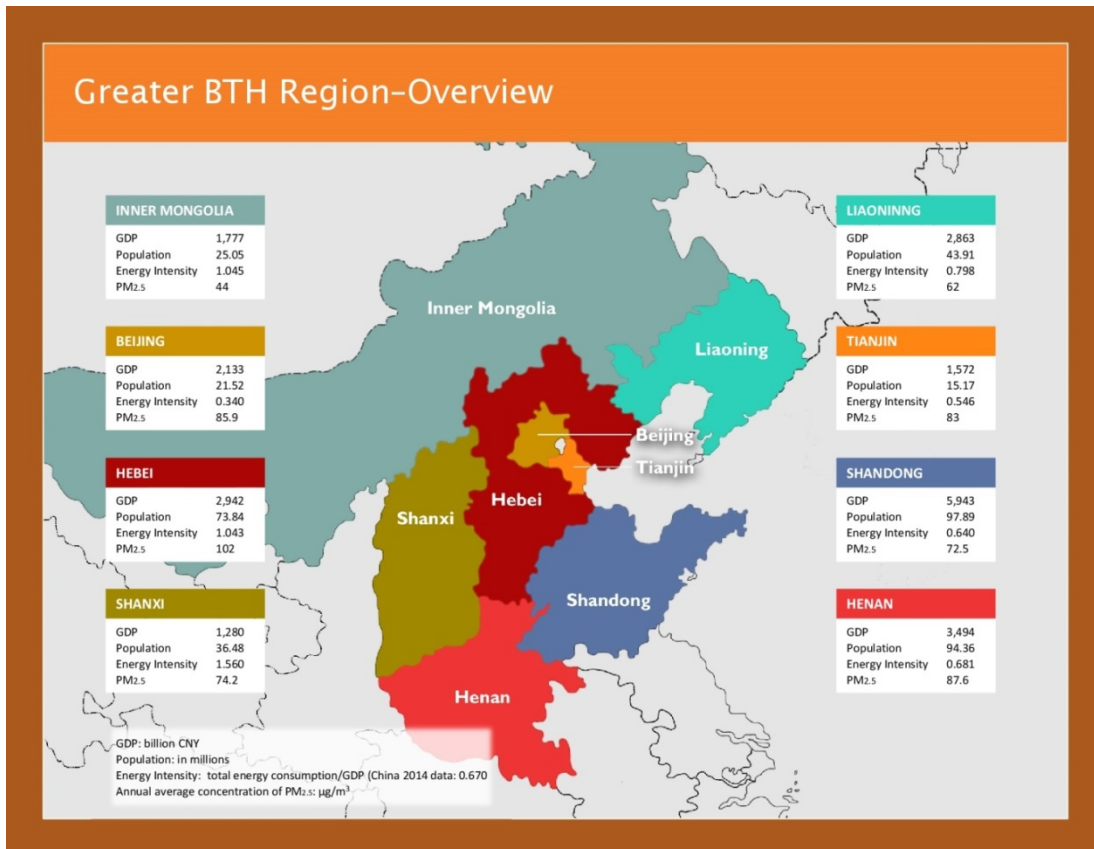


FRAMEWORK FOR THE BEIJING–TIANJIN–HEBEI REGION AIR QUALITY IMPROVEMENT PROGRAM, 2016–2020

A. Overview of the Greater Beijing–Tianjin–Hebei Region

1. Beijing, Tianjin, Hebei, Henan, Shandong, Shanxi, Inner Mongolia, and Liaoning or together the greater Beijing–Tianjin–Hebei (BTH) region (hereinafter referred to as greater BTH region), are 8 interconnected provinces, municipalities and an autonomous region, spanning more than 20% of the People’s Republic of China’s (PRC) total landmass and is home to more than 30% of the country’s population. This region also generates more than 34% of the PRC’s gross domestic product (GDP), 38% of which is generated from secondary industry.¹ About 64% of the PRC’s iron ore reserves as well as 69% of the country’s coal, 27% of petroleum, and 19% natural gas reserves are in this region. The rich endowment of energy and mineral reserves, availability of excellent land and sea transport infrastructure, and proximity to major consuming centers have led to rapid industrialization with high concentration of energy intensive industries in the region. More than 53% of the urban employed population in the region works in the industrial/mining sector of BTH region. Except for some parts of Henan Province, greater BTH is above the so-called Qin-Huai line and requires heating during the winter months.



¹ According to the China Statistical Yearbook 2015, the secondary industry refers to mining and quarrying, manufacturing, production and supply of electricity, heat, gas and water, and construction.

Salient features of the greater BTH region

The greater BTH region is diverse, including areas of intense industrial activity, modern urban centers, and edge districts trying to resist urban sprawl and maintain a rural character. While the eight individual provinces and cities of the greater BTH region share common issues of poor air quality, there are subtle differences in their socio-economic make up and natural resources endowment as briefly captured below:

Population: About two-thirds (266 million) of the greater BTH region's population is concentrated in Shandong, Henan, and Hebei Provinces. The urban population is nearly 50% in all areas except Beijing and Tianjin where urban population are more than 78%.

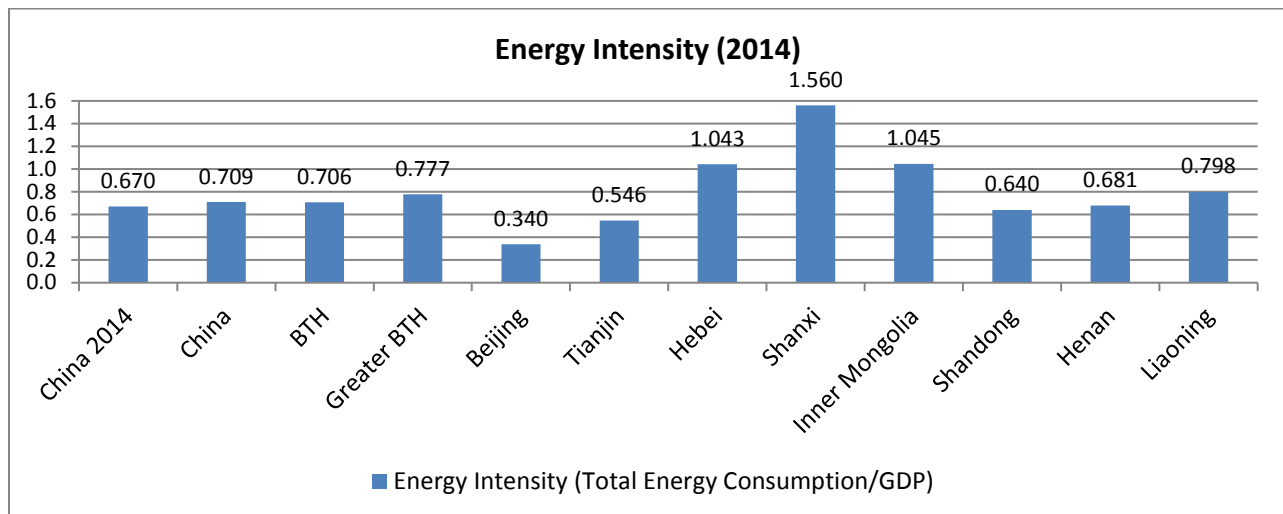
GDP: Shandong contributes more than a quarter (27%) of the greater BTH region's GDP. Each other area contributes nearly around 8%–10% of the region's GDP. Apart from much higher share of service sector in the GDP for Beijing (77%) and to some extent Tianjin (50%), in other areas service sector makes up for around 40% of the GDP.

Per Capita Disposable Income: Per capita income varies widely within the region. It varies from a high of CNY44,500 in Beijing (national average is CNY20,000) to about CNY16,000 in Hebei, Henan and Shanxi.

Natural Resources: Overall, greater BTH region is extremely water scarce and has only 5% of the country's water resources. Individually, each area of the greater BTH is water-stressed. The region houses two top ranked provinces (Shanxi and IMAR) in coal production in the PRC, petroleum resources of the region are concentrated in Hebei, Liaoning, and Shandong.

Energy Intensity: While the region's overall energy intensity is almost at par with the national average, the energy intensity of Hebei, Shanxi and IMAR is 50%–100% higher than the region's average.

Figure 1: Energy Intensity in Greater BTH region



B. Air Quality in the Greater BTH Region

I. General Background

2. While the sustained economic growth of the PRC in the past 2 decades has lifted around 500 million people out of poverty, the growth was resource and energy intensive relying on heavily polluting industries, on burning coal for energy, and has resulted in an explosion in the number of cars. Combined together, these have gradually increased pollutants emissions and worsened air quality. In the greater BTH region, a very dry climate with little precipitation and high concentration of pollutants—42% of total carbon dioxide (CO₂), 39.7% of total sulfur dioxide (SO₂), 39.4% of total nitrogen oxides (NO_x), and 44% of total smoke and dust pollutant in the PRC—have rapidly deteriorated air quality.

a. Main Causes of Haze/Air Pollution

i. Coal Burning

1. Heating and Domestic Use

3. Coal combustion for heating is pollution intensive. It is a legacy issue that will take concerted efforts to fix the problem. From 1950 to 1980, the government provided free coal for home and office during winter heating systems for anyone living north of the Huai River and Qin Mountain range.² During that time northern cities received free unlimited central heating between November and March. This has resulted in unregulated heating system and a large number of heat only boilers with no pollution control devices or measures. After the marketization, the free central-heating system has been replaced by heavily subsidized central-heating system. In the greater BTH region, the heating system is still largely coal-based and technically inefficient. The incomplete combustion of coal in these boilers leads to the release of at least three kinds of pollutant—total suspended particulates, CO₂, and NO_x. The amount of pollution produced varies depending on the type of coal used, which is relevant to the geographical area that the coal is produced. It is estimated that in the greater BTH region alone, additional 500 million tons of coal is used during the heating on top of regular use of coal in electricity production and industrial application. This exacerbates the already poor air quality during winter months. The red alerts in northern PRC during the winter months of 2015 have highlighted the continued problem with the coal-based heating system.³

2. Power and Industrial Use of Coal

4. In the PRC, coal is predominantly used in industrial application both as fuel and in some cases as feedstock. This is due to limited supply of natural gas and often weak distribution network. In any case, natural gas was 3–4 times more expensive than coal. The widespread use of coal and limited regulation on emissions from industries led to its inefficient use and excessive pollution. Till recently, very few industries installed end-of-pipe equipment on their industrial plants to limit

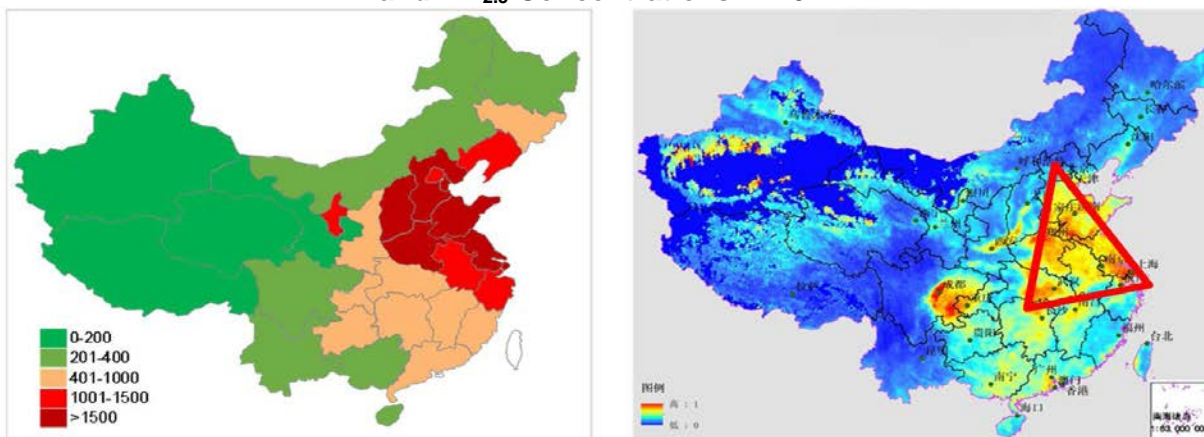
² The reason to choose Huai River and Qin Mountain as the divide was that the PRC Government could not afford supplying free heating to all of the PRC and the Huai River follows the January 0°C (32°F) average temperature line.

³ In Harbin, a city in northern China, dense smog blanketed the city on 20 October 2013, the day when the coal-powered district heating system was switched on. The visibility was reduced to below 50 meters in parts of Harbin and all primary and middle schools, and the airport, were closed for 3 days in Harbin. On 30 November 2016, the air quality index in Beijing reached a staggering 611 for small particulate matter. While the situation in Beijing and Harbin is alarming, they are not unique; many cities in Northern China are facing the same.

pollutant emissions. When the rapid capacity expansion of the energy intensive enterprises was underway in 2003–2007 period, the energy demand was outpacing the economic growth.

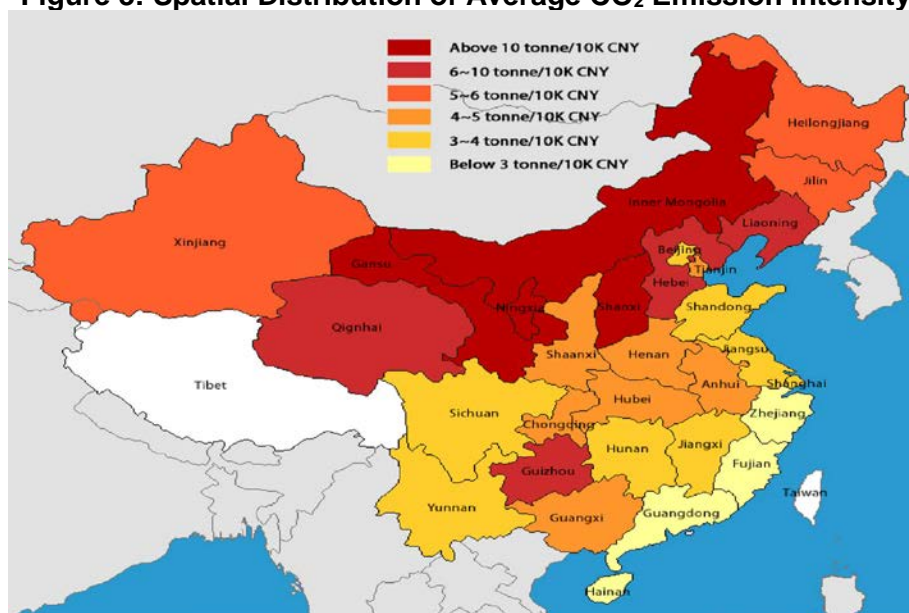
5. The coal-based electricity plants are the backbone of the electricity supply in the PRC. They have traditionally supplied more than 75%–80% of the PRC's total electricity demand. After the 2003 electricity supply shortages, the capacity addition took off at a phenomenal rate. Between 2005–2009, the PRC added almost the entire United States (US) coal fleet. In addition, from 2010v2013, it added another 50% of the US coal fleet. The PRC burns about 4 billion tons of coal a year now compared to that US burns only 1 billion tons and European Union only 600 million tons. While majority of the new coal-based power plants use best available technology and are highly efficient and fitted with advanced end-of-pipe equipment, many old plants which are still in operation and need to be retired to bring up the average efficiency of the coal fleet and reduce pollution. The PRC's emission standards for new coal plants are more stringent now than that in many Organisation for Economic Co-operation and Development countries. Figure 2 capture the strong correlation between coal consumption intensity and the level of particulate matter less than 2.5 microns in diameter ($PM_{2.5}$) especially in the greater BTH region. Figure 3 captures the correlation with CO_2 intensity.

Figure 2: China's Coal Consumption Density in 2012 (ton/km²) and $PM_{2.5}$ Concentrations in 2012



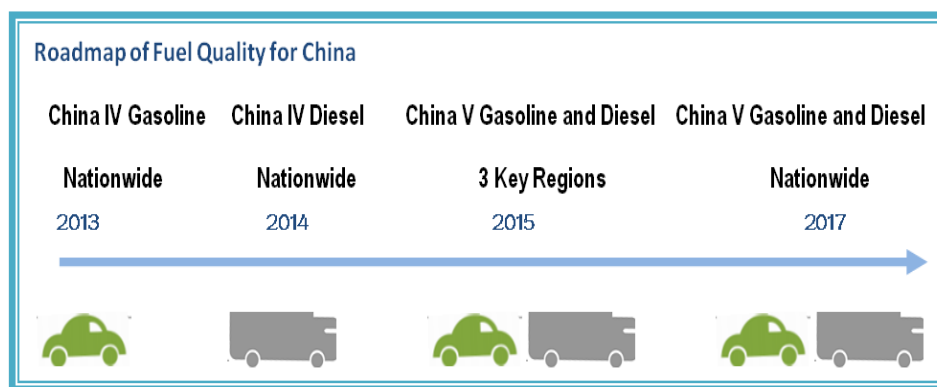
Source: Chinese Academy for Environmental Planning, 2014.

Figure 3: Spatial Distribution of Average CO₂ Emission Intensity



ii. Transport Sector

6. In the PRC, the number of motor vehicles rose from about 1 million in 1991 to 105 million in 2013 in tandem with the increased per capita incomes. This has also led to many transport related challenges including air pollution from mobile sources, traffic congestion, and increased traffic accidents. The use of high emission vehicles for freight and passenger transport is a significant contributor to the air pollution. The main causes of air pollution from transport sector are inadequate fuel standard and continued lower prices of fuels in the local market. The Clean Air Action Plan 2013–2017 (CAAP) targets to phase out all yellow label vehicles (registered before 2005) by 2017.⁴ There is also a clear timeline of clean fuel supply as showed in the following roadmap.



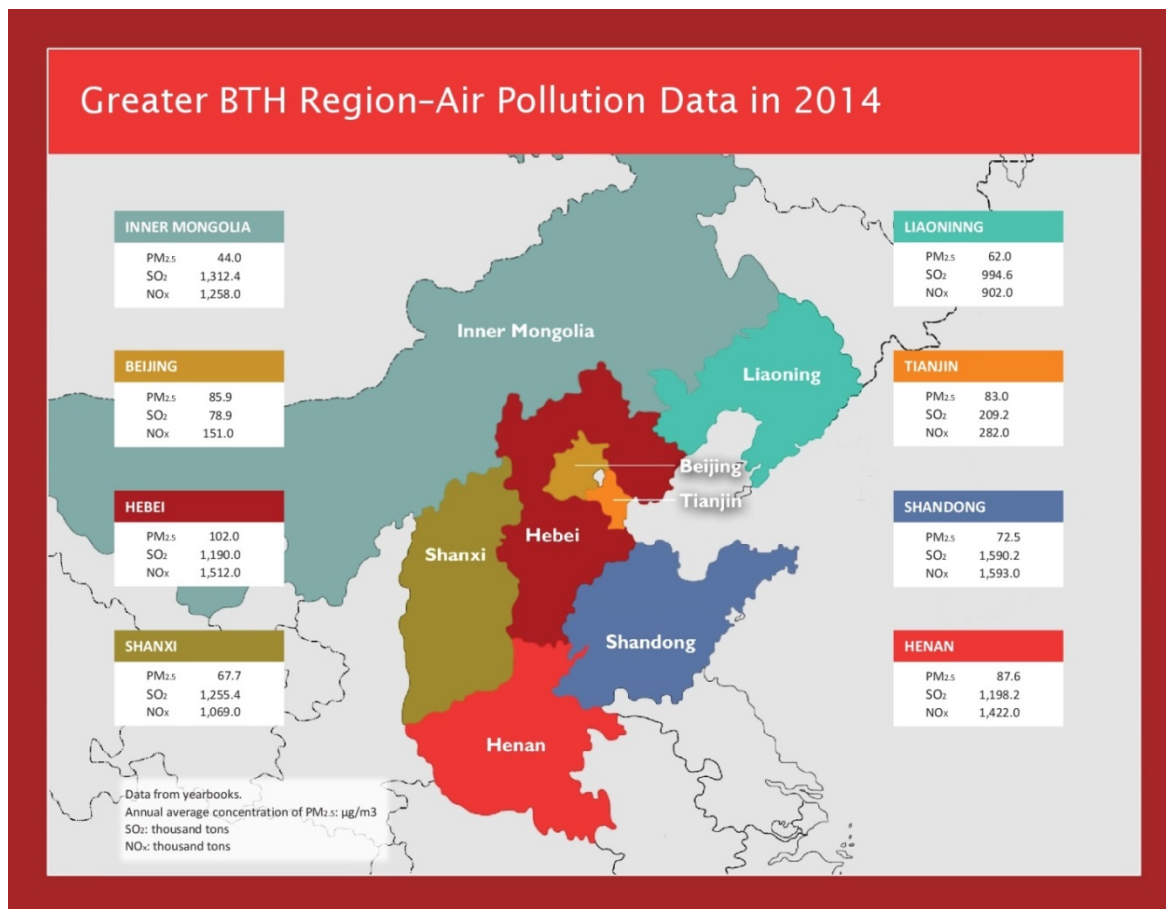
Source: <http://cleanairasia.org/node/12066/>

⁴ Yellow label vehicles are the high emitting vehicles that cannot meet National I standard for gasoline vehicles and National III standard for diesel vehicles.

iii. Agriculture Sector

7. The greater BTH hosts important food production bases which feed near 400 million people in the region. The agriculture sector accounted for about 20% of PRC's GHG emissions in 2015, equivalent to 0.82 billion tons CO₂.⁵ Also, ammonia (NH₃) released by fertilizers applications and livestock farming is a key ingredient of fine particulate matter. In PRC, ammonium salts could account for 7% to 57% of the total ambient PM_{2.5}.⁶ Meanwhile, the overuse of chemical fertilizers and lack of reuse of organic fertilizers from livestock farming is harmful to the environment, as the nitrogen not used by the crops pollutes air, water and soil. Combined with the effects of climate change, the aforementioned environmental problems threaten long-term food security.

8. The PRC Government has acknowledged the environmental threat posed by the agriculture sector. Pilots have been launched throughout PRC since 2008 but more sizable demonstrations are needed to enable a transformative shift towards more sustainable and low-carbon food production. A combination of regulation, technical assistance, and financial measures should form the foundation of a clean air, sustainable and climate smart agriculture strategy.



⁵ Mainly from rice paddies, livestock, manure management and nitrous oxide emissions from fertilizer application, and energy-related CO₂ emissions which account for about 8% of the total.

⁶ Studies conducted in Europe indicate that the contribution from agricultural ammonia to PM_{2.5} ranges between 10% to 40%. In Europe total emissions of ammonia from the agricultural sector are ≈94%, thus control strategies to reduce ammonia emissions can considerably influence PM concentrations.

iv. Focus on PM_{2.5}

9. Among the pollutants, PM_{2.5} has the most severe impact on public health. The World Health Organization concludes that no amount of PM_{2.5} is safe. An epidemiological study by the Chinese Academy of Sciences in Beijing showed the correlation between levels of ambient particulate matter and mortality from cardiovascular and respiratory diseases. The results confirm research findings from the United States and Europe. In the greater BTH region, PM_{2.5} is locally generated and formed in the atmosphere by emissions from (i) industries, (ii) continuous coal burning for electricity generation and heating boilers in urban and rural areas, (iii) increasing motor vehicle emissions, and (iv) the burning of agricultural biomass waste.⁷ Industrial processes and the residential sector are the main sources of primary PM_{2.5} in the region, accounting for 54% and 29% of the pollution, respectively. Industrial processes include the steel, cement, coking and other sectors. The residential sector emissions are mainly from coal and stalk burning. Moreover, the power sector, heating, industrial boiler and the transportation sector represent the other 4%, 3%, 6%, and 4% of the primary PM_{2.5} emissions. SO₂, NO_x, volatile organic compounds (VOCs) and NH₃ are the main causes for secondary PM_{2.5}. Industrial boilers, industrial processes (sinter and industrial furnaces), the power sector, the residential sector, and the heating sector contribute 39%, 19%, 17%, 15%, and 8% of SO₂ emissions, respectively. The transportation sector, industrial boilers, the power sector, heating and industrial processes (mainly cement industry) are the main sources of NO_x emissions, accounting for 28%, 27%, 24%, 10%, and 7%, respectively. About 40%, 26%, and 9% of VOCs emissions are from solvent use, industrial process, and residential sector, and transportation sector, respectively. NH₃ emissions are mainly from nitrogen fertilizer application and livestock farming.

10. For the greater BTH region, the most effective control measures for SO₂ emission reductions are energy mix adjustment measures (accounting for 39.5% of total SO₂ reductions), followed by desulfurization in the power sector (22.8%); the most effective control measures for NO_x emission reductions are power sector denitrification (accounting for 46.33% of total NO_x reductions), followed by reductions from vehicles (19.6%) and energy mix adjustment measures (19.1%). The most effective control measures for primary PM_{2.5} emission reductions are upgrades of dust collectors in the steel industry (contributing to 28.7% of primary PM_{2.5} reductions), and also measures to adjust the energy mix (20.3%).

Table 2: Source Contribution (%) of PM_{2.5} in Greater BTH

Area	Regional	Coal combustion	Industry	Dust	Transportation	Others
Beijing	28–36	27	17	30	20	6
Tianjin	22–34	28.5	25.2	22.5	15	8.8
Shijiazhuang	23–30	30.2	5	24.5	28.9	11.5
Baoding	29.7	27	18	24	15	16
Jinan	20–32	50	-	15	20	15
Shenyang	-					

⁷ Open burning of harvesting waste and direct burning of biomass, such as crop stalks and firewood, for cooking, water heating, and space heating emit black carbon, an ingredient of PM_{2.5}, and short-lived climate forcing agent.

II. Assessment of the progress and challenges on BTH Air Quality Improvement work

11. **Government's efforts, plans, and challenges.** As a national priority, the central government is scaling up its efforts to address this environmental challenge together with climate change. The national air quality standards were updated in 2012 to be equivalent with those in most developed countries. The new environmental protection law came into force in 2015. In 2013, the State Council issued the CAAP 2013–2017. In 2013–2014, the central government budgeted CNY15 billion to improve the air quality in six northeastern provinces, including the BTH region. The provincial governments issues their own air quality improvement plans. On 16 March 2016, the PRC adopted the 13th Five-Year Plan.

Table 3: 10 Key Areas of Air Pollution Prevention and Control Measures

10 key areas of air pollution prevention and control measures

- (a) Reduce coal consumption by 83 million tons in the BTH region. This target is to be achieved by (i) improving energy efficiency in the industrial, power, and building sectors; and (ii) increasing the use of clean energy, particularly natural gas and renewable energy, with specific targets to increase natural gas consumption by 50 billion cubic meters and the share of non-fossil fuels in primary energy to 15% in the BTH region by 2017.
- (b) Reduce emissions from (i) point sources in the industrial and power sectors by implementing end-of-pipe measures for particulates removal, desulfurization, and denitrification; (ii) area sources to reduce dust emissions; and (iii) mobile sources in the transport sector by increasing public transport, improving fuel quality, phasing out inefficient vehicles, and promoting electric and compressed natural gas.
- (c) Increase the use of market mechanisms and expand green financing to energy efficiency, clean energy, and emission reduction investments by scaling up green financing from domestic banks and piloting innovative financing models and products.
- (d) Adjust economic structure by closing down inefficient energy-intensive industries.
- (e) Accelerate technological innovation.
- (f) Strengthen environmental standards and permitting for newly built infrastructure.
- (g) Strengthen legal framework and enforcement.
- (h) Establish regional collaboration mechanisms, particularly in the BTH Region.
- (i) Establish environmental monitoring and warning systems.
- (j) Specify the responsibilities of the government, enterprises, and citizens.

BTH = Beijing–Tianjin–Hebei.

12. The 13th plan, builds on the success of the previous plan, requiring greater reductions in the emissions of many pollutants and adding a major air pollutant, VOCs, to those with specific reduction goals, or “hard” targets. For the first time, the plan also includes a total energy consumption cap of 5 billion tons of coal equivalent. The 13th plan sets ambitious targets for air quality progress, requiring hundreds of cities to 80% of the time meet “good” or “excellent” standards—meaning they must score below 100 on China’s Air Quality Index of 0–500. The 80% target is in addition to a target to reduce the number of polluted days by 25%, and to reduce by 18% the number of days when PM_{2.5} (the air pollutant of particular health concern) exceeds allowable limits. The plan also steps up the reduction targets for the two major air pollutants (SO₂ and NO_x) that had been in previous plans.

13. One major reason to expect progress in the 13th plan is the addition of a target to reduce target to reduce VOCs, which are emitted not just from fossil fuels (especially gasoline), but from paints, solvents, and all sorts of industrial processes. This is the first time this target has appeared

in a five-year plan, and VOCs are a critical component of both PM_{2.5} and ozone. The plan aims to reduce VOCs nationwide by 10% or more, with an emphasis on major cities and industries. While most coverage of PRC's air pollution problems emphasizes PM_{2.5}, the reality is that most PM_{2.5} is what is known as a secondary pollutant, produced in the air from other pollutants that the PRC regulates, including sulfur dioxide and nitrogen dioxide. The addition of VOCs is ambitious because it requires regulating many more sources of pollution than SO₂ and NO_x.

14. The largest sources of air pollution are coal combustion, both inside and outside the power sector, and automobiles. The 13th plan calls for any new coal-fired power plants to be “ultra-low emissions,” a standard that attempts to make coal-fired power plants as clean as natural gas plants. Moreover, the work report calls for the replacement of coal in non-power sectors either with electricity (where pollution is easier to treat) or natural gas. The plan explicitly calls for PRC's oil industry to produce gasoline and diesel suitable for vehicles at the China V standard. China V is equivalent to Euro V, a standard adopted in the European Union in 2009.

Table 4: Key Targets for 13th Five-Year Plan (%)

	12th Plan Targets (Compared to 2010)	12th Plan Achievements (Compared to 2010)	13th Plan Targets (Compared to 2015)
Energy Intensity (Energy Consumption per Unit of GDP)	(16)	(18.2)	(15)
Carbon Intensity (Carbon Emissions per Unit of GDP)	(17)	(20)	(18)
Non-Fossil Fuel Percentage	11.4	12	15
Sulfur Dioxide (SO₂)	(8)	(18)	(15)
Nitrogen Oxides (NO_x)	(8)	(18.6)	(15)
Ammonia Nitrogen	(10)	(13)	(10)
Chemical Oxygen Demand (COD)	(10)	(12.9)	(10)
Forest Coverage	21.7	21.63	23.04

III. What the development partners have done so far in the greater BTH region

a. ADB (with KfW cofinancing)

15. **ADB targeted the core emission problem area of Hebei.** In 2014, seven of the 10 cities with the worst air quality in the PRC were in Hebei. Hebei emits more than 80% of total primary PM_{2.5} in the core BTH region, and three times more NO_x—one of the precursors of secondary PM_{2.5}—than the total of Beijing and Tianjin. To improve the region's air quality, the first priority is to address Hebei's problems, while improving coordination of air quality improvement efforts in the region. ADB's policy based loan (PBL) approved in 2015 for \$300 million comprehensively addresses these. The PBL included policy actions supporting (i) adjustment of the energy structure, (ii) promotion of public transportation, (iii) reduction of seasonal biomass burning and promotion of clean energy in rural area, (iv) capacity development in environmental monitoring, administration and supervision, and (v) employment promotion for inclusive industrial transformation.

b. World Bank

16. World Bank's program for result loan (\$500 million) intends to focus primarily on improvement in energy efficiency and expansion of clean energy, contributing to the coal

reduction targets and also address end-of-pipe measures and on the commercial financing channel. These measures will support the implementation of the CAAP. It also expands the coverage area from core BTH region to neighboring provinces. The companion operation, the World Bank-supported Hebei Air Pollution Prevention and Control Program (\$500 million), intends to focus on other areas as of the CAAP, such as phasing out inefficient vehicles and enhancing environmental monitoring in Hebei Province, and complements this proposed BTH program from ADB.

C. Key Issues in the Action Plan Implementation and Air Quality Improvement in BTH

A. Gap between legislation and implementation

17. **Need for comprehensive and concerted efforts.** The air quality improvement in the greater BTH region requires a long-term concerted effort across all provinces and cities in the region as well as all sectors of the economy. There has been good progress so far in improving the BTH air quality and the results are somewhat better than anticipated. This shows that the firm political and policy support for BTH air quality improvement is working. But initial results could be misleading as they targeted “low hanging and high impact” measures such as retiring overcapacity, fitting end-of-pipe measures, etc., with generous support from the government. The London smog took at least 20 years of gradually tightening pollution reduction efforts with substantial short-term economic pains. Currently, the air quality improvement plan in the greater BTH region is in early stage of these efforts with substantial headwinds/risks such as, large number of laid-off workers, much slower economic growth, declining revenues for enterprises, which further weakens their ability to invest in emission reduction. As the air quality improvement efforts continue, they have to be ramped up substantially. Thus, unless the potential risks are adequately mitigated and managed in a comprehensive manner, the plan may be derailed or provide slower outcomes.

18. **Need for right capacity and coordination is essential to avoid gap between legislation plan and implementation.** Environmental management and effective implementation is a common issue across many countries mainly because of weak regulations and inadequate capacity to implement it. In the PRC itself, the record is pretty mixed. While the national government is driving coordination between various provinces and cities within the greater BTH region at this early stage, there is a need to build capacity and adopt appropriate institutional set up to make this effort sustainable in the long term. The monitoring system of pollutants similarly need urgent attention and expansion especially at higher than prefecture level cities to appropriately and regularly monitor and publicly report emission levels. The environmental regulations need to be tightened and where feasible should be market-oriented so that they can be backed up by rigorous implementation arrangement to ensure that there are no gaps between regulations and their implementation.

19. **Energy efficiency investments are crucial.** While enterprises are tasked with the burden of clean up and modernize and upgrade, such investments do not lead to any new revenue unless they are packaged together with the energy efficiency improvement so that overall there is business and economic case for investment. Similarly, moving away from coal in the region requires rapid renewable energy capacity, which by nature is capital intensive and in an environment of depressed economic conditions and revenues for enterprises require careful attention.

20. **Improve access to financing for enterprises facing difficulties.** Many developers, particularly small and medium-sized enterprises (SMEs) such as energy service companies

(ESCOs), face difficulties in accessing financing because: (a) most local banks usually rely on balance sheet financing, which requires that borrowers have either good credit ratings or high-level of collaterals. The concept of project-based financing that focuses on the cash flows from energy savings has not yet been widely accepted by financial institutions. The result is that the most developers in need of financing are typically not creditworthy from the lenders' perspectives; (b) lenders also perceive energy efficiency investments to be highly risky, because they are not convinced that the expected future savings will be realized or captured by the investors; (c) most financial institutions still lack the required technical expertise and interest in financing energy efficiency and distributed renewable energy generation projects; and (d) energy efficiency and distributed renewable energy generation investments tend to be small, with high transaction costs, and most banks' short-term tenures do not match the long-term payback of renewable energy technologies. As a result, despite the fast growth of the ESCO industry in PRC, only 20% of the ESCOs are financed through external financing sources, while the majority relies on self-financing.

21. Despite the emerging green financing market in the PRC, the banking sector's interest in green financing remains low. A number of Chinese banks have established business lines on green financing, partly attributed to the role of several international financial institutions. The regulatory authorities have also started to build basic regulatory and institutional frameworks for green financing. However, the majority of Chinese banks still do not fully understand how to control the environmental and social risks of their lending portfolios. Capacity of risk appraisal and underwriting skills related with green investment needs to be improved, since green investment often is a collateral-based lending practice rather than cash-flow based lending with an appropriate credit assessment and appraisal system; lack of effective incentive structure. Internal and external incentive structures need to be developed to increase private capital mobilization for green projects. Innovative green finance products need to be introduced to demonstrate how an effective mechanism works; and lack of mid- and long-term strategy and instruments for pollution control and emission reduction. These impediments have hindered the increase of debt financing from Chinese banks to environmentally friendly projects, such as energy efficiency investments.

22. Public funding is warranted to remove market failures and barriers and unlock project financing by lowering risks and closing finance gaps. Energy efficiency continues to face market failures and barriers. The fact that a large share of the energy efficiency potential remains to be untapped demonstrates that the energy efficiency market is not yet fully commercial. Therefore, public funds are justified to cover the externalities of public goods and remove market barriers. In addition, public funds are essential to mitigate financiers' risk perception by enhancing the interests and capacity of domestic banks through a learning-by-doing process, increasing access to financing for SMEs and ESCOs, and providing long-term tenures to match the long-term payback period of renewable energy investments.

23. Transportation Plan for the BTH metropolitan area. Under the Coordinated Development Plan, Beijing Municipal Commission of Transport announced transport development plan for integrating cities in the BTH area. The plan includes: (i) developing a suburban rail network. Priority has been placed on developing a 1,000 kilometer (km) suburban rail network. In addition, Beijing will expand the current subway to 1,000 km from 52 km; (ii) building highways to link unconnected roads in the six-city metropolis.⁸ Administrative barriers within the three administrative regions (Beijing, Tianjin, and Hebei) have left many highways and roads unconnected. The Government targets completion by the end of 2017; (iii) implementing a "single

⁸ Including Beijing, Tianjin, Shijiazhuang, Baoding, Langfang, and Zhangjiakou.

transportation pass” program: residents in Beijing, Tianjin, and the four cities of Hebei province will be able to use a single transportation pass for public transportation across the six cities; and (iv) appointment of a committee to oversee the plan: the three governments have established a high-level committee to coordinate the integration of transportation facilities in the region. The plan called for the construction of a transportation network that would put residents of Beijing, Tianjin, and Shijiazhuang, within an hour’s distance; residents of other satellite cities would also be able to reach the major cities within 30 minutes.

B. Social Protection

24. Subsequent to the 13th plan adoption, the government also unveiled the plan to cushion the effect of job losses on families and society by allocating CNY100 billion to help the laid-off workers find new jobs. In addition to the help given to redundant staff, support will be offered to firms who create new jobs by adopting the “Internet Plus” strategy, developing new industrial fields and products and expanding domestic and overseas market. A “back-to-work” program should be created so that workers receive training and career guidance for free, and, for those who want to start their own businesses, channels that will give them access to government support, will be provided. Local authorities should also enhance trans-regional cooperation to relocate redundant workers to regions with employment opportunities.

25. To switch from an investment driven economy to consumption and innovation driven economy, the PRC is slashing industrial overcapacity, mainly in the coal and steel sectors. According to preliminary forecast by the human resources ministry, the two sectors will expect a combined 1.8 million laid-off workers.

26. Improving the energy efficiency and enhancing usage of clean energy is a key to improve air quality in the greater BTH. Such air pollution control regulations will require enterprises upgrade their equipment and change the production lines, which will in turn require reallocating their employees and upgrading their skills. Some of the enterprises, not meeting environmental requirements, may need to exit from the market, which would further require workers in the affected industries to find new jobs. Social security programs need to be strengthened urgently to provide necessary support for those workers. More fundamentally, improving portability and continuity of social security benefits across localities and occupations are necessary to enhance the labor mobility with social stability.

27. As a policy initiative, the central government issued a paper on “State Council’s Opinion on Further Improving Employment and Entrepreneurship” to enhance employment and entrepreneurship, and each province in the greater BTH also issued relevant implementation policies in 2015.⁹ The progress and approach to social protection and security varies across the greater BTH provinces. As a key province in the greater BTH, Hebei Province also issued very detailed implementation policies by focusing on (i) strengthening unemployment insurance, (ii) strengthening funds for employment or entrepreneurship, including expansion of employment funds and establishment of entrepreneurship funds, (iii) improving monitoring labor market conditions, and (iv) strengthening supports for rural migrants.¹⁰ In addition, ADB helped Hebei Province strengthen its policies on improving quality of training and administrative supports for unskilled workers. Liaoning Province and Inner Mongolia have made good progress in developing

⁹ 2015. State Council. PRC.

¹⁰ Hebei. 2015. *Notification of Related Issues on Adjustment of Unemployment Insurance Premium (Guanyu Tiaozheng Shiye Baoxian Feily Youguan Wenti de Tongzhi)*; Hebei. 2015. *Notification of Further Supports for Enterprises to Stabilize Positions and Employment (Guanyu Jinyibu Zuohao Yuangi Wengang Gongzuo de Tongzhi)*.

detailed implementation policies with the similar focuses to Hebei Province.¹¹ They have also issued provincial policies to support rural migrants. Meanwhile, Shanxi and Henan Provinces appear to have similar policies to practically enhance employment and support rural migrants.

D. What ADB can do to assist greater BTH air quality improvement during 2016–2020

I. How ADB can assist

28. The importance of good air quality in the BTH region cannot be emphasized enough. It is a basic human need and an important component of the Sustainable Development Goal No. 3—*Ensure healthy lives and wellbeing for all at all ages*. ADB and the government have agreed on a multi-year lending support program spanning 2015–2020 to address this national priority. The proposed air quality improvement support is well aligned with the Country Partnership Strategy 2016–2020 priority of managing climate change and environment to help support the government realize ecological civilization.¹² The PBL in 2015 was ADB’s entry point to help address the BTH air quality issue. ADB’s planned lending support during 2016–2020 will be about \$500 million per year and will revolve around three key pillars (i) policy and regulatory framework in the region; (ii) tailored financing approaches; and (iii) technology leapfrogging in key sectors. ADB support will complement the government and other development partners’ actions.¹³ ADB lending support each year will be mutually reinforcing and will be backed up by analytical, policy advisory and capacity development non-lending work, many of which are already in progress.¹⁴ Future ADB support in the greater BTH region will follow the key development concepts included in the 13th plan—innovation, coordination, green, openness, and sharing.

II. ADB’s proposed assistance

29. **Air Quality Improvement in the BTH Region—China Investment and Guaranty Corporation’s Green Financing Platform (2016)**. Going forward, ADB as first step should (a) back up each of the PBL’s policy actions with targeted investments so that these measures are field tested, reinforced and scaled-up not only in Hebei but across the greater BTH region; (b) facilitate this investment by providing a multi-province, multi-sectoral common platform for leveraging green investments in the greater BTH region to introduce complete suite of financing tools and instruments recommended in the Green Financing Guidelines and will leverage domestic savings to meet the investment requirements; and (c) address market failures that have inhibited investments in energy efficiency, and emission reduction projects in SMEs. It is a logical next step in the BTH program that will fill in the critical gap of the region dedicated financing vehicle and expand tool kit of financial instruments and expand the envelope of public funds for sustainable infrastructure, cleaner industrial productions to reduce primary air pollutants and improve public health.

¹¹ Liaoning. 2015. *Liaoning provincial government’s implementation opinion on further improving employment and entrepreneurship*; 2015. *IMAR Government’s implementation opinion on further improving employment and entrepreneurship*.

¹² ADB. 2016. *Transforming Partnership: People’s Republic of China and Asian Development Bank, 2016–2020*. Manila.

¹³ ADB is closely coordinating with World Bank and other bilateral development partners.

¹⁴ ADB. 2014. *Technical Assistance to the People’s Republic of China for the Study on the National Control of the Important Pollutant–Volatile Organic Compounds*. Manila; ADB. 2015. *Technical Assistance to the People’s Republic of China for the Beijing-Tianjin-Hebei Regional Air Pollution Control*. Manila; ADB. 2016. *Technical Assistance to the People’s Republic of China for the Developing Cost-Effective Policies and Investments to Achieve Climate and Air Quality Goals in the BTH region*. Manila; ADB. 2015. *Technical Assistance to the People’s Republic of China for the Study on the coordinated Development of Beijing-Tianjin-Hebei*. Manila.

30. **Air Quality Improvement in the Greater BTH Region—Regional Emission-Control and Pollution-Reduction Facility (2017).** In 2017, ADB will support the government to set up a BTH region dedicated emission control and pollution reduction fund to leapfrog to advanced best available low-carbon least polluting technologies in key sectors—agriculture, energy, environment, green financing, transport, and urban—to make them future ready. The fund will be an open fund and it will seek partnership with central government, provinces, cities and domestic commercial financial institutions. It will introduce super ESCOs approach in high energy intensive and polluting industries, such as, iron and steel, cement, and petrochemical. It will also address waste water and sludge treatment in urban and peri-urban settings in a highly energy-efficient manner. The fund will lower the perceived risks inherent in such advanced technology areas that generally inhibit domestic commercial financing for such projects.

31. **Air Quality Improvement in the Greater BTH Region—Enhanced Policy Measures (2018).** As a successor to CAAP 2013–2017, a next set of policy recommendations and action plans are likely to be set in place in 2018 by the government. ADB’s ongoing nonlending work (footnote 14) will contribute to the government’s policy and action plan formulation. In 2018, the midterm review of 13th plan will also identify policy gaps. ADB and the government will also undertake a midterm review of ADB’s 5-year BTH air quality improvement program and identify weak areas that need immediate strengthening. The social cost of the air pollution needs to be managed to avoid exacerbating pains on laid off workers. This requires a comprehensive set of efforts on ensuring social protection, retraining, reemployment and wherever essential, trans-regional cooperation to relocate redundant workers to regions with employment opportunities. ADB 2019 support will aim at new policy reforms to bridge the policy gaps and will target economically weaker provinces and cities in the region to ensure that the results of the government program are achieved.

32. **Air Quality Improvement in the Greater BTH Region—Green Financing Scale-Up Project (2019).** It is unlikely that the green financing platform set up in 2016, followed by the emission control and pollution reduction fund in 2017, together will fill all the financing gaps in the greater BTH region to improve its air quality. As the CAAP will draw to a close in 2017, the government is expected to announce even more stringent measures and market-based approaches to rein in pollution and support green financing measures. ADB and the government will also look back the achievement made and check if there is need to top up and refine the BTH green financing platform and industrial and urban pollution fund targeting areas prioritized in the new action plan by the government. ADB support will seek more market-oriented approaches and tailored financing tools to strengthen green financing arrangements in the greater BTH region.

33. **Air Quality Improvement in the Greater BTH Region—Cities Support Program (2020).** As the 13th plan draws to a close, new challenges and opportunities are likely to emerge. This will be the first full plan under “New Normal” and will have direct bearing on the air pollution efforts in the greater BTH region. It is expected that by 2020 air quality in the greater BTH region would have improved substantially though lot of work still need to be done as the average air quality in most part of the greater BTH region will still be far below the national and WHO standards. The government publishes the list of 10 most polluted cities across the country. Generally, all of these cities have been in the greater BTH region. ADB and government will assess the need to support a cluster of most polluted and economically weak cities across the region thru a loan to help them meet air quality standard.