

CHINA CLEAN AIR POLICY BRIEFINGS

NO.1

“TWELFTH FIVE-YEAR PLAN”

ON AIR POLLUTION PREVENTION AND CONTROL IN KEY REGIONS

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CAAC China Clean Air Policy Briefings

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FOREWORD

China Announced Plan to Control Air Pollution in Key Regions

On December 5, 2012, Ministry of Environmental Protection (MEP), National Development and Reform Commission (NDRC), and Ministry of Finance jointly issued “12th Five-Year Plan on Air Pollution Prevention and Control in Key Regions”. The plan was approved by the China’s State Council earlier.

It is the first time the central government of China issues a comprehensive air pollution prevention and control plan. The plan covers 3 key regions (Beijing-Tianjin-Hebei, Yangtze River Delta, and Pearl River Delta) and 10 city clusters, involving 19 provincial level jurisdictions and 117 cities. These areas covers only 14% of the country’s land area, but accounts for nearly half (48%) of the country’s population, 71% of the nation’s GDP, 52% of the country’s coal consumption. The air pollutants emissions level is 2.9 to 3.6 times higher than the nation’s average. Some of the key features of the plan include:

1. **It sets ambient concentration targets for the first time.** The plan requires key regions (including the city clusters) to reduce ambient concentration of SO₂ and PM₁₀ by 10%, NO₂ by 7%, and PM_{2.5} by 5%. The plan also requires the three key regions, namely Beijing-Tianjin-Hebei, Yangtze River Delta, Pearl River Delta to reduce PM_{2.5} concentration by 6% by 2015, and also makes it a binding target for local government in these regions.

Ambient air quality concentration targets	PM ₁₀	SO ₂	NO ₂	PM _{2.5}	PM _{2.5} (in 3 key regions)
	10%	10%	7%	5% (expected target)	6% (binding target)

2. **It sets more ambitious emission reduction targets in key regions than the national targets.** By 2015, the target is set to reduce SO₂, NO_x, industrial PM,

by 12%, 13%, and 10% respectively. The SO₂ reduction target is 4% higher than the national target (which is 8%); NO_x emissions reduction target is 3% higher than the national target (which is 10%). The industrial PM emissions reduction target was set for the first time (there is no national emission reduction target for industrial PM emissions).

Total emission reduction targets	SO₂	NO_x	Industrial PM
National targets by 2015	8%	10%	No target
Targets in key regions by 2015	12%	13%	10%

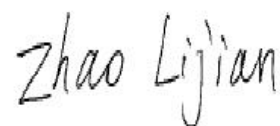
3. **It sets city air quality attainment plan requirements.** The plan also requires cities that currently fail to attain the national air quality standards to develop separate air quality attainment plans, and such plans should be made publicly available.
4. **The plan further classifies 47 cities as key control areas,** where these cities should take even more stringent requirements on pollution control. Special emission standards (the most stringent) in key sectors will apply in these cities. In addition, new projects need to offset 2 times of their emissions.
5. **It adopts comprehensive measures to tackle air pollution,** in addition to pollution treatment requirements, measures also includes adjusting industrial structure, shutting down high polluting enterprises, promoting clean energy including renewable energy and natural gas, piloting regional coal consumption cap in 3 key regions and Shandong city cluster, expanding coal-free zones, phasing out small industrial coal boilers and reducing rural indoor coal burning, improving coal quality, upgrading vehicle emission and fuel standards, as well as other sustainable energy measures. These measures could not only reduce air pollution, but also have climate benefits.
6. **It includes detailed projects to reduce emissions,** in addition to the policies and management requirements, the plan also include an annex with a long list

of specific projects which were estimated to require \$55.6 billion (350 billion yuan RMB) investment.

According to the Plan, if successfully implemented, the plan is estimated to result in SO₂ emission reduction of 2.28 million tons/year, NO_x emission reduction of 3.59 million tons/year, PM emission reduction of 1.48 million tons/year, and VOCs emission reduction of 1.525 million tons/year. And it is estimated to bring over \$317 billion (2 trillion yuan RMB) society benefits.

Challenges ahead

- The ambient concentration targets are very hard to achieve. Even if the emission reduction targets were achieved, it doesn't automatically translate into the same level of ambient concentration reductions. It is a great challenge to meet such ambient concentration reduction targets.
- Especially the time is very short (only 3 years left to achieve 2015 targets), and the local capacity is very limited, in terms of government and research institute staff, their experience on air quality management, etc.



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PREFACE

China's air pollution has reached an extremely critical state. With coal-smoke pollution yet to be capped, regional air pollutants like ozone, PM_{2.5} and acid rain, are growing more serious and frequent to form regional compound air pollution. Simultaneous large-scale severe air pollution episodes in many regions have been rising. This significantly constrains the sustainable development of the society and the economy, along with threatening public health. The regional compound air pollution is posing huge challenges to the current environmental management systems. It is difficult to solve worsening air pollution just through traditional management style of controlling within the city's municipal boundaries. Joint regional air pollution prevention and control has proved to be an effective approach in improving air quality internationally and in regional air quality management efforts such as the Beijing Olympics, Shanghai Expo and Guangzhou Asia Games. Thus it is necessary to explore and establish new regional air pollution prevention and control management system, which requires planning, monitoring, supervision, assessment and coordination in an integrated manner across a whole region.

The "12th Five-Year" period will see rapid industrialization and urbanization across China. The consumption of resources and energy will continue to rise and air quality will be threatened by air pollution. To comprehensively realize the air quality requirements of a developed nation by 2020, it is important to seize this opportunities to carry out air pollution joint control and prevention in key regions during the "12th Five-Year" economic and social development transition period, a strategic period for resolving major environmental issues. Regional air pollution prevention and control policies will be systematically formulated and implemented with the intent to improve air environmental quality. Environmental thresholds will be strengthened. Clean use of energy will be advanced and the phase out of backward capacity will be accelerated. Multiple pollutants control measures will be implemented and emissions will be reduced. To contribute to the harmonious development of regional

economies and environments, “Reversed Pressure Transmission Mechanism”¹ will be formed to advance the shift in economic development patterns.

“Twelfth Five-Year Plan on Air Pollution Prevention and Control in Key Regions” is developed in accordance to *“The Law of the People's Republic of China on the Prevention and Control of Air Pollution”* and *“The Twelfth Five-Year Plan for National Economic and Social Development of the People's Republic of China”*. A total of 19 provinces, autonomous regions and municipalities are involved, covering a combined area of approximately 1,325,600 square kilometers or 13.81% of the nation's land area. The plan encompasses the regions of Beijing-Tianjin-Hebei, Yangtze River Delta, Pearl River Delta, as well as the city clusters of Central Liaoning, Shandong Province, Wuhan region, Changsha-Zhuzhou-Xiangtan, Chengdu-Chongqing, Straits Fujian, Central and Northern Shanxi, Shaanxi Guanzhong, Gansu-Ningxia, and the city of Urumqi in Xinjiang (all cities and regions are listed in the attached table).

¹To develop economy and improve development patterns based on environmental requirements

1 STATUS AND CHALLENGES IN AIR POLLUTION PREVENTION AND CONTROL

1.1 PROGRESS IN PREVENTING AND CONTROLLING AIR POLLUTANTS

1.1.1 *Remarkable Results of Major Pollutants Emissions Reduction*

The 10% reduction of total SO₂ emission is a binding indicator defined in 11th Five-Year Plan outline for national economic and social development. To achieve the emission reduction target, government took a series policy measures such as preferential de-sulfurization electricity price premium, promotion of high capacity power generators and phasing out small power generators, the regional phase-out deadlines and regional approval restrictions, and increased investment in environmental protection, and implemented projects emission reduction, management and emissions reduction to achieve remarkable results. In 2010, de-sulfurization units were built and operated in national wide. The installed capacity of the units reached 578 million kilowatts and the de-sulfurization ratio of thermal power units increased from 14% in 2005 to 86% in 2010. 76.83 GW of small fire electric generators total installed capacity was shut down. 120 million tons of iron, 72 million tons of steel and 370 million tons of cement production capacity have been eliminated. Whereas the average annual growth rate of the national economy was up to 11.2% during the 11th Five-Year period and the total coal consumption increased by more than 1 billion tons, the sulfur dioxide emissions dropped 14.29% compared to 2005, which over fulfilled the emission reduction targets in the 11th Five-Year Plan.

1.1.2 *Promoting Comprehensive Urban Air Quality Regulation*

China pushed for comprehensive regulation of urban air quality during 11th Five-Year period. Through the implementation of “Retreat from the Second Industry and Develop the Third Industry” policy, a large number of heavily polluting enterprises were relocated, retrofitted, and optimized for urban industrial layout. Active promotion of urban clean energy retrofits, developing cogeneration, and district heating, helped to eliminate a number of small coal-fired boilers. Gas station gasoline recycling and treatment were established in Beijing-Tianjin-Hebei region, Yangtze Delta region and the Pearl River Delta region. Beijing,

Shanghai, Guangzhou, Shenzhen completed 1462, 500, 514, 256 oil and gas recovery renovation projects respectively. National III Standards of vehicle emissions have been implemented and in some of the cities, National IV standard of vehicle emissions have also been implemented. The average emission intensity of vehicles has dropped by over 40%. In year 2010, the annual average concentration of SO₂ and PM₁₀ were 35µg/m³ and 81µg/m³ in the prefectural and cities level, dropping 24.0% and 14.8% respectively compared to 2005. The concentration of NO₂ was basically stable. Therefore, the comprehensive regulation of urban air quality has achieved positive results.

1.1.3 *Actively Explore Regional Air Pollution Joint Prevention and Control Mechanism*

In order to ensure air quality during the Beijing Olympics, Shanghai Expo, and the Asian Games, six provinces in Northern China, Yangtze and Pearl River Delta region broke the administrative boundaries, established steering group and signed the environment protection agreement in order to co-operate on environmental protection, developed and implemented the air quality protection program as concerted joint, provincial departmental effort to carry out comprehensive integration control on SO₂, NO_x, PM₁₀ and VOCs. This unifies environment law enforcement, regulations, and information disclosure, thus forming a strong pollution control system to achieve positive results. During the events, the air quality was good in each host city, which fulfilled the promise of the Green Olympics, Green Expo and Green Asian Games. In addition, it accumulated useful experience for our future regional joint prevention and control of air pollution.

1.2 THE SERIOUS STATE OF AIR QUALITY

1.2.1 *Immense Burden of Air Pollution*

The emissions amount of air pollutants is huge in China. China's emission of SO₂ and NO_x are the highest in the world. China emitted 22.678 million tons of SO₂ and 22.736 million tons of NO_x in 2010, with dust emissions of 14.661 million tons, which are all far beyond the environmental carrying capacity. The Beijing-Tianjin-Hebei, Yangtze River Delta, Pearl River Delta regions, as well as the city clusters of Central Liaoning, Shandong Province, Wuhan

region, Changsha-Zhuzhou-Xiangtan, Chengdu-Chongqing, Straits Fujian, Central and Northern Shanxi, Shaanxi Guanzhong, Gansu-Ningxia, and Urumqi in Xinjiang are the thirteen key regions that have high centralized area of economic activity, pollution emissions, and prominent ambient air problem. These key regions accounts for 14% of the total land area, 48% of the total population, produce 71% of the total GDP, consume 52% of the coal, discharge 48% of SO₂, 51% of NO_x, 42% of dust and 50% of VOCs. The pollutant emission intensity per unit in these regions is 2.9-3.6 times more than the national average, and serious air pollution has become a restricting bottleneck for regional socio-economic development.

Table1. The emission of main pollutants in key region in 2010 (10,000 tons)

Region	Province	SO ₂	NO _x	Industrial PM	VOCs in key industries
Beijing-Tianjin-Hebei	Beijing	10.4	19.8	3.96	11.6
	Tianjin	23.8	34.0	7.99	15.6
	Hebei	143.78	171.29	95.89	15.4
Yangtze River Delta	Shanghai	25.5	44.3	8.9	23.9
	Jiangsu	108.55	147.19	96.18	51.3
	Zhejiang	68.4	85.3	43.33	52.7
Pearl River Delta	Guangdong	50.7	88.9	37.7	38.1
Central Liaoning	Liaoning	62.31	54.71	50.44	24.2
Shandong Province	Shandong	181.1	174	58.1	79.6
Wuhan Region	Hubei	39.27	36.97	24.17	20.7
Changsha-Zhuzhou-Xiangtan	Hunan	12.04	14.13	17.05	3.8
Chengdu-Chongqing	Chongqing	56.1	27.21	22.43	15.6
	Sichuan	73.2	52.01	38.36	8.9
Straits Fujian	Fujian	40.91	43.37	27.88	26.5
Central and Northern Shanxi	Shanxi	53.94	46.37	32.43	2.6
Shaanxi Guanzhong	Shaanxi	61.34	49.8	21.56	10.2
Gansu-Ningxia	Gansu	25.69	18.21	7.4	8.6
	Ningxia	6.68	9.3	3.04	3.95
Urumqi, Xinjiang	Xinjiang	18.3	19.87	7.22	4.0

1.2.2 Severe Air Pollution

In 2010, the annual average concentration of SO₂ and PM₁₀ in key regions were 40 µg /m³ and 86 µg /m³ respectively, which are 2-4 times greater than developed western nations. Annual average concentration of NO₂ is 33 µg /m³, with industry-intensive regions between Beijing and Shanghai being most seriously affected areas of NO₂ pollution in the troposphere, according to the satellite data. Based on the latest revised National Ambient Air Quality Standards, 82% of the key region cities fall below standards. Severe ambient air pollution threatens the health of public, increasing the mortality rate and morbidity risk from respiratory, cardiovascular and cerebrovascular diseases. They erode the building materials, destroy the ecology, cause decreases in food production, declines in forestry, and result in huge economic losses.

Table2. 2010annual average concentration of major air pollutants in key regions ($\mu\text{g}/\text{m}^3$)

Region	SO ₂	NO ₂	PM ₁₀
Beijing-Tianjin-Hebei	45	33	82
Yangtze River Delta	33	38	89
Pearl River Delta	26	40	58
Central Liaoning	46	33	84
Shandong Province	52	38	96
Wuhan region	28	28	91
Changsha-Zhuzhou-Xiangtan	51	40	86
Chengdu-Chongqing	43	35	76
Straits Fujian	29	26	71
Central and Northern Shanxi	44	19	75
Shaanxi Guanzhong	37	35	106
Gansu-Ningxia	46	32	111
Urumqi, Xinjiang	43	36	96

1.2.3 Increases in Majors Air Pollution Compounds

The rapid development of heavy chemical industries, energy consumption and motor vehicle ownership has resulted in massive emissions of SO₂, NO_x and VOCs, which have lead to increasing pollution of secondary pollutants like by PM_{2.5}, ozone, and acid rain. In 2010, the annual average value from PM_{2.5} pilot monitoring stations in seven cities was 40-90 $\mu\text{g}/\text{m}^3$, which is 14-157% higher than the latest revised National Ambient Air Quality Standards. Ozone monitoring pilots show that ozone levels exceeded Grade II National Ambient Air Quality Standard for 20% of the days in the year in some cities, and the maximum ozone concentration per hour in some regions exceeds the European alert level (240 ppb). Complex air pollution significantly reduces visibility and causes haze around 100 days a year in Beijing-Tianjin-Hebei, Yangtze Delta and Pearl River Delta regions. In some cities haze occurs for more than 200 days a year.

Column: Main sources of PM_{2.5}

The formation of the PM_{2.5} is rather complicated. Direct emissions of fine particulate matters in coal combustion, vehicles, fugitive dust, and biomass combustion produces 50% of PM_{2.5}. Complex chemical reactions of SO₂, NO_x, VOCs, NH₃ in the air create the other 50% secondary fine particulate matter. The sources of PM_{2.5} are widespread, coming from thermal power, iron and steel, cement, coal-fired furnaces and other industrial sources of emissions. They also come from mobile emission sources such as motor vehicles, ships, aircraft, construction machinery, agricultural machinery, or wide range of catering fumes, renovation and decoration of non-point source emissions. In order to control PM_{2.5}, the multiple pollutant control strategy should be implemented, the comprehensive management of multiple pollutants should be strengthened and regional joint prevention and control measures should be developed.

1.2.4 Pollution Impacts Each Other Among Cities

As urban environment continues to expand and develop, atmospheric circulation causes the pollution interaction and transmission between cities to become more prominent. In the Beijing-Tianjin-Hebei, Yangtze Delta, and Pearl River Delta regions, 30-40% of SO₂, 12-20% of NO_x, and 16-26% of PM₁₀ come from the outside sources. Changes in regional urban air pollution are also synchronized with weather patterns and heavy pollution weather successively appeared in general a day.

1.2.5 Air Pollution Prevention Faces Major Challenges

This is a critical period in establishing a prosperous, well-rounded society in next five years, as industrialization and urbanization continuing develop rapidly. According to forecasts, the GDP of the key regions will increase by over 50%, the total consumption of coal will increase by over 30%, and the total number of cars (including low-speed vehicles) ownership will increase by 50% in 2015. Based on the current pollution control efforts, SO₂, NO_x, industrial PM, and VOCs emissions were 1.6, 2.5, 1.0 and 2.2 million tons respectively, accounting for 15%, 22%, 17%, and 20% of the total emission in 2010. With continuing large reductions in SO₂ emission, the room for further reductions is shrinking. Existing pollution control efforts

have difficulty met the urgent demand of the public to improve the quality of ambient air, as controls on VOCs emissions -one of large contributor to $PM_{2.5}$ –are at an early stage. In order to improve the air environment quality much stricter pollutants controls measurements should be adopted and further reduce the total emission based on offsetting huge new amount of pollutants. The pollution prevention and control task however are very arduous.

1.3 THE MAIN PROBLEMS IN AIR PREVENTION AND CONTROL

1.3.1 *Obsolete Air Environmental Management*

The current environment management model is hardly appropriate for the air pollution prevention and control requirements. Regional air environment issues require the establishment of an integrated, unified planning mechanism between the local regions. According to the current management system and regulations, the local government is responsible for the local environment quality, carrying out the measures aimed at improving local environment quality and working separately, making it hard to solve regional air quality issues.

1.3.2 *Relatively Simple Elements to Pollution Control*

For a long time, China has not established a comprehensive multi-pollutant control system aimed at improving air quality. From the perspective of pollution control factor, the main focus of the pollution control has been on SO_2 and PM from industrial sources. Pollution controls for NO_x and VOCs from fugitive dust, non-point sources, automobiles and non-road vehicles sources have been insufficient.

1.3.3 *Weak Environmental Monitoring and Statistical Foundations*

Air environment quality monitoring indicator is incomplete, since most of the cities have not set up ozone and $PM_{2.5}$ monitoring, which leads to weak control for data quality, so that it cannot reflect the current air pollution situation. VOCs and fugitive dust are not included in the environment statistic system, so the lack of data is hard to fulfill environment management requirements.

1.3.4 *Incomplete Regulation Criteria*

The current laws and regulations about prevention and control of air pollution lack effective measures to prevent and control air pollution and mobile pollution sources on a regional level. They also lack of VOCs emission standards, comprehensive city dust management systems, and vehicle fuel standards lag behind the motor vehicle emission standards.

2 GUIDING IDEAS, PRINCIPLES AND OBJECTIVES

2.1 GUIDING IDEAS

Deng Xiaoping's Theory and the "Three Represents Theory" guide the 12th Five-Year Plan Prevention and Control Plan as it seeks to thoroughly execute the scientific concept of development, focusing on protecting the health of the people as the fundamental starting point, advancing the transformation of economic development model, the level of eco-civilization, and increasing regional air prevention and control capacity. Improving regional air environment quality through overall regional environmental resources, implement multiple pollutants co-control reduction effort in order to settle the PM_{2.5}, ozone, acid rain and other important environmental issues in order to enhance public satisfaction towards air quality.

2.2 PRINCIPLES

Coordinating Economy Development with Environment Protection. Adopt air pollutants and coal consumption control strategies and implementing the strictest "Reversed Pressure Transmission Mechanism of environmental pressure". To advance the transformation of economic development model and realize environmental protection and optimizing economic development. Through adjusting the industry and energy structure, accelerate the elimination of backward production capacity and processes, improve the clean production level of enterprise, decrease emission intensity of pollutants, and advance coordination between economy, society and environmental resource.

Jointing Prevention and Control Combined with Local Management. A regional air pollution joint prevention and control mechanism should be established to achieve "unified planning, monitoring, management, evaluation and coordination". According to the economy development level and environment pollution status of different cities, design key control areas and general control areas to have different management. Point out regional pollution reduction responsibility based on the local management principles.

Unification of Total Emission Reduction and Quality Improvement. Establish a control,

evaluation, and assessment system placing the quality improvement as the core. According to the relationship between total emission reduction and quality improvement, establish regional total amount control based on quality improvement. Through implementation of multi-pollutants co-control and balance control of SO₂, PM₁₀, and VOCs will help to resolve air pollution problems.

Exploring New Paths with Overall Coordination. Start with key regions, key industries and key pollutants, advance work in all areas by drawing upon the experience gained. Centralized control to solve the significant problems concerning to public health, local environmental safety, and sustainable economic society development. Accumulate important experiences in prevention and control of air pollution.

2.3 PLANNING OBJECTIVES

By the year 2015, emission of the SO₂, NO_x, and industrial PM should decrease 12%, 13%, 10% respectively. The prevention and control of VOCs should proceed in well round way in key regions. The air environment quality should improve significantly with annual average concentration of PM₁₀, SO₂, NO₂ and PM_{2.5} decreasing by 10%, 10%, 7%, and 5% respectively. Ozone pollution will be controlled and acid rain pollution will be reduced. Regional air pollution joint prevention and control mechanism will be established so that regional air environmental management capacity significantly improves.

PM_{2.5} will be the assessment indicator of Beijing-Tianjin-Hebei, Yangtze River Delta, Pearl River Delta regions, and the concentration of PM_{2.5} should decrease 6%. Other urban areas should consider it as an expected indicator.

The base year of the plan is 2010 and the specific planning targets are shown in the following table.

Table3. The planning indicators of prevention and control of air pollutants in key regions for provinces and cities in 12th Five-Year Plan (part 1)

Category	NO.	Indicator	Beijing	Tianjin	HeBei	Shanghai	Jiangsu	Zhejiang	Pearl River Delta	Central Liaoning	Shandong	Wuhan Region
Environment Quality Indicator	1	Proportion of SO ₂ annual average decline (%)	10	8	11	11	12	11	12	11	14	7
	2	Proportion of NO ₂ annual average decline (%)	7	9	7	9	10	10	9	9	10	4
	3	Proportion of PM ₁₀ annual average decline (%)	15	12	12	10	14	10	8	12	14	10
	4	Proportion of PM _{2.5} annual average decline (%)	15	6	6	6	7	5	5	6	7	5
Emission Control Indicator	5	Proportion of industrial PM emission reduction (%)	5	8	15	5	15	10	8	10	15	12
	6	Proportion of VOCs emission reduction from current sources (%)	15	18	15	18	18	18	18	15	15	10

Table3. The planning indicators of prevention and control of air pollutants in key regions for provinces and cities in 12th Five-Year Plan (part 2)

Category	NO.	Indicator	Changsha-Zhuzhou-Xiangtan	Chengdu-Chongqing (Chongqing)	Chengdu-Chongqing (Sichuan)	Straits Fujian	Shaanxi Guanzhong	Central & northern Shanxi	Gansu-Ningxia (Gansu)	Gansu-Ningxia (Ningxia)	Urumqi Xinjiang
Environment Quality Indicator	1	Proportion of SO ₂ annual average decline (%)	9	6	6	6	7	10	14	10	9
	2	Proportion of NO ₂ annual average decline (%)	5	4	4	5	5	7	8	7	9
	3	Proportion of PM ₁₀ annual average decline (%)	10	12	12	8	14	12	14	10	12
	4	Proportion of PM _{2.5} annual average decline (%)	5	6	6	4	4	4	4	5	4
Emission Control Indicator	5	Proportion of industrial PM emission reduction (%)	12	10	10	8	12	10	15	10	15
	6	Proportion of VOCs emission reduction from current sources (%)	10	15	10	10	10	10	10	10	10

3 COORDINATION OF REGIONAL ENVIRONMENTAL RESOURCES, OPTIMIZING INDUSTRIAL STRUCTURE AND LAYOUT

3.1 IDENTIFY REGIONAL CONTROL KEY POINTS AND IMPLEMENT CLASSIFICATION MANAGEMENT

3.1.1 *Identifying the Types of Regional Pollution Control*

The Beijing-Tianjin-Hebei, Yangtze Delta, and Pearl River Delta regions along with the Shandong Province are areas with severe and compound pollution. The Yangtze River Delta and Pearl River Delta regions should strengthen control of acid rain; whereas the Beijing-Tianjin-Hebei region, Jiangsu and Shandong provinces should strengthen the controls on PM₁₀. All of these regions should focus on the controlling fine particulate matter (PM_{2.5}) and ozone.

The city clusters of Central Liaoning, Wuhan region, Changsha-Zhuzhou-Xiangtan, Chengdu-Chongqing, and Straits Fujian are compound pollution areas. They should focus on PM₁₀, SO₂, and NO₂ as well as control of PM_{2.5} and ozone. In addition Wuhan region, Chengdu-Chongqing and Changsha-Zhuzhou-Xiangtan should seek to strengthen the controls for acid rain, whereas Central Liaoning should enhance the controls for coal pollution during the heating season.

Central and northern Shanxi, Shaanxi Guanzhong, and Urumqi should mainly focus on the control of traditional coal pollution, particularly in PM₁₀, SO₂ and enhancing control on coal pollution during heating season.

3.1.2 *Defining Key Control Areas*

The regions are classified into key control area and general control areas according to geographical features, the level of socio-economic development, the degree of air pollution, urban space distribution and transport pattern of air pollutants among regions. Differentiated control requirements and develop targeted pollution prevention strategies. For the key control area, stricter environmental conditions, special emission limits for key industry pollutants, and more powerful pollution control measures will be applied. There are 47 cities in the key control areas, and the cities refer to the whole the city area except for

Chongqing which refers to main city area.

The six cities in the Beijing-Tianjin-Hebei key control area include Beijing, Tianjin, Shijiazhuang, Tangshan, Baoding and Langfang. The fourteen city in the Yangtze River Delta key control area include Shanghai, Nanjing, Wuxi, Changzhou, Suzhou, Nantong, Yangzhou, Zhenjiang, Taizhou, Hangzhou, Ningbo, Jiaxing, Huzhou, Shaoxing and Pearl River Delta key control area consists of nine cities. Central Liaoning key control area includes Shenyang. Shandong Province key control area includes Jinan, Qingdao, Zibo, and Weifang. Wuhan key control area includes Wuhan and its surrounding areas. Changsha-Zhuzhou-Xiangtan region key control area is Changsha. Chengdu-Chongqing region key control area includes Chongqing and Chengdu. Straits Fujian key control area is Fuzhou and Sanming. Central and Northern Shanxi's key control area is Taiyuan. Xi'an and Xianyang is the key control area of Shaanxi Guanzhong. Gansu-Ningxia region key control area is Lanzhou and Yinchuan. Xinjiang Province's key control area is Urumqi.

3.2 STRICTER ENVIRONMENTAL THRESHOLDS, STRENGTHEN MANAGEMENT AT THE SOURCE

Increase environmental threshold requirements of high-energy consumption, high pollution and resource based industries according to the national industrial policy. Strict requirement for the new high-energy consumption and high pollution projects along with curbing of duplicate construction.

3.2.1 *Strict Controls on High Energy Consumption and High Pollution Projects*

Key control areas will forbid new, modified or enlargement construction projects, which use small generation system projects and coal-fired power plant (excluding cogeneration plant). The exception is high capacity generation systems. High pollution projects in iron & steel, cement, petrochemical, chemical, non-ferrous metal industries will meet strict limitations. New high-pollution projects in the coal electricity, iron & steel, building material, coking, non-ferrous metal, petrochemical, and chemical sectors will be prohibited, except when cogeneration is used. Construction is prohibited for new coal combustion, heavy oil, residual oil, direct burning, and biomass boilers under 20 tons of steam per hour in industrials park and under 10 tons of steam per hour in other sectors. High-polluting industries will see strict

control on their capacity. Beijing, Shanghai and Pearl River Delta region should strictly control the petrochemicals production capacity. Liaoning, Hebei, Shanghai, Tianjin, Jiangsu and Shandong should implement total emission control of iron-steel production capacity. Shanghai, Jiangsu, Zhejiang, Shandong, Chongqing, Sichuan and other cities should strictly control the expansion of cement production and replace of backward production capacity.

3.2.2 *Strict Controls of New Pollutants Emissions*

The project is determined based on total emission control, which is the pre-condition of the EIA approval. Newly built projects which discharge SO₂, NO_x, industrial PM, and VOCs should apply pollutant emission reduction alternatives to reduce pollutants even though the production capacity increases. New project should implement pollutants offset at a ratio of 1:2 in key control area cities. New project should implements pollutants offset at 1:1.5 in general control area. For projects disapproved by EIA, the authority should not review, examine or approve construction, should not issue the production license, safety production license or emission permit. Financial institutions shall not grant any form of additional credit support and relevant public utility shall not supply water and electricity.

3.2.3 *Implementation of Special Emission Limits*

Newly built projects should have advanced pollution control and treatment facilities. Thermal power plant and steel sintering machine projects should simultaneously install efficient dust removal, de-sulfurization and de-nitrification facilities. Newly built cement production line should apply low NO_x combustion technology and install a bag filter and flue gas de-nitrification device, new built coal combustion boiler should install efficient dust removal, de-sulfurization facilities and apply low NO_x combustion or de-nitrification technology to achieve emission standard requirements. Special emission limits on air pollutant emission standard should be achieved on all new thermal power, iron & steel, petrochemical, cement, nonferrous metal, chemical and other heavily polluting projects are built in key control areas. Thermal power project implementation time should be the same as the planning publishing time. Other industries implementation time synchronizes with emission standard publishing time.

3.2.4 Increase Construction Requirements for VOCs Emission Projects

The VOCs pollution controls will be an important element in a construction project's environmental impact assessment and adopt strict pollution control measures. Limit the amount of new built projects under 10 million tons per year atmospheric and vacuum distillation unit, under 1.5 million tons/year catalytic cracking unit, under 1 million tons/year continuous reforming unit, under 1.5 million tons/year Hydro cracking production unit and other limit projects in petrochemical industry. New built petrochemical projects should keep the loss of crude oil at less than 0.4‰, and be equipped with appropriate organic waste gas treatment facilities. VOCs emission collection rate should no less than 90% in the workshop of new, altered and enlarge projects and exhaust gas recycling /purification device should be installed. Newly built oil storage, gas stations, and new tanker should be installed with vapor recovery equipment. The usage of low volatile organic content in water-based paint has to be no less than 80% of the total paint in new motor vehicle manufacturing painting project. VOCs emission of painting small passenger vehicles shall not exceed 35 g/m³. The usage of low volatile organic content of water-based paint should be no less than 50% of the total paint and interior and exterior wall coating should all use water-soluble paint in new painting project in electronics, furniture and other industries. New packaging and printing projects requires the use of environmental labeling ink.

3.3 ACCELERATE ELIMINATION OF BACKWARD PRODUCTION CAPACITY AND OPTIMIZE INDUSTRIAL LAYOUT

3.3.1 Increase Elimination of Backward Production Capacity

In strict accordance with the release of "Elimination of Backward Production Technology, Equipment and Product Stewardship Directory" and "The 2011 Industrial Restructuring Catalog", the elimination of the obsolete production capacity will be accelerated. Improve notification system for eliminating of obsolete production capacity for those regions that fail to accomplish the elimination task, national environmental investment projects can suspend the procedures of review for approval and filing of construction for thermal power, iron and steel, nonferrous metals, petrochemicals, cement, chemicals, and other key industries. For enterprises that fail to meet elimination deadlines, emission permits, production and other licenses can be revoked.

Eliminate Backward Thermal Power, Steel-Iron, and Building Materials Production Capacity.

Eliminate conventional coal-fired power with unit capacity of 100MW and conventional coal-fired thermal power units with design life expiration of large grid covering the range unit capacity of 200 MW. Conventional thermal power units and fuel-based power generation boilers and generator with unit capacity below 50MW will be eliminated. Eliminate soil sintering machines in the steel industry that are below 90 m², sintering machine for iron steelmaking that are 400 m³ and below, blast furnaces (except cast iron enterprises, but must provide evidence) that are 30 tons and below, iron smelting converters (excluding iron alloy converter) and electric furnace, and foundry cupolas, single-stage gas furnaces and other heavily polluting production processes and equipments. Eliminate all cement kiln, dry kiln (except production of alumina cement, sulfur aluminate cement), and wet kiln cement clinker production line. Eliminate brick kiln and shaft kiln below 24 wheels. Eliminate no top round and horseshoe kiln. Eliminate 1 million m²/year and below building ceramic tiles, 200,000 pieces/year low-grade sanitary ceramics production line, and the colburn process flat production line. Eliminate of indigenous coking with furnace production capacity below 75,000 tons/year and coke ovens with carbonization chamber height less than 4.3m (except tamping coke oven with carbonization chamber height more than 3.8m).

Eliminate Backward Production Capacity in VOCs Emission Industry. Eliminate crude oil distillation units less than 2 million tons per year. Eliminate waste rubber and plastics oil refinery process methods. Eliminate the open-air spray in vehicle maintenance and other repair industrial dry cleaning equipment without solvent recovery facilities. Prohibit the production, sale and use of indoor decorative paints with hazardous substance and VOCs over 200 g/L along with solvent-based wood furniture coatings with hazardous substance and VOCs over 700 g/L. Eliminate traditional printing ink production device with annual production of less than 300 tons. Eliminate printing ink with benzene solvents. Eliminate all paint, adhesives and printing ink without VOCs collection, recycling, and purification devices or facilities. Eliminate other craft and product contains severe VOCs pollution, carry out VOCs emission reduction and control non-economic feasibility craft and product.

3.3.2 *Optimizing Industrial Layout*

Accelerate adjustments to industrial layout will consider regional environmental carrying capacities, atmospheric patterns, resource advantages and the development priority zones requirements. Enhance regional environment impact assessments, and establish reasonable development zoning structures, and scale of key industries according to regional resources and environment carrying capacity. The Environment Protection Bureau needs to enhance the guidance on regional environmental impact assessments in Beijing-Tianjin-Hebei, Yangtze River Delta, Chengdu-Chongqing and other key regions. Meanwhile provincial environmental protection departments need to advance environmental impact assessment of urban areas.

Heavy pollution enterprises in environmental sensitive and urban areas need to be relocated and reconstructed. Relocation schedule for key pollution enterprises needs to be developed. This involves accelerating the relocation of steel plants and the safe and environment-friendly relocation of petrochemical base in Shanghai. Continuously advance centralizing the industrial projects to industrial park and reducing emission and energy consumption of small enterprises through centralized heating system. Integrate and improve environment management level of current industrial parks and increase the environment threshold requirement for the enterprises. An industry relocation regulatory system should be established to enhance the environmental regulation of relocation industries, and prevent backward production capacity from moving to the economically underdeveloped areas.

4 STRENGTHEN CLEAN ENERGY UTILIZATION AND CAP REGIONAL COAL CONSUMPTION

4.1 OPTIMIZE THE ENERGY STRUCTURE AND CAP COAL USE

4.1.1 *Develop Clean Energy*

Accelerate the development of natural gas and renewable energy in order to realize a clean energy supply and diversified energy mix. Combine national natural gas pipeline networks, regional pipeline networks, LNG terminals, gas storages and other natural gas distribution projects to strengthen natural gas infrastructure construction in key regions. Optimally allocate and use natural gas as well as develop distributed natural gas system in accordance to the rules of “The priority development of city gas, actively adjustment industrial fuel structure, and modestly development of natural gas power generation”.

Aggressively develop and use wind energy. Advance onshore wind power base constructions in Northeast, North and Northwest China and distributed wind power in Central and East China and offshore wind power in the coastal areas of Shanghai, Jiangsu, Zhejiang, Hebei, Shandong, Guangdong, and Fujian provinces. Accelerate the use of solar PV and actively advance the development of the solar power industry. Advance the graded comprehensive utilization of biological energy via biomass briquette, liquid fuel, power generation and gasification. Accelerate the surveying, exploration, and exploitation of coal bed gas and shale gas in the city clusters of Liaozhong peninsula, Chengdu-Chongqing, Central and Northern Shanxi, and Shaanxi Guanzhong, to advance energy structure. Popularize the use of geothermal energy in Central Liaoning and Shaanxi Guanzhong, Gansu-Ningxia city clusters through fiscal support and demonstration subsidies. Actively develop hydropower with consideration to ecologic conservation and migration resettlement.

4.1.2 *Implement Cap on Coal Consumption*

Setting and implementing long-term regional coal consumption caps must take into consideration social-economic development, energy consumption characteristics, and air pollution status, and be based on the national energy consumption caps. All regional coal

consumption cap implementation plan should decompose region's total targets to local governments with the accountability, management, supervision, and examination of them. A total coal consumption forecast and warning mechanism will be built to regulate and control the amount growth of coal consumption in the regions. Coal consumption cap pilots will be actively developed in Beijing-Tianjin-Hebei, Yangtze River Delta, Pearl River Delta regions and Shandong province city cluster.

4.1.3 *Expand Restricted Zones for High Polluting Fuels*

Expand the scale of “restricted zones for high polluting fuel”. The restricted area zones should be more than 80% of the urban area in key control areas, and more than 60% in general control areas. By the end of 2013, restricted zones in the key control areas will be designated and in general areas by the end of 2014. Designated restricted zones should be constantly adjusted along with the development of the urban area. The burning of raw coal (including loose coal), washed coal, honeycomb briquette, coke, charcoal, coal gangue, coal slime, coal tar, heavy oil, and residual oil are forbidden in restricted zones, as well as various combustible waste, directly combusted biomass, and other high polluting fuels such as light diesel oil, kerosene and manufactured gas in which the pollutant values are exceeding national standards. Various facilities with high polluting fuels, which have been built, should be dismantled or retrofitted to use pipeline natural gas, LNG, pipeline coal gas, electricity or other clean energy within a definite time. Facilities, which use high polluting fuels past the prescribed deadline, will to be ordered to dismantle or be confiscated.

4.2 IMPROVE COAL UTILIZATION PATTERN AND ADVANCE COAL CLEAN UTILIZATION

4.2.1 *Increase Cogeneration Projects and Eliminate Small Coal Boilers*

Actively advance “District Heat Source”. Construct and perfect heat supply network projects and develop “heat-electricity-cool” trip cogenerations. Enhance the technical retrofit of pure condensing steam coal-fired units, to extract steam for heat supply network maximally. According to the CHP and centralized heating development rules in the “unified plan, electricity based on heat load and moderate scale”, CHP enterprises should be the heating source for new-built industrial parks, and if there is no condition, centralized heating should

be allocated according to the needs of the industrial park. CHP and centralization heating retrofits should be implemented for existing industrial parks and concentration zones, in order to integrate the industrial enterprises in with centralized heating. Centralized heating will be carried out in urban areas combined with large power or heat-power enterprise. The elimination of coal-fired boilers, which will be replaced by approved new CHP projects, should be performed on the schedule.

Eliminate of small-sized coal-fired boilers. All distributed coal-fired boilers in the scale of heating supply network will be removed, and the coal-fired boilers under 10 tons per hour will be eliminated step by step in urban areas and municipal districts. By 2015, centralized heating will be realized in industrial parks almost. Phase-out decentralized heating coal stoves in rural areas, encourage the utilization of clean energy, and implement centralized heating in areas with suitable conditions.

Advance metered heating reform. Accelerate the push for metered heating and energy efficiency retrofit on existing residential buildings in northern heating regions. Supervision of metered heating projects in new buildings must be strengthened. Implement metered heating charging and advance energy saving through users behaviors to advance energy saving and emissions.

4.2.2 *Improve Coal Quality and Advance Clean, Efficient Utilization of Coal*

The exploitation and use of low quality high-sulfur and high-ash coal must be controlled. Proportion of coal washing will be increased and the establishment of coal blending centers will be further advanced. Research and popularize clean and efficient coal utilization technologies will be implemented to reduce the air pollutant emissions. In key control areas, the coal-fired boilers and industrial stoves without de-sulfurization and dust-remove equipments are forbidden to use the coal, which contained more than 0.6% sulfur and 15% ash. Low-sulfur briquette coal combined with fixed sulfur sorbent should be used for resident combustion and other small-sized coal-fired facilities.

5 STRENGTHEN TREATMENT OF AIR POLLUTION AND IMPLEMENTATION OF CO-CONTROL FOR MULTIPLE POLLUTANTS

5.1 STRENGTHEN THE TREATMENT OF SO₂ AND DEVELOP COMPREHENSIVE CONTROL OF NO_x

5.1.1 *Comprehensive SO₂ Reduction*

Strengthen SO₂ treatment in thermal power sectors. De-sulfurization equipment should be installed in all coal-fired power units, and substandard de-sulfurization equipment should be upgraded and reconstructed. Cancel the bypass flues of de-sulfurization equipment according to the rules, and strengthen equipment supervision and management to ensure the overall desulphurization efficiency in thermal power is greater than 90%.

Flue gas SO₂ treatment in non-power sectors such as steel and petrochemical sectors needs to be strengthened. De-sulfurization equipment should be installed for all sintering machines and pellet production facilities located in urban areas. Their overall de-sulfurization efficiency should be greater than 70%. De-sulphurization equipment should be installed in the petrochemical sector for catalytic cracking units with sulfur recovery rate in excess of 99%. Accelerate the retrofits for production technologies and equipment in non-ferrous metal metallurgy to improve the recycling and reuse rate of sulfur from exhaust gas, including sulfuric acid recycling and other methods used for the flue gas containing SO₂ of more than 3.5% and the de-sulfurization treatment applied to low concentration flue gas and sulfuric acid exhaust, which exceed standards. Implement de-sulfurization of coke oven gas, and hydrothion-remove efficiency will exceed 95%. Strengthen flue gas treatment in mid to large-sized coal-fired boilers, so that the boilers with capacity above 20 tons per hour should have sulfur removed, and the desulphurization rate greater than 70%. Advance SO₂ control in building material industries like ceramic, glass and brick.

5.1.2 *Develop Comprehensive NO_x Controls*

Advance NO_x controls in the thermal power sector. Accelerate technical retrofits of low-nitrification combustion and de-nitrification equipment on thermal power units. Units with capacities above 0.2 million KW and more than 20 years' operation life must be mated

with de-nitrification equipment with de-nitrification efficiency greater than 85% and overall de-nitrification efficiency will be more than 70%. Enhance the supervision and management of existing de-nitrification equipment to make sure the stable operations.

The treatment of NO_x in the cement industry will be enhanced. Low-nitrification combustion technical retrofit will be implemented for new type dry-process cement kilns combined with de-nitrification equipment. Overall de-nitrogen efficiency of newly built, reconstructed or extended cement production lines will be no less than 60%.

Flue gas de-nitrogen demonstration for industrial coal-fired boilers and sintering machines will be developed. Two or three iron and steel enterprises which have sintering machines with unit area more than 180 M² will be selected in Beijing-Tianjin-Hebei, Yangtze River Delta, and Pearl River Delta regions to develop flue gas de-nitrogen demonstration projects. . Low-nitrification combustion retrofits and de-nitrogen demonstrations for industrial coal-fired boilers will be pursued.

5.2 ENHANCE THE TREATMENT OF INDUSTRIAL SMOKE AND DUST AND VIGOROUSLY REDUCE PARTICULATE MATTER EMISSIONS

5.2.1 Enhance Smoke Treatment in the Thermal Power Industry

Coal-fired power generation units should be coupled with efficient smoke-removers. Substandard coal-fired power general units should be retrofitted with efficient smoke removers. The substandard is defined as smoke emission concentrations of no greater than 30 mg /M³ in general control areas and 20 mg /M³ in key control areas.

5.2.2 Enhance Dust Treatment in the Cement Industry

The dust-removers in cement kilns and kiln-grinding combined machines should be replaced by bag filters. Highly efficient dust-removers should also be adopted in crushers, mills, packing machines, drying machines, drying mills, coal mills, cooling machines, cement bin and other ventilation devices to make sure PM emissions reach a standard. Enhance comprehensive treatment of PM emissions in cement plants and grinding stations. Adoptions of effective measure to control PM fugitive emissions include advancing the production of bulk cement while limiting and decreasing the production of bagged cement. All raw

materials and products should be enclosed during maintenance and delivery in order to effectively avoid emitting dust during load and unloading.

5.2.3 *Improve Particulate Matter Treatment in the Iron & Steel Industry*

Efficient dust-remove technical retrofit should be taken for existing sintering (pelletizing) machine heads, which cannot reach the stable standard emissions. In addition, special emission limit values should be achieved in key control areas. Coking processes should be mated with efficient ground station dust-removal systems, and CDQs should be advanced. Tap holes, skimmers and troughs for iron making should be enclosed with de-dusting hoods and bag filters.

5.2.4 *Advance Comprehensive Smoke Treatment for Industrial Coal-Fired Boilers*

Dust-removal retrofit should be carried out for the industrial coal-fired boilers when emissions cannot reach the standards, and they should reach the requirements of special emission limit values in key control area. Bag filters should be installed for fluidized bed boiler and coal-powder boilers. Use clean energy like natural gas to replace coal. The utilization of biomass briquette should comply with relevant technical standards and with special combustion equipment. If there is no condition to use clean fuels, utilization of briquette coal is favored.

5.2.5 *Actively Advance Industrial Kiln PM Treatment*

Popularize cleaner energy in industrial kilns. Industrial kilns in ceramic and glass industries could use natural gas and coal gas to replace coal, and internal combustion could be developed in clay brick industry. Enhance the dust removal in industrial kilns by installing efficient dust-removers to ensure the discharge meets standard levels.

5.3 DEVELOP KEY SECTORS MANAGEMENT AND REFINE VOCs POLLUTION PREVENTION SYSTEM

5.3.1 *Development of VOCs Survey*

VOCs emissions survey will be developed in key sectors like petrochemical, organic chemical, synthetic material, original drug manufacturing for chemicals, plastic products manufacturing, coating for equipment manufacturing, electron component

manufacturing, electronic/electrical products manufacturing, packing and printing. Formulating of VOCs emission factors for each sector, and establishment of emission inventories for key sectors should be advanced to configure sectorial and regional characteristics of VOCs. Select key emission sources and build a supervision list for key enterprises. Develop investigative monitoring of VOCs in the regions with serious air pollution in order to understand the concentration level, seasonal variations and regional distribution characteristic of VOCs in atmosphere.

5.3.2 *Perfect VOCs Emission Control Requirements & Policy System in Key Sectors*

VOCs emission standards, clean production evaluation index system and technical specifications of treatment projects in relevant sectors will be established as soon as possible. Develop and perfect measurement standards, monitoring technical specifications and monitoring equipment standards for VOCs in ambient air and from stationary sources. Enhance the control of nonpoint VOCs emissions. Research and develop environmental labeling product certification standards for the products like paint, printing ink, adhesive, building board, furniture, dry cleaning, which contain organic solvents. Establish an admittance system for sale and use of products with organic solvents, and implement limit management to VOCs value. Declaration system for the utilization of organic solvents will be set up. Develop integrated VOCs pollution prevention pilot projects in industrial parks, which are concentrated with key VOCs enterprises, to explore monitoring, control technology, and supervision system of VOCs.

5.3.3 *Comprehensive Development of Oil and Gas Recovery in Gas Stations, Oil Storage Tanks & Oil Tank Trucks*

Increase the efforts on oil and gas recovery improvement in gas stations, oil storage tanks and oil tank trucks. The recovery should be finished in key control areas by the end of 2013 and in the general control areas by the end of 2014. Conduct experiments with online monitoring for oil and gas recovery in order to realize the long-distance centralization of monitoring, management, and control of oil and gas recovery in the key oil storage and gas stations.

5.3.4 *Reduce VOCs Emissions in Petrochemical Industry*

LDAR (Leak Detection and Repair) technology should be developed throughout petrochemical industries. The monitoring and supervision of VOCs leak during petrochemical production, transportation and storage processes should be strengthened. Retrofit equipment that have leak rates that exceed limits, control breathing loss during storage and transportation by using efficient sealed floaters for raw materials, intermediate products and end products storage facilities, or by installing headspace connecting displaced oil and gas recovery devices. The loss rate of crude oil processing should be controlled less than 6%. Organic process off-gas from oil refining and petrochemical production units should be recovered, and for those which cannot be recovered (or fully recovered), the gas should be combusted by boilers, process furnaces, incinerators and torches, or be treated by absorption, adsorption and condensation. Isolation measures should be adopted between the surface of wastewater collection systems and ambient air. Covers should be added to seal blast aeration tanks and floating tanks, and the waste gas should be collected to purify. Enhance the management of recovery equipment and organic waste gas treatment equipment, to ensure VOCs emissions could meet the standard stably, and implement specific emission limit value in key control areas. Online continuous monitoring systems will be installed gradually for organized waste gas emissions in petrochemical industries, and VOCs environmental monitoring devices should be installed for industrial boundaries.

5.3.5 *Actively Advance VOCs Control in Organic Chemical Industries*

Advance controls technologies for organic chemicals (including organic chemical materials, synthetic materials, household chemicals, paints, printing inks, adhesives, dyes, chemical solvents and reactant productions), pharmaceutical chemicals, and plastic products enterprises. Strictly control the “leaking and loss”. Raw materials, intermediate products and end products should be stored sealed. And efficient sealed floaters or sealed exhaust systems should be installed for purifying in organic liquid storages with more than 2.8 kPa actual steam pressure and more than 100 M³ capacities. Production processes with VOCs emissions should be operated within sealed spaces or equipment, and waste gases with VOCs should be purified, with no less than 90% purification efficiency. Live monitoring

systems networked with environmental protection departments will be gradually installed in organic chemical industries with odor or high-toxic VOCs emissions.

5.3.6 Strengthen VOCs Control for Coating Processes

Actively advance VOCs control for coating process in the automobile manufacturing/maintenance, shipbuilding, container, electronics, household appliances, furniture production, equipment manufacturing, and electrical wiring sectors. Increase the utilization ratio of coatings with low volatility organics like water-based coating, high solid coating, powder coating and UV-curing coating. The ratio should be more than 50% in automobile, electronics and appliances production industries, and more than 30% in furniture production. Advanced coating and optimized spray processes and technology in the auto industries need to become the mainstream. For coupes, VOCs emission per unit coating area should be limited to 40 g/M². Solvent-based coating for surfaces should be operated in enclosed spaces that are equipped with organic waste gas collection systems and efficient recover purify devices in order to have 90% purification efficiency.

5.3.7 Advance VOCs Treatment in Solvent Utilization

Inks used in printing and packaging industries should meet the environmental protection requirements. Adsorption equipment such as active carbon should be installed in dehydrated workshops to recover organic solvents. Organic waste gas will be purified at 90% efficiency in the workshops. Advance the utilization of low-toxic, low-volatility solvents in textile and dyeing, leatherworking, shoemaking, artificial board production and household chemicals industries. Low volatility solvents have to be used in food processing industry. Adhesives in shoemaking industries should meet the requirements in the mandatory national “Adhesive in shoes and bags” standards. In the meantime, develop the collection and purification of VOCs.

5.4 ENHANCE TOXIC WASTES CONTROL AND PERFORM INTERNATIONAL CONVENTION TARGETS

5.4.1 Strengthen Toxic Wastes Control

Work out and release a national priority control list of toxic waste pollutions, advance the environmental supervision of enterprises with toxic waste emissions, and implement

mandatory clean production audit for key enterprises. Toxic waste control will be the important issues in the approval of EIA, along with confirmation of control measures and emergency countermeasures. Investigative monitoring will be carried out on Pb, Hg, Cd, benzo-a-pyrene, dioxin and other toxic air pollutant in key areas. And perfect the emission standards and prevention technology specifications of toxic air pollutants.

5.4.2 *Advance Atmospheric Mercury Emissions Control*

Develop atmospheric mercury emissions control pilots in thermal power plants and advance the co-control of mercury emissions. Demonstration projects for flue gas mercury removal technology in nonferrous metal industry will be implemented. Atmospheric mercury emission control technologies in cement production and waste burning will be developed. Atmospheric mercury emissions inventories in key sectors like coal-fire, nonferrous metals, cement, waste burning industries, iron & steel, petroleum, natural gas industries, and mercury mining will be developed to search for control measures.

5.4.3 *Elimination of Ozone-Depleting Substances*

Refine the approval and supervision system for ODS's production, utilization, imports and exports. Fulfill the obligations of the Montreal Protocol target requirement to eliminate HCFC and CFCs in medical aerosol and bromomethane, and restrict the growth in production capacity of HCFC and methane chloride. Enhance the development and application of substitutes and substitute technology in relevant sectors, and strengthen contractual capacity construction in national, local and sectorial levels.

5.5 STRENGTHEN VEHICLE POLLUTION PREVENTION AND EFFECTIVELY CONTROL MOBILE SOURCE EMISSIONS

5.5.1 *Rapid Development of the Sustainable Transportation System*

Develop city and intercity public transit and rail system, implement transit priority strategy for urban transportation development, improve the travel conditions for biking and walking, and encourage green forms of travel. Strengthen and optimize the construction of urban areas road network structure, and increase traffic efficiency via alternate working hours and adjusting parking fees. Popularize urban intelligent traffic management and eco-driving technology. Encourage the adoption and use environmental friendly motorcycles, popularize

the utilization of gas-fueled vehicles and new energy vehicles, and gradually perfect relevant foundational infrastructure. Actively popularize electric buses and taxis.

Start to research policies for controlling the size of the urban motor vehicle population (travel volume is the key), and try to regulate and control the total motor vehicle population size in megacities and big cities.

5.5.2 Upgrade Fuel Quality Standards

Accelerate upgrades to low-sulfur auto-fuel processes, issue and implement National phase IV auto-fuel standard. National IV auto-gasoline (sulfur content is not more than 50 ppm) will be supplied fully by the end of 2013, and National V auto-diesel will be supplied by the end of 2014 in Beijing-Tianjin-Hebei, Yangtze River Delta, Pearl River Delta regions as priority areas. The sulfur content in regular diesel will be reduced to below 350 ppm before July 1, 2013 while the sulfur content in the fuels used for ocean vessels will be gradually reduced to below 2000 ppm.

Enhance the supervision and inspection of oil quality by cracking down on illegal production and sale of vehicle oils that do not meet the requirements of national and local standards. Establish a sound oil quality control system in all petrochemical industries in order to guarantee overall oil quality. Vehicle oils sold in gas stations on highways and in city urban have to meet the auto-gasoline and auto-diesel standards. Advance the construction of urea charging station, and finish the establishment of urea charging network by the end of 2015, to ensure the SCR devices in diesel vehicles could be operated smoothly.

5.5.3 Accelerate the Implementation Process of New Vehicle Emission Standards

National Phase IV Vehicle Emission Standards will be implemented and the National Phase V Vehicle Emission Standard will be released and implemented at the right time. Implementation of the next phase vehicle emission standards should be encouraged in the regions with adequate conditions. The same energy efficiency and emission standards for low-speed vehicles (tricar and low-speed truck) will be implemented for light trucks by 2015. Perfect green vehicle approval and compulsory certification system, and expand the scope of environmental protection supervision to ensure the bulk-produced vehicles could

meet the emission standard. Vehicles that do not meet the national vehicle emission standard, will not be produced, sold and registered. The vehicles from other locations should be supervised strictly.

5.5.4 Deepen Environmental Management of Existing Vehicles

Implement the examination and issuing of environmental labeling for vehicles, and over 85% will be issued by the end of 2015. An intelligently and digitally way to manage environmental labeling will be developed. Push for delegation overall vehicle environmental examination, accelerate installation process of online environmental monitoring equipment, strength quality management of checkout equipment, increase quality control for monitoring data from environmental examination agencies, strengthen measurement technology supervision and data verification, and advance the standardized operation of environmental examination agencies. Accelerate the implementation process for a simplified test method for vehicle exhaust. Perfect the vehicle environmental inspection and maintenance (I/M) system.

5.5.5 Accelerate the Elimination of Yellow-Sticker Vehicles

Strictly implement the mandatory elimination of older vehicles, and strengthen the management and supervision of the mandatory scrapping of commercial vehicles. Implement limit line measures for yellow-sticker vehicles through by providing sound local laws and regulations to accelerate the elimination process of yellow-sticker vehicles. By the end of 2013, yellow-sticker vehicles will be forbidden in the main urban zones of the key control areas and in other cities by the end of 2015. Push for the centralization of management for city buses, taxis, intercity buses and carrier vehicles (including low-speed vehicles) to stop the black smoke-discharging phenomenon. By the end of 2015, aggressively aim for the elimination of the commercial vehicles registered before the end of 2005, so that yellow sticker vehicles will be almost eliminated in Beijing-Tianjin-Hebei, Yangtze River Delta, and Pearl River Delta regions.

5.5.6 Develop Pollution Prevention for Non-road Vehicle Sources

Understand the pollution situation by emission investigation from non-road vehicle sources like engineering machinery, railway engine, ship, agricultural machinery, industrial machinery,

and airplane. Establish a management ledger to control for mobile sources of air pollution. The emission control of machineries and ships will be pushed in the National Phase III non-road vehicle machinery emission standards and National Phase I ship engine emission standard, which will be implemented by the end of 2013. Actively develop the environmental prevention of construction machineries, and accelerate the installation of post-processing apparatus for air pollutants. The construction of “Green Ports” should be accelerated in Tianjin, Shanghai, Nanjing, Ningbo, Guangzhou and Qingdao. Construct demonstration projects of the dock shore power device in key ports; accelerate the processes of “gas replace heavy oil” and “electricity replace heavy oil” for trailers and handling facilities in the port, to reduce the pollutant emissions.

5.6 STRENGTHEN FUGITIVE DUST CONTROL AND NON-POINT SOURCE POLLUTION MANAGEMENT

5.6.1 *Strengthen the Integrated Management of Urban Fugitive Dust*

Fugitive dust control should be an important issue in comprehensively improving the urban environment all over the country. Establish a coordination agency, composed of the authorities of Housing and Urban-Rural Development, Environmental Protection, Municipal Administration, Botanical Garden and City Management to carry out urban fugitive dust integrated management and strengthen supervision. Set up fugitive dust control zones to actively control dust from constructions and debris loss, develop bare ground management, increase green coverage ratio, enhance road cleaning, and expand the area of control zones. By the end of 2015, the density of dust fall in urban areas should be reduced by more than 15% in the key control areas and by more than 10% in general control areas when compared with 2010.

5.6.2 *Strengthen the Supervision of Construction Dust*

Enhance the environmental supervision and law-enforcement inspection for construction dust. Construction agencies should submit fugitive detailed dust control plan implementation plan to construction and environmental protection authorities separately before start. Fugitive dust control is included in the project supervision scope and fees in the project budget. The raised dust controls for construction will be included in the construction

enterprises credit management system, and published regularly, which could be very important for bidding. Enhance law-enforcement inspection and supervision during earthworks period, by increasing inspection times and making punishment more severe.

Push for green onsite construction. Barricades should enclose construction sites, and open-type operations are forbidden. The ground of construction site roads, operation areas and living quarters should be hardened. Actively develop the utilization of bulk cements, pre-mixed concrete and mortar in urban construction site. On site mixed concrete or mortar is forbidden. Control measures like coverage, watering and sealing should be adopted for the fugitive dust sources caused by stacking, handling, conveying and stirring. Garbage, muck and sand in the construction sites should be removed in a time manner. Flushing platform should be set up at the entrance of construction site. Establish video monitoring platform for urban fugitive dust and install video monitoring devices in urban areas, mainly at the construction site entrances, cranes and material piles, and new construction sites before construction starts, in order to realize the delicate management of key processes and key points in a construction site.

5.6.3 Controlling Road Dust

Actively advance urban road mechanized cleaning by increasing the ratio of mechanized cleaning. On major urban roads, the ratio should be more than 70% in general the control areas and more than 90% in key control areas by the end of 2015. The frequency of flush cleaning of urban roads should be increased to reduce the dirt retention on the road. The size of excavation area and exposure time of the road should be decreased, and the excavation should be taken section-by-section and closed, recover the broken road in time. Enhance the greening of roadways and reduce bare ground area. Strengthen supervision and management of debris carrying vehicles. All urban debris carrier vehicles will be sealed during transportation. Implement qualification and register system and install GPS to comprehensively monitor the debris carrying vehicles in key areas and key road sections.

5.6.4 Advance Comprehensive Dust Management

Enhance the supervision and management of dumps and banks. Sealed bunkers and

transmissions should be installed in large-scaled dumps and banks. Open storage should be covered or be equipped with automatic spraying devices. Video monitoring devices should be installed at dumps and banks in power plants and ports, and networked with an urban dust video monitoring platform. For long-term stacked waste, it should be covered by greening, paved, hardened and sprayed regularly. Push for comprehensive utilization of coal fly ash and slag to reduce stacked quantity.

5.6.5 *Strength Urban Forestation*

Strength urban forestation combined with city development and industrial distribution, work hard to increase the urban greening level, enhance self-purification ability of environment. Build green ecological protective barrier like windbreak and sand fix forestry system. Implement ecological rehabilitation, strength the treatment of various abandoned mines, to recover the ecological vegetation and landscape, and control fugitive dust.

5.6.6 *Strengthen Environmental Supervision of Straw Burning*

Illegal burning in the open air of biomass such as crop straw, urban cleaning waste, garden waste and construction waste is forbidden. Popularize the comprehensive use of straw, including straw mulching, application like making fertilizer and feed, and its utilization as energy. Develop and implement straw comprehensive utilization plan, establishing demonstration projects for comprehensive straw utilization, the recycling application of straw, and strengthen supervision of straw burning. Further strengthen the publication of information for straw burning and the fire point monitoring in key areas. Establish four-level responsibility system of straw burning in city, county, town and village, and perfect the target-responsibility system.

5.6.7 *Advance Oil Smoke Treatment from Catering Services*

Pay attention to environmental approvals of newly built catering services, and popularize the use of clean energy like pipeline gas, natural gas and electricity. Efficient oil smoke purification facilities should be installed in catering service places with strict operations and management. Strengthen the environmental management of barbeques outside without oil smoke purification facilities.

6 INNOVATIVE REGIONAL MANAGEMENT MECHANISM AND IMPROVE JOINT PREVENTION AND CONTROL MANAGEMENT CAPACITY

6.1 ESTABLISH A JOINT PREVENTION AND CONTROL MECHANISM FOR REGIONAL ATMOSPHERIC POLLUTION

6.1.1 *Establish Unified Joint Regional Prevention and Control Coordination Mechanism*

Under the Ministry of Environmental Protection joint conference system, organize regular regional air pollution joint prevention and control joint conferences, and coordinate overall regional air pollution preventive work. Setup a joint air pollution prevention and control working group in the Beijing-Tianjin-Hebei, Yangtze River Delta, Chengdu-Chongqing, Ganning (Gansu and Ningxia) regions. The Ministry of Environmental Protection initiates this leading work group, with the participation by provincial municipalities in these regions. Other groups of cities can found their leading group, which nominates the provincial leaders with main responsibilities as the team leader. The districts in the region take turns at organizing annual joint working conferences where yearly reports on the progress of regional air pollution joint prevention and control. It is also a place to exchange experience and confirm major objectives, main focus and major task for the next year.

6.1.2 *Establish Regional Joint Air Quality Enforcement Supervision and Management Mechanism.*

Strengthen regional environmental enforcement, supervision and management. Confirm and publish regional key enterprises list. Carry out inspections of regional air environmental joint enforcement and centralize governance of illegal enterprises. Close down heavy pollution enterprises, which still do not attain the emission requirement after the limited compliance period. The function of national environmental inspection for resident agencies in each region is to strengthen supervision, inspection and monitoring of air pollution prevention work in regional and key environmental protection cities, along with regular implementation of inspection of air pollution of specific key industries and enterprises. It also organizes to check and punish major air environmental pollution cases, coordinate to deal with cross-provincial heavy pollution disputes, and fight against illegal air pollution activities occurring in the administrative region boundary. Strengthen environmental supervision on the relocation of regional industrial projects. Relocated projects should strictly implement

national and regional environmental protection requirements for newly built projects.

6.1.3 *Establish Environmental Impact Assessment Consultation Mechanism for Major Projects*

Projects which have great influence on the regional air quality, such as thermal power generation, petrochemical, iron & steel, cement, non-ferrous metal, and chemical, should be comprehensive evaluated based on their impact on regional air quality and key regional industry.. The evaluation result shall be opened to public and open to comment, the scale of project influence and relevant city environment protection departments as the important evidence of environment assessment approval.

6.1.4 *Establish Environmental Information Sharing Mechanisms*

According to regional air quality management requirements and the establishment of websites, advance regional environmental information sharing, integrating information on the monitoring of regional environment air quality, key sources of air pollution emissions, key construction projects, and motor vehicle environmental labels. Establish regional environmental information sharing mechanism in order to advance the communication of environmental information among cities in the region.

6.1.5 *Establish Advance Warning and Emergency Response Mechanism for Regional Air Pollution*

Strengthen air pollution warning system during extremely adverse weather and strengthen the quality of regional air environmental forecasts in order to arrive at risk information determination and warning. Establish a severe air pollution emergency plan for key regions. Construct an integrated region, provincial and city emergency response system and delegate support task force. When extremely adverse weather condition occurs, conduct the emergency response plan in time and implement emergency control measures with the region. These include restricting production of key air pollutants emission at the source, stopping earthworks on construction sites, and imposing motor vehicles restrictions.

6.2 INNOVATIVE ENVIRONMENTAL MANAGEMENT POLICY MEASURES

6.2.1 *Improve Fiscal Subsidies Incentive Policy*

Increase financial support for the elimination of backward production capacity and

accelerate the elimination of backward productivity, such as thermal power generation, iron & steel, cement, including small boilers and backward craft in VOCs emissions industry. Actively support projects in accordance with award condition. Increase financial support for air pollution prevention technology demonstration projects. Implement subsidies for old scrape cars and update economic incentives policies for eliminating yellow-sticker vehicles. For the enterprise whose production meets vehicle fuel standards in the next phase, provide preferential consumption tax policy. Preferential tax policies for the comprehensive utilization of straw should be encouraged. Implement green procurement in government, improve compulsory purchase and optimize purchasing system, and gradually raise the proportion of energy conservation and environmental friendly products.

6.2.2 Further Expand Price and Financial Trade Policy

Fully implement de-sulfurization with electricity pricing. Continue to implement differential electricity prices, punitive electricity pricing policy, and advance power plant smoke de-nitrification tariffs policy. Financial organization should implement stricter loan standards for energy intensive and highly polluting industries. Integrate information on environmental illegality by enterprises into the People's Bank enterprise reference system and the Banking Regulatory Commission (CBRC) information disclosure system, and link together with enterprise loan credit rating and securities financing. Include air pollution emission intensity of heavy pollution products into the “national high pollution and high environmental risk” product list. Adjust import-export tax policy to limit the exportation of energy intensive and high emission products. Carry out compulsory high environmental risk enterprise environmental pollution liability insurance demonstrations.

6.2.3 Improve VOCs Pollution Charges Policy

Establish and improve the VOCs emission equivalent calculation method, and research collection of a VOCs pollutant discharge fee. Research and formulation of a charging policy for dust pollutant discharge should also be carried out.

6.2.4 Fully Implement Pollutant Discharge Permit System

Fully implement atmospheric pollutant discharges permit system. Key enterprises which

discharges sulfur dioxide, nitrogen oxide (NO_x), industrial PM and VOCs should apply for pollutant discharge permit with the Ministry of Environmental Protection before the end of 2014. Pollutant discharge permits should specify the name, type, quantity, way of discharge, control measure, and monitoring requirement of emissions. These factors are considered important evidence of the overall control of pollution charges and environmental enforcement. The enterprises without pollutant discharges permit shall not discharge pollutants. Continue to implement emissions trading pilots by exploring and establishing regional major air pollutant emission fees and trading system for the power, iron & steel, petrochemical, nonferrous metals industries.

6.2.5 *Implement Key Industry Environmental Protection Inspection System*

For heavy polluting industries, such as thermal power, iron & steel, nonferrous metal, cement, petrochemical, chemical, implement environmental protection inspection system. For enterprises who fail to compliance during inspection they will be asked to implement correction or control measures within a given time frame, stop production for remediation or shut down. For the enterprises of failing to submit the application, failing to pass through the verification and deceptive enterprises, respite for examination and approval its new, change, and expansion project environmental impact assessment documents, do not provide all kinds of environmental protection special funds, suspend its application for public environmental protection check, and do not provide any qualified environmental protection standards or law-abiding documents. Environmental protection department announced the environmental review result of enterprises to the public. This would be the important basis of examination and approval for an enterprise's credit, production, import and export.

6.2.6 *Implement Regulation on Construction& Operation of Pollution Facilities*

Improve power plant desulfurization facilities franchising system, explore to implement governance facilities socialization operation in the aspect of de-nitration, dusting and VOCs governance, and improve the construction quality of pollution treatment facilities and operation effect. Carry out certification of environmental protection facilities and operation through a certificate permit system, and advance environmental protection for facilities,

professionals and third party operation service. Improve the market access mechanism of air pollution regulation and motor vehicle detection, standardize market behavior, break regional protections, and create a fair competitive market environment for the enterprises.

6.2.7 Implement Environmental Information Disclosure System

Cities should release real time ambient air quality information, carry out air quality evaluation regularly, and disseminate it to the public. For environmental impact assessments for new construction project, ask for a wide range of public opinion. Environmental information for key enterprise, including the condition of pollutant emissions and treatment facilities operation must be made public. Regularly disseminate air pollutant emission monitoring result and accept social monitoring. Establish mandatory environmental information disclosure system on enterprises with heavy pollution and those that discharge toxic substances. Widely mobilize the whole society to participate in the protection of the air environment. By taking such measures as prize reports, encourage the public to supervise vehicle take black smoke, straw burning in the open air and other illegal environmental protection behavior.

6.2.8 Advance City Ambient Air Quality Target Management

In accordance with the provisions under Article 17 of "*The Law of the People's Republic of China on the Prevention and Control of Atmospheric Pollution* ", the municipalities, who do not meet the environmental air quality standard, should formulate time limited plan to meet the air quality standard. According to the timeline defined by the State Council and the Ministry of Environment Protection, standard have to met in five, ten, fifteen and twenty years. The compliance-planning deadline of municipalities directly under the central government should be approved by the State Council, the compliance planning deadline of the 113 national key environmental protection cities should be agreed by provincial government, and approved by the Ministry of Environment Protection. The compliance planning deadline of other cities should be approved by provincial government and recorded in the Ministry of Environment Protection. The compliance-planning deadline of all cities should open to social public. The national and provincial environmental protection

departments shall inspect and evaluate the implementation situation of compliance planning deadline, and disseminate the evaluation result to the social public.

6.3 STRENGTHEN THE CAPACITY OF JOINT PREVENTION AND CONTROL

6.3.1 *Establish an Unified Regional Air Quality Monitoring System*

Strengthen the construction of regional environment air quality monitoring system. According to the requirement of “12th Five Year” national air monitoring network setup plan, each province should gradually build capacity for their urban air quality monitoring stations. In the mean time, uniformly layout the number of regional station on transfer tunnels located outside the city center or region. All city-monitoring stations will increase monitoring for PM_{2.5}, O₃, and CO with digital environment photography record systems to carry out all indicators monitoring. The regional station should also add monitoring capacity for visibility and meteorological five parameters. The Beijing-Tianjin-Hebei, Yangtze River Delta, and Pearl River Delta region should finish the regional environmental air quality monitoring system before the end of 2012, and other cities agglomeration should finish regional environmental air quality monitoring systems before the end of 2015. Strengthen construction of super air quality monitoring station and carry out the monitoring of the effect in roadside environment from moving sources.

Strengthen overall monitoring data quality control and reinforce regulations on monitoring technology and data auditing. Connect all regional monitoring stations with the central national environment monitoring station in order to transfer the environment air quality data in real time. Provincial environmental management departments are responsible for supervising quality control of urban air quality monitoring stations, while the Ministry of Environment Protection carries out the spot-checking, flight check and cross-check for quality control. All 631 city monitoring stations and 61 regional stations in the key regions are considered important evidence for air quality monitoring, evaluation and assessment in this plan.

Table 4. “12th Five Year” Key Regional Cities with the Number of Monitoring Stations and Air Quality Evaluation

Region	Province	City	The number of monitoring spots of city in “12 th five year”	The number of monitoring spots of city in 2010	City’s annual avg concentration of SO ₂ in 2010 (mg/m ³)	City’s annual avg concentration of NO ₂ in 2010 (mg/m ³)	City’s annual avg concentration of PM in 2010 (mg/m ³)
Beijing-Tianjin-Hebei	Beijing	Beijing	12	12	32	57	121
	Tianjin	Tianjin	15	13	54	45	96
	Hebei	Shijiazhuang	8	7	54	41	98
		Tangshan	6	6	57	29	85
		Qinhuangdao	5	5	41	25	64
		Handan	4	4	44	29	90
		Baoding	6	6	41	31	84
		Chengde	5	5	46	39	53
		Cangzhou	3	3	33	24	78
		Hengshui	3	4	40	26	79
		Xingtai	4	4	44	24	82
		Zhangjiakou	5	5	51	23	60
		Langfang	4	3	43	30	78
Yangtze River Delta	Shanghai	Shanghai	10	10	29	50	79
	Jiangsu	Nanjing	9	6	36	46	114
		Wuxi	8	7	47	46	88
		Xuzhou	7	6	44	26	88
		Changzhou	6	4	34	28	97
		Suzhou	8	8	33	54	90
		Nantong	5	5	33	29	97
		Lianyungang	4	4	38	25	90
		Huai’an	5	3	31	33	95
		Yancheng	4	3	39	23	122
		Yangzhou	4	4	33	23	96
		Zhenjiang	4	4	24	36	97
		Taizhou	4	3	39	32	87
		Suqian	4	3	31	22	99
	Zhejiang	Hangzhou	11	10	34	56	98
		Ningbo	8	5	31	53	96
		Wenzhou	4	4	28	58	85
		Jiaxing	3	3	42	45	93
		Huzhou	3	3	18	46	86
		Shaoxing	3	2	55	42	95
		Jinhua	3	3	36	48	67
		Quzhou	3	3	20	28	65
		Zhoushan	3	2	15	24	61
		Taizhou	3	3	29	38	80
		Lishui	3	3	22	28	71

Pearl River Delta	Guangdong	Guangzhou	11	11	33	53	69
		Shenzhen	11	8	11	45	57
		Zhuhai	4	4	15	33	49
		Foshan	8	8	37	51	64
		Jiangmen	4	4	27	24	57
		Zhaoqing	4	4	36	41	58
		Huzhou	5	5	18	25	51
		Dongguan	5	5	30	47	63
		Zhongshan	4	4	27	40	51
Central Liaoning	Liaoning	Shenyang	11	11	58	35	101
		Anshan	7	7	46	39	105
		Fushun	6	5	38	36	94
		Benxi	6	6	57	34	69
		Yingkou	4	4	30	26	73
		Liaoyang	4	4	53	35	66
		Tieling	4	3	41	23	78
Shandong Province	Shandong	Jinan	8	8	45	27	117
		Qingdao	9	8	52	48	99
		Zibo	6	6	89	33	110
		Zaozhuang	5	5	57	33	99
		Dongying	4	4	56	40	89
		Yantai	6	6	41	39	81
		Weifang	5	5	58	42	99
		Jining	3	3	64	44	116
		Tai'an	3	3	49	42	97
		Weihai	3	3	24	33	67
		Rizhao	3	3	39	44	89
		Laiwu	3	3	54	32	107
		Linyi	4	4	56	40	97
		Dezhou	3	3	47	36	89
		Liaocheng	3	3	53	30	93
		Binzhou	3	3	55	49	97
		Heze	3	3	50	27	93
Wuhan Region	Hubei	Wuhan	10	10	41	57	108
		Huangshi	5	5	38	23	91
		Ezhou	3	2	33	22	83
		Xiaogan	2	1	21	28	101
		Huanggang	2	1	9	14	71
		Xianning	4	2	27	23	94
Changsha-Zhuzhou-Xiangtan	Hunan	Changsha	10	9	40	46	83
		Zhuzhou	7	6	58	33	81
		Xiangtan	7	5	55	40	95
Chengdu-Chongqing	Chongqing	Chongqing	17	20	48	39	102
	Sichuan	Chengdu	8	8	31	51	104
		Zigong	4	4	63	40	81

		Mianyang	4	4	35	29	82
		Yibin	6	6	55	35	78
		Luzhou	4	4	51	49	86
		Deyang	4	4	46	36	65
		Nanchong	6	6	42	30	61
		Suining	4	4	29	25	71
		Neijiang	4	4	51	37	52
		Leshan	4	4	27	28	79
		Meishan	4	4	41	44	83
		Guang'an	5	5	46	29	59
		Dazhou	5	5	27	23	69
		Ziyang	5	5	46	33	62
Straits Fujian	Fujian	Fuzhou	6	4	9	32	73
		Xiamen	4	4	21	46	65
		Quanzhou	4	4	19	21	68
		Putian	5	4	28	13	64
		Sanming	4	4	54	14	91
		Zhangzhou	3	3	23	44	72
		Nanping	4	3	55	29	72
		Longyan	4	4	38	16	83
		Ningde	3	3	18	18	53
Central and Northern Shanxi	Shanxi	Taiyuan	9	9	68	20	89
		Datong	6	6	36	28	75
		Shuozhou	5	5	36	11	75
		Xinzhou	3	3	35	17	61
Shaanxi Guanzhong	Shanxi	Xi'an	13	11	43	45	126
		Xianyang	4	3	32	24	94
		Tongchuan	4	3	48	38	99
		Baoji	8	6	24	27	98
		Weinan	4	4	39	41	112
Gansu- Ningxia	Gansu	Lanzhou	5	5	57	48	155
		Baiyin	2	2	46	29	99
	Ningxia	Yinchuan	5	5	39	26	94
Urumqi, Xinjiang	Xinjiang	Urumchi	7	6	89	67	133
		Changji	3	2	25	29	82
		Wujiaqu	1	1	14	13	73

Note: the reference monitoring stations in the city monitoring stations will not be considered in the city air quality evaluation.

6.3.2 Strengthen the Capacity Building of the Key Sources of Pollution Monitoring

Strengthen overall on-line monitoring capacity by building of national and provincial controls for key pollution sources, such as sulfur dioxide (SO₂), nitric oxide (NO_x) and PM. Before the end of 2014, key pollution sources will have completed the online monitoring system and

connect the network with the environmental protection department, advancing on-line monitoring for VOCs. Strengthen VOCs and mercury supervision monitoring capacity for each monitoring station. Further advance the validity verification of auto monitoring data on key pollution sources. The operation stability of auto monitoring equipments and the validity level of monitoring data will be considered into environmental protection credit level of enterprises.

6.3.3 Advance Capacity Building in Motor Vehicle Pollutants Discharge Monitoring

Accelerate motor vehicle pollution control mechanisms and standardize construction processes. Push for establishment of a provincial and municipal motor vehicle pollutants discharge monitoring organization. Provinces and key control areas should be built up before the end of 2013, and general control areas should be built up before the end of 2014. Improve the pollution monitoring capacity for motor vehicle, advance environmental protection information sharing for new cars and in-use vehicles, and improve pollution monitoring level for vehicles.

6.3.4 Strengthen the Pollutant Discharge Statistics and Environment Quality Management Capacity Building

Gradually put VOCs and mobile source discharge into the environment statistical system. Formulate volatile organic compounds emission factors from terms of different sectors, establish a VOCs emissions statistical method, and carry out diagnostic investigations. Organize non-road vehicle source emission investigation, and be familiar with the non-road vehicle sources of emission coefficient and activity level. Research and carry out investigation on non-organized PM emission. Conduct source analysis work for heavy PM pollution cities. Carry out regular air quality investigations for regional pollutants, which are threatening public healthy and influencing air quality. Construct regional air quality management platform based on the environment quality, a multi-scale and high-resolution atmospheric pollution discharge source list, and improve the comprehensive capacity of across boundary pollution source identification, cause analysis and quantitative analysis and evaluation of the control scheme.

7 THE KEY PROJECTS AND THE EVALUATION OF INVESTMENT BENEFIT

7.1 KEY PROJECTS

Key project is divided into eight categories, including SO₂ treatment, NO_x treatment, industrial PM treatment, industrial VOC treatment, petrol and gas recycling, elimination yellow-sticker vehicles, comprehensive dust treatment, and capacity building. The capacity building consists of building capacity for regional air quality monitoring, enterprise pollution emission monitoring, motor vehicle pollutants discharge monitoring, pollutants discharges, and environment quality investigation projects. The key project requires investment of around 350 billion. SO₂ treatment requires 73 billion, NO_x treatment requires 53 billion, industrial PM treatment requires 47 billion, industrial VOC treatment requires 40 billion, petrol and gas recycling requires 21.5 billion, elimination yellow-sticker vehicles requires 94 billion, dust comprehensive treatment requires 10 billion, and capacity building requires 11.5 billion.

7.2 BENEFITS ANALYSIS

The implementation of the key projects will increase emissions reduction capacity of SO₂ by 2.28 million tons, NO_x by 3.59 million tons, and PM₁₀ by 1.48 million tons, and VOCs by 1.525 million tons per year. There will be a dramatic improvement in air quality due to the decrease in photochemical smoke, haze and acid rain. The total economic savings will be about two trillion Yuan.

8 SAFEGUARDS

8.1 STRENGTHEN ORGANIZATIONS AND LEADERSHIP

As the key body responsible for the regional air pollution prevention plan, the local people's government should strengthen their organization and leadership. They should work out a joint prevention and control plan for local air pollution, assigning all tasks to responsible institutions and enterprises. They should work out annual working plan and update new key project dynamically. Define annual tasks and responsible departments, and confirm task, project, funding, and responsibility. All relevant departments should strengthen coordination,

according to the division of responsibilities to carry out the corresponding work, formulate relevant supporting measures, and ensure the implementation of planning tasks.

8.2 STRICT EVALUATION

The Ministry of Environment Protection and the relevant departments of State Council will formulate assessment methods, and annually evaluate the implementation of the key regional air pollution joint prevention and control plan and organize to carry out final plan evaluation by the end of the plan. The plan annual assessment and final evaluation report should be submitted to the state council, which is considered as the important basis of comprehensive evaluation for municipal leader group, in the meantime, implement the accountability system and environment as a veto,, and results publish to the public. For the province (city) that successfully completed the plan and whose air quality saw obvious improvements, the Ministry of Environment Protection, Ministry of Finance and the NDRC will increase their support for regional pollution abatement and environmental protection capacity, along with awards. Notices will be given to province, which do not pass the evaluation. For the cities that conduct the project slowly and retain heavy air pollution, environment assessment and limited approval of construction projects phase-by-phase will be implemented, honorary title given by nation for environmental protection will be cancelled.

8.3 INCREASE INVESTMENT

Establish the diversified government-enterprise-social investment mechanism, and broaden the financing channels. A pollution abatement fund mainly dependent on the individual enterprise and the government invests priority support the pollution abatement project included in the planning. Special fund for air pollution prevention will be setup from central government finance will mainly be used the abatement of industrial, transportation, and nonpoint pollution abatement along with regional atmospheric pollution join prevention and control capacity building. It will utilize a method of “substituting subsidies with rewards” to accelerate municipal and enterprise air pollution prevention. The atmospheric pollution control task, which is defined by municipalities according to the plan definite air pollution

control task, will include the pollution prevention fund in the financial budget, and increase investment.

8.4 IMPROVE LAWS AND REGULATIONS STANDARD

Speed up revision work on environmental protection law and regulations on the prevention and control of air pollution. Accelerate formulation of pollution control ordinances for motor vehicles along with the discharge standards of air pollutants from key industries, such as oil and chemical refinery, raw material and products production, equipment manufacturing and painting, automobiles industry, electronics production, packing, iron & steel, cement, and coal-fired boilers. Speed up the formulation of the key industrial pollution control technology policy and technical specifications, including control engineering for volatile organic compounds and toxic waste gas pollution. In seriously polluted ambient air quality areas, implement the special pollutant discharge restrictions and formulate air pollutants discharge standards that are more stringent than the national standard.

8.5 STRENGTHENING SCIENCE AND TECHNOLOGY SUPPORT

Increase efforts in support of regional air pollution joint prevention and control technology research and development in the area of national and local relevant special plan of science and technology. Accelerate the push forward of the key technology plan of air pollution integrated management, carrying out the countermeasures studies on photochemical smog and haze pollution control. Carry out the research on regional air pollution control countermeasures system by increasing the research, development and demonstrations on the technology like industrial VOCs pollution prevention, highly efficient SO₂, NO_x, dust removal technology for coal-fired boilers, de-nitrification in the cement industry and mercury removal technology in coal-fired power plants. Promotion advanced and practical techniques. Carry out the study of multi-pollutant co-control techniques in key industry.

8.6 STRENGTHEN PUBLICITY AND EDUCATION

Leverage World Environment Day and Earth Day to carry out a wide range of environmental publicity education activities that will popularize air protection knowledge, improve overall environmental consciousness of residences, and enhance the ability of public participation in

environmental protection. Reinforce personnel training, improve the recognition of leaders on the importance of atmospheric pollution joint prevention and control, and advance the business skill set of environmental protection personnel. News media must fully play a role in atmospheric environmental protection. Actively publicize the importance and urgency of regional air pollution joint prevention and control, the adoption of policies, measures, and achievements. Promote advanced models, advance public supervision, and create a positive atmosphere for air quality improvement.

Appendix I: Planning Scope

Region	Province	City	Area (10,000 km ²)
Beijing-Tianjin-Hebei	Beijing, Tianjin, Hebei	Beijing, Tianjin, Shijiazhuang, Tangshan, Qinhuangdao, Handan, Xingtai, Baoding, Zhangjiakou, Chengde, Changzhou, Langfang, Hengshui; 13 prefecture-level cities in total	21.9
Yangtze River Delta	Shanghai, Jiangsu, Zhejiang	Shanghai, Nanjing, Wuxi, Xuzhou, Changzhou, Suzhou, Nantong, Lianyungang, Huai'an, Yancheng, Yangzhou, Zhenjiang, Taizhou, Suqian, Hangzhou, Ningbo, Wenzhou, Huzhou, Jiaxing, Shaoxing, Jinhua, Quzhou, Zhoushan, Taizhou, Lishui; 25 prefecture-level cities in total	21.07
Pearl River Delta	Guangdong	Guangzhou, Shenzhen, Zhuhai, Foshan, Jiangmen, Zhaoqing, Huizhou, Dongguan, Zhongshan; 9 prefecture-level cities in total	5.47
Central Liaoning city cluster	Liaoning	Shenyang, Anshan, Fushun, Benxi, Yingkou, Liaoyang, Tieling; 7 prefecture-level cities in total	6.5
Shandong city cluster	Shandong	Jinan, Qingdao, Zibo, Zaozhuang, Dongying, Yantai, Weifang, Jining, Tai'an, Weihai, Rizhao, Linyi, Dezhou, Liaocheng, Binzhou, Heze; 17 prefecture-level cities in total	15.67
Wuhan region city cluster	Hubei	Wuhan, Huangshi, Ezhou, Xiaogan, Huanggang, Xianning, Xiantao, Qianjiang, Tianmen; 6 prefecture-level cities and 3 county-level cities in total	5.94
Changsha-Zhuzhou-Xiangtan city cluster	Hunan	Changsha, Zhuzhou, Xiangtan; 3 prefecture-level cities in total	2.8
Chengdu-Chongqing city cluster	Sichuan, Chongqing	Chongqing, Chengdu, Zigong, Luzhou, Deyang, Mianyang, Suining, Neijiang, Leshan, Nanchong, Meishan, Yibin, Guang'an, Dazhou, Ziyang; 15 prefecture-level cities in total	22.14
Straits Fujian city cluster	Fujian	Fuzhou, Xiamen, Putian, Sanming, Quanzhou, Zhangzhou, Nanping, Longyan, Ningde, Pingtan compressive experimental region; 9 prefecture-level cities and 1 experimental region in total	12.4
Central and northern Shanxi city cluster	Shanxi	Taiyuan, Datong, Shuozhou, Xinzhou; 4 prefecture-level cities in total	5.69
Shaanxi Guanzhong city cluster	Shaanxi	Xi'an, Tongchuan, Baoji, Xianyang, Weinan, Yanglin national agricultural high-tech demonstration zone; 5 prefecture-level cities and one deputy provincial development zone in total	5.5
Gansu-Ningxia city cluster	Gansu, Ningxia Hui Autonomous Region	Lanzhou, Baiyin, Yinchuan; 3 prefecture-level cities	4.33
Urumqi city cluster in Xinjiang	Xinjiang Uygur Autonomous Region	Urumqi, Changji, Fukang, Wujiaqu; 1 prefecture-level city and 3 county-level cities in total	3.15

Appendix II: Sample Translation of Key Projects

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Table 1 Summary Sheet of Key Projects

No.	Types of Projects	Amount of Projects	Emission Reduction Capacity	Investment (Billion)
1	SO ₂ Treatment Projects	447	Increase SO ₂ reduction capacity 2,280,000 tons per year	730
2	NO _x Treatment Projects	755	Increase NO _x reduction capacity 2,430,000 tons per year	530
3	Industrial Smoke and Dust Treatment Projects	10073	Increase PM reduction capacity 860,000 tons per year	470
4	VOCs Treatment Projects in Key Industries	1311	Increase VOCs reduction capacity 605,000 tons per year	400
5	Oil and Gas Recovery Projects	281 (including 23468 gas stations, 11262 oil tank trucks and 573 oil storages)	Increase VOCs reduction capacity 405,000 tons per year	215
6	Yellow-Sticker Vehicle Elimination Projects	188 (8066.1 thousands yellow-sticker vehicles in total)	Increase reduction capacity of NO _x , PM and VOCs 1,158,000 tons per year, 213,000 tons per year and 515,000 tons per year respectively	940

7	Fugitive Dust Comprehensive Treatment Projects	192	Increase PM reduction capacity 406,000 tons per year	100
8	Capacity Building Projects (Including Regional Air Quality Monitoring Network Building Projects, Online Monitoring Capacity Building Projects for Enterprise Pollution Emission, Vehicle Emission Monitoring Capacity Building Projects, Pollution Emission and Environmental Quality Surveys Projects)	122	---	115
	Total	13369	Increase reduction capacity of SO ₂ , NO _x , VOCs and PM 2,280,000, 3,590,000 1,480,000, 1,525,000 tons per year respectively.	3500

Table 2 SO₂ Treatment Projects in Electricity Industry (Sample, 126 in total)

No.	Urban Region	Cities	Enterprises	Unit	Installed Capacity	Types of	Overall De-sulfurization	Year for
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				Number	(MW)	Projects	Efficiency (%)	Operation
1	Beijing-Tianjin-Hebei region (Tianjin)	Tianjin	Tianjin Dagang Power Plant of Guowang Energy Development CO., Ltd.	1	328.5	Rebuild	90	2011
100	Gansu-Ningxia (Ningxia)	Yinchuan	Ningxia Tairui Pharmaceutical Co., Ltd.	2	25	New	85	2013
126	Urumchi in Xinjiang	Fukang	Aluminum Company of Xinjiang Tianlong Mining CO., Ltd	6	300	New	90	2014

Table 3 SO₂ Treatment Projects for Steel Sintering Machine / Pelletizing (Sample, 206 in total)

No.	Urban Region	Cities	Enterprises	Unit Name &	Scale of Production	Overall De-sulfurization	Year for Operation
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				Number	Facilities (M ²)	Efficiency (%)	
10	Beijing-Tianjin-Hebei region (Hebei)	Shijiazhuang	Hebei Jinye Iron & Steel CO., Ltd.	2	230	70	2011
100	Yangtze River Delta Region (Jiangsu)	Xuzhou	Xuzhou Dongnan Steel Industry Co., Ltd.	1	120	70	2013
206	Urumchi in Xinjiang	Fukang	Fukang Taihua Coke & Chemical CO., Ltd	1	180	70	2012

Table 4 SO₂ Treatment Projects for CCU in Petroleum & Petrochemical Industry ((Sample, 51 in total)

No.	Urban Region	Cities	Enterprises	Unit Name & Number	Production Capacity (10,000 tons/year)	Overall De-sulfurization Efficiency (%)	Year for Operation
1	Beijing-Tianjin-Hebei	Beijing	Yanshan branch	Secondary	80	70	2011

	region (Beijing)			CCU			
51	Urumchi in Xinjiang	Urumchi	Urumchi Petrochemical Company	1# RFCCU	140	70	2014

Table 5 SO₂ Treatment Projects in other industries (Sample, 64 in total)

No.	Urban Region	Cities	Enterprises	Industry	Project Content and Scale	Overall De-sulfurization Efficiency (%)	Year for Operation
20	Changsha-Zhuzhou-Xiangtan	Zhuzhou	Zhuzhou Smelter Group CO., Ltd.	Nonferrous Metals	Flue gas desulphurization in 5# volatile kiln	85	2011
63	Gansu-Ningxia (Ningxia)	Yinchuan	Ningxia Meijie Paper Industry CO., Ltd	Papermaking	Wet Desulphurization for 50 tons boiler	70	2015

Table 6 NO_x Treatment Projects in Electricity Industry (Sample, 531 in total)

No.	Urban Region	Cities	Enterprises	Unit Number	Installed Capacity (MW)	Overall De-nitrification Efficiency (%)	Year for Operation
1	Beijing-Tianjin-Hebei Region (Tianjin)	Tianjin	Tianjin SDIC Jinneng Electric Power CO., Ltd.	1	1000	70	2012
200	Yangtze River Delta Region (Zhejiang)	Jiaxing	Zheneng Jiaxing Electric Power Co., Ltd	1	300	70	2014
500	Gansu-Ningxia (Gansu)	Baiyin	Jingyuan Secondary Electric Power Co., Ltd	8	320	70	2012

Table 7 NOx Treatment Projects in Cement Industry (Sample, 204 in total)

No.	Urban Region	Cities	Enterprises	Unit Number	Clinker Production Capacity (ton/d)	Overall De-nitrification Efficiency (%)	Year for Operation
100	Shandong	Dezhou	Dezhou China United Cement CO., Ltd.	1	2333	70	2014
200	Gansu-Ningxia	Yinchuan	Ningxia Building Material Group Co.,	Dry-process	2500	50	2014

	(Ningxia)		Ltd	kiln 1			
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Table 8 De-nitrification Demonstration Projects for Sintering Flue Gas in Steel Industry (Sample, 20 in total)

No.	Urban Region	Cities	Enterprises	Unit Name and Number	Scale of Production Facility (M ²)	Overall De-nitrification Efficiency (%)	Year for Operation
1	Central Liaoning	Anshan	Iron-making General Plant of Angang Steel Company Limited	Secondary sintering machine	360	60	2014

Table 9 Dust-remover Retrofit Projects in Coal-fired Power Plant (Sample, 86 in total)

No.	Urban Region	Cities	Amount of Power Units	Installed Capacity (GW)	Treatment Measure	Treatment Requirement	Year for Operation
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31	Pearl River Delta Region	Guangzhou	15	205	Dust-remover retrofit	Smoke & dust emission concentration $\leq 20 \text{ mg /m}^3$	2014
86	Urumchi in Xinjiang	Fukang	10	162	Dust-remover retrofit	Smoke & dust emission concentration $\leq 30 \text{ mg /m}^3$	2012

Table 10 Dust-remover Retrofit Projects for Steel Sintering Machine (Sample, 21 in total)

No.	Urban Region	Cities	Amount of Sintering Machines	Treatment Measure	Treatment Requirement	Year for Operation
1	Beijing-Tianjin-Hebei Region (Tianjin)	Tianjin	1	Dust-remover retrofit of machine head	Meet special emission limitation	2013

Table 11 Dust-remover Retrofit Projects for Cement Kiln (Sample, 38 in total)

No.	Urban Region	Cities	Amount of Production Lines	Production Capacity (ton clinker/d)	Treatment Measure	Treatment Requirement	Year for Operation
38	Urumchi in Xinjiang	Fukang	2	900	Bag filter retrofits for kiln tail	Meet emission standards	2012

Table 12 Dust Removing and Comprehensive Treatment Projects for Coal-fired Boiler (Sample, 110 in total)

No.	Urban Region	Cities	Amount of Boilers	Capacity (tons/h)	Treatment Measure	Treatment Requirement	Year for Operation
10	Beijing-Tianjin-Hebei Region (Hebei)	Hengshui	4	75	Dust-remover retrofit	Meet emission standard	2013-2014
100	Shaanxi Guanzhong	Yangling	3	27	Centralized heating replace	Meet emission standard	2012-2015

					small coal-fired boilers		
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Table 13 Other PM Treatment Projects (Sample, 56 in total)

No.	Urban Region	Cities	Enterprises	Name and No. of Units	Treatment Measure	Treatment Requirement	Year for Operation
28	Central Liaoning	Benxi	Benxi Steel Company	T101, T102 vestibule for coke transport	New bag filters	Meet emission standard	2013

Table 14 Industrial VOCs Treatment Projects (Sample, 300 in total)

No.	Urban Region	Cities	Industry	Amount of Enterprises	Key Enterprises Name	Treatment Requirement	Year for Operation
100	Yangtze River Delta Region (Jiangsu)	Yancheng	Organic chemical material production	2	Jiangsu Yulang Chemical industry CO., Ltd, Jiangsu Jinling Paper CO., Ltd	Comprehensive VOC treatment during the storage of raw materials and product, handing operations, and organic process exhaust	2012-2015
300	Urumchi in Xinjiang	Changji	Synthetic material	1	Xinjiang Blue Ridge Tunhe PET CO., Ltd	VOCs comprehensive treatment for processes of monomer synthesizing and polymerization	2015

Table 15 Oil and Gas Recovery Projects (Sample, 281 in total)

No.	Urban Region	Cities	Categories	Amount of Enterprises	Treatment Measure	Year for Operation
1	Beijing-Tianjin-Hebei Region (Tianjin)	Tianjin	Gas Stations	246	Build oil and gas recovery pipeline, adopt oil gun which could recover oil and gas	2012-2014
101	Central Liaoning	Fushun	Oil storage	5	Retrofit Efficient sealed floater or install headspace connecting displaced oil and gas recovery devices	2011-2014

Table 16 Yellow-Sticker Vehicles Elimination Projects (Sample, 188 in total)

No.	Urban Region	Vehicle type		Amount of Eliminated Vehicles	PM Reduction (tons /year)	NOx Reduction (tons /year)	VOCs Reduction (tons /year)	Year for Operation
1	Beijing-Tianjin-Hebei Region (Beijing)	Passenger vehicle	Mini	62900	0.00	1217.19	3921.18	2012-2015
2			Small	149200	0.93	2886.96	8697.01	2012-2015
3			Medium	37700	38.48	7033.36	7290.35	2012-2015
4			Large	1900	1472.18	17394.64	7913.09	2012-2015

Table 17 Fugitive Dust Comprehensive Treatment Projects (Sample, 192 in total)

No.	Urban Region	Cities	Categories	Scale		Treatment Measure	Year for Operation
				Unit	Amount		
100	Wuhan Region	Ezhou	Construction site	10,000m ²	80	Build dust-proof screen, clean and water the path	2015
101			Yard		3	Reduce dust by spraying, transportation with tarpaulins	2015
102			Road	10,000m ²	100	Pave asphalt, clean road	2015

Table 18 Regional Air Quality Monitoring Network Construction Projects (Sample, 57 in total)

No.	Urban Region	Projects	Amount of Automatic station	Content	Year for Operation
13	Yangtze River Delta Region (Jiangsu)	Construction of regional stations	4	Construction of station house, automatic monitoring devices for all indicators and devices for visibility and meteorological parameters. Operation maintenance.	2012

14		New monitoring indicators in city stations	72	Increase monitoring devices for O ₃ , CO, PM _{2.5} and visibility in city stations, and replace old devices	2012
15		Construction of Automatic Air Quality supersite	1	Construction of station house, automatic monitoring devices for all indicators, stereoscopic monitoring devices like LIDAR and wind profile radar. Operation maintenance.	2012-2013

Table 19 Online Monitoring Capacity Building Projects for Enterprise Pollution Emission (Sample, 27 in total)

No.	Urban Region	Projects	Amount (set)	Content	Year for Operation
1	Beijing-Tianjin-Hebei Region (Hebei)	New online monitoring devices	69	Online monitoring devices construction for key emission sources	2012-2015

2		New monitoring devices in active stations	13	Increase monitoring devices for flow, NOx and specific pollutants	2012-2015
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Table 20 Vehicle Emission Monitoring Capacity Building Projects (Sample, 34 in total)

No.	Urban Region	Projects	Amount (set)	Construction standard and requirement	Year for Operation
3	Beijing-Tianjin-Hebei Region (Hebei)	Construction of vehicle emission monitoring and control agency in provincial level and environmental monitoring and management platform for active vehicles	1	700m ² office space, with office devices, 2 inspect cars, 1 set of inspect device, 1 set of remote sensing monitoring device, software and hardware building, and net service	2012-2015
4		Construction of vehicle emission monitoring and control agency in city level	11	400m ² office space, with 2 inspect cars, 1 set of inspect device for active vehicles, 1 set of	2012-2015

				environmental monitoring device for vehicle fuel, 1 set of mentoring device for oil and gas recovery	
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Table 21 Pollution Emission and Environmental Quality Surveys (Sample, 4 in total)

No.	Projects	Content	Year for Operation
1	VOCs Emission Survey	Develop VOCs emission survey in key sectors, formulate VOCs emission factors and configure VOCs emission status	2012-2015

Clean Air Alliance of China

Clean Air Alliance of China (CAAC), initiated by 10 key Chinese academic and technical institutions in clean air field, aims at providing an integrated clean air collaboration platform in China for academic and technical institutions, provinces and cities, non-profit organizations and enterprises. The overarching goal is to improve air quality in China and mitigate the negative impacts on public health due to air pollution. The members of CAAC include academic institutions, provinces & cities, as well as other nonprofit organizations and enterprises that care about clean air.

Founding Members

Chinese Academy for Environmental Planning (CAEP), Appraisal Center for Environment & Engineering of MEP, Tsinghua University, Nanjing University, Renmin University, Beijing Normal University, Chinese Research Academy of Environmental Sciences (CRAES), Peking University, Fudan University, Vehicle Emission Control Center (VECC) of MEP

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