Yan XIN, Transportation Program, Energy Foundation China, November 15, 2018

Non-Road Mobile Sources Emissions Control in China

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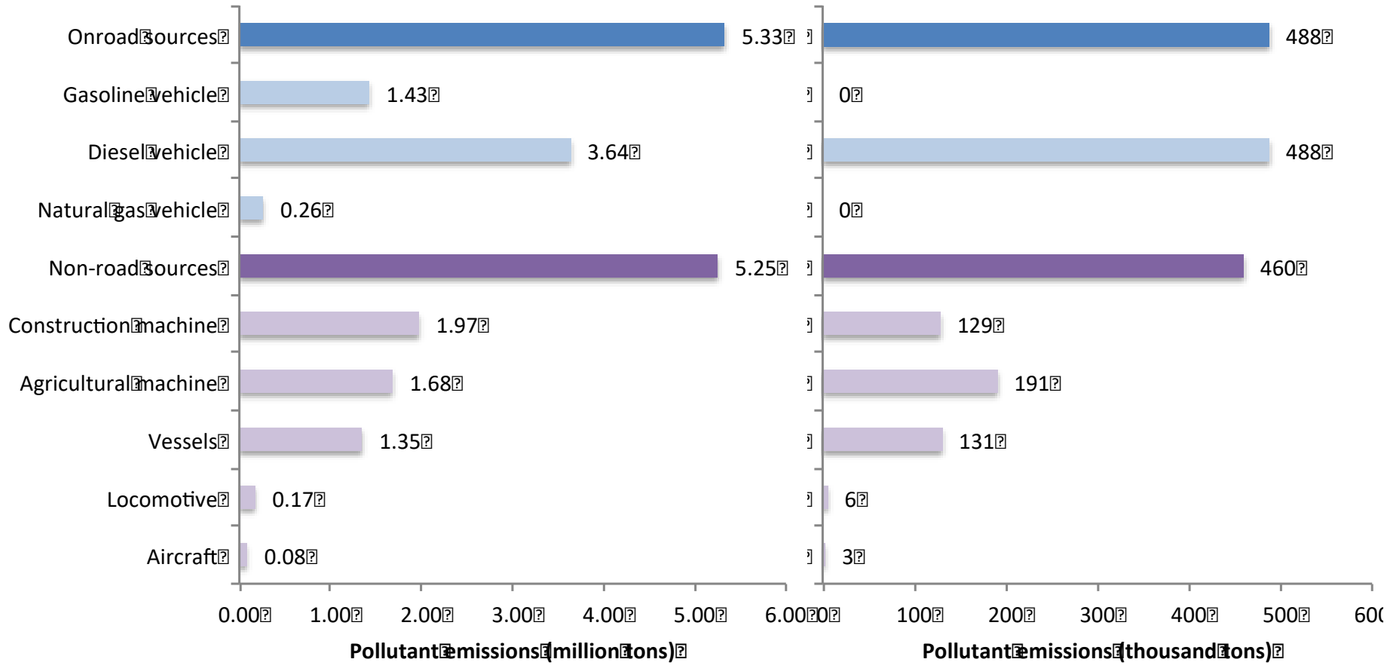
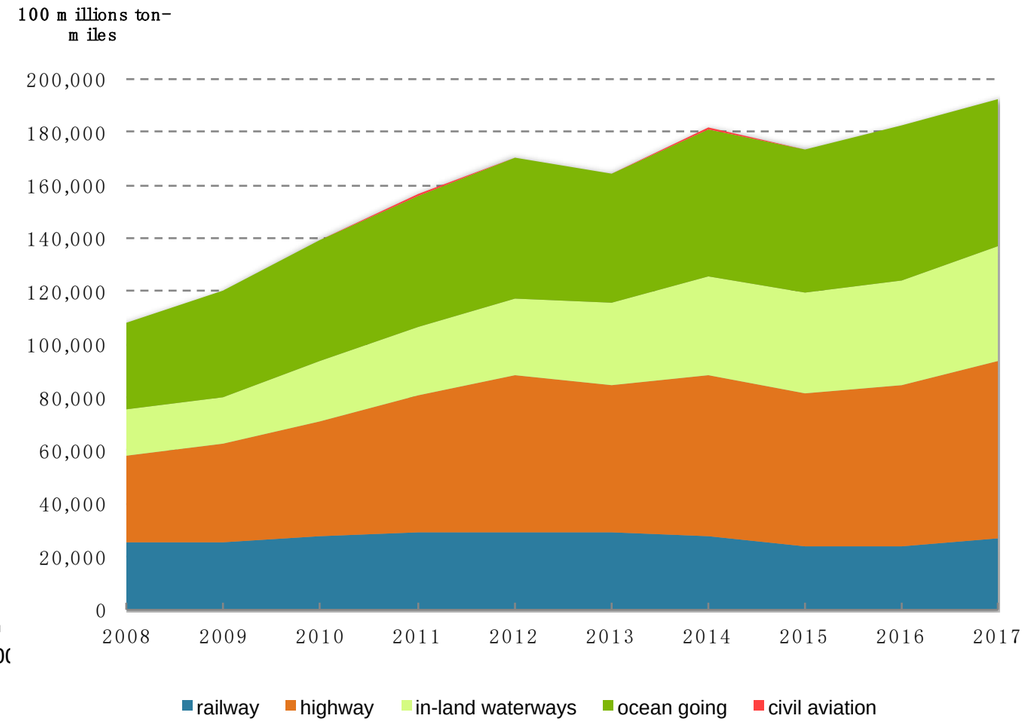
Non-road is emerging as significant new pollutant source

Pollutant emissions by mobile source categories (2017)



The development trend of rail, highway, waterway, aviation and pipe in terms of ton-mileage



Data sources: Transportation Industry Statistics 2017
China Vehicle Environmental Management Annual Report 2018

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The non-road regulations are lagging behind its on-road counterpart

The enforcement of mobile source emissions standards

		2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
LDV	Compression□ignition	China□I		China□II					China□IV					China□V		China□VI	
	Spark□ignition	China□I			China□II					China□IV					China□V		China□VI
	Gas□spark□ignition	China□I			China□II					China□IV					China□V		China□VI
HDV	Compression□ignition	China□I				China□II				China□IV				China□V			China□VI
	Spark□ignition		China□I				China□II			China□IV				China□V			China□VI
	Gas□spark□ignition	China□I			China□II			China□IV			China□V				China□VI		
Motorcycle	Two-wheel□and□moped		China□I				China□II								China□IV		
	three-wheel			China□I				China□II							China□IV		
Nonroad	Diesel				China□				China□I					China□II			
	Gasoline					China□								China□I			
	Vessel														China□		

Data sources: China Vehicle Environmental Management Annual Report 2018

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Air pollution is critical driving force to improve the non-road regulation

- 2013 Five-year Air Pollution Prevention and Control Action Plan
- 2016 Clean Air Law revision (Air Pollution Prevention and Control Law)
- 2018 Three-year Action Plan to restore blue skies

The production/sale

- Emission standards
- Emissions information disclosure

The in-use emissions

- Low emission zone

Fuel quality

- Normal diesel fuel standards
- Marine fuel standards

Retrofit & replacement

- Retrofit program

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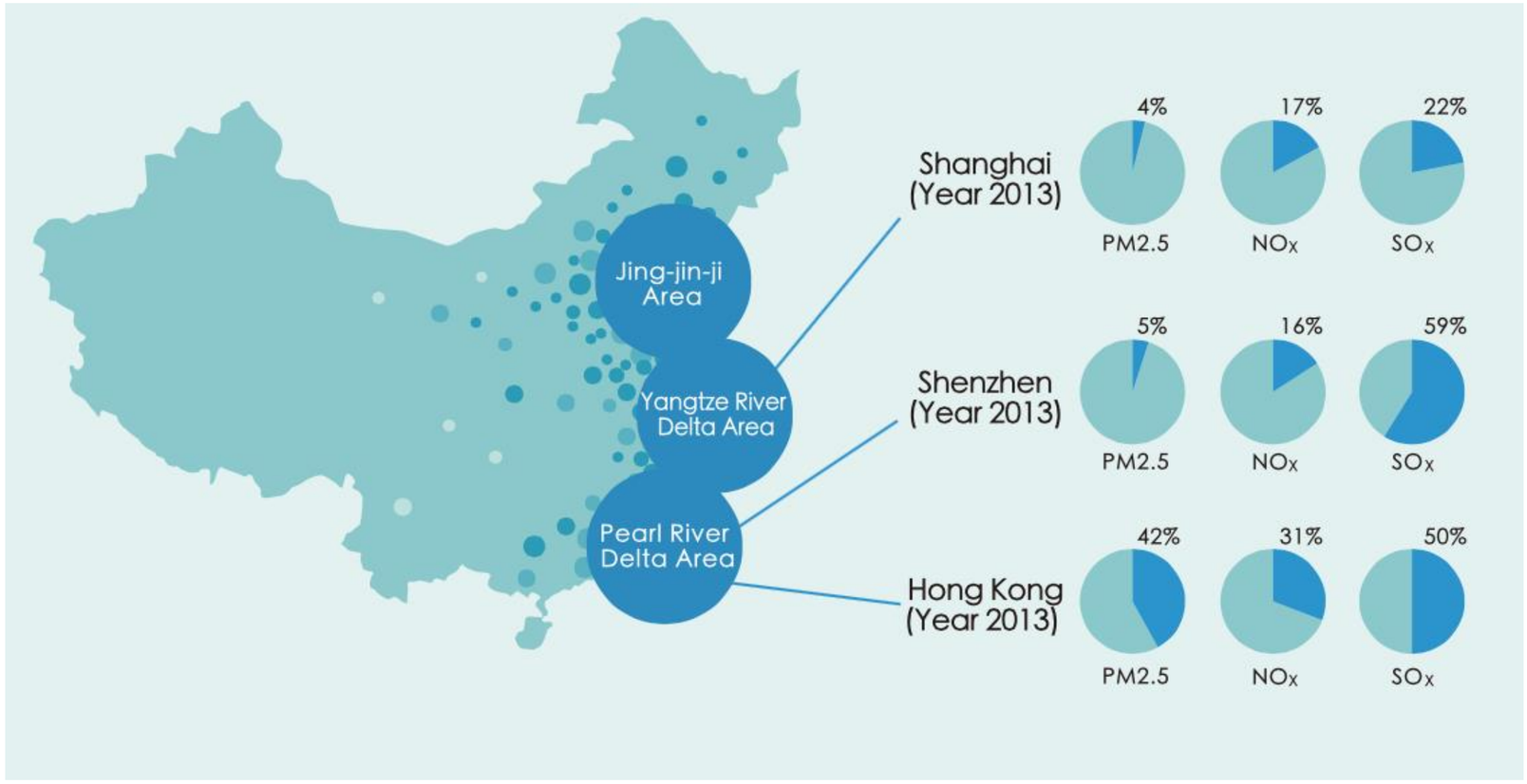
Vessel emissions are outstanding in coastal cities, e.g. in the south

The contribution of shipping to local air pollutants' concentration in 2013



Sources: The Energy Foundation

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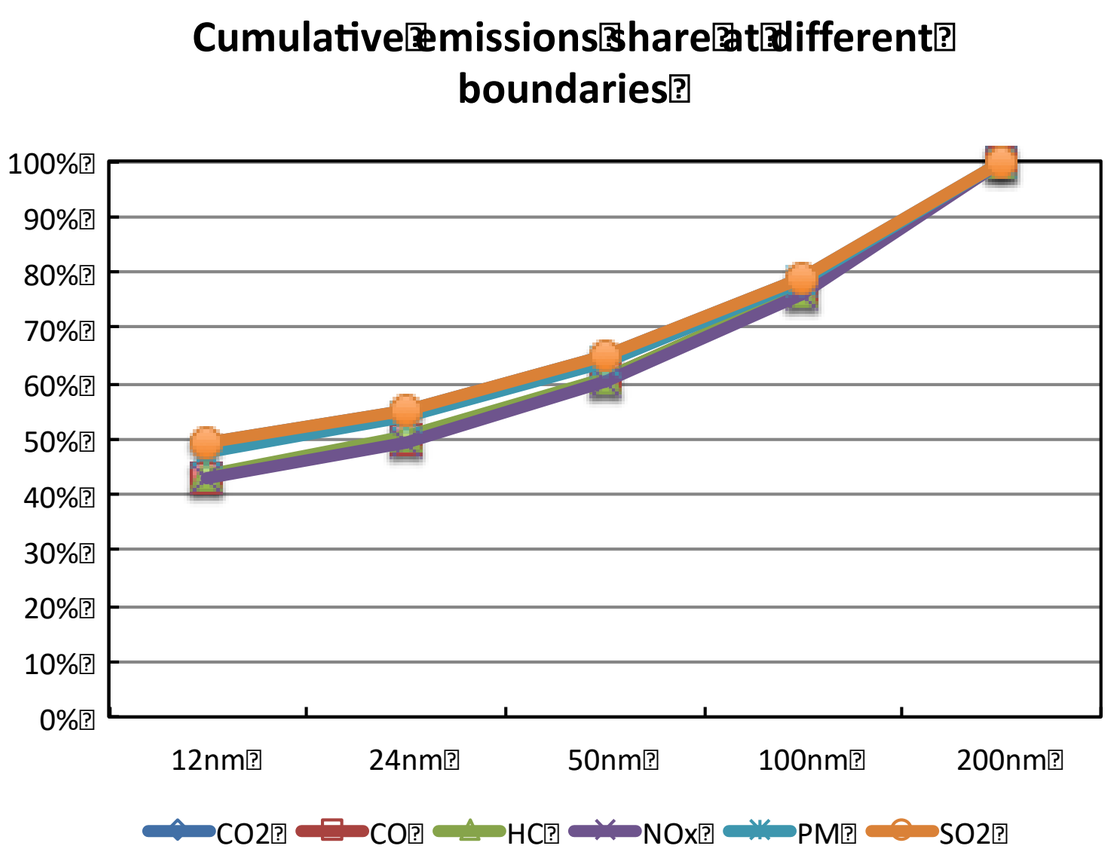
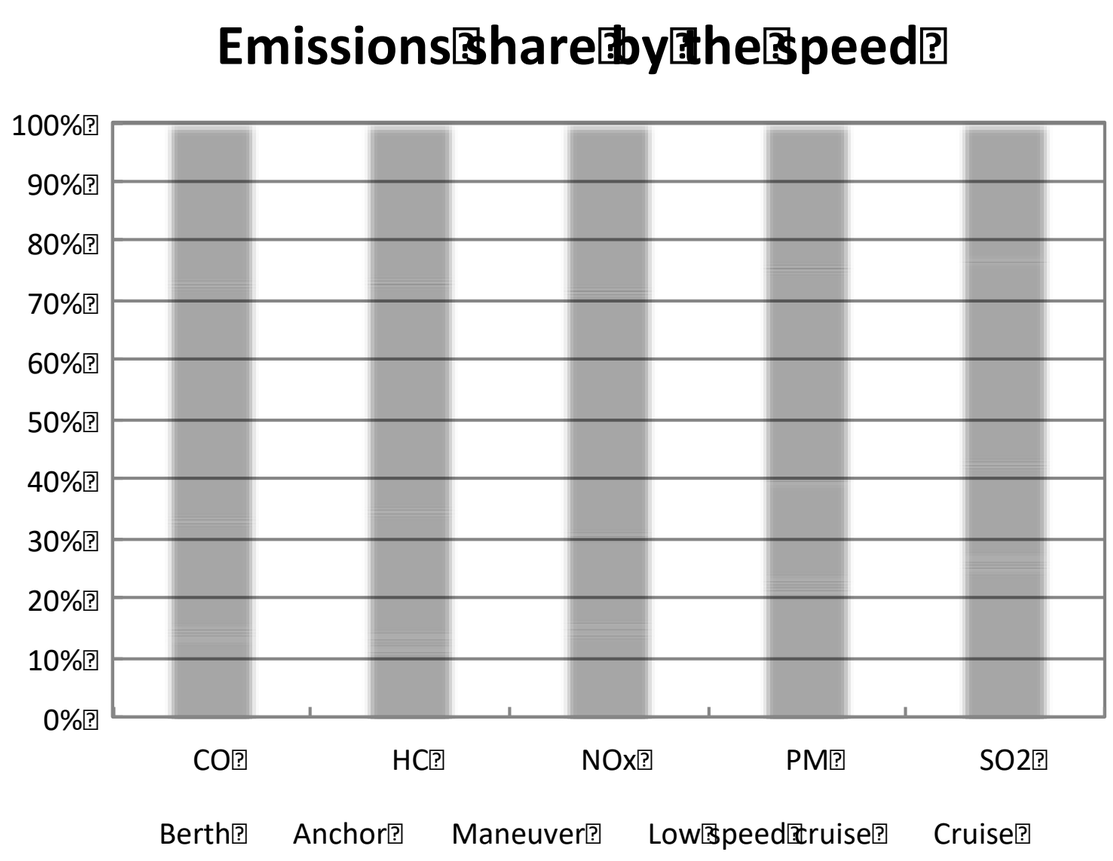
Half of vessel emissions are within 12nm





Data sources: Vehicle Emission Control Center

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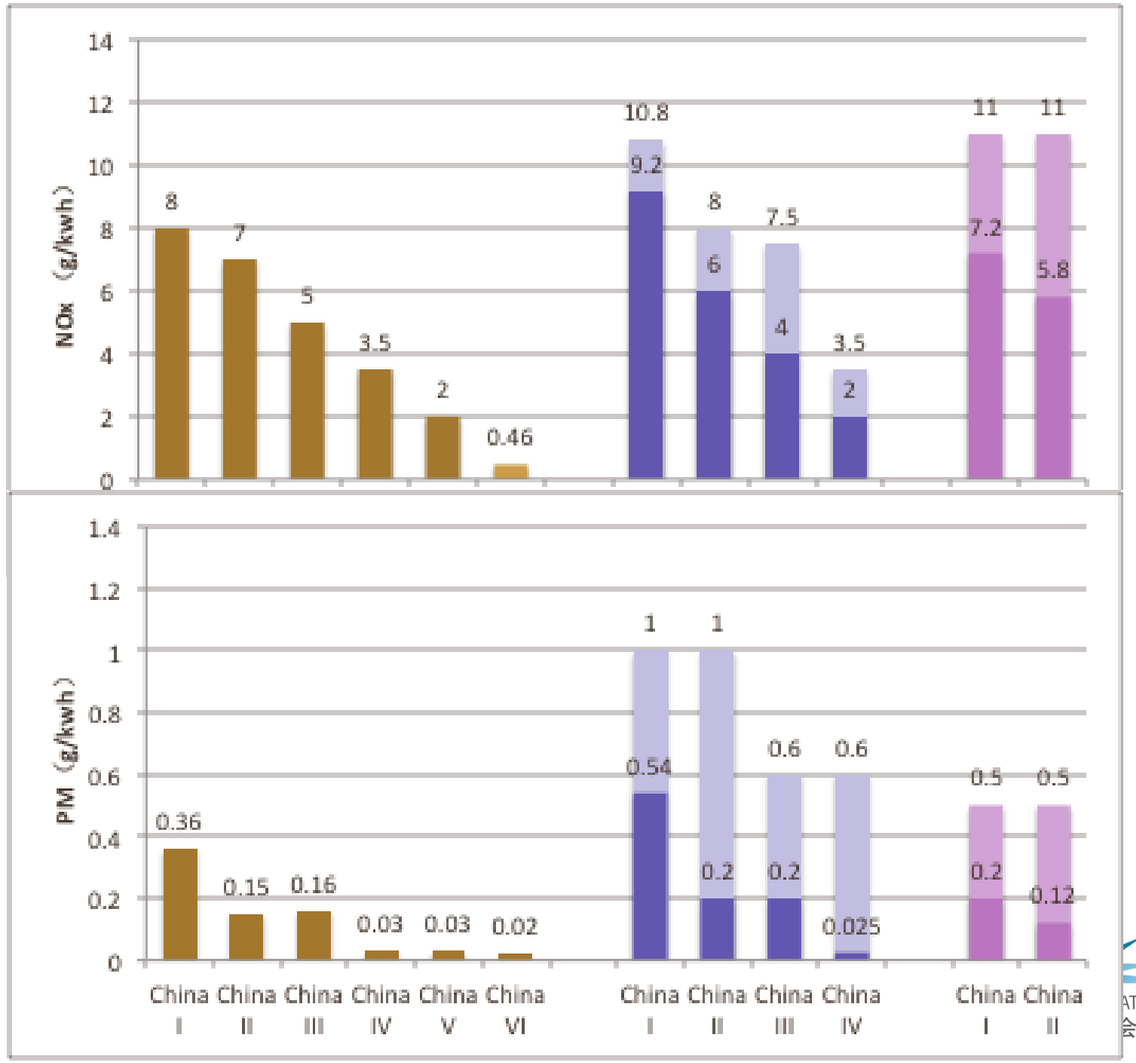
The Vessel Emissions Standards will be more stringent than IMO Tier II

Enforcement date	2018/7/1 phase I
	2021/7/1 phase II

Comparison of emissions limits for IMO Tier II and China II

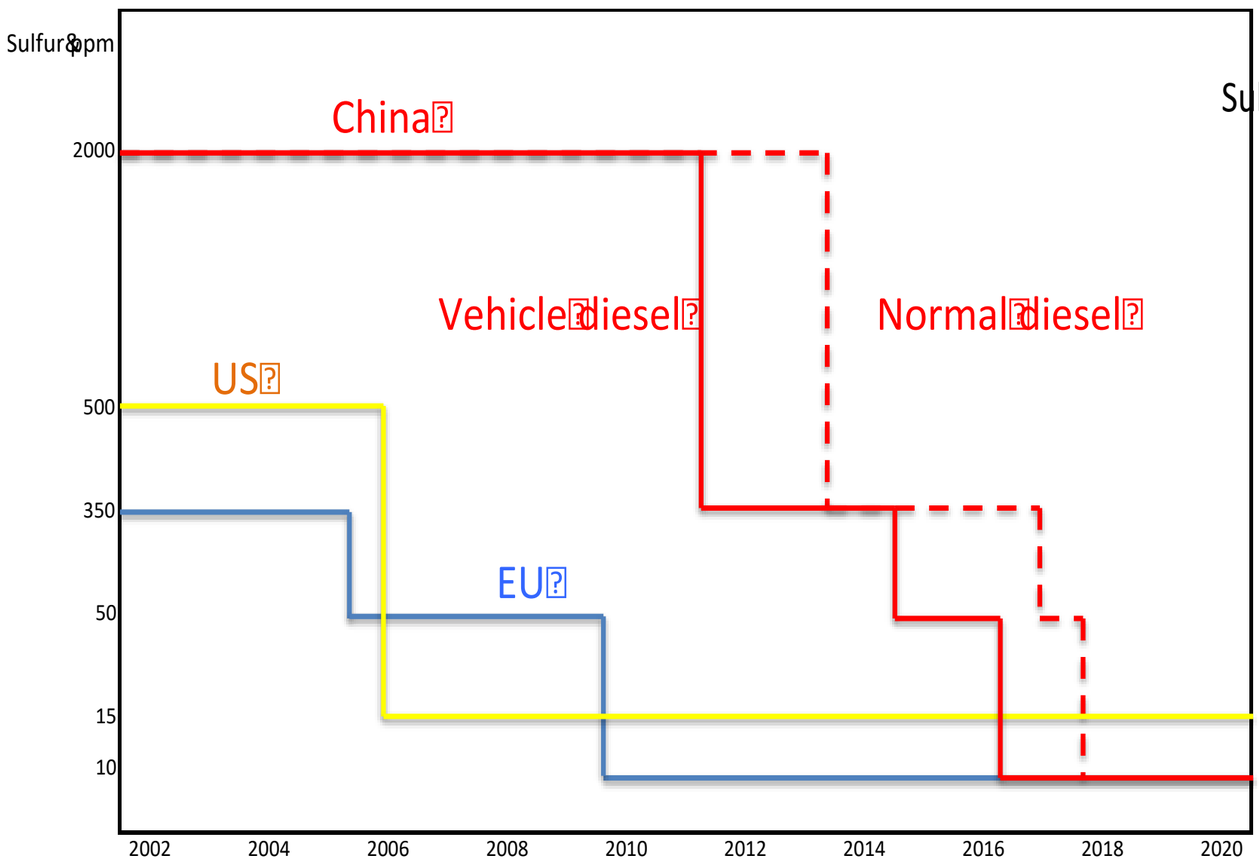
IMO Tier II	China II			
NO_X	Power (kW)	CO (g/kW.h)	HC+NO_X (g/kW.h)	PM (g/kW.h)
8.18～9.75	（2.5L≤SV＜5L）	5.0	7.2	0.20
8.98～9.75	（5L≤SV＜15L）	5.0	7.8	0.27
8.98～9.75	P＜3300 （15L≤SV＜20L）	5.0	8.7	0.50
8.98～9.75	（20L≤SV＜25L）	5.0	9.8	0.50
10.1～11.1	（25L≤SV＜30L）	5.0	11.0	0.50

Comparison of emissions limits for HDV, non-road equipment and vessel

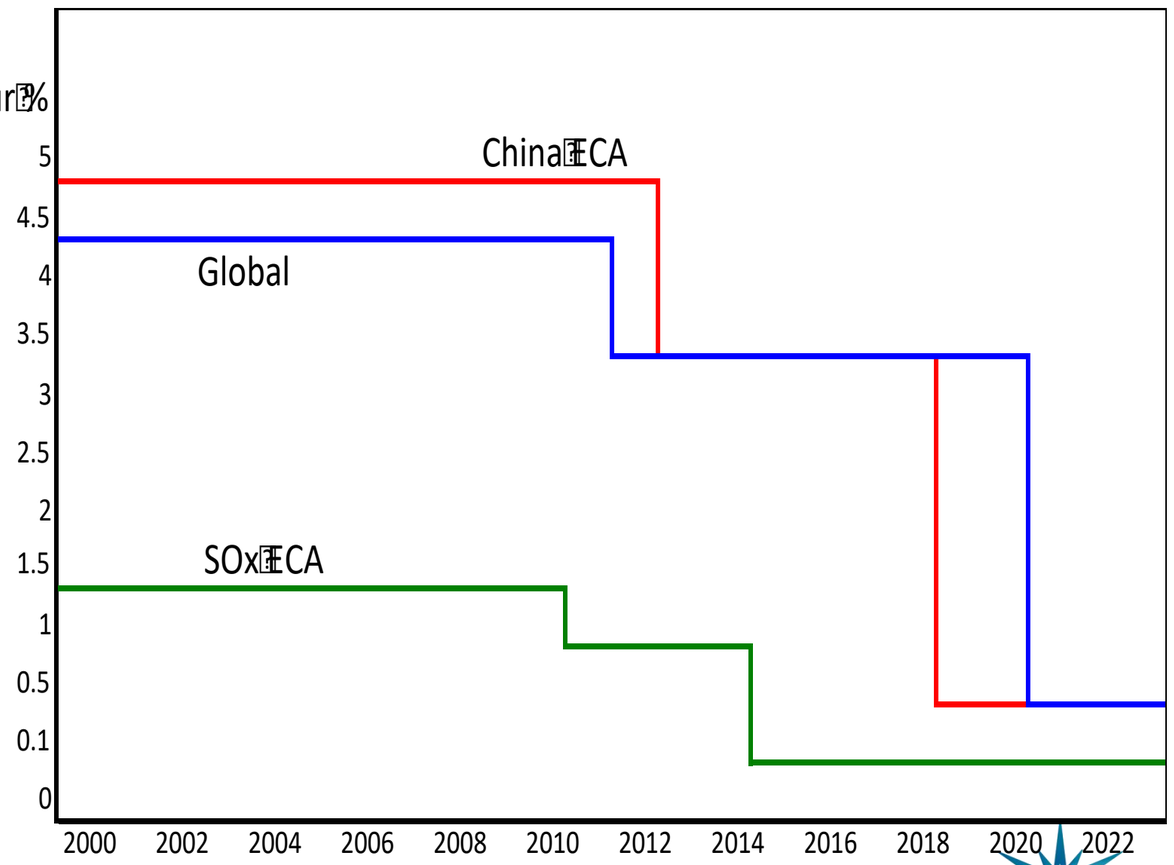


The fuel quality standards have improved significantly

The progress of diesel desulfurization



Global comparison of marine fuel sulfur content



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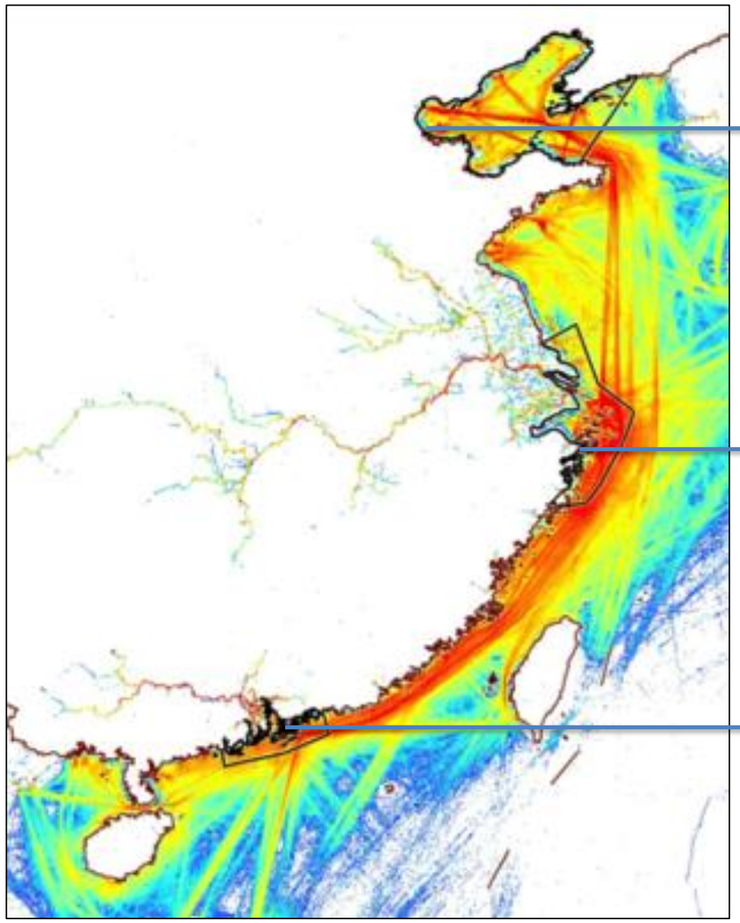
China’s domestic Emissions Control Area policy improves air quality in ports



SO_x concentration reduced by 56% in Jingtang port

SO_x concentration reduced by 26.2% in Shanghai city

- 30.2-52% reduction in ports

SO_x concentration reduced by 30% in Shenzhen port

Data sources: Transportation Planning Research Institute

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Incentive programs accelerate standardization and clean transition

139 LNG vessels by 2016

743 million RMB (107 million US dollars) allocated for shore power usage

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Barriers and challenges

Enforcement

Effectiveness

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Suggestions for future work and collaboration

- Possible collaboration in IMO ECA application
- Collaborative incentive program for clean vessels
- Enhanced communication in emissions inventory and air quality monitoring programs

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Building a sustainable future

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