little to no compliance. Many factories were unaware or unwilling to comply so they continued operating in their old polluting ways. Now some factories are being forced to cease their production immediately and indefinitely. And if they don't comply their power could be shut off leaving them in the dark.[71]

69 http://daxueconsulting.com/green-products-china/
70 https://www.reuters.com/article/us-china-steel-pollution/chinas-hebei-vows-to-shut-polluting-steelmakers-from-september-1-idUSKBN1AP07A
71 https://www.8020sourcing.com/china-epa-crackdown-shuts-down-tens-of-thousands-of-factories-with-no-end-in-sight/

Environmentally Friendly Technologies

Electric Vehicles

According to the US media, China, by its full willpower, has created the world's largest market for electric vehicles. Big bets on domestic production has attracted major foreign car manufacturers to follow. The Chinese government is providing subsidies to domestic manufacturers to attract domestic consumers and is also building a huge network of charging stations. The government estimates that there will be 4.8 million charging stations in China by 2020, up from 156,000 in March. At this pace of development, the ratio of the number of charging posts and electric vehicles in China is about 1: 6, compared with 1:17 in the United States and Norway.

It is reported that in the United States and elsewhere, people are sceptical of the rapid development of EVs into large-scale markets. China has made its determination that one of its goals is to control pollution while reducing its reliance on foreign oil. However, China's primary goal is to harness the emerging electric vehicle market to boost the quality of domestic car makers. In order to achieve this goal, China is using industry policy measures to create a huge testing ground for the design and technology of domestic companies. This year on the 28th September 2017, the Chinese government put a statement that **overseas manufacturers producing cars in China must begin to produce new-energy vehicles locally by 2019[72].**

Large automobile companies are focusing to launch electric vehicles in emerging markets like China.

General Motors:	Volkswagen:	Toyota:	Ford Motor:	Tesla:
General Motors CEO Bora gave GM a specific plan to launch at least 10 electric cars by 2020. GM in other markets did not put forward such a specific goal. GM currently sells three electric vehicles in China, including Volt China, launched in 2017.	Volkswagen is setting a target of 1.5 million electric cars in the Chinese market by 2025. Volkswagen will invest 83 billion U.S. dollars by 2030 and launch 300 electric vehicles worldwide.	At a Shanghai Auto Show in April, Tohmatsu, chief executive of Toyota Motor Corporation's China operations, told the media that the real need to get people to pay attention to electric cars was the Chinese government's support. Toyota Motor said at the Shanghai Auto Show that it will begin production of electric vehicles that meet China's requirements.	Ford Motor Co. promised a statement that by 2025, 70% of its vehicles in China will be electric vehicles.	Tesla is planning to build factory in Shanghai[73].

72 http://us.xinhuanet.com/2017-10/10/c_129717722.htm
73 http://www.telegraph.co.uk/business/2017/10/23/tesla-eyes-shanghai-factory-electric-car-company-looks-expand/

Latest Industry Partnerships

- In 2017, Ford Motor Company, Renault-Nissan Motor Union and Volkswagen have successively set up a new joint venture in China to produce electric vehicles.
- In July 2017, Daimler AG, the parent company of Mercedes-Benz, said it will jointly invest 760 million U.S. dollars with Chinese state-owned Beijing Automotive Group Co., Ltd. to develop electric vehicles.

Artificial Intelligence

As the first pilot city of "Made in China 2025" pilot project, Ningbo, a port city, is trying to occupy an innovative high ground of artificial intelligence. In an artificial intelligence industry summit Forum, Ningbo City plans to spend three years, brought 108 billion dedicated to supporting advanced manufacturing industries, including artificial intelligence to increase, including the policy of emerging industries is skewed. In the forum, a number of government officials and experts said that Ningbo to create artificial intelligence industry should make full use of its manufacturing base and port advantages, combined with a strong supportive policies[74].

As a pilot city for the "Made in China 2025" pilot project, Ningbo has taken the development of smart manufacturing as its main direction of promoting the transformation and upgrading of the real economy. According to Ningbo Development and Reform Commission official, the smart economy is the future direction of industrial development, artificial intelligence is the core driver of a new round of industrial change, Ningbo in this new era should seize the opportunity.

The Ningbo government will step up its policy on new industries including artificial intelligence, encourage preferential policies on finance and credit for innovation and entrepreneurship to be open to such emerging enterprises and at the same time, explore and implement some emerging economies New equity management system, focusing on building high-tech service-oriented emerging industry system. According to recent study, China's investment in artificial intelligence accounts for about 63.5 billion yuan, accounting for 33% of the world's total, second only to 51% in the United States.

74 http://finance.sina.com.cn/roll/2017-09-19/doc-ifykyfwq8316502.shtml

The government guides the fund to play a big role in mobilizing social capital. Ningbo requires agencies to double the government-led funds it receives for local projects. In order to solve the problems of financing difficulties and financing in innovative enterprises, in recent years, Ningbo City has actively lent social capital investment to support innovation and entrepreneurship, focusing on building an angel guide fund "investment + policy + service" Ningbo model.

Ningbo Science and Technology Bureau data show that as of the end of 2016, Ningbo angel guiding funds total investment has exceeded 125 million yuan, social capital investment guide more than 1.5 billion yuan, fund amplification effect of up to 12.2 times; cumulative with the cast project amounted to 150, involving new materials, new energy, high-end equipment manufacturing and other strategic emerging industries areas; enterprises have already voted eight in three new board listed, 20 listed on the regional equity market.

As of April 2016, Ningbo City recorded an investment of angel institutions and individuals reaching 344 (persons), of which 64 institutions. In 2016, Ningbo Angel Investment and Guidance Fund completed the withdrawal of 6 heel investment projects such as Gifted Scholars and Pentagon Damping Fund, with the total capital of 5,129,000 yuan and a profit of 979,000 yuan. As of April this year, the Guiding Fund has totally withdrawn 16 projects, The average yield of 26.1%.

According to Ningbo City Commission by letter, Ningbo manufacturing enterprises reached 120,000, 99% are private enterprises, mostly small and micro enterprises. Of these, more than 7,000 in size, more than 1,000 in capacity, and 16.7 in capacity of 10 billion. Formerly export-oriented, now the introduction of new foreign technology is key. Ningbo has been standing at the peak of business in China. On the basis of geographical advantages and industrial advantages, Ningbo Bangzheng upgraded itself to smart manufacturing and cross-border e-commerce and completed the transformation from traditional commerce to modern commerce.[75]

75 http://www.gov.cn/xinwen/2017-09/30/content_5228960.htm

Smart Manufacturing Projects

The "Made in China 2025" initiative is changing the Chinese industrial landscape towards automation and smart manufacturing technology. The technology of new energy vehicles with intelligent manufacturing as the core has led the tide of the development of China's new energy industry. In 2017, the Ministry of Industry and Information Technology has issued two public announcements of project support linked with "smart manufacturing", and listed a number of new energy enterprises[76].

From June 7 to June 13, 2017, according to the Notice of the General Office of the Ministry of Industry and Information Technology of the General Office of the Ministry of Industry and Information Technology on Issuing the Working Guideline on Funding for Industrial Transformation and Upgrading in 2017 (Made in China 2025), the Ministry of Industry and Information Technology released the "2017 Smart Manufacturing Integrated Standardization and New Model Application Proposed Project Publicity ": Among them, there are 38 projects involving the new energy automobile industry chain.

From September 15 to September 24, 2017, in accordance with the requirements of "Guidelines for Smart Manufacturing Engineering Implementation (2016-2020)" under "Smart Manufacturing Development Plan (2016-2020)", the Ministry of Public Works announced the "2017 Smart Manufacturing Pilot Demonstration Project Among them, which involved a total of 18 automotive industry.

There are two lithium titanate demonstration enterprises in the "2017 pilot project of smart manufacturing pilot project." Silver Dragon In 2016 due to rapid charge of lithium titanate and Dong Mingzhu cross-border mergers and acquisitions and sudden emergence, has repeatedly become the industry headlines, the marketing speed of its siege slightly by the peer attention

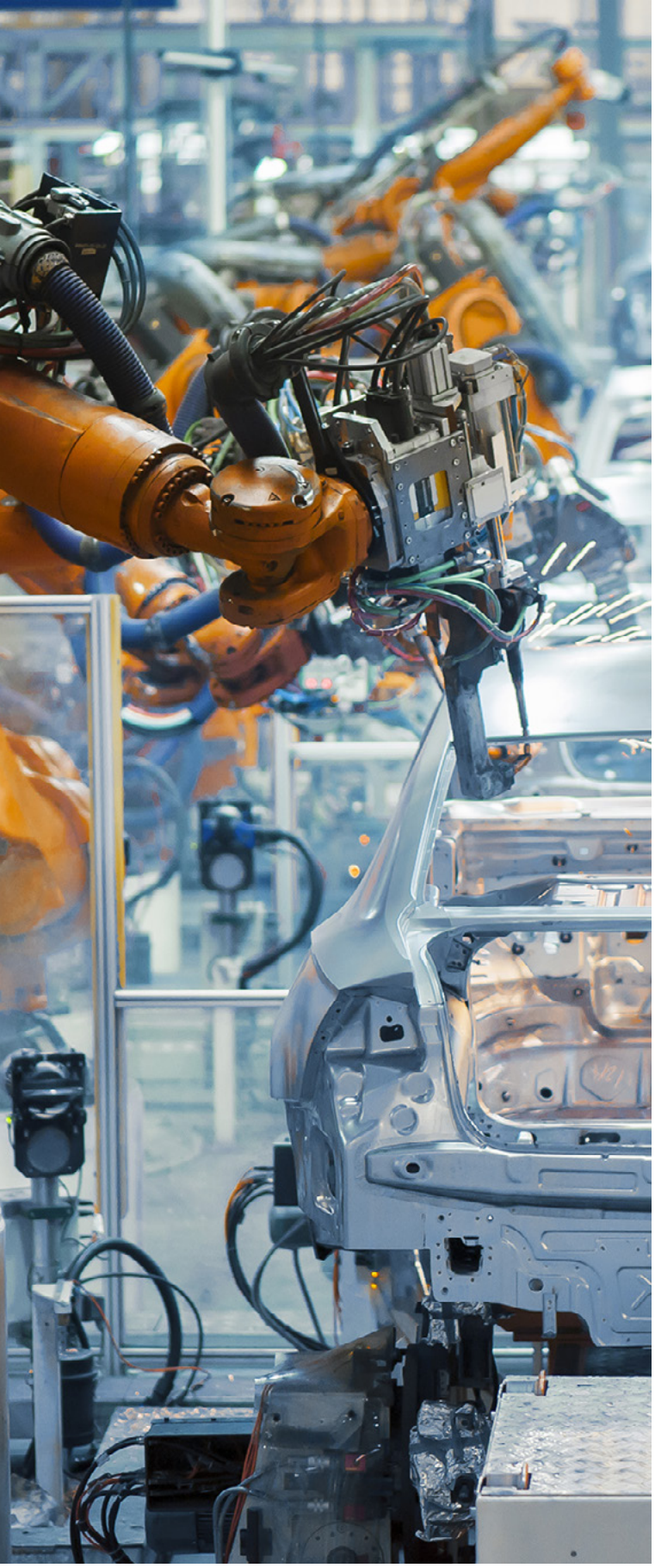
Green + Smart into the next Manufacturing Outlet

The role of smart manufacturing in enhancing green manufacturing has become increasingly prominent, and "green + smart" manufacturing Qi Qi is becoming the new outlet.

Reverse restraint and positive incentive are two-pronged approach, forcing green manufacturing to accelerate development. On the one hand, environmental inspectors are still under high pressure. The third tranche of the Central Environmental Protection Inspectorate's transcripts were just released covering 23 provinces with a preliminary fine of about 880 million yuan and 1183 cases of investigation and prosecution. The fourth batch of environmental inspectors was fully activated[77].

Accelerating the implementation of favorable policies will also increase the enthusiasm of local authorities and enterprises for green manufacturing. The "Made in China 2025" deployment of intelligent manufacturing engineering, green manufacturing engineering and five other major projects have been fully launched; MIIT coordination of industrial development throughout the foundation and industrial layout, approved 12 cities such

76 http://shupeidian.bjx.com.cn/news/20170921/851499.shtml
77 http://news.xinhuanet.com/finance/2017-08/11/c_1121467545.htm



as Ningbo and 5 cities in southern Jiangsu, the Pearl River West Bank, long Zhuzhou and Zhengluoxue are the pilot cities for demonstration of “Made in China 2025” (Group). The Ministry of Industry and Information Technology announced the list of the first batch of demonstration green manufacturing systems to be selected in 2017 from July 28 to August 3.

In the recent guidance the Ministry of Industry set up the first national green manufacturing alliance - China Green Manufacturing Alliance, which provides a number of green manufacturing special funds each year in the scale of 1 billion to 2 billion yuan. For those enterprises that are engaged in environmental protection projects, if they meet the standards of green manufacturing through the approval of the Ministry of Industry and Information Technology, they will get certain equipment subsidies, which will to some extent enhance the enthusiasm of enterprises in developing green manufacturing.

Robotics

In 2017, the robot industry in full swing. Recently, Foshan, a city in central Guangdong Province in southeastern China, was the first to promote the application of robotics and intelligent transformation of the site will be held in the core area of Foshan High-tech Zone, according to the official release of the “Foshan City, to promote robot applications and industrial development support programs (2018 - 2020).

At present, Foshan faces the problems of low industrial level and rising production costs. The demand of enterprises to reduce labor costs with machines and smart manufacturing, and increase production efficiency and economic efficiency is very urgent. For many manufacturing enterprises, the application of robots is attractive, but knowledge on how to remains low.

Until now, Foshan has implemented over 6,000 robots in more than 300 industrial enterprises above designated size, mainly in the fields of automobile manufacturing, ceramics, household appliances, machinery and metal materials processing industries, Welding, palletizing, spraying, assembly, stamping and other jobs. At the same time, the manufacturing scale of intelligent equipment focusing on industrial robots, numerical control equipment and 3D printing has been rapidly increasing. At present, there are over 300 intelligent equipment manufacturing enterprises above designated size in the city of Foshan (including about 100 robotics R & D and manufacturing enterprises) with a total industrial output value of over 70 billion yuan.

In the first half of 2017, Foshan added 79 new industrial enterprises above designated size to carry out "Machine Substitution" with 1155 new robot applications. Specific to the South China Sea, the first half of this year, the region has added 305 new robot applications (sets).

In March 2017, Nanhai District, Foshan City, promoted the development of the robot industry support approach, with robot business rent subsidies, product subsidies, financial contribution incentives, and introduced specific support measures.

It is reported that a number of well-known enterprises including NC, Xinpeng, Tigerway, Airloo and others now have settled in Fojia District and have been developing rapidly. They are leading the country in control systems, servo motors and integrated technologies. At the same time, it has introduced the project of "two divisions and one hospital" of Huazhong Numerical Control and set up Foshan Robot Innovation Industrial Park, Foshan Robot Innovation Alliance and China (Guangdong) Robot Integration Innovation Center. Huazhong CNC "two companies and one hospital" was approved as "the city to promote 2025 service agencies in China," has signed more than 30 robotics technology enterprises, to achieve more than 750 industrial robots production and sales, and strive to the end of 2017, a total of 20% (That is, 2000).

Many SMEs lack enthusiasm for independent innovation initiatives, and are cautious towards the intelligent transformation of the production line. In the Foshan Hi-tech Zone in addition to the implementation of robots and smart equipment applications, the "million project" combined with actual high-tech zones, is facing the traditional industries such as home appliances, furniture, non-ferrous metals, etc., and is selecting a group of representative enterprises to carry out the construction and upgrade of intelligent production demonstration lines and form a model and leading role.

In 2017, the congress promoted the application of robotics and intelligent technology in a meeting and also organized more than 160 business representatives to Haier Group Foshan Branch, Foshan Weishang Furniture Manufacturing Co., Ltd., Guangdong Fu-wah Machinery Group Co., Ltd., Foshan Wei Shida Electric Industrial Co., Ltd. 4 companies visit the scene.

According to Liu Ming'en, director of Foshan Bureau of Economic Information,

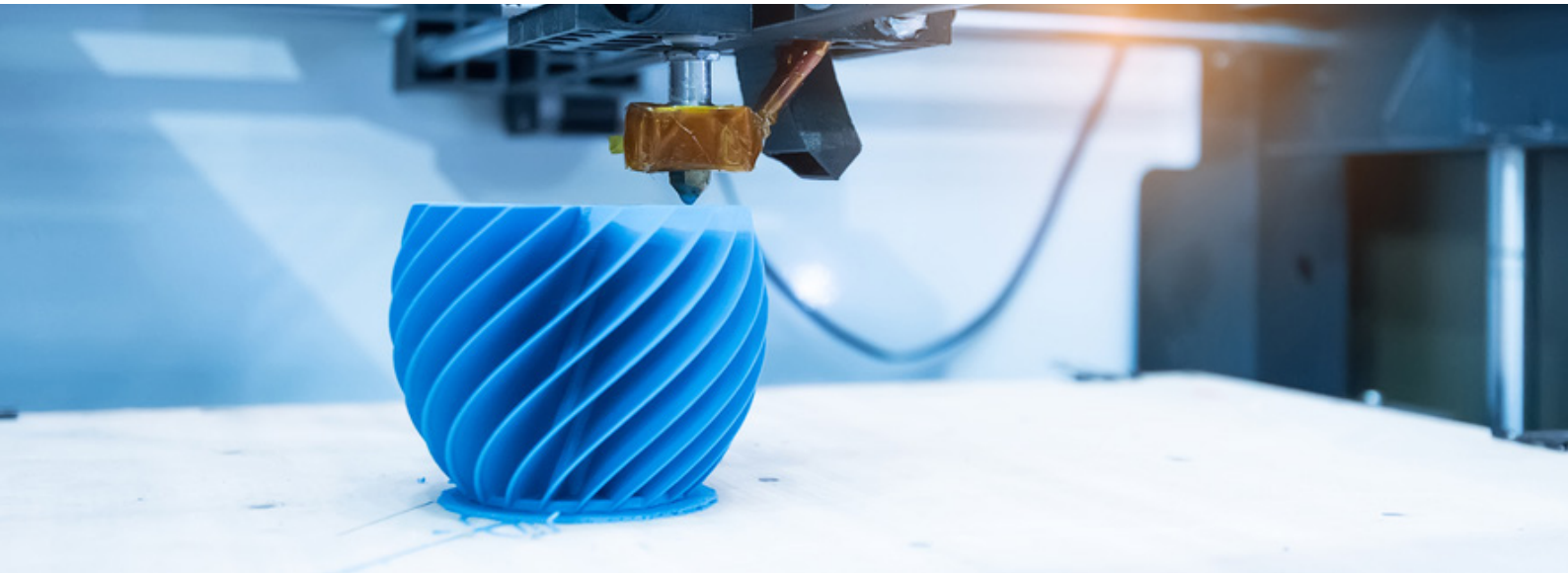
> *"The move hopes that more companies can see that in some traditional manufacturing industries, robotic applications and intelligent transformation and upgrading of certain processes or a certain element of business operations have produced outstanding benefits, and that most enterprises in Foshan can learn from them these applications and improvements".*

3D Printing Technology

3D printing technology is becoming one of the booming technologies in China. Multiple companies are taking initiatives to use 3D printing technology. Recently in 2017, Taizhou City, Jiangsu Province, set up a 500 million yuan guide fund to fund the settled 3D printing enterprises in areas such as talent settlement and training subsidies.[78].

While promoting the application of 3D printing into the campus and the 3D printing public service platform, Taizhou City and the Ministry of Industry and Information Technology jointly launched a special campaign of personnel-building (3D printing) personnel with the Ministry of Industry and Information Technology this year, signing agreements with four universities including Suzhou University of Science and Technology, For local, base and business needs, a large number of professional training for qualified personnel. And make use of the advantages of university's technology research to promote the rapid achievement of scientific and technological achievements and create a closed-loop ecology.

On the basis of cultivating professionals, the local area is accelerating the integration of the traditional public service platform with additive manufacturing (3D printing) and traditional industries. In the future, 3D Print Focus on promoting intelligent manufacturing, helping "Made in China 2025".



78 http://news.xinhuanet.com/local/2017-07/17/c_1121331047.htm

Appendix

Chinese milk powder imports of raw materials change 2013-2017

Unit: Million tons billion US dollars, US dollars / ton

	2013	2014	2015	2016	2016-2017 (1-7 Change %)
Quantity (tons)	85.44 4.57	92.34	54.72	60.42	44.57
Money (USD/ tons)	35.85	44.38	15.071	14.78	10.72
Price (USD)	**4195.53**	**4805.95**	**2753.62**	**2446.89**	**2404**

China raw milk source of imports 2017.1-7

Unit: ton, %

	2017 year 7 month			2017 year 1-7 month		
Country / region	Quantity	Accounting%	Change%	Quantity	Accounting%	Change%
Country Total	67111.6	100	77.3	496750.3	100	11.5
New Zealand	50237.7	74.9	60.4	396945	79.9	4
The EU	8312.9	12.4	193.3	54419.4	11	74.5
Australia	5851.3	8.7	156	25626.7	5.2	30.6
United States	2498.3	3.7	127.3	18122.1	3.6	115.7
Argentina			-100	554.4	0.1	83.3
Total EU	8312.9	12.4	193.3	54419.4	11	74.5
Germany	2150.8	3.2	165.9	15814.4	3.2	106.6
France	1377.3	2.1	135.7	14640.5	2.9	149.1
Finland	934.5	1.4	0.6	5996	1.2	18.2
Netherlands	1347.1	2	1882.2	4674.7	0.9	42.3
Sweden	859.8	1.3	752.9	4102.5	0.8	-6.8

Chinese milk powder points (areas) imports 2017.1-7

Unit: ton, %

	2017 year 7 month			2017 year 1-7 month		
Country / region	Quantity	Accounting%	Change%	Quantity	Accounting%	Change%
National Total	6.71	100	77.3	49.68	100	11.5
Shanghai	1.41	20.9	150.4	9.88	19.9	23.9
Guangdong	1.57	23.4	79.7	8.73	17.6	4.3
Tianjin	0.8	11.9	58.4	8.02	16.2	15.6
Zhejiang	0.79	11.7	49.5	6.23	12.5	-10.3
Beijing	0.55	8.1	35.8	3.99	8	97.1
Inner Mongolia	0.35	5.3	352703.5	3.45	6.9	-27.8
Shandong	0.14	2.1	-18.7	1.98	4	52.6
Jiangsu Province	0.27	4	0.4	1.97	4	22.9
Sichuan Province	0.21	3.1	582.9	1.09	2.2	-4.4
Fujian Province	0.09	1.3	55	1.03	2.1	8.1
other	0.5	8.2	40	3.3	6.7	29.4

Chinese milk powder points (areas) imports 2017.1-7

Unit: ton, %

	2017 year 7 month			2017 year 1-7 month		
Country / region	Quantity	Accounting%	Change%	Quantity	Accounting%	Change%
Country Total	53739.7	100	1.7	331942.5	100	-9.7
The EU	32737.8	60.9	-16.4	179327.4	54	-28.4
new Zealand	13777.9	25.6	64	110153.6	33.2	62.7
Australia	6128.2	11.4	43.6	35353.7	10.7	-8
Korea	589.5	1.1	-14.8	4355.7	1.3	-8.8
Switzerland	137.2	0.3	-1.2	795.3	0.2	-37.9
Total EU	32737.8	60.9	-16.4	179327.4	54	-28.4
Germany	15825.4	29.4	-0.7	94721.8	28.5	-25.7
France	9085.9	16.9	-41.8	44111.1	13.3	-41.6
Poland	1501.5	2.8	-29.8	8308.8	2.5	-41.4
United Kingdom	1289.8	2.4	-39.7	8035.4	2.4	-1.8
Belgium	1180.7	2.2	78.6	5711	1.7	28.5

In 2017, Ministry of Environmental Protection conducted an inspection and identified few companies for rectification of air pollution[79]

Serial number	City	Area	Name of pollution source	Main problem	Investigate the situation	Rectification (progress) situation	Rectification deadline
9-T001-BJ	**Beijing**	**Miyun District**	Beijing Jinghai heat transfer equipment manufacturing limited liability company	The company is producing on-site inspection. Existing problems: 1. Spraying room is not equipped with VOCs treatment facilities, exhaust gas row; 2. No sand blasting workshop management facilities.	Miyun District Environmental Protection Agency on-site verification, reflect the problem is true. The District Environmental Protection Bureau has already filed a case of punishment (the docket numbers are: Minibao Baolizi [2017] No. 145 and Minibao Baolizi [2017] No. 146), with a total penalty of RMB 250,000.	At present, the unit has been purchasing dust remover, and has been removed paint repair process, paint booth is being demolished.	***October 16, 2017***
9-T002-BJ	**Beijing**	**Miyun District**	Blue Ge Medical Supplies (Beijing) Co., Ltd.	On-site inspection of the company did not produce. Problems: Extrusion, injection process is not installed VOCs governance facilities.	Miyun District Environmental Protection Agency on-site verification, reflect the problem is true. The EPB inspects 3 extruders and 1 injection molding machine of this unit and has already filed a case of punishment (Docket No.:Mihuan Baolizi [2017] No. 148) with a penalty of 50,000 yuan.	At present, the unit has been discontinued, is rectification process.	***October 16, 2017***
9-T003-BJ	**Beijing**	**Miyun District**	Beijing Guodian Ruifeng Electric Co., Ltd.	On-site inspection of the company did not produce. Problems: Extrusion process is not equipped with VOCs treatment facilities.	Miyun District Environmental Protection Agency on-site verification, reflect the problem is true. District Environmental Protection Agency has sealed the unit plastic extruder, and put on file for punishment (case number: dense environmental protection legislation [2017] 144), the amount of 20,000 yuan to be punished.	District Environmental Protection Agency review, the unit is discontinued rectification, has been installed to contact the installation of emission control facilities.	***October 16, 2017***
9-T004-BJ	**Beijing**	**Yanqing District**	Beijing Xia Duo source of soy products Technology Development Co., Ltd.	On-site inspection of the company did not produce. Problems: Frying section is not equipped with VOCs treatment facilities.	Yanqing District Environmental Protection Agency on-site verification, the unit frying section has been installed gas hood and fume purification device.	At present, the company has been shut down by the territorial government.	***Completed***
9-T005-BJ	**Beijing**	**Mentougou District**	Beijing Xin Huayuan Machinery Manufacturing Co., Ltd.	The company is producing on-site inspection.Problems: spray, drying process is not installed VOCs governance facilities, exhaust straight.	Mentougou District Environmental Protection Agency on-site verification, reflect the problem is true. District Environmental Protection Agency has ordered the decision to stop production and remediation (docket number: door environmental stop production [2017] 007), requiring spray equipment to stop using.	At present, the unit is being sprayed on the production line to be removed.	***September 30, 2017***
9-T006-BJ	**Beijing**	**Mentougou District**	Beijing Century Industrial Printing Co., Ltd.	The company did not produce on-site inspection. There are problems: 1. The printing section is not installed VOCs treatment facilities; 2. hazardous waste storage does not meet the requirements.	Mentougou District Environmental Protection Agency on-site verification, the unit workshop printing production line printing section has been equipped with VOCs exhaust collection and treatment facilities, and normal use; hazardous waste storage room has been completed in accordance with the "three defenses" requirements.	At present, the unit has completed the correction.	***Completed***

79 http://bj.people.com.cn/n2/2017/1009/c82840-30808162.html

Serial number	City	Area	Name of pollution source	Main problem	Investigate the situation	Rectification (progress) situation	Rectification deadline
9-T007-BJ	**Beijing**	**Huairou District**	Beijing fashion Yi-Furniture Co., Ltd.	The company did not produce on-site inspection. Problems: Blow molding machines are not equipped with VOCs treatment facilities.	Huairou District Environmental Protection Agency on-site verification, reflect the problem is true. District Environmental Protection Agency has sealed the unit blow molding production line, and requested the demolition.	At present, the company is demolishing blow molding production line.	***September 30, 2017***
9-T008-BJ	**Beijing**	**Huairou District**	Beijing Ze Yu Printing Co., Ltd.	The company is producing on-site inspection, there are problems: 1. Exhaust gas treatment equipment (adsorption purifier) is not open; 2. The printing workshop is not sealed, the exhaust emissions of unorganized.	Huairou District Environmental Protection Agency on-site verification, reflect the problem is true. The District Environmental Protection Bureau has sealed up the main switch in the workshop and ordered the correction order to be rectified and filed for punishment (the case numbers are: Huaihuanjian Zi [2017] No. 122; Huaihuanjian Zi [2017] 123 No.), the amount to be punished a total of 40,000 yuan.	At present, the unit is rectification process.	***September 30, 2017***
9-T009-BJ	**Beijing**	**Huairou District**	Beijing wonderful car paint limited liability company	The company did not produce on-site inspection. Problems: Spray painting section, paint section is not installed VOCs governance facilities.	Huairou District Environmental Protection Agency on-site verification, reflect the problem is true. The District Environmental Protection Bureau has sealed the unit spray paint section, issued a decree to correct the illegal acts, and placed on file for punishment (file No.: Huaihuanjian [2017] No. 124), the amount of 50,000 yuan to be punished.	At present, the unit has been rectification completed.	***Completed***
9-T010-BJ	**Beijing**	**Huairou District**	Beijing Bosa Auto Parts Co., Ltd.	The company is producing on-site inspection. Existing problems: electrophoretic paint section, painting section, paint section is not installed VOCs treatment facilities, exhaust straight.	Huairou District Environmental Protection Agency on-site verification, reflect the problem is true. The District Environmental Protection Bureau has now sealed up the unit's paint spray booth and issued a decision letter of order to correct the illegal act and filed a case of punishment (No.:Haihuanjianjianshui [2017] No. 119) with a proposed amount of 50,000 yuan.	Currently, the unit is installing VOCs governance facilities.	***September 30, 2017***
9-T011-BJ	**Beijing**	**Huairou District**	Beijing Xin welfare metal products factory	The company is producing on-site inspection. Exist problems: VOCs are not installed in the spray booth and exhaust gas is discharged directly.	Huairou District Environmental Protection Agency on-site verification, reflect the problem is true. The District Environmental Protection Bureau has sealed the spray booth of the unit and issued a decision letter of order to correct the illegal act and filed the case for punishment (No.:Huaihuanjianjiao [2017] No. 120), with a penalty of 30,000 yuan.	At present, the unit spraying section has been banned.	***Completed***
9-T012-BJ	**Beijing**	**Shunyi District**	Beijing yuan a car decorated Limited	The site inspection company is producing, there are problems: 1. Spraying section purification treatment facilities did not continue to run; 2 hazardous waste storage does not meet the construction requirements, solid waste and hazardous waste mixed with no anti-seepage measures.	Shunyi District Environmental Protection Agency on-site verification, the unit of hazardous waste floor hardening impermeable handling, things on both sides of the ground to set anti-loss trough, regular clean-up, the other reflect the problem is true. District Environmental Protection Agency has issued a decree to correct the illegal acts and intends to file a case of punishment, requiring emissions control facilities to be opened before production, after the closure of production.	At present, the unit has carried out repairs and rectifications on the hazardous waste stockpile, classifies the solid wastes and hazardous wastes, and proactively plans to deeply reform the exhaust gas treatment facilities to ensure discharge standards.	***Completed***

Serial number	City	Area	Name of pollution source	Main problem	Investigate the situation	Rectification (progress) situation	Rectification deadline
9-T013-BJ	**Beijing**	**Chaoyang District**	Beijing dream fly interactive cultural Communications Limited	The company is producing on-site inspection. 1. No environmental protection procedures; 2. Brush paint VOCs exhaust gas row.	Chaoyang District EPA in conjunction with the Calendula Township government on-site verification found that the unit has been discontinued. Calendula government has implemented water and electricity off the unit, requiring them to be completed before September 30 relocation.	September 19, District Environmental Protection Agency review, the unit has been relocated.	***Completed***
9-T014-BJ	**Beijing**	**Chaoyang District**	Ma Zhuangcun Chaoyang District, Beijing Zhao Huisheng Furniture Factory	The company is producing on-site inspection. 1. No environmental protection procedures; 2. Brush paint VOCs exhaust gas row.	Chaoyang District EPA in conjunction with the Calendula Township government on-site verification found that the unit has been discontinued. Calendula government has implemented water and electricity off the unit, requiring them to be completed before September 30 relocation.	September 19, District Environmental Protection Agency review, the unit has been relocated.	***Completed***
9-T015-BJ	**Beijing**	**Chaoyang District**	Beijing Hong Long Building Materials Co., Ltd. Hong Kong	The company is producing on-site inspection. 1. Stone grinding workshop without dust control facilities; 2. No environmental procedures.	Chaoyang District Environmental Protection Bureau in conjunction with the Wang Siying Township government on-site verification, reflecting the problem is true. District Environmental Protection Bureau ordered the unit to stop using contaminated equipment, and seized its meter box. Wang Siying Township government requested that it be completed before September 30.	September 19, District Environmental Protection Agency review, found that the unit is in shutdown state, is moving.	***September 30, 2017***
9-T016-BJ	**Beijing**	**Chaoyang District**	Beijing Shen Diao Rong Jie Building Materials Co., Ltd.	The company is producing on-site inspection. 1. Stone grinding workshop without dust control facilities; 2. No environmental procedures.	Chaoyang District Environmental Protection Bureau in conjunction with the Wang Siying Township government on-site verification, reflecting the problem is true. District Environmental Protection Bureau ordered the unit to stop using contaminated equipment, and seized its meter box. Wang Siying Township government requested that it be completed before September 30.	September 19, District Environmental Protection Agency review, found that the unit is in shutdown state, is moving.	***September 30, 2017***
9-T017-BJ	**Beijing**	**Changping District**	Beijing Feiyu Trading Company	Enterprises are producing at the scene of the inspection, dust collection device (bag dust) is not open.	Changping District Environmental Protection Agency on-site verification, reflecting the problem is true. The District Environmental Protection Bureau has filed a case of punishment (case number: Chang environmental supervision legislation [2017] 310), the amount of 50000 yuan to be punished.	September 20, Shahe town government review, the unit is in power cut-off state, the company has been required to complete the installation of the overall dust collection device, the normal operation of the facility shall not be resumed.	***September 30, 2017***
9-T018-BJ	**Beijing**	**Fengtai District**	Beijing Arima CIGNA Printing Co., Ltd.	Enterprises are being inspected during on-site inspection. Problems exist: 1. Printing process control facilities are not operating normally. 2. VOCs coating facilities have no VOCs treatment facilities.	Fengtai District Environmental Protection Bureau on-site verification: 1. The unit printing process exhaust gas treatment facilities blower design air volume and activated carbon adsorption layer thickness does not match, resulting in lack of wind; 2. Glue packaging process and violet binding machine in the same confined workshop, The collector on the gluing machine collects to the exhaust gas treatment facility for disposal. District Environmental Protection Agency on the unit of indoor emissions of unorganized emissions testing, test results up to standard. District Environmental Protection Bureau asked the unit to further improve the exhaust gas treatment facilities and strengthen environmental management.	September 5, the District Environmental Protection Agency review, the unit has a thorough renovation of the exhaust gas treatment facilities, replaced by the advanced photoelectric integrated exhaust gas treatment facilities, operating normally.	***Completed***

Serial number	City	Area	Name of pollution source	Main problem	Investigate the situation	Rectification (progress) situation	Rectification deadline
9-T019-BJ	**Beijing**	**Haidian District**	Beijing An Jikang Plastic Products Co., Ltd.	On-site inspection companies are producing, there are problems: injection molding machines, blow molding machines, crushing machines are not installed pollution control facilities, exhaust straight.	Haidian District Environmental Protection Agency joint Sujiatuo on-site verification, reflect the problem part of the real. District Environmental Protection Bureau ordered the unit to stop the illegal act and file a case of punishment (file number: Hohhot Li Zi [2017] No. 547), the amount of the proposed punishment of 30,000 yuan.	At present, the unit crushing workshop has been disabled, the equipment has been emptied, exhaust vents closed, injection and blow molding workshop has been installed exhaust gas purification facilities. District Environmental Protection Agency asked the company to strengthen management to ensure that pollutants discharge standards.	***Completed***
9-T020-BJ	**Beijing**	**Fangshan District**	Beijing Hong Shunde Strong Building Materials Co., Ltd.	The business environment-free procedures, painting workshop pollution prevention and control facilities.	Fangshan District Environmental Protection Bureau, the District Commission by letter, Qinglonghu town government on-site verification, the problem unit is Beijing Green Runde Decoration Materials Co., Ltd., the unit over range management, belong to "scattered pollution" enterprises. District Environmental Protection Bureau ordered the unit to stop production and file a case of punishment (file number: Housing Environmental Protection [2017] No. 348), the amount of the proposed punishment of 95,000 yuan. Qinglonghu town government requires the unit to strictly implement the "two off three clear" measures.	On September 19, 2017, the district Environmental Protection Bureau, the District Economic and Information Committee and Qinglonghu Town Government reviewed the unit. The main production facilities were dismantled and the materials were being cleared.	***September 30, 2017***

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