



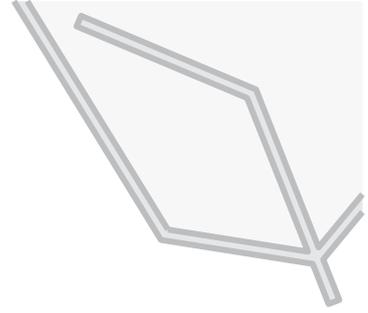
THEMATIC REPORT 16

China Dedusting, Desulfurization and Denitration Industry

Edited by China-Italy Chamber of Commerce



Camera di Commercio Italiana in Cina
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China-Italy Chamber of Commerce



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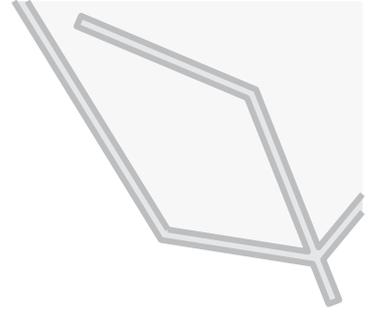


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1. Analysis of Policy Impacts of the Dedusting, Desulfurization and Denitration Industry

1.1. Analysis of National Policy Impacts

Since the implementation of *the Action Plan on Prevention and Control of Air Pollution*, China has achieved remarkable results with respect to the control of air pollution. In 2019, the Chinese government has continuously issued relevant policies, regulations, and standards for air pollution control at all levels. It has continued to drive the development of the air pollution control industry and created favorable macro-environment for the development of the dedusting, desulfurization and denitration Industry.

Serial No.	Time	Release Department	Policy Name	Policy Content
1	September 2013	The State Council	<i>The Action Plan on Prevention and Control of Air Pollution</i>	The plan put forward particle control goals up to 2017, while also emphasizing the requirements to comprehensively improve small coal-fired boilers, speeding up the construction of dedusting, desulfurization and denitration projects in key industries, and implementing the desulfurization for coal-fired boilers.
2	February 2019	Ministry of Ecology and Environment	<i>the Key Points of National Air Pollution Prevention and Control Work in 2019</i>	In 2019, the annual average concentration of fine particulate matter (PM 2.5) in non-compliance cities nationwide fell by 2% year-on-year, and the average fine days ratio of cities at the prefecture level and above reached 79.4%; while the total national emission volume of sulfur dioxide (SO ₂) and nitrogen oxides (NO _x) reduced by 3% year-on-year.
3	April 2019	five departments, including the Ministry of Ecology and Environment, the National Development and Reform Commission and the Ministry of Industry and Information Technology	<i>Opinions on Promoting the Implementation of Ultra-Low Emissions in the Iron and Steel Industry</i>	It set the necessity to strive to complete by the end of 2020 the ultra-low emission transformation of about 60% of the production capacity of iron and steel enterprise in key regions; by the end of 2025 to complete the ultra-low emission transformation of iron and steel enterprises in key regions, and strive to complete the transformation of more than 80% of production capacity across the whole country.
4	April 2019	Comprehensive Department of National Energy Administration	<i>Urgent Notice on Effectively Strengthening Comprehensive Safety Management of Dangerous Chemicals in the Power Industry</i>	The notice included to actively carry out the treatment of major hazard sources in liquid ammonia tank farms, to accelerate the replacement and upgrading of urea, and to adopt a technical route without major hazard sources in the newly-built coal-fired power generation projects.

5	July 2019	Ministry of Ecology and Environment and other three departments	<i>Comprehensive Treatment Plan for Air Pollution Caused by Industrial Furnace</i>	The plan put forward the emission targets for industrial furnaces used in the iron, steel, coking, nonferrous metals, building materials, petrochemicals, chemicals, machinery manufacturing and other industries (emission limits for particulate matter, sulfur dioxide and nitrogen oxides in key regions shall be respectively not higher than 30, 200, and 300 mg/m ³)
6	July 2019	Ministry of Ecology and Environment	<i>Guiding Opinions on Strengthening the Response to Heavy Pollution Weather and Consolidating Emergency Emission Reduction Measures</i>	The opinion carried out performance classification for 15 key industries, and divided the enterprises in key industries into level A, B, and C. It was based on the principle of "More emission more reduction, less emission less reduction, and no emission no reductions". The goal was to take differentiated emission reduction measures during the heavily polluted period.
7	December 18, 2019	Ministry of Ecology and Environment	<i>Notice on Strengthening the Evaluation and Monitoring of Ultra Low Emissions in Iron and Steel Enterprises</i>	Eco-environmental departments at all levels are required to include the enterprises that have been assessed and monitored to achieve ultra-low emissions into the dynamic management list, so as to implement differentiated management.

Table 1: *De dusting, Desulfurization and Denitration Industry Policies.*

1.2. Analysis of Industry Policy Impact

1.2.1. "Ultra-Low Emission" Standards for Thermal Power Emissions

The air pollutant emission standards for thermal power plant in China have undergone revisions for three times, formulating gradually tightened standards. In 2014, the National Development and Reform Commission and other departments proposed the "ultra-low emissions." It defined that the emission concentrations of smoke dust, sulfur dioxide and nitrogen oxides should be respectively not higher than 10, 35, and 50 mg/m³, which completely exceeded the level of the same in the European Union, and fully implemented in accordance with the *Work Plan for the Comprehensive Implementation of Ultra-Low Emission and Energy-Saving Transformation in Coal-Fired Power Plants*. The eastern, the central and the western regions are estimated to complete the ultra-low emission transformation of all coal-fired power plants by 2017, 2018 and 2020, respectively.

1.2.2. Increasingly Stricter Emission Standards in the Iron and Steel Industry

The iron and steel industry is the second heaviest high-polluting industry, it only ranks behind the thermal power industry. In 2018, the total emission volumes of sulfur dioxide, nitrogen oxides and particulate matter respectively accounted for about 7%, 10% and 20% of the total national emission volumes. In April 2019, the Ministry of Ecology and Environment worked together with other four ministries and

commissions to jointly issue *the Opinions on Promoting the Implementation of Ultra-Low Emissions in the Iron and Steel Industry*. The document proposed that the newly-built (including relocated) iron and steel projects nationwide should achieve ultra-low emission level. It also included that by the end of 2020 the iron and steel enterprises in the key regions would be required to complete the ultra-low emission transformation of about 60% of their production capacity.

1.2.3. Increasingly Stricter Emission Standards in the Cement Industry

The Cement Plant Air Pollutant Emission Standards (GB4915) were revised in 1985, 1996, 2004 and 2013, respectively. The prevailing national cement industry standards are *the Air Pollutant Emission Standards for the Cement Industry” (GB4915-2013)*. Since 2018, many provinces and cities have issued implementation plans for the special emissions values of air pollution in the cement industry, requiring the cement industry to fully complete ultra-low emission transformation within 1-2 years.

1.2.4. Increasingly Stricter Coke Oven Exhaust Emission Standards

Coke oven exhaust gas is the most important source of exhaust gas pollution in coking enterprises, from which about 60% SO₂ and 90% NO_x generate. At present, the coking industry implements the *2012 edition of the Standards for Pollutant Emissions in the Coking Chemical Industry (GB 16171-2012)*. In January 2018, the Ministry of Environmental Protection issued *the Announcement on the Implementation of Special Emission Limits of Air Pollutants in Beijing-Tianjin-Hebei Air Pollution Transmission Channel Cities*, requiring coking enterprises located in "26+2" cities to commence to implement special emission limits for sulfur dioxide, nitrogen oxides, particulate matter and volatile organic compounds from October 1, 2019.

1.2.5. Increasingly Stricter Emission Standards for Industrial Furnaces

In July 2019, four national ministries and commissions jointly issued the *Integrated Treatment Plan for Air Pollution in Industrial Furnaces and Kilns*. It put forward emission indicators and focused on industrial furnaces and kilns applied in the iron and steel, coking, nonferrous metals, building materials, petrochemicals, chemical, machinery manufacturing and other industries. It specified that emission limits for particulate matter, sulfur dioxide, and nitrogen oxides in key regions should not be higher than 30, 200, and 300 mg/m³, respectively.

1.2.6. Summary of Pollutant Emission Limits in Major Non-Electrical Industries

Industry	Particles in the Glass Industry (mg/m ³)			Sulfur Dioxide (mg/m ³)			Nitrogen Oxide (mg/m ³)		
	Limit	Special Limit	Ultra Low Limit	Limit	Special Limit	Ultra Low Limit	Limit	Special Limit	Ultra Low Limit
Steel Sintering	50	20	10	200	50	35	300	100	50

Coking Industry	50	30	10	100	30	30	500	150	100
Cement Industry	32	20	10	200	100	50	400	320	100
Industrial Furnace	30	20	10	200	50	35	300	100	50
Glass Industry	50	20	20	400	150	150	700	400	400

Table 2 Pollutant Emission Limits for Major Non-Electrical Industries.

2. Market Analysis of Dedusting, Desulfurization and Denitration Industry

2.1. Analysis of Market Demand in the Thermal Power Industry

After nearly 10 years of control, the completion rate of ultra-low-emissions transformation of coal power has reached 80%, and 810 million kW coal-fired units have reached the emission level of natural gas all over the country. The 2020 transformation target has been completed ahead of schedule. At present, the outstanding demands are the zero discharge of desulfurized waste water, the regeneration of deactivated denitrified catalyst, as well as the disposal of spent catalyst.

2.1.1. Desulfurized Waste Water Treatment

In 2018, the thermal power installed capacity in China was 1.14 billion kW, among which 80% units adopted wet desulfurization. This has generated a large amount of desulfurization wastewater and caused serious pollution to water and soil. The total emission volume is about 70 million m³ per year, based on the current average utilization of 4,000 hours of power plants and the average emission of 12 m³ per hour of 2×300 MW-level units. The cost of desulfurized wastewater treatment is RMB 75/kW, thus the overall market capacity is about RMB 70 billion.

Thermal Power Installed Capacity in 2018 (MW)	Wet Desulfurization Ratio	Unit Discharge Volume of Desulfurized Waste Water (m ³ /h)	Average Utilization Hours of Power Plant	Annual Emission Volume (10,000 m ³)	Unit Treatment and Construction Cost	Market Capacity (100 Million)
11.4	80%	12	4000	7000	1500	700

Table 3 Market Capacity Measurement and Calculation of Desulfurized Waste Water Treatment Market.

2.1.2. Regeneration of Deactivated Denitration Catalyst and Disposal of Spent Catalyst

The service life of SCR denitration catalysts is generally 3 to 5 years. In the next few years, a huge amount of denitration catalysts would gradually reach the service life and become deactivated. It is estimated that by 2020 the demands for denitration catalysts would reach 228,500 m³, while the waste volume would reach nearly 170,000 m³. It would reach a peak during the 14th Five-Year Plan period, as by 2025 the demand for denitration catalysts would reach 287,900 m³ and the waste volume would reach 401,000 m³. Considering the high cost of directly updating deactivated denitration catalysts with new denitration catalysts, the deactivated denitration catalysts could be regenerated and put into use again, and then dispose the waste catalysts as hazardous waste until the catalyst regeneration benefits are no longer attractive.

2.2. Analysis of the Market Demand in the Non-Electric Industry

The emission of major pollutants from non-electricity industries has become the focus of air pollution

control in addition to thermal power. In April 2019, five ministries and commissions jointly issued *the Opinions on Promoting the Implementation of Ultra-Low Emissions in the Iron and Steel Industry*. At local level, the schedules for ultra-low-emissions transformation of local iron and steel enterprises were generally accelerated based on the national plan. Zhejiang, Shanghai and other places required iron and steel enterprises to complete the ultra-low emission transformation by the end of 2022. The comprehensive implementation of ultra-low emission in the iron and steel industry also indicated that the atmospheric control in non-electrical industries has become the focus of policy development. The dedusting, desulfurization and denitration market capacity of the non-electrical industry is approximately RMB 87.28 billion.

Emission Category	Construction Capacity	Construction / Reconstruction Ratio	Construction Unit Price	Total Construction Price (RMB 100,000,000)
Iron and Steel Newly-Built Desulfurization	16,000 m ²	10%	260,000 m ²	41.6
Iron and Steel Transformation Desulfurization	72,000 m ²	45%	150,000 m ²	108
Iron and Steel Newly-Built Denitration	112,000 m ²	70%	300,000 m ²	336
Iron and Steel Transformation Denitration	24,000 m ²	50%	180,000/m ²	43.2
Iron and Steel Transformation Dedusting	16,000 m ²	10%	150,000/m ²	24
Iron and Steel Fugitive emissions	159 Steel Mills	53%	40 million/plant	64
Cement Denitration and Dedusting	998 Production Lines	43%	6 million/plant	59
Glass Denitration, Desulfurization and Dedusting	138 Production Lines	43%	50 million/plant	68
Aluminum Processing Desulfurization and Dedusting	105 Production Lines	50%	60 million/plant	63
Industrial boiler	44,000 T/h	40%	150,000/T/h	66
Total	/	/	/	872.8

Table 4: Market Capacity Measurement and Calculation of the Dedusting, Desulfurization and Denitration Market in Non-Electrical Industry.

3. Analysis of the Supply and Profit Status of Dedusting, Desulfurization and Denitration Industry

3.1. Analysis of Market Supply Status in the Dedusting, Desulfurization and Denitration Market

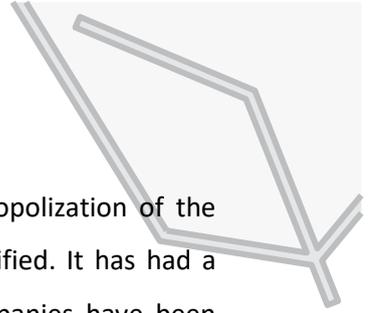
Due to the low technical barriers in the industry, the dedusting, desulfurization and denitration market is highly dispersed. For example, there are nearly 170 registered companies engaged in the bagfilter dedusting business, distributed in 26 provinces (municipalities) around the country. Among them, nearly 50 are scientific research centers, universities and host companies, more than 100 are fiber and filter materials companies, and more than 10 are accessories and testing equipment companies. The main waste-producing enterprises (large state-owned enterprises and state-owned enterprises) usually set up environmental protection subsidiaries to deal with the waste treatment requirements. The dedusting, desulfurization, and denitration market is decentralized, immature, and opaque.

Serial No.	Enterprise Name
1	Longking
2	Feida Environmental
3	Datang Environment
4	China Huadian Science Working
5	Guodian Longyuan
6	Yuanda Environmental Protection
7	Fengye Environmental Protection
8	Datong Coal Mine Environmental Protection
9	SPC Environment Protection
10	Tiancheng Environmental Protection

Table 5 Key Enterprises in the Dedusting, Desulfurization and Denitration Industry

3.2. Profit Analysis of the Dedusting, Desulfurization and Denitration Industry

The operating income of companies in the dedusting, desulfurization and denitration industry has been declining for the past two years, with a gross profit margin of 10-20% in 2019. The main reason for the decline in the operating income lied in the reduction of the prosperity degree of the downstream thermal power industry, while the rise of environmental protection subsidiaries of waste-producing central enterprises has squeezed out some orders from the private enterprise market. The rising prices of coal affected the cost of thermal power, the new energy policies limited the utilization rate of thermal power capacity, and the operating conditions of downstream industries underwent decline. They all have largely



affected the development of the upstream exhaust gas treatment industry. The monopolization of the environmental protection subsidiaries of large state-owned enterprises has also intensified. It has had a crowding-out effect on the market share of private enterprises, and the private companies have been severely affected.



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 www.sicab.net

 sicab@fondazione.polimi.it

 [@sicabItaly](https://twitter.com/sicabItaly)

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