

# Air Pollution Control

- An International Perspective

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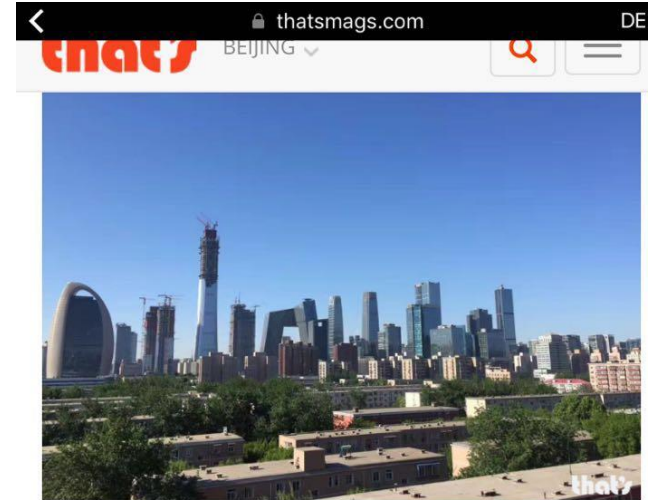
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# Air quality in Beijing

It is a sand storm

- May 4<sup>th</sup> 2017
- PM 10 very high
- High winds



... and after:



# Pollution problem is real

- View from Topsoe office downtown Beijing
- Dec 20 2016
- PM 2.5 very high



Why this special problem in northern and central China?

- Economic growth
- Density of population
- Density of polluting industry & automotives
- Special climate conditions
  - Often low winds
  - Inversion layers

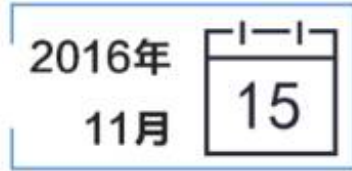
# Initiatives to prevent air pollution

- Tighter emission regulation in industry
- Relocation of Industry to remote areas
- Region specific regulations
- Temporary shut down of industries
- Regulation of number of vehicles
- Alternative energy sources
  - Renewable energy
- Electrification

## Measures to improve air quality during Peoples National Congress 2017

- 86000 industries were shut down in 6 provinces
  - Beijing
  - Tianjin
  - Shandong
  - Shanxi
  - Hebei
  - Henan
- All cement plants were shut down for 10 days
- Shut down period varies from industry to industry

# The 5 year plan



- Reduction targets



- Target regions, pollutants & industries



# Power plants

- The general picture

		China	EU	US
SO <sub>2</sub>	New	100	200	160
	Existing	200/400 <sup>1</sup>	400	160/640 <sup>3</sup>
NO <sub>x</sub>	New	100	500/200 <sup>2</sup>	117
	Existing	100/200 <sup>4</sup>	500/200 <sup>2</sup>	117/160/640 <sup>5</sup>
PM	New & existing	30	50	22.5
Mercury	New	0.03	-	0.001
	Existing	0.03	-	0.002

1) 400 for four provinces with high-sulphur coal

2) 500 until end 2015; 200 as from 2016

3) 160 for plants built 1997-2005; 640 for plants built 1978-1996

4) 100 for plants built 2004-2011; 200 for plants built before 2004

5) 117 for plants built after 2005; 160 for plants built 1997-2005; 640 for plants built 1978-1996

Source: WRI (2012)

# The current situation

## Pollutants

PM	SOx	NOx	VOC	CO
PM control in place except for diesel vehicles	<ul style="list-style-type: none"><li>• SOx control at power plants in place</li><li>• China V fuel standard is being implemented</li></ul>	Tighter emission standards considered in all industries e.g. <ul style="list-style-type: none"><li>• Power</li><li>• Coking</li><li>• Waste</li><li>• Biomass</li><li>• Cement</li><li>• Petrochemical</li><li>• Industrial boilers</li></ul>	New regulation in 5 selected industries is being formulated <ul style="list-style-type: none"><li>• Organic chemical</li><li>• Petrochemical</li><li>• Coating</li><li>• Packaging</li><li>• Painting</li></ul>	No regulation

# Conclusions

## Clean air technologies - The international perspective (China)

- Air quality is still a big issue in China
  - Air quality index is typically 5-10 times higher than major cities in Europe
- Present regulation in China is not far from the EU level
- High ambitions for emissions regulation in China
- Business opportunities in China
  - Emission control in industry
  - Automotive China VI technology
  - Fuel upgrade
  - Alternative energy sources
  - Energy storage



# Recommendations

How to increase export to the international market of clean air solutions

- Demonstration projects in Denmark
  - Useful for new technologies
  - However often useful to make demonstrations with end users in the international market
  - Branding of Denmark as center for Clean Tech
  - Improvement of air quality in Danish cities
- Bilateral targets for export of clean air solutions with China
- Tighter emissions standards in EU
- Develop competitive products
  - Performance & price