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Globalization of China's Air Environmental Protection Industry under the Belt and Road Initiative

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Abstract: The advancement of the Belt and Road Initiative has enabled the countries along the route to deepen cooperation in ecological and environmental protection. With the increasing pressure for air environment quality improvement along the route, and China's experience and technologies in air pollution control, opportunities are provided for the globalization of China's air environmental protection industry. This study first summarizes the air environment status of countries along the Belt and Road, and then analyzed the cooperation conditions and demands of these countries. It also evaluated the level of air environmental engineering technology and equipment in China, and the level of air environmental services including air environmental monitoring and project operation, thus to explore the advantages for going global. By comprehensive analysis of cooperation approaches and advantages, strategic recommendations are proposed, including prioritizing cooperation in air environmental monitoring technology and equipment, encouraging international cooperation in air environmental services, promoting cooperation in the air pollution control technology and engineering, establishing a major technological project for air environmental engineering, and making full use of green finance.
Keywords: the Belt and Road; air environmental protection industry; go global

1 Introduction

Since the proposal of "Global Sustainable Development 2030", the ecological civilization concept and a green Belt and Road initiative have had a positive response from most countries along the route. The Belt and Road construction has increased trade and investment. The economic activities such as capacity cooperation and infrastructure construction such as land and sea transportation have been fully launched. The mobility of resources, energy, and other factors has increased, and international cooperation in the ecological environment is showing a tendency of fast growth, which has provided tremendous opportunities for the globalization of China's environmental protection industry [1]. In particular, the policies and measures on atmospheric environmental protection intensively introduced in recent years have greatly promoted the development of the atmospheric environmental protection industry. Therefore, China has advantages over other countries along the Belt and Road in air pollution monitoring technology, air pollutant control technology and equipment, and atmospheric

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environmental engineering design and operation.

Most countries along the Belt and Road are being pressured to control air pollutant emissions. With the advancement of regional air pollution prevention and control cooperation, there is a strong demand in the fields of atmospheric environment monitoring, atmospheric environmental engineering design, technology, and equipment. The environmental protection market is substantial, and the prospects for investment cooperation are broad [2]. Therefore, a deeper understanding of the following topics is necessary: the state of the atmospheric environment of the countries along the Belt and Road, and the current status and needs of cooperation in atmospheric environmental protection. Further, based on comprehensive analysis and evaluation of the development potential of China's atmospheric environmental protection industry, this study proposes targeted countermeasures for the globalization of China's atmospheric environmental protection industry. Further enhancement of the competitiveness of China's atmospheric environmental protection industry and strengthening international cooperation in the atmospheric environmental protection industry are of great theoretical and practical significance. These changes would support the improvement of the overall atmospheric environmental quality of countries along the Belt and Road.

2 Current situation: analysis of the atmospheric environment in the countries along the Belt and Road

In general, air pollution levels in countries along the Belt and Road are lower than the global average. According to the latest statistics from the World Bank (2012), the global average emission level of nitrogen oxides (NO_x) is 0.44 metric tons of carbon dioxide equivalent per person, and the emission levels of countries along the route are 0.15 metric tons of carbon dioxide equivalent per person lower than the global average [3]. In addition, the world average concentration level of fine particulate matter ($PM_{2.5}$) is approximately 41.71μg/m^3, and 70% of the 65 countries along the route are below this level. Although the overall emission concentration is not high, the air pollution in countries along the Belt and Road has increased in recent years. Some areas have severe air pollution. For instance, South and West Asia have high levels of $PM_{2.5}$ pollution, while pollutants in Southeast Asia and Central and Eastern Europe are mainly NO_x.

2.1 Major pollutant emissions

2.1.1 NO_x

From the perspective of NO_x emissions, the total NO_x emissions in the countries along the Belt and Road since 2010 accounted for approximately 40% of global emissions, of which China was responsible for the highest percentage. China's NO_x emissions have increased annually, from 414 million metric tons of carbon dioxide equivalent in 2000 to 587 million metric tons of carbon dioxide equivalent in 2012. Additionally, South Asia is heavily polluted by not only $PM_{2.5}$ but also NO*x*, and NO_x emissions rank second in all regions. Southeast Asia was third in NO_x emissions. From 2000 to 2012, NO_x emissions in Central Asia, Southeast Asia, South Asia, West Asia, and the Middle East generally demonstrated an upward trend and declined overall in Mongolia and Central and Eastern Europe. Among the regions, Central Asia had the least NO_x emissions and less than 0.5 billion metric tons of carbon dioxide equivalent (Fig. 1).

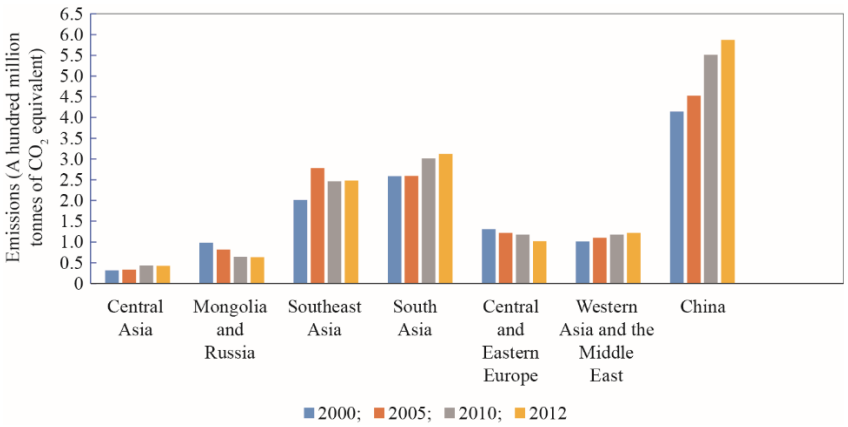

Fig. 1. NO_x emissions in countries or regions along the Belt and Road.

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2.1.2 SO_2

According to the published statistics of SO_2 emissions in the countries along the Belt and Road, the annual per capita emissions of SO_2 in West Asia and the Middle East increased from 0.61 metric tons per person in 1980 to 0.69 metric tons per person in 2000. This region records the highest SO_2 emissions. Before 2000, 19 countries in Central and Eastern Europe had been the region with the highest SO_2 emissions per capita, reaching 1.78 metric tons per person in 1980. From 1980 to 2000, the per capita annual SO_2 emissions of the eight countries in South Asia had been at the lowest level in all regions, but the overall trend is gradually increasing.

2.2 Atmospheric environmental quality in key regions

According to the statistics of the World Bank, little change occurred in $PM_{2.5}$ pollution from 2000 to 2012. Only four countries along the Belt and Road have reached or approached in 2000 and 2012 the $PM_{2.5}$ standard issued by the World Health Organization, and the number of countries in the transitional targets 1 and 2 increased from 37 to 39, accounting for nearly 60%. In 2000 and 2012, 26 and 25 countries were at high pollution levels respectively. The poor air diffusion conditions in these regions, coupled with the development model of heavy chemicals, led to the high $PM_{2.5}$ concentration and severe air pollution (Table 1).

Table 1. $PM_{2.5}$ pollution in countries or regions along the Belt and Road.

Year	Stage of standard	$PM_{2.5}$ annual average ($\mu g \cdot m^{-3}$)	Number of countries that fulfill the standards	Region
2000	Substandard	> 35	26	West Asia and the Middle East (Qatar, Saudi Arabia), South Asia, Central Asia, Southeast Asia, Central and Eastern Europe (Bosnia, Macedonia)
	Transitional goal 1	35	12	West Asia and the Middle East, South Asia, Southeast Asia, Central and Eastern Europe (Poland, Bulgaria)
	Transitional goal 2	25	25	West Asia and the Middle East, Southeast Asia, Central and Eastern Europe, Central Asia
	Transitional goal 3	15	2	Central Asia, Central and Eastern Europe
	Guideline value	10	2	Central and Eastern Europe, Southeast Asia
2012	Substandard	> 35	25	West Asia and the Middle East, South Asia, Southeast Asia, Central Asia, Central and Eastern Europe (Bosnia and Herzegovina)
	Transitional goal 1	35	12	Central and Eastern Europe, West Asia and the Middle East, Southeast Asia, South Asia, Central Asia
	Transitional goal 1	25	27	West Asia and the Middle East, Central and Eastern Europe, Southeast Asia, Mongolia, Russia, Central Asia
	Transitional goal 1	15	2	Central and Eastern Europe, Southeast Asia
	Guideline value	10	2	Southeast Asia, Central and Eastern Europe

2.2.1 Central and Eastern Europe

Since the 1990s, the air pollution situation in Central and Eastern Europe has improved, but the content of some pollutants still exceed the standard. The *European Air Quality – Annual Report 2015*, released by the European Environment Agency, analyzed and explained the concentrations of atmospheric pollutants in the 28 countries of the European Union and the 33 countries of the European Economic Area in 2013. The situation of PM_{10} in Central and Eastern European countries was as follows: Countries in Central and Eastern Europe exceeded the standard, except for Estonia and Bosnia and Herzegovina. In most parts of Poland, the PM_{10} content exceeded $50\mu g/m^3$, and in many areas, it exceeded $75\mu g/m^3$. In the case of O_3, the near-surface O_3 content of the Czech Republic and Slovenia in 2013 was $120–140\mu g/m^3$, and it reached $120\mu g/m^3$ in some parts of Poland, Slovakia, Hungary, Serbia, and Macedonia.

2.2.2 South Asia

In terms of air pollution levels, South Asia ranks first in the world. Heavy industry development, motor vehicle exhaust, and irrational energy structures are all causes of regional air pollution. Moreover, various industrial enterprises in the region do not practice much pollution control; thus, the level of air pollutant control technology is low, and most of the exhaust gas is directly discharged into the atmosphere without treatment. Particulate matter is the most serious pollutant in regional air pollution. The PM_{10} levels in many cities in South Asia are several times more than the international standard. The concentration levels of $PM_{2.5}$ and total suspended particulates are increasing.

In summary, the atmospheric environment in the countries along the Belt and Road is substandard. The pollution caused by SO_2, $PM_{2.5}$, and NO_x is generally aggravating, and the quality of the atmospheric environment

is deteriorating. With the promotion of the Belt and Road initiative and the implementation of various projects, the pressure on regional atmospheric environmental protection will continue to increase. Therefore, countries along the route must strengthen their cooperation in air pollution control. Notably, because of geopolitical relationships, the collaboration of countries along the route has been increasing in the areas of environmental protection such as air pollution control, for example, the signing of mutual assistance agreements, the research and development of air pollution control technologies, and the promotion and application of equipment.

3 Analysis of cooperation status and needs in the field of atmospheric environment

3.1 Status of cooperation between China and countries along the route

The rapid development of China's economy and society has caused many resource and environmental problems for this nation. Therefore, China has made commitments to promote ecological environmental protection. In addition to sponsoring domestic research, China has cooperated in environmental protection projects with countries along the Belt and Road. The main parties cooperating with China to improve the atmosphere are mainly its neighboring countries. Notably, the literature has concluded that various conventions and agreements are the main forms of cooperation with neighboring countries, including air pollution monitoring and control technology, mechanism research, cooperation mechanisms, and monitoring systems for atmospheric environmental pollution [2,4,5] (Table 2).

Table 2. Cooperation between China and countries along the Belt and Road in atmospheric environmental protection.

Year	Partner country	Form or content
1990	China, Mongolia	Effective communication and cooperation on environmental concerns such as land degradation, sandstorms, and urban air quality improvement
1993	China, South Korea	Signed an environmental cooperation agreement. South Korea proposed to strengthen cross-border cooperation with China in the area of air pollution, including dust pollution, and agreed to conduct joint research
1997	China, Kazakhstan	Signed the *Agreement on Environmental Cooperation Between the Government of the People's Republic of China and the Government of the Republic of Kazakhstan*, and their cooperation involves prevention and control of air pollution
1997	China, Uzbekistan	Signed an agreement on environmental protection cooperation and identified cooperation areas such as water, atmosphere, and environmental science and technology research
1996	China, Kyrgyzstan	Signed the *Meteorological Science and Technology Cooperation Agreement Between the China Meteorological Administration and the National Hydrometeorological Service of the Government of the Kyrgyz Republic*. They attempt to establish an international mechanism to monitor and coordinate the import and export of hazardous substances to the ozone layer
2008	China, Tajikistan	Signed the *Joint Statement of the People's Republic of China and the Republic of Tajikistan on Further Developing Good-Neighborly Friendship and Cooperation.* The two sides cooperate in protecting and improving the ecological environment and preventing air pollution

3.2 Status of cooperation between other countries along the route

Other countries along the route have conducted relevant cooperation in the area of atmospheric environmental protection. The forms of cooperation are, for example, national or regional environmental protection agreements, cooperative programs, engineering projects, and Memorandum of Cooperation (Table 3).

Overall, cooperation between countries in the area of atmospheric environmental protection mainly remains at the stage of bilateral and multilateral agreements, forums, declarations and dialogues, and non-governmental exchanges and is always included in general environmental protection agreement. Agreements on atmospheric environmental protection have generally not had substantive provisions, flexibility, and operability. There have been few exchanges and acts of cooperation in specific air pollution control technologies, equipment, and service industries, including atmospheric environmental monitoring. Therefore, the depth and breadth of cooperation in the area of atmospheric environmental protection among countries along the route require further exploration. With the continuous advancement of the Belt and Road initiative, China's atmospheric environmental protection industry has an unprecedented opportunity to go global.

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3.3 Major cooperation needs of countries along the route

At present, the six regions of the Belt and Road are Central Asia, Mongolia and Russia, Southeast Asia, South Asia, Central and Eastern Europe, as well as West Asia and the Middle East. Their demand for improvement on atmospheric environmental quality is urgent. Most countries, mainly Southeast Asia, South Asia, and other countries, have relatively poor air pollution control technologies and lack governance equipment. Therefore, there is a strong demand for technologies and equipment for atmospheric environmental monitoring and pollutant treatment, facility operation, and equipment maintenance services [1]. Specifically, most countries have more cooperation needs in the following areas: environmental air quality monitoring equipment, continuous emission monitoring equipment, source emission measurement technology, exhaust gas leakage detection equipment, flue gas desulfurization equipment, selective catalytic reduction technology, selective non-catalytic reduction technology, urea hydrogen production reagent technology, oxidized catalysts, catalytic converters, instrument test−adjustment−maintenance−repair, and so forth. The fields should be prioritized in the globalization of China's environmental protection industry.

Table 3. Cooperation between countries along the Belt and Road in atmospheric environmental protection.

Year	Partner country, region, or institution	Form or content
1999	Kazakhstan, Kyrgyzstan, Tajikistan, Uzbekistan	*Agreement on Cooperation in the Field of Hydrometeorology*. Countries are committed to monitoring cooperation including atmospheric environment, meteorological conditions, and so forth.
1992–2002	Kazakhstan, Kyrgyzstan, Tajikistan, Uzbekistan	*Agreement on Cooperation in the Field of Hydrometeorology* *Agreement on the Parallel Operation of Central Asian Energy Systems*
2014	Iran, France	Expand cooperation in the areas of air pollution control, climate change response, and environmental protection in Lake Urmia
2013	Belarus, all Central Asian countries	*Agreement on Environmental Protection Cooperation in the Commonwealth of Independent States* Effective cooperation in air pollution control, ozone layer protection, animal and plant protection, and climate change
2011	Iran, United Nations Environment Programme	Iran abolished the use of HCFCs in the inhalant manufacturing industry by promoting new technologies and became the first country in Asia to achieve this goal
2012	Turkey, Japan	The Japan International Cooperation Agency and the Turkish Cooperation and Coordination Agency signed a memorandum to promote environmental cooperation between the two sides, including technical cooperation on atmospheric pollution.
1995	China, Japan, South Korea, Hong Kong of China, Taiwan of China, Mongolian, Russian NGOs	East Asia Atmospheric Movement Network; its main purpose is to monitor transboundary air pollution and reduce acid rain pollution emissions
1995	Japan, Asian Development Bank, the Philippines	Manila Air Quality Management Department Construction Project, dedicated to policy and organizational structure reform, and air monitoring station construction
2003	ASEAN countries (Malaysia, Indonesia, Thailand, the Philippines, Singapore, Brunei, Vietnam, Laos, Myanmar, Cambodia)	*The ASEAN Cross-border Smog Pollution Agreement*, World's first regional anti-pollution agreement The 10 ASEAN countries jointly take measures to manage, e.g., transnational smog pollution issues, including supervision, prevention, and technical cooperation
1999	China, Japan, South Korea	*China-Japan-Korea Joint Action Plan for Environmental Cooperation (2015–2019)* Priority cooperation in air quality improvement and biodiversity
2000	SAARC countries	*The Male Declaration* Various air pollution control actions
2003	South Asian subregion	Regional air quality management project Refining the standard of air pollution in *The Male Declaration* Pilot demonstration projects to promote cleaner technologies Air quality monitoring and evaluation

4 Analysis of the potential of the globalization of atmospheric environmental protection industry in China

4.1 Level assessment of atmospheric environmental engineering technology and equipment in China

China's environmental protection products and technologies have had comparative advantages in developing countries. On one hand, China is in the same historical development period as these developing countries, and all the regions are accorded the dual task of economic development and environmental protection. Thus, China's environmental protection enterprises understand the difficulties and realities of other developing countries, making it easy to propose solutions according to actual conditions. On the other hand, compared with high-standard, high-cost European and United States' technology equipment, China's affordable environmental products and services have had a competitive advantage [6]. The advantages of these two aspects have created conditions for China's environmental protection enterprises to explore the international market, especially the national market along the Belt and Road.

Since the 10th Five-Year Plan, in terms of air pollutant emission control, China has focused on the ultra-low emission of flue gas from the electric and nonelectric power industries (e.g., steel, cement, coking, glass). Unregulated pollutant emission reduction technologies and equipment with independent intellectual property rights such as cloth-bag dusting, wet electrostatic precipitation, wet and dry desulfurization, selective catalytic reduction (SCR), and regenerative thermal oxidizer have been developed.

China's overall technology is advanced by international standards, and some of its achievements have reached the international advanced level [7–9]. With the implementation of China's new environmental protection law and the air pollution prevention action plan, various environmental protection policies and regulatory measures have been introduced and more stringent requirements are imposed on soot, SO_2, and NO_x emissions. It has promoted continuous breakthroughs and innovations in pollution control technologies and upgrade of equipment in China's coal-fired power stations, steel, and other industries. Compared with the countries along the Belt and Road, China has obvious advantages in the field of air pollution control. The main aspects of this advantage are as follows.

4.1.1 Coal-to-electricity conversion technology

At present, the pollutant discharge level of coal-fired units after environmental protection renovation has reached the requirements of gas units in China. Approximately 50% of China's coal uses coal-to-electricity conversion technology, and its efficiency exceeds that of many developed countries [10]. Studies have shown that the energy intensity decreases by approximately 4% for every 1% increase in the proportion of electric energy in terminal energy consumption. The efficiency of other energy sources can be indirectly increased by increasing the conversion rate of electricity in the country of investment. In addition, coal–electricity conversion can greatly reduce loose coal combustion and pollutant emissions.

4.1.2 Low-nitrogen combustion and flue gas denitrification

Low-nitrogen combustion and flue gas denitrification are the main technical measures for controlling NO_x emissions in coal-fired power plants in China. Low-nitrogen combustion is controlled from the source, including advanced self-maintaining technologies and equipment such as dual-scale low-nitrogen combustion, advanced composite air classification, and tertiary combustion. Flue gas denitrification is for tail gas treatment, including technologies and products based on selective non-catalytic reduction (SNCR), SCR, and SNCR/SCR. Through the matching combination and optimization design of the two methods, NO_x ultra-low emission can be realized, and China's NO_x control technology ranks among the world's best.

4.1.3 Flue gas dedusting

Flue gas dedusting is the earliest pollution control technology in China. After years of development, a new technological pattern with high-efficiency electrostatic precipitation as the main part, and an electrostatic-bag and bag type as the supplemental part, has been formed. In addition, the development of movable electrodes, new power supplies (e.g., high-frequency power, three-phase power, pulse power supply), and fine particle agglomeration technology has further improved electrostatic precipitator technology and provided technical support for ultra-low emission. The innovation of the filter bag material has increased the service life, the fine particle collection below 2.5μm, and the reduction of filtration resistance, providing a basis for the promotion and application of the bag and electric bag composite dust removal technology.

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4.1.4 Flue gas desulfurization

In recent years, the development and application of desulfurization technology in China has gradually been advancing, forming a technical pattern dominated by a limestone–gypsum wet method and supplemented by other processes (e.g., seawater desulfurization, ammonia desulfurization). With the tightening of standards, the popularization of ultra-low emission control requirements, and the application of high-efficiency desulfurization technology, the emission control of SO_2 in coal-fired power plants in China has fulfilled gas emission standards.

4.2 China's atmospheric environmental service industry level assessment

According to the annual financial statistics of the environmental services industry in 2017, there were 5150 environmental service enterprises, an increase of 9.4% from 2016. From the perspective of enterprise quantity, the field of air pollution control ranked third in the five major segmentations in 2017. Among the two areas of accelerated growth, the enterprise quantity in the air pollution control field increased the most, reaching 17.9%; from the perspective of revenue, it was also in third place in 2017. The revenue was higher than last year, and the growth momentum was strong in various fields (Fig. 2). Moreover, the concentration of water pollution control, air pollution control, and hazardous waste management increased, and the field of air pollution control was the highest.

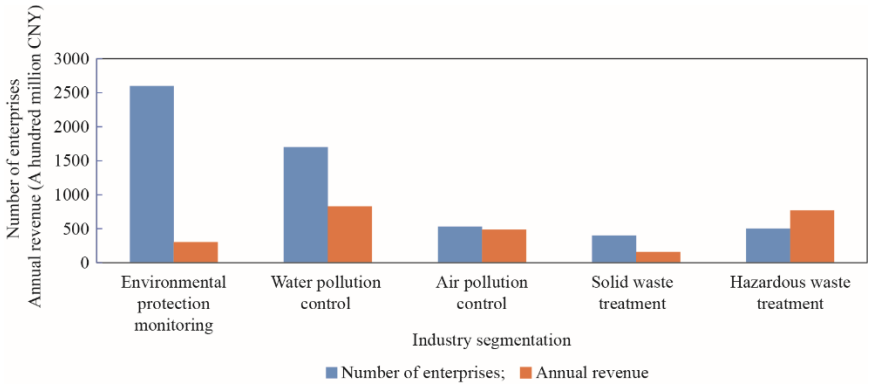

Fig. 2 China's environmental service industry segment in 2017.

Overall, China's environmental service industry has developed rapidly in recent years, especially in the atmospheric environmental protection service industry. In addition to expanding the business scope of air pollution engineering design, operation, and maintenance, this industry has also demonstrated substantial advantages in the development and application of atmospheric pollutant monitoring technology.

China has successfully developed online monitoring technologies and equipment for various air pollutants such as PM_{10}, $PM_{2.5}$, SO_2, NO_2, O_3, and VOCs. These technologies fulfill the requirements of, for example, automatic air quality monitoring, continuous emissions monitoring systems, and vehicle exhaust online monitoring. Additionally, the localization rate of equipment has increased to more than 85%, providing effective support for the implementation of new environmental quality standards during the 12-th Five-Year Plan. Some high-end scientific research instruments that have been independently researched have begun to be practically applied, supporting the construction of national environmental monitoring service stations and superstations, such as aerosol lidar, a single particle aerosol time-of-flight mass spectrometer [11].

At present, China's atmospheric environmental protection industry remains in an accelerated development period, and international development is an inevitable means for its future development. According to statistics, more than 60% of the international orders of China's environmental protection enterprises are from countries along the Belt and Road. Therefore, the countries along the route are also the key areas for China's atmospheric environmental protection industry to "go global." Based on the aforementioned analysis, we observe that China's atmospheric environmental protection industry has a high level of pollutant emission reduction technology and equipment, especially in thermal power and some non-electrical industries. China also has strong advantages in atmospheric environmental monitoring technology and atmospheric environmental engineering design and operation services. Therefore, on the basis of understanding the cooperative demand among countries along the Belt and Road, China can take full advantage of its comparative advantages in the atmospheric environmental protection industry; promote the popularization and application of advanced, practical, and economical

technologies, equipment, and products in the countries along the route; strengthen the pollution control of the atmospheric environment between regions and countries; and promote overall improvement of the atmospheric environmental quality in countries along the route.

5 Countermeasures for China's atmospheric environmental protection industry to go global

5.1 Prioritize cooperation in atmospheric environmental monitoring technology and equipment

Domestic atmospheric environmental protection enterprises and institutions should be encouraged to cooperate with countries along the Belt and Road to jointly build atmospheric environmental engineering technology research and development platforms and bases and develop advanced, practical, and low-cost atmospheric environmental engineering technologies. Relevant industry associations should formulate industry standards, norms, and guidelines in line with international standards and promote joint research and development and the application of advanced atmospheric environmental protection technologies.

Domestic atmospheric environmental monitoring enterprises and institutions should be supported to actively participate in the operation and maintenance of atmospheric environmental automatic monitoring facilities and the monitoring of atmospheric environmental impact assessments in the countries along the route and prioritize the promotion of online monitoring technologies and equipment for atmospheric pollutants in China. In countries where the market or atmospheric environment monitoring business is immature, the government must guide funds to conduct demonstration projects for atmospheric environmental monitoring technology systems in key areas or of pollution sources.

5.2 Encourage international cooperation in air environmental services

With the promotion of cooperation and exchange projects between China and countries along the route, in addition to prioritizing the promotion of atmospheric environmental monitoring technologies and services, we encourage the export of China's air pollution facilities operation services, professional marketing, import and export trade, and atmospheric environmental financial services to countries with strong atmospheric environmental protection needs, such as the Philippines, Malaysia, Thailand, and India. Moreover, the following are possible: establish a talent cultivation cooperation mechanism, promote the output of China's professionals in the atmospheric environment service industry, and advance the construction of a team of high-level talent in the atmospheric environmental service industry along the route.

5.3 Promote cooperation in air pollution control technology and engineering

Domestic atmospheric environmental protection technology enterprises should be encouraged to actively promote low-nitrogen combustion, flue gas denitrification, and flue gas dedusting technologies to countries with serious air pollution problems such as South Asia and West Asia. In the technical fields of multicontaminant synergy and joint removal, high efficiency combined with purification of vehicle exhaust control and VOC exhaust control are necessary to cooperate with advanced countries. The mutual recognition of atmospheric environmental protection equipment and products and the cooperation of air pollution control technologies between China and the SAARC countries can be promoted, by means of the China-ASEAN Expo and relying the connecting role of Yunnan, Sichuan, and other southwestern provinces for Southeast Asia and South Asia.

5.4 Establish a major science and technology project for Belt and Road atmospheric environmental engineering

China has committed to a green Belt and Road; thus, scientific and technological support is an urgent necessity for ecological environment engineering. A proposal was made to establish a major Belt and Road atmospheric environmental engineering science and technology project. In the context of the current atmospheric status and environmental management requirements of the countries along the Belt and Road, China should focus on the development of high-efficiency and low-cost atmospheric environment engineering technologies that correspond to the conditions of the countries along the route on the basis of the systematic key technical achievements of the "Research on the Causes and Control Technologies of Atmospheric Pollution" project. Specifically, the elements are, for example, haze and photochemical smog formation mechanisms, pollution source control technology in the whole process, air quality improvement technology, and air pollution joint prevention and control technology.

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5.5 Full use of green finance

To promote the cooperation of the national environmental protection industry along the Belt and Road, the financial cooperation among countries along the route must be strengthened to enhance the level of strategic cooperation in green finance and provide financial support for the Belt and Road green technology transfer center, atmospheric environmental monitoring website, and joint laboratories. China should increase its foreign technical assistance and use technical assistance and cooperation as a guide to build a demonstration base for atmospheric environmental engineering technology and equipment and an atmospheric monitoring technology and equipment demonstration base. The channels for the promotion, diffusion, and transfer of atmospheric environmental engineering technology will gradually open up. Technical assistance and cooperation in the field of atmospheric environmental monitoring technology along the route should be prioritized. For projects with long investment horizons and externalities, China should design a long-term, low-cost financing mechanism to increase the risk weight of financial institutions' financing.

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