

Comparative Study on Ambient Air Quality Standards of Countries along the Belt and Road

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Abstract: To capture the strategic opportunity created by the Belt and Road Initiative to go global, enterprises in China should fully understand the environmental standards of countries and regions along the route. This paper first summarizes the ambient air quality standards of countries along the Belt and Road, and then compares and analyzes these standards in terms of standards setting, pollutants and their limits, regional differences, etc. We found that most countries along the Belt and Road have formulated their own ambient air quality standards; however, there are still profound discrepancies in pollutants setting, average time, and concentration limits among these standards. The standards in Mongolia, Russia, and most Central and Eastern European countries are comparatively stringent, while those in Central and Southeast Asia countries are relatively loose; and there is a great diversity in the strictness of standards in South Asia, West Asia, and Middle East regions. Considering the differences in environmental standards requirement and economic development level, suggestions are proposed accordingly, including environmental standards cooperation, and export of China's environmental standards and industries.

Keywords: environmental standard; the Belt and Road; ambient air quality standard; standards cooperation

1 Introduction

With implementation of the Belt and Road initiative, Chinese “going global” enterprises face great development opportunities. China's foreign investment and cooperation activities should meet local environmental standards and requirements. This should not only reduce the risks associated with overseas enterprises and projects, but could also help consolidate China's friendly, cooperative, and good-neighborly relations with countries and regions along the Belt and Road. It is expected that this will also establish China's image as a major responsible country [1–3]. Because there are huge differences in environmental protection standards and regulations among countries along the Belt and Road [4,5], it is particularly important to understand fully the environmental standards of the countries in those regions.

Due to management and language barriers in the countries and regions along the Belt and Road, their respective environmental standards, the core of environmental management [6], have not been collected and analyzed entirely. Environmental standards contain environmental quality standards and pollutant emission standards. It is generally believed that pollutant emission standards, as the basic means of environmental management, serve environmental quality standards [7]. Usually, the higher the environmental quality standards requirements are set, the stricter are the pollutant emission standards adopted. Considering the diversity and complexity of pollutant emission standards, we only focused on environmental quality standards in this study. According to the survey on national ambient air

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quality standards for the WHO member states conducted by the WHO Regional Office for Europe and the Swiss Federal Office for the Environment from 2015 to 2016, we collected and sorted out ambient air quality standards for the Belt and Road countries. The standards setting, pollutant limits, and regional differences were analyzed, compared, and discussed, to provide a reference upon which to base cooperation on environmental standards of countries along the Belt and Road and integration of environmental protection.

2 Data sources and country types

To mitigate the health impact of air pollution on public health, in 2005, the WHO released air quality guidelines on the basis of scientific evidence already gathered [8]. The aim of the guidelines was to ensure that the air quality has no or minimal negative impact on human health; however, considering the constraints of technology, economy, and other factors (political and social), the WHO guidelines also presented interim targets. These are particularly helpful for reducing air pollution in severely polluted countries or regions over time, thereby steadily decreasing human health risk or air pollution. Since publication of the WHO guidelines, several overviews have been conducted to assess how they are being followed by countries or regions. Between 2015 and 2016, the Swiss Federal Office for the Environment and WHO jointly conducted an investigation on national air quality standards for the 194 WHO member states [9]. By combing through legislation, official documents and reports on air pollution, interviewing country representatives, and searching the Airlex database, the research group acquired national quality standards of typical air pollutants (including PM_{2.5}, PM₁₀, O₃, NO₂, SO₂, and CO) in 170 countries. As far as we know, it is the most comprehensive body of information on ambient air quality standards around the world. Based on this investigation, we selected and compiled the national ambient air quality standards of countries along the Belt and Road, which were then used in the analysis and comparisons.

The Belt and Road initiative involves 64 countries and regions (China excluded), which were divided into six parts: Central Asia, Mongolia and Russia, Southeast Asia, South Asia, Central and Eastern Europe, as well as Western Asia and the Middle East, according to geographical division. According to the annual per capita income standards set by the World Bank in 2016, they were also divided into four types: low-income countries, low-middle-income countries, upper-middle-income countries, and high-income countries. We used both ways to classify the countries along the Belt and Road, as shown in Table 1.

Table 1. Classification of Belt and Road countries by geography and income level.

Region	Income level	Number	Country
Central Asia	Low-middle	3	Kyrgyzstan (KGZ), Tajikistan (TJK), Uzbekistan (UZB)
	Upper-middle	2	Kazakhstan (KAZ), Turkmenistan (TKM)
Mongolia and Russia	Low-middle	1	Mongolia (MNG)
	Upper-middle	1	Russia (RUS)
Southeast Asia	Low-middle	7	Indonesia (IDN), Cambodia (KHM), Laos (LAO), Myanmar (MMR), Philippines (PHL), East Timor (TLS), Vietnam (VNM)
	Upper-middle	2	Malaysia (MYS), Thailand (THA)
	High	2	Brunei (BRN), Singapore (SGP)
South Asia	Low	2	Afghanistan (AFG), Nepal (NPL)
	Low-middle	5	Bangladesh (BGD), Bhutan (BTN), India (IND), Sri Lanka (LKA), Pakistan (PAK)
	Upper-middle	1	Maldives (MDV)
Central and Eastern Europe	Low-middle	2	Moldova (MDA), Ukraine (UKR)
	Upper-middle	9	Albania (ALB), Bulgaria (BGR), Bosnia (BIH), Belarus (BLR), Croatia (HRV), Macedonia (MKD), Montenegro (MNE), Romania (ROU), Serbia (SRB)
	High	8	Czech (CZE), Estonia (EST), Hungary (HUN), Lithuania (LTU), Latvia (LVA), Poland (POL), Slovakia (SVK), Slovenia (SVN)
Western Asia and Middle East	Low-middle	7	Armenia (ARM), Egypt (EGY), Georgia (GEO), Jordan (JOR), Palestine (PSE), Syria (SYR), Yemen (YEM)
	Upper-middle	5	Azerbaijan (AZE), Iran (IRN), Iraq (IRQ), Lebanon (LBN), Turkey (TUR)
	High	7	United Arab Emirates (ARE), Bahrain (BHR), Israel (ISR), Kuwait (KWT), Oman (OMN), Qatar (QAT), Saudi Arabia (SAU)

3 Comparative analysis of ambient air quality standards

3.1 Overall situation

Results (Table 2) showed that 51 out of 65 Belt and Road countries had set national ambient air quality standards (information was not found on six countries in Western Asia and the Middle East). No standards were defined by eight countries (about 14% of the countries with information) for ambient air quality standards. These included Laos, Myanmar, East Timor, and Brunei in Southeast Asia; the Maldives in South Asia; Moldova and Bulgaria in Central and Eastern Europe; and Iraq in the Middle East. Generally speaking, environmental protection of air quality has attracted the attention of officials in most countries along the Belt and Road.

Table 2. Number of countries with and without standards and information.

Region/Country	Number of countries	Number of countries with standards	Number of countries without standards	Number of countries without any information
Central Asia	5	5 (100%)	0	0
Mongolia and Russia	2	2 (100%)	0	0
Southeast Asia	11	7 (64%)	4 (36%)	0
South Asia	8	7 (88%)	1 (12%)	0
Central and Eastern Europe	19	17 (89%)	2 (11%)	0
Western Asia and Middle East	19	12 (63%)	1 (5%)	6 (32%)
China	1	1 (100%)	0	0

Note: The six countries without any information are Palestine, the Republic of Yemen, the United Arab Emirates, Bahrain, Oman, and Qatar.

The time of issuance (or most recent revision) of national ambient air quality standards for countries with standards are listed in Table 3. It can be seen that most countries formulated, revised, or issued their own national ambient air quality standards after the release of the WHO guidelines in 2005. Only Turkmenistan, Cambodia, Ukraine, Egypt, and a few other low-middle income countries still followed the old version of air quality standards.

Table 3. Years that national air quality standards were released (or revised) by the Belt and Road countries.

Region	Country	Issuance time	Region	Country	Issuance time	Region	Country	Issuance time
Central Asia	KGZ	–	South Asia	BTN	–	Central and Eastern Europe	LVA	2007
	TJK	2010		IND	2009		POL	2012
	UZB	2010		LKA	2008		SVK	–
	KAZ	2012		PAK	2010		SVN	–
	TKM	1996		Central and Eastern Europe	UKR	2001	Western Asia and Middle East	ARM
Mongolia and Russia	MNG	2007	ALB		2003	EGY		1994
	RUS	–	BIH		2012	GEO		2001
	Southeast Asia	IDN	2010		BLR	2010		JOR
KHM		2000	HRV		2014	SYR		2011
PHL		2014	MKD		2011	AZE		2011
VNM		2013	MNE		2015	IRN		2011
MYS		2015	ROU		–	LBN		–
THA		2010	SRB		2009	TUR		2008
SGP		2014	CZE		–	ISR		2014
South Asia	AFG	2010	EST	–	KWT	–		
	NPL	2003	HUN	–	SAU	–		
	BGD	2005	LTU	2015	China	CHN	2012	

3.2 Pollutant item analysis

Referring to the pollutant items and averaging time set in the WHO guidelines, Fig. 1 provides an overview of the number of countries that have set standards for air pollutants. It can be seen that particulate matter (PM) pollution received the greatest attention from countries that have set air quality standards. Fifty of 51 countries

(excepting Cambodia) have set standards for PM or total suspended particulate (TSP) matter in their national air quality standards, while 49 and 48 countries have set standards for NO₂ and SO₂, respectively. In comparison, only 41 and 37 countries have set standards for CO and O₃, respectively. Most countries in Central Asia, Western Asia, and the Middle East have not paid enough attention to CO and O₃ emissions.

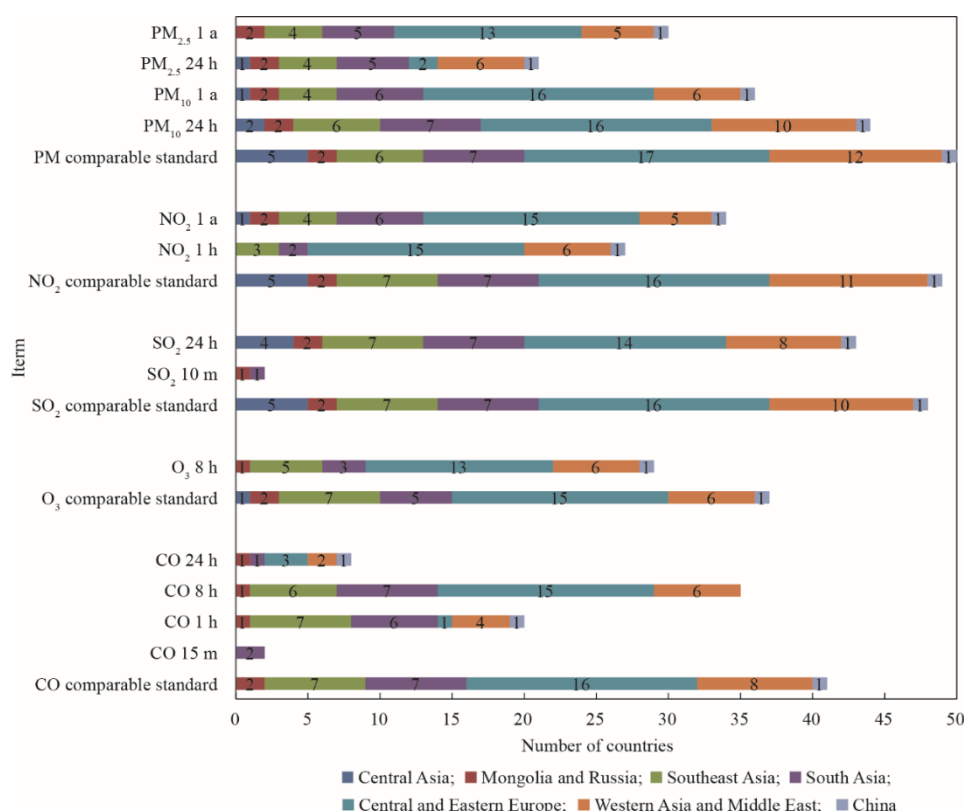


Fig. 1 Number of countries with air quality standards for long-term and short-term regulation of air pollutants.

3.2.1 PM analysis

(1) PM_{2.5}

The number of countries with long-term PM_{2.5} standards is higher than that with short-term PM_{2.5} standards. Thirty and 21 countries have set PM_{2.5} 1-year and 24-h standards, respectively. This is because most Central and Eastern European countries have implemented EU standards, which only limit the annual average concentration for PM_{2.5}.

As shown in Fig. 2, Afghanistan and Iran are the only countries that set standards compliant with the WHO guideline value (10 µg/m³) for the PM_{2.5} annual mean concentration limit. Countries that adopted the WHO Interim-Target 3 (15 µg/m³) include Singapore, Bangladesh, Pakistan, Belarus, Jordan, Kuwait, and Saudi Arabia. Mongolia, Russia, and most countries in Central and Eastern Europe are in line with the WHO Interim-Target 2 (25 µg/m³). Malaysia and China have adopted the WHO Interim-Target 1 (35 µg/m³) as the concentration limit. The PM_{2.5} annual mean concentration limit set by India is as high as 40 µg/m³, which has not yet met the WHO interim targets.

The WHO guideline value (25 µg/m³) for 24-hour PM_{2.5} was adopted by Singapore, Afghanistan, Belarus, Montenegro, and Iran. The countries Kazakhstan, Russia, Pakistan, Armenia, Israel, Kuwait, and Saudi Arabia have set standards stricter than that of WHO Interim-Target 3 (37.5 µg/m³). Malaysia, Bangladesh, India, Jordan, and China adopted the WHO Interim-Target 1 value (75 µg/m³).

(2) PM₁₀

Compared to PM_{2.5}, PM₁₀ has attracted more attention from countries along the Belt and Road, thus the number of countries that have set PM₁₀ standards is higher than the number that have set PM_{2.5} standards. Moreover, more countries have set long-term PM₁₀ standards than have set short-term PM₁₀ standards. Roughly 44 and 36 countries have set PM₁₀ 24-hour standards and 1-year standards, respectively.

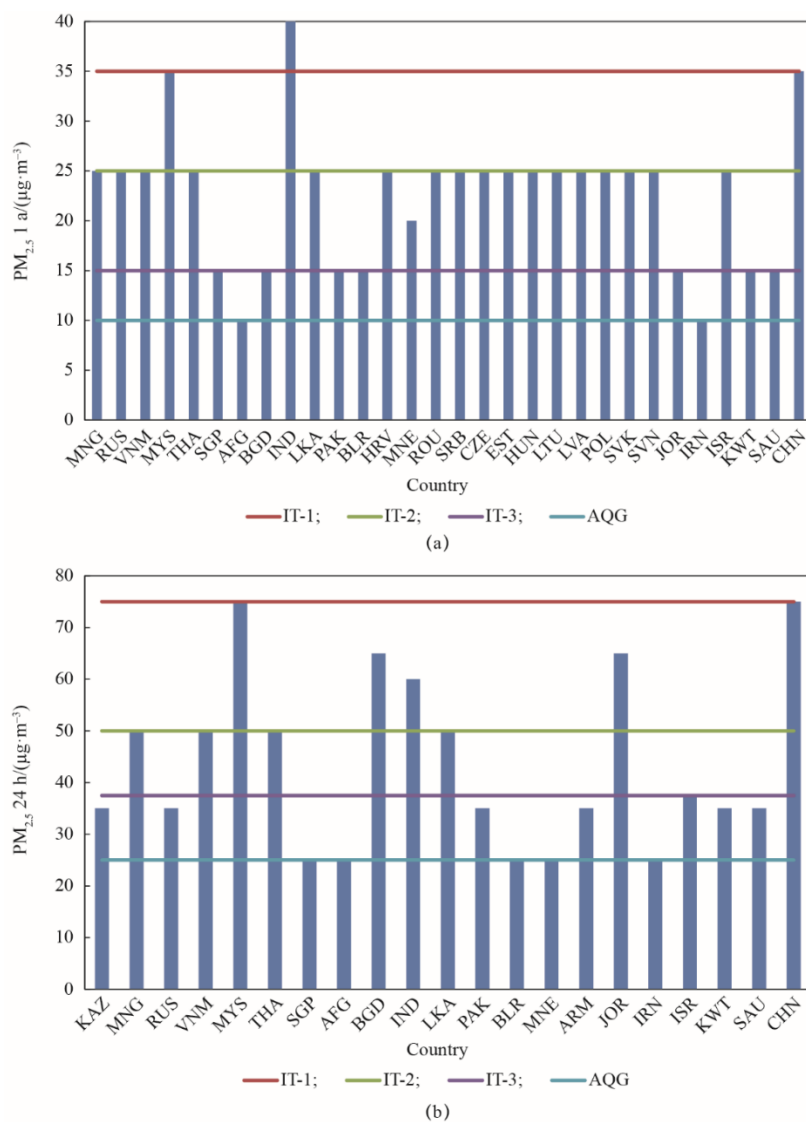


Fig. 2. PM_{2.5} concentration standards set by the Belt and Road countries.

As shown in Fig. 3, only Afghanistan and Iran set standards compliant with the value in the WHO guidelines (20 µg/m³). The standards set by most Central and Eastern European countries (and China) met the WHO Interim-Target 2 (50 µg/m³). The limits set by the Philippines, Bhutan, India, Jordan, and Turkey reached the WHO Interim-Target 3 (70 µg/m³). The PM₁₀ annual average concentration limits of Pakistan, Kuwait, and Saudi Arabia have not yet met the WHO interim targets.

Afghanistan, Iran, and the Central and Eastern European countries compliant with EU standards have adopted the WHO guideline value (50 µg/m³) as their PM₁₀ 24-h concentration limit. The standards set by other countries can meet the WHO interim targets. The PM₁₀ 24-hour concentration limit set by Uzbekistan and Saudi Arabia are as high as 300 µg/m³ and 340 µg/m³, far looser than the WHO guideline standards. This might be related to the high background values caused by desertification.

For particulate matters, TSP is used in some countries along the Belt and Road, mainly in Central Asia, Russia, and Ukraine, as well as in Western Asia and the Middle East.

3.2.2 NO₂ analysis

The WHO guidelines set the NO₂ long-term (1 year) and short-term (1 hour) average concentration limits, at 40 µg/m³ and 200 µg/m³, respectively. Among the Belt and Road countries with ambient air quality standards, those apart from Belarus and Jordan (which did not set NO₂ indicators) have set long-term (1 year) and short-term (24 hour, 8 hour, 4 hour, 1 hour, or 20 minute) average concentration limits for NO₂.

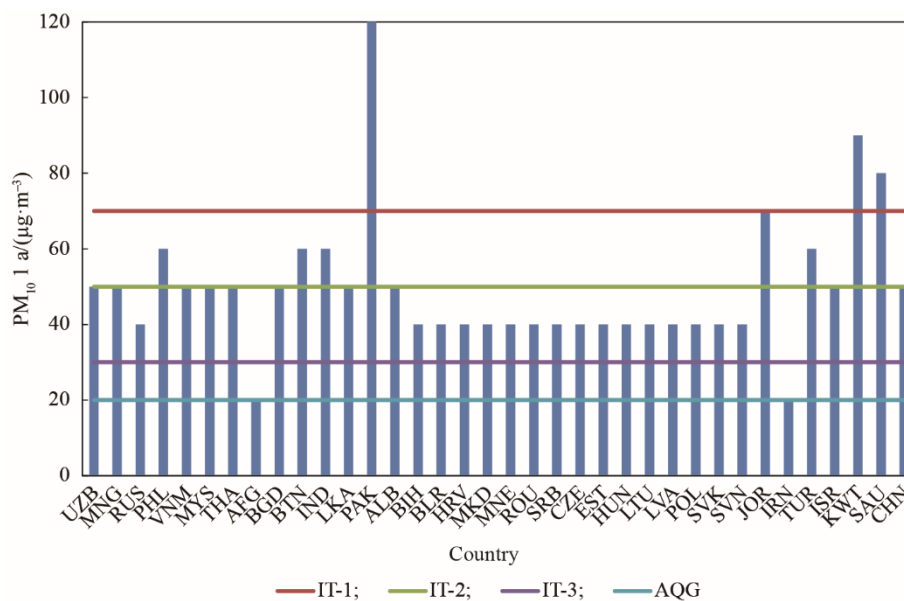


Fig. 3. PM₁₀ concentration standards set by the Belt and Road countries.

With reference to the WHO guidelines, the countries for which the NO₂ annual mean concentration limits were lower than in the WHO guideline targets included Indonesia (100 µg/m³), Thailand (57 µg/m³), Singapore (100 µg/m³), Bangladesh (100 µg/m³), Bhutan (60 µg/m³), Lebanon (100 µg/m³), and Saudi Arabia (100 µg/m³). The countries for which the NO₂ 1-hour average concentration limits did not meet the WHO guideline targets include Cambodia (300 µg/m³), Malaysia (320 µg/m³), Sri Lanka (250 µg/m³), Albania (250 µg/m³), Egypt (400 µg/m³), Turkey (300 µg/m³), and Saudi Arabia (660 µg/m³).

3.2.3 SO₂ analysis

The WHO guidelines only set a short-term average concentration limit for SO₂, that is, 24-hour and 10-minute average SO₂ concentrations. The countries with ambient air quality standards (except Belarus, Georgia, and Jordan, which did not set an SO₂ indicator), have set SO₂ standards. Regarding the short-term time scales set for SO₂, there was 10 minutes (Mongolia, Afghanistan), 20 minutes, 1 hour, 8 hours or 24 hours. Additionally, more than 20 countries have set a long-term (1 year) average concentration limit for SO₂.

As shown in Fig. 4, the countries that have set limits compliant with the WHO guideline standard (20 µg/m³) are Mongolia, Afghanistan, and Kuwait. The countries that have set limits compliant with the WHO Interim-Target 2 (50 µg/m³) are Kyrgyzstan, Turkmenistan, Russia, and Israel. Most other countries complied with the WHO Interim-Target 1 (125 µg/m³). Eleven countries set concentration limits that did not meet the WHO targets: Uzbekistan (200 µg/m³), Indonesia (365 µg/m³), Cambodia (300 µg/m³), the Philippines (180 µg/m³), Thailand (300 µg/m³), Singapore (365 µg/m³), Bangladesh (365 µg/m³), Egypt (150 µg/m³), Turkey (250 µg/m³), Saudi Arabia (365 µg/m³), and China (150 µg/m³).

3.2.4 O₃ analysis

Ozone (O₃) pollution can result in serious harm to human health. Among those with ambient air quality standards, nearly 1/3 of the countries set no O₃ standard. Most of these countries are concentrated in Central Asia, Western Asia, and the Middle East. For instance, among the five Central Asian countries, only Kyrgyzstan set an O₃ limit, while none of the other four countries set an O₃ indicator. Except for several high-income countries (e.g., Kuwait and Israel) in West Asia and the Middle East, most countries (these are middle and low income) did not set an O₃ standard. The WHO only set a short-term (8-hour) average concentration limit for O₃, while among the Belt and Road countries that regulated the averaging times for O₃, the limits included 1 hour, 8 hours, and 24 hours.

As shown in Fig. 5, seven countries have set O₃ 8-hour mean concentration limits in accordance with the WHO guidelines standard (100 µg/m³): Mongolia, the Philippines, Afghanistan, India, Iran, Lebanon, and Kuwait. The O₃ 8-hour mean concentration limits set by other countries can meet the WHO interim targets (160 µg/m³).

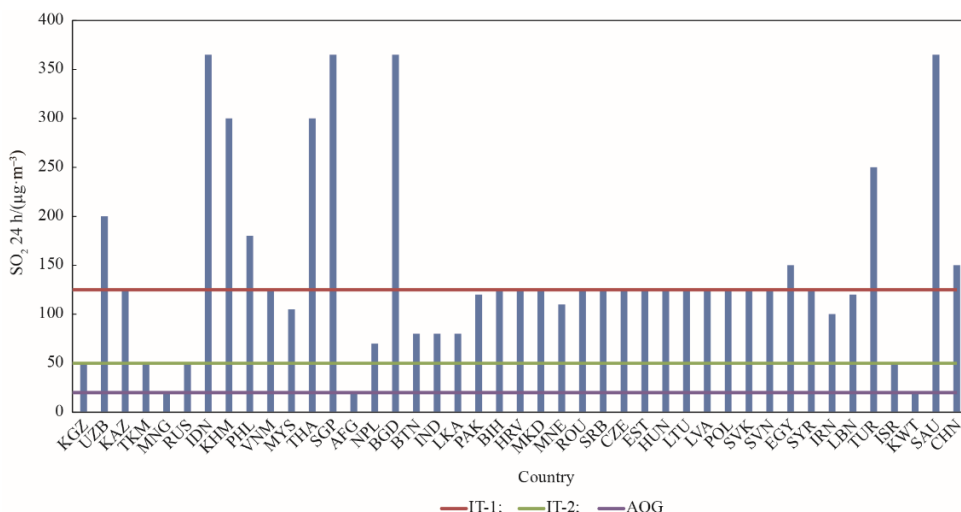


Fig. 4. SO₂ concentration standards set by the Belt and Road countries.

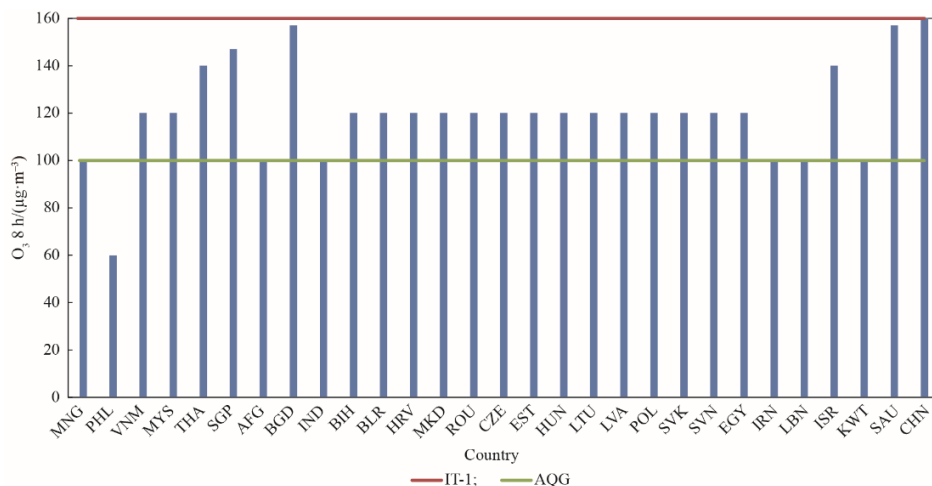


Fig. 5. O₃ concentration standards set by the Belt and Road countries.

3.2.5 CO analysis

The five Central Asia countries, as well as Georgia, Jordan, Syria, and Israel (located in Western Asia and the Middle East) did not set a CO indicator in their national ambient air quality standards. There are great differences in the averaging time scales used for the CO concentration limits among countries setting a CO indicator. Most have set short-term (15 minute, 20 minute, 30 minute, 1 hour, 8 hour, and 24 hour) concentration limits, while a few have set a long-term (1 year) concentration limit for CO.

The WHO set an average concentration for 15-minute, 1-hour, 8-hour, and 24-hour CO limits of 100 mg/m³, 35 mg/m³, 10 mg/m³, and 7 mg/m³, respectively. Most countries selected the 8-hour mean concentration as their CO standard, including some countries in Southeast Asia, South Asia, and Europe (Central and Eastern). Except for Cambodia, the CO standard of which is higher than the WHO standard, other countries have set CO 8-hour mean concentration limits that are similar or even stricter, than the WHO standard.

3.3 Regional difference analysis

3.3.1 Central Asia

Most of the five Central Asian countries have set TSP, NO₂, and SO₂ standards, but because of differences from the WHO standards regarding pollutants and average time, it is difficult to make a direct comparison. The ambient air quality standards of Kyrgyzstan and Kazakhstan are relatively comprehensive and rigorous (only Kazakhstan distinguished coarse and fine particulate matters, and the PM_{2.5} and PM₁₀ concentration limits met the WHO Interim-Target 3, and only Kyrgyzstan has regulated the O₃ concentration limit).

3.3.2 Mongolia and Russia

The ambient air quality standards of Mongolia and Russia demand stringent specifications. These have not only covered all the WHO indicators, but have also met the WHO Interim-Target 2 (even stricter than the WHO guideline standards).

3.3.3 Southeast Asia

The ambient air quality standards in Southeast Asian regions are relatively loose, whereas Laos, Myanmar, East Timor, and Brunei have not even set standards. In those countries with standards, the concentration limits are generally high, and many only meet (or fail to meet) the WHO Interim-Target 1. Among them, Singapore, the country with the highest GDP per capita along the Belt and Road, has set lenient air quality standards. Except for the PM_{2.5} limit, which meets the WHO guideline standard, the other indicators only meet (or fail to meet) the WHO Interim-Target 1. However, Singapore has proposed that a more demanding target will be set by 2020.

3.3.4 South Asia

The countries in South Asia (except for the Maldives, which has set no ambient air quality standards), have formulated standards covering a wide range of air pollutants. Among these countries, Afghanistan, the country with the lowest GDP per capita along the Belt and Road, has set the most stringent standards (these completely comply with the WHO standards).

3.3.5 Central and Eastern Europe

Most countries in Central and Eastern Europe (with the exception of Moldova and Bulgaria, which have no ambient air quality standards), the high-income countries in particular, enforce EU standards by which all limits can meet the WHO guideline standards or interim targets.

3.3.6 Western Asia and Middle East

With the exception of Iraq (no ambient air quality standards), there are great differences among the standards in the regions in Western Asia and the Middle East. Generally, the standards set by middle- and high-income countries are relatively comprehensive and rigorous. For example, the standards set by Iran, Kuwait, and Saudi Arabia cover all six of the pollutants above, but the concentration limits regulated are quite different. For Saudi Arabia, only the concentration limits for PM_{2.5} and O₃ meet the WHO guidelines standards or interim targets, while the concentration limits for the other four pollutants far exceeded the WHO targets. This could be due to the dependence of this country on the oil and petrochemical industries.

3.3.7 China

China's ambient air quality standards have been revised three times since they were released in 1982. In the third revision in 2012, PM_{2.5} and O₃ were added. The revised standards covered all six of the pollutants regulated by WHO and imposed stricter limits on these pollutants. The Chinese government attaches great importance to the implementation and the revision of ambient air quality standards. Through the enforcement of a series of air pollution prevention and control measures, including the Air Pollution Prevention Action Plan and the Three-Year Operation Plan (2018–2020), the periodic targets of the air quality standards have been achieved. Even so, compared with the WHO standards, there remains a gap in the standards for China. For example, the concentration limits for NO₂ and CO can meet the WHO guideline standards, while the limits for other indicators can only reach the WHO interim targets. Among these, the 24-hour average concentration limit for SO₂ cannot even meet the WHO Interim-Target 1. Given the progress anticipated in the future regarding revision of standards, China is expected to accelerate progress in raising its ambient air quality standards to meet international standards.

4 Discussion

4.1 Conclusions

(1) Most countries along the Belt and Road attach great importance to environmental protection of air quality and have formulated their own ambient air quality standards. However, even among the countries concerned with traditional air pollutants (e.g., PM, NO₂, and SO₂) some other important pollutants (O₃ and CO), have received little attention. This is especially true of the middle and low-income countries in Central Asia and the Middle East. Because O₃ pollution is very harmful and difficult to control, it is essential that it be included among the items upon which attention is focused.

(2) The ambient air quality standards in Mongolia, Russia, and most Central and Eastern European countries are relatively strict, while those in Central Asia and Southeast Asia are relatively lax. There are great differences in the limits of standards among South Asia, West Asia, and the Middle East, among which the standards of Afghanistan, India, Pakistan, Iran, and Kuwait are stricter than those of China.

(3) There are major differences in the ambient air quality standards regarding the formulation, pollutants regulated, average time, and limits among the countries along the Belt and Road. This condition is mainly due to the great variation in political systems, economic levels, social cultures, technical levels, and the priority given to environmental protection.

4.2 Policy advice

4.2.1 Strengthen the docking and integration of environmental protection strategies and promote the establishment and mutual recognition of environmental standards

The environmental standards of countries along the Belt and Road vary widely. The standards of some countries are stricter than those of China, while those of others are relatively lax. Moreover, some countries have not even set environmental standards at all. These issues might result in institutional barriers to the cooperation of enterprises and projects in the countries and regions along the Belt and Road. First of all, therefore, it is necessary to understand fully and to master the environmental standards and rules of the countries along the route, establish an environmental standards database for those countries, and follow up and update these standards in real time.

Due to the great differences in the levels of economic and social development of countries along the route, it is difficult to reach unified and legally binding environmental standards for the entire region. However, protection of the ecological environment and improvement of environmental quality is already being pursued by all the countries along the route. Therefore, it is possible to promote the construction of a regional coordination mechanism and dialogue platform for environmental protection. This should strengthen the exchange of environmental management information among the countries and enable negotiation on environmental issues (including environmental standards). In this way, acceleration of the docking and integration of ecological and environmental protection strategies should be possible, as should reaching consensus on the concept of green development. Under the common concept that arises, carry out the co-construction and mutual recognition of environmental standards and promote their interconnection. This might include such as sharing and exchanging experience in the setting and application of environmental standards, and signing agreements on mutual recognition of environmental standards.

4.2.2 Accelerate the internationalization of China's environmental standards, and promote China's environmental standards to meet global standards

Regarding the cooperation between China and other countries along the route on environmental standards, the adoption of stricter standards should be given priority under a common environmental protection concept and consensus should be reached that includes all participants. For those that already have stricter environmental standards than China does, we should actively integrate the more advanced environmental standards to enhance the international level of China's environmental standards. Additionally, it is necessary to formulate and improve China's environmental standards system so that it is compatible with international standards and with the standards of all the countries along the route. For mining, thermal power, steel, cement, building materials, chemical industry, and other key industries, there is need to research and formulate green industry standards and regulations in line with international standards. The newly established environmental standards and regulations will be important for the construction of infrastructure.

For those countries that have no environmental standards, or ones looser than those of China, we should actively communicate with local authorities, share China's experience, and help them to improve their environmental standards. In fact, the quality of China's environmental technology has reached a relatively high level. Furthermore, compared with EU or US standards, China's standards are more suitable for the domestic equipment and production processes exported, and thus are more economical. However, at present, due to the lack of understanding of China's environmental standards and technologies, they have not been widely recognized and accepted by countries along the route. Therefore, it is necessary to popularize China's environmental standards. Through publicity and training about China's environmental standards, and demonstration of and cooperation with China's green standards, a benchmark based upon China's environmental standards should be created, to have these standards gradually be recognized and accepted by more countries along the Belt and Road.

4.2.3 Enhance enterprise's awareness of environmental protection, and promote the establishment of green enterprises along the route

For countries with stricter environmental standards than China, the Chinese government should urge enterprises to comply with local standards and regulations, while enterprises should strive to meet the international advanced environmental standards in accordance with local environmental management requirements. Most of these are high income countries in Central and Eastern Europe. In order to stand out from the competition in local markets, the environmental protection industry should achieve the level of advanced international standards, and seek cooperation and communication with these countries about the technologies used for environmental protection. Some of these countries are low- and middle-income, such as Afghanistan, Iran, Pakistan, Mongolia, and Vietnam. Due to the early stage of their industrial development, the environment has not yet been significantly affected in these countries. To avoid repeating the inefficient process of "administration after contamination" that has occurred in many countries, there is need to provide environmentally friendly technologies and services that are affordable, effective, and compatible with their current processes of industrialization.

For countries with looser environmental standards than China or without environmental standards, China's foreign investment and projects should comply not only with local standards, but also with higher standards (including China's environmental standards) that are also required by the green Belt and Road initiative. Most of these are developing countries in Central Asia and Southeast Asia, of which the economic levels lag behind China. There are also some middle- and low-income regions in Central and Eastern Europe, West Asia, and the Middle East. China's environmental protection industry has huge potential to enter the budding markets in these countries. However, considering the local economic levels, China's environmental products and services should not only be technically feasible, but also cost-effective. A number of practical environmental protection technologies and products could be selected for these countries and popularized. They would also be supported by providing potential users with financial, technical, personnel, and legal assistance. Some of these are high income countries of which the economic levels far exceed that of China (e.g., Saudi Arabia, Brunei, Singapore). In the future, with increased pressure on their environments, the demand for environmental products and services will also increase. Therefore, China's environmental protection enterprises should promote their technological innovation and reserves to make good use of the opportunities anticipated as a result of the Belt and Road initiative.

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