

Selected City Cases of Sensor Technology Application in China

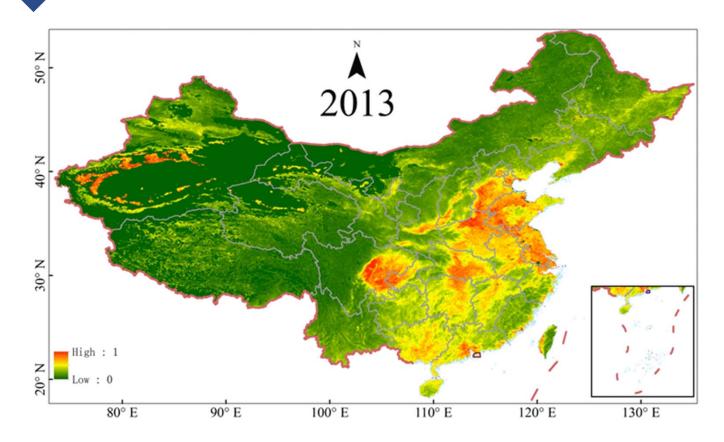
Tonny Xie
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2018/9/14





Rapid AQ Improvement in China

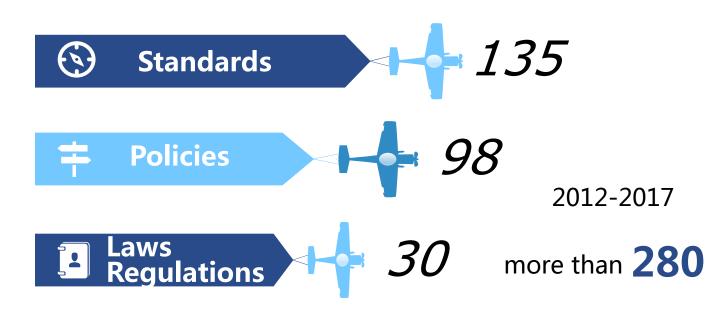




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Air Quality Policies (2013-2017)





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Plans



2 Key Policy Milestones



Feb.

Ambient Air Quality Standards

Apr.

The Environmental Law Amendment passed

May.

Measures for Assessment of Implementation of Air Pollution Prevention Action Plan (Trial) Nov.

Plan for Control of Pollutant Discharge Permit System

Dec.

Interim Provisions on the Administration of Pollutant Discharge License

2012 2013 2014 2015 2016 2016

Feb.

The State Council convened a executive meeting and decided to speed up the upgrading of oil products.

Sept.

Air Pollution Prevention and Control Action Plan (2013-

17)

May.

Key Work of Joint Prevention and Control of Air Pollution in Jing-Jin-Ji region and Surrounding Areas in 2015

Aug.

PRC Law on Air Pollution and Control

Aug.

Intensive Inspection Program for Air Pollution Control Measures in Jing-Jin-Ji region and Surrounding Areas in 2017-2018 Autumn and Winter

Oct.

19th CPC National Congress
: "We will get everyone involved in
improving the environment and address
environmental issues at the root. We will
continue our campaign to prevent and
control air pollution to make our skies
blue again."

Management Innovation

06



Characteristic Chinese Model of Air Quality Management

01

04

Information Disclosure

More citizens participated in air quality improvement

Mechanism of Urban Air Quality Attainment :

Cities play an important role for air quality improvement

Innovation of Region Cooperation: 05

Jing-Jin-Ji and other key areas

Reform of Pollutant Discharge Permit System:

focus of management has extended to operation

Management Goals:

pollution reduction \longrightarrow improvement of environmental quality and protection of public health

Management Mechanism and Model Innovation:

Central environmental inspection, city ranking of air quality, annual assessment, interview

Reform of Vertical Management of Environmental Monitoring System:

The management right of 1436 national environmental air monitoring sites has been all given back to central government

Vision: 2030 Clean Air Goals



Cleaner Future

- Coal < 45% of total energy consumption, more than
 used to electricity
- High polluting industries largely reduced, Service industry > 60%
- ◆ 50% reduction of SO₂, NO_X, VOCs, PM_{2.5}
- Mobile source emissions comparable to US and EU
- ◆ New Energy Vehicles > 50% in Beijing

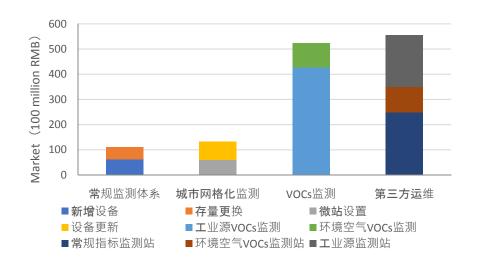
By 2030, All Cities Get Attained to

China's Standards : $PM_{2.5} < 35 \mu g/m^3$

Future Monitoring Market: 130 billion USD



- ◆ Regular air quality monitoring: super station, high-performance O₃ monitoring equipment
- ◆ Grid monitoring: micro air quality monitoring stations
- ◆ VOCs monitoring : rigid equipment demand for industrial pollution sources monitoring, monitoring of VOCs in environmental, On-line VOCs monitoring
- ◆ Operation and maintenance by third party and professional organizaton
- ◆ Monitoring instruments and methods: online monitoring instruments and Grid, stereo monitoring

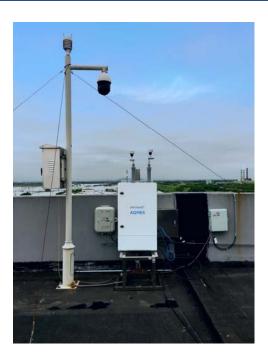




Grid Monitoring System







Strong Support for City Air Quality Management

Beijing Case (PM2.5 Monitoring)



- Over 1500 sensor-based monitoring stations
- Grid scale down to kilometer level (3X3, 8X8)
- Cover the whole city area and transport from neighbors
- Strong QC&QA requirements

Integration of Big Data, Artificial Intelligence, and Cloud technology.





Future Trend



- Over 40 cities already applied grid monitoring;
- ◆ New trend to Integrate of PM2.5, CO, VOCs, O3, SO2, NO2;
- Jing-Jing-Ji 2+ 26 cities will be the first batch in 2018;
- 3600 key grids (3km X 3 km) identified by central government.



Huge market opportunities for both equipment and service providers





Sensor Application

Mobile Monitoring

Mobile AQ Monitoring System



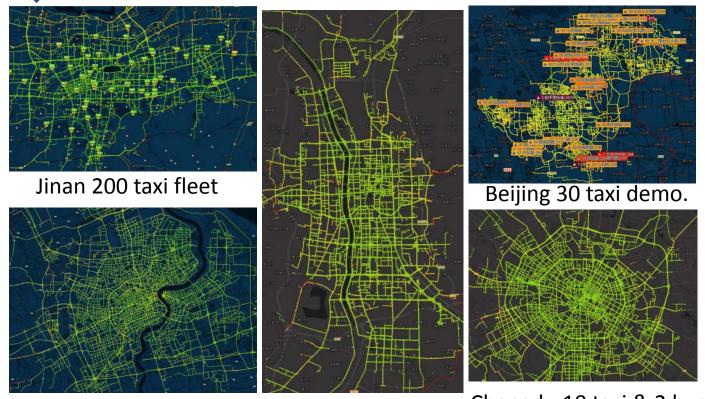
Install Air Quality Sensors in the Lighting System of Taxis











Shanghai 30 taxi pilot Taiyuan 50 taxi phase 1 Chengdu 10 taxi & 2 buses



Sensor Application

Pollution Source Monitoring

Shanghai Case (Dust Monitoring)



- Mandatory required for construction dust monitoring of over 1300 construction sites
- Data were effective for enforcement with daily supervision
- Violation:2 occurrences of >2.0mg/m3

7occurences >1.0mg/m3





Hebei Case (VOCs Monitoring)

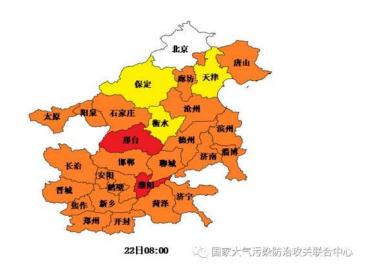


- PID Sensor based Technology
- Parameter: TVOCs, Temperature, and Humidity
- Applicable for both source monitoring and facility boundary monitoring
- Applied in Shijiazhuang, Handan, Xingtai, Baoding, Hengshui, Cangzhou, Langfang, and Tangshan cities
- Strong needs from both EPBs and Industrial Zones



Jing-Jin-Ji Case (Fugitive Dust Monitoring

- Monitoring of fugitive PM2.5 and PM10
- ◆ Mandatory for Jing-Jin-Ji 2+26 cities
- Facilities in key industries, such as Iron and Steel
- Every facility should install at least 20 online monitors





Bluetech Clean Air Alliance





- focusing on the development of clean air technologies and industries in China and the world through technology transfer, technology assessment and demos, investment service, IP protection, and policy research.
- Evolved from the Clean Air Alliance of China (CAAC), an integrated platform launched in 2013 by 10 leading Chinese research institutions to tackle China's severe air pollution problem.

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BCAA Progress



112 Experts

















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4 Professional

networks

Members













Clean Air Technology

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Reports























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Newsletters

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China Air Quality Updates







Clean Air Local Pilots



The alliance had carried out pilot activities in 10 provinces and cities, to help with air quality planning, air quality management assessment, measures design, technology demonstration assessment.

- Beijing
- Tianjin
- Shanxi Province
- Jiangsu Province
- Guangdong Province
- Guangzhou
- Taiyuan
- Shenzhen
- Changzhou
- Xinzhou



Bluetech Award (Since 2015)





200 Technology Applications from **16** Countries







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