

Coal in China: Environment Risks and It's future

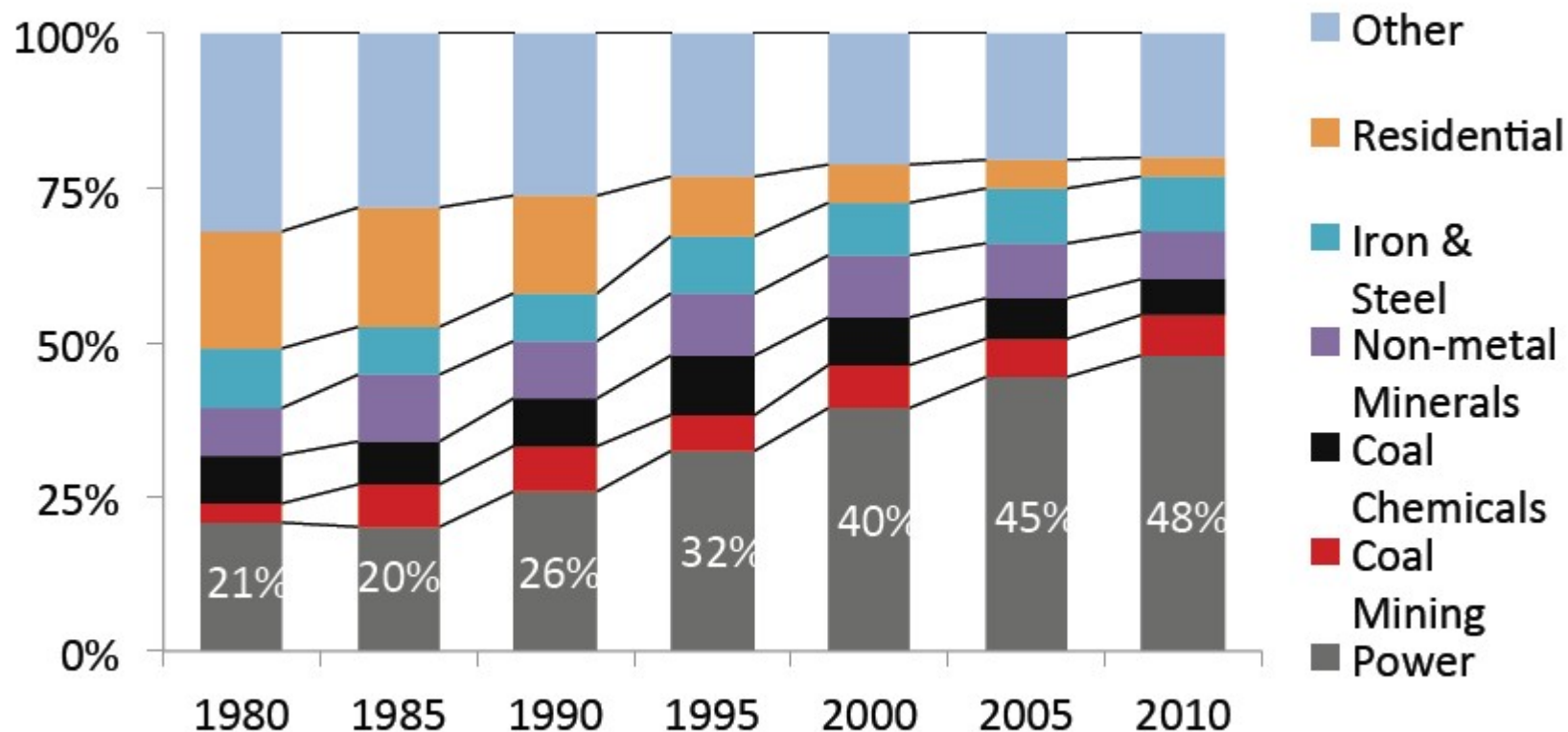
Qingwei Sun, Greenpeace

Woodrow Wilson – May 3, 2013



- China coal industry overview
- Thirsty coal
- Air pollution
- CO₂ emissions
- Policy dynamics
- Coal imports

Coal Consumption by Sector in China



Source: NBS and CNCA.

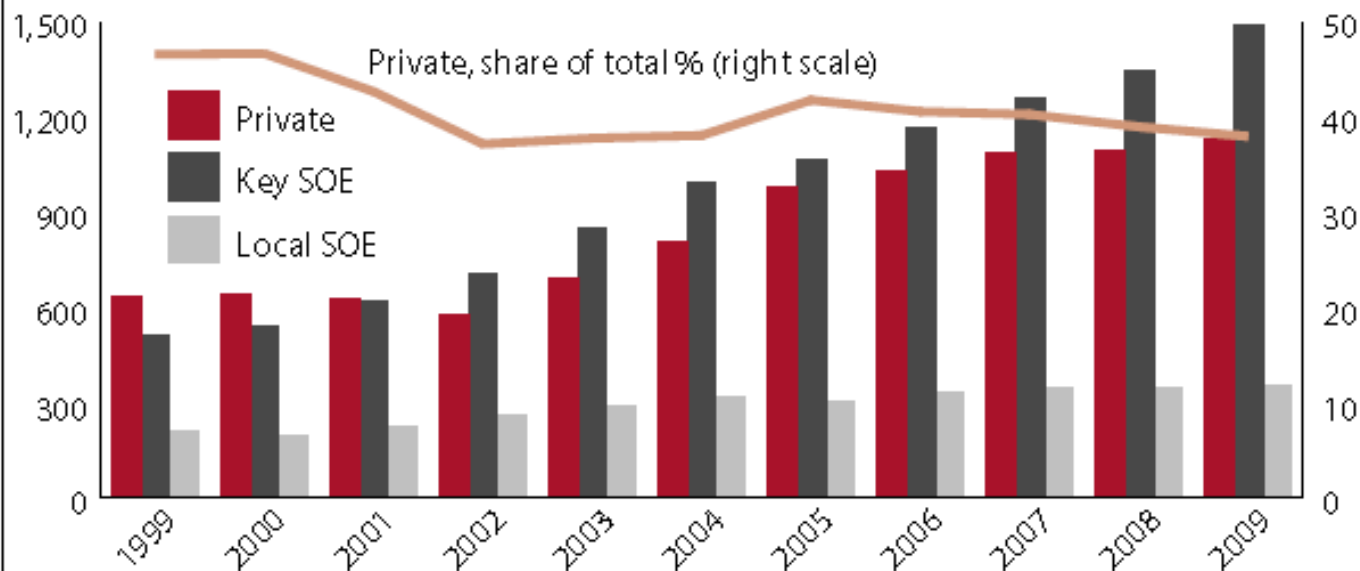
China Coal Industry History

1978: 620 million tons —————> 2012: 3.62 billion tons

Coal mines (Fragmented):

- Key SOE Mines
- Local SOE Mines
- Private (TVE) Mines

Figure 2: Coal output by enterprise type, m tons



Source: China Coal Transportation and Distribution Association

1978

104 Key SOE

+ 2000 Local SOE: 85%
of production

15%: TVE Mines

1983

Beijing endorses
private mines

1982 – 1996:
TVE mine production
grows from 100m to
700m tons

(Country total doubles
over this period)

1997

抓大放小 policy: Restore
profitability of SOEs

Ministry of Coal Industry
Abolished

Key SOEs put under
provincial management

+s: Reduced coal mines,
safety improved,
profitability restored

-s: Coal statistics became
highly unreliable

Rise of underground small
mines
Supply growth slowed

Early 2000s:

Beijing forced to allow surge
in private supply due to lack
of supply growth to meet
demand.

Mining deaths forces another
wave of consolidation

2009: Shanxi consolidation
-Mines fell from (2,600 to
1,100)
-Key SOE share increased to
50%

Consolidation extended now
to:

-Inner Mongolia
-Henan
-Guizhou
-Shandong

China's Coal Addiction

- China = world's largest coal producer, user, and biggest emitter of CO₂
- 2011: half of global coal production (BP); consumption reached 3.52 billion tons
- Total CO₂ emission over 9 Giga Tons by 2011 (BP); per capita levels in 2011 are getting close to average of European levels (7.2t vs. 7.5t)
- Over reliance on coal, nearly 70% of primary energy use; 80% in power generation
- Non fossil fuel 8.1% in primary energy use in 2011

Coal Bases









Why coal bases

- The Central Government: More energy to sustain economy development
- Coal enterprises: Unlimited coal
- Local governments: Yes, more coal, but more money to my pocket
- A “win-win-win”: coal bases with a longer coal industry chain (coal mine, coal power, coal chemicals)

Coal and water conflict

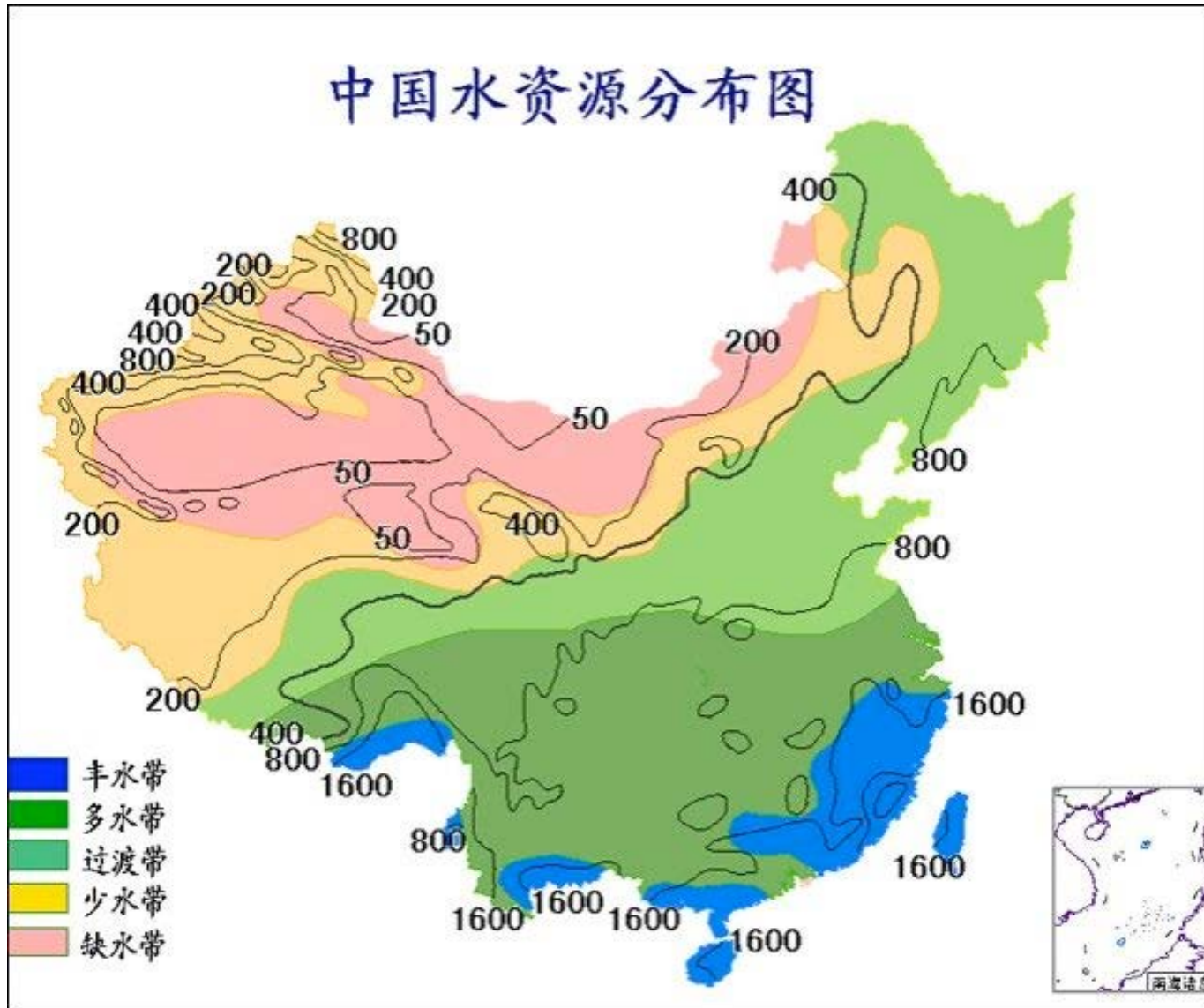
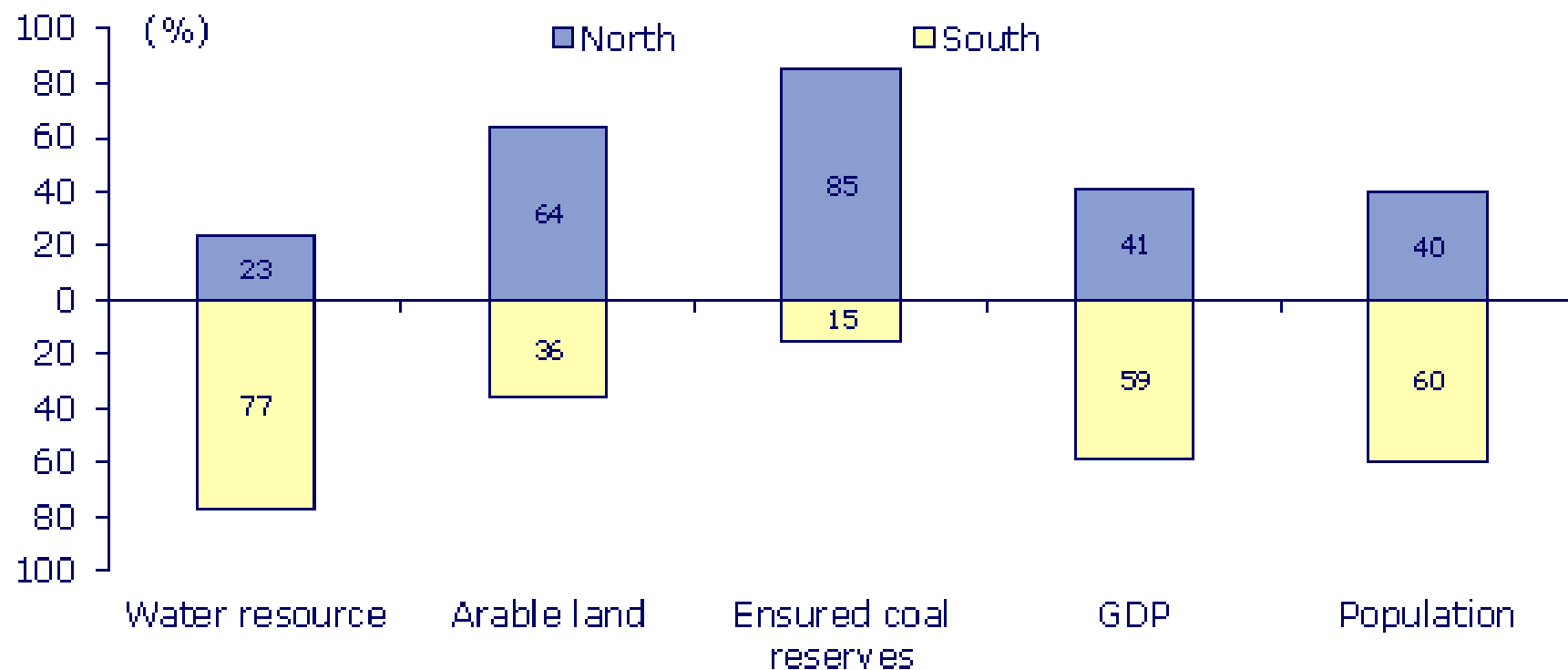
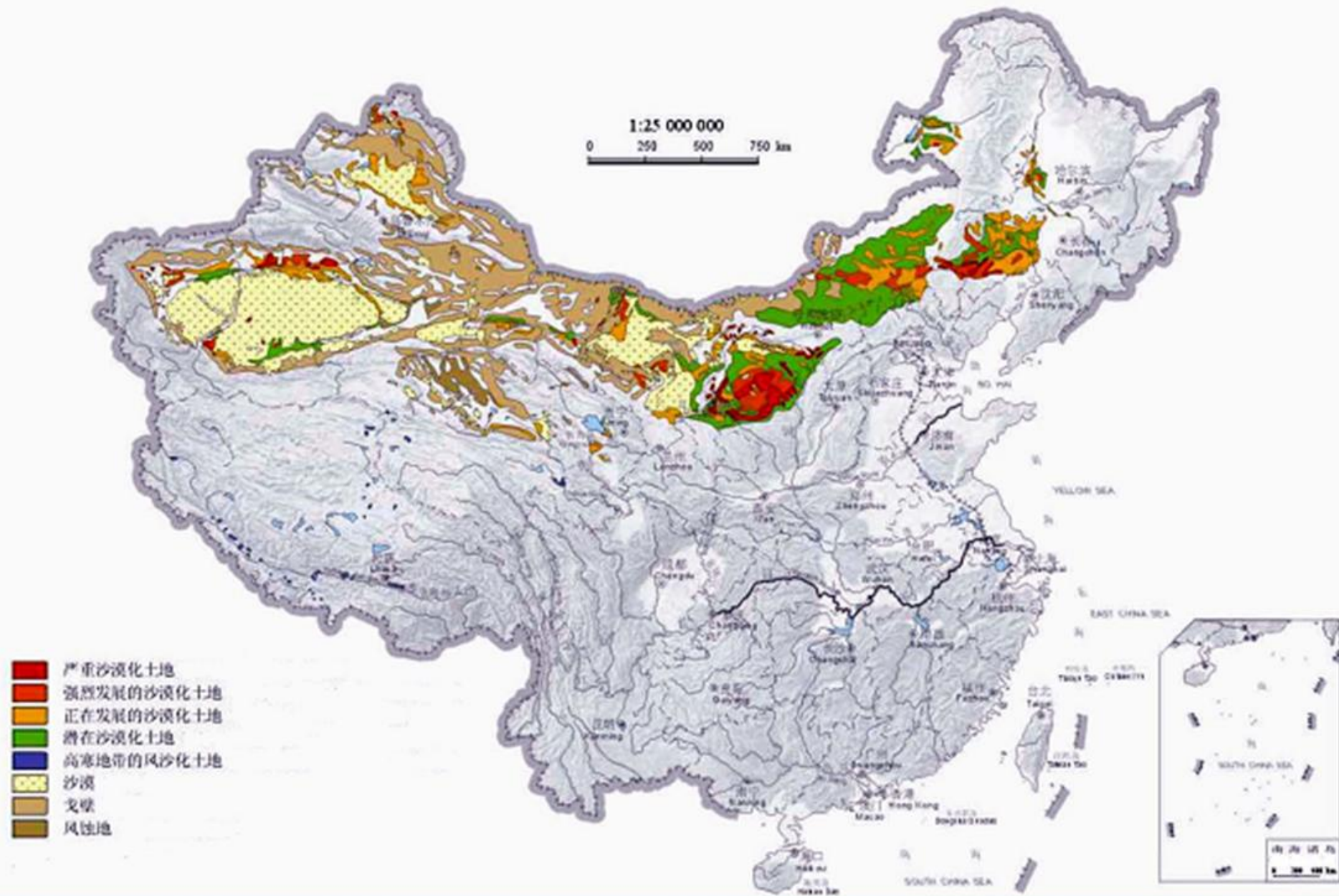


Figure 9

North vs south: Mix of key resources



Source: China Water Risk, www.chinawaterrisk.org





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Choke Point: China/中国之瓶颈:水匮乏与能源需求

Since November 2010, researchers at Circle of Blue conducted research and reporting to examine how energy and water are being used in China. The findings, presented in text, photographs, and interviews (see the 12 stories below), provide compelling evidence of a problem that is readily visible in China and virtually certain to worsen. China, though, is not a narrative of doom and gloom. Conservation and efficiency measures that work. From 2009 to 2010, energy consumption increased by roughly 15 percent even as the economy

The growing collection of multi-media Choke Point: China is a joint Circle of Blue/China Environment Foundation and additional support from Vermont Law School and the Alpern Foundation.

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CHOKE POINT CHINA

**Confronting Water Scarcity and
Energy Demand in the World's
Fastest-Growing Economy**



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Woodrow Wilson
International
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China Environment Forum

Greenpeace Report Predicts Widespread Water Crises Caused by China's Northwestern Coal Power Bases

Press release - 2012-08-14

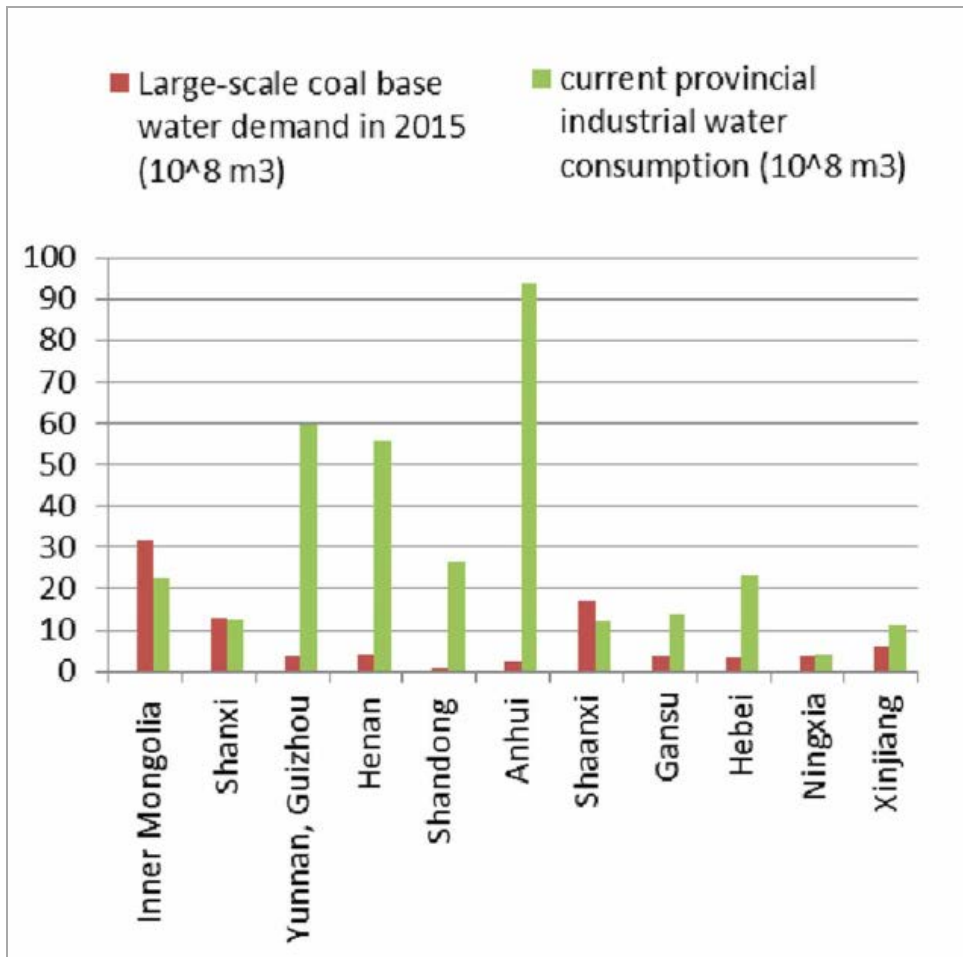
August 14, 2012, Beijing – At least some 10 billion cubic meters of water – equivalent to about one sixth of the annual total water volume of the Yellow River – will be consumed by 16 new coal power bases in China in 2015, triggering severe water crises in the country's arid Northwest, a new Greenpeace report claims.

"The truth is, in this part of the country, even a single drop of water is too precious to be squandered. China is basically trading water rights of millions for energy," says Li Yan, Greenpeace East Asia Climate and Energy Campaign Manager, also citing a statistic that says per capita water supply in China's coal-rich areas is one tenth of the national average. "It's plain sad to see that coal power bases add another layer of meaning to their dirty nature."

Greenpeace commissioned the Institute of Geographical Sciences and Natural Resources under the Chinese Academy of Sciences to carry out the study, which calculates the least amount of water required by the total of 16 coal power bases that China plans to construct during the period of the 12th Five-Year Plan (2011-2015). [View the report here.](#)



Water Disconnect



New Coal Power Bases:

14 large-scale coal power bases with a total expected installed capacity of 600GW, will be built, predominantly in driest part of country.

Expected Coal Power Base Water Consumption: 9.975 billion m^3 of water in 2015

Water Situation in the West:

2015 coal power base demand for water > Provinces' respective 2010 water consumption.

Expected Yellow River Pollution:

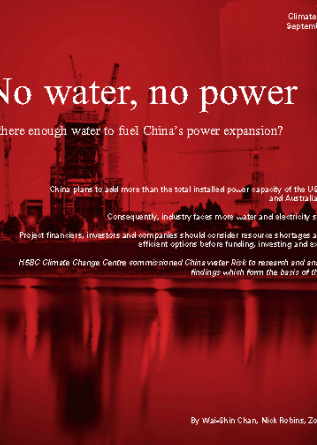
5 coal power bases currently located along the Yellow River discharge more 80 million tons of waste annually, which ultimately flows into the river stream.

Financial Community

“China plans to add more than the total installed power capacity of the US, the UK and Australia by 2030. Consequently, industry faces more water and electricity shortages

Project financiers, investors and companies should consider resource shortages and more efficient options before funding, investing and expanding.”

HSBC Global Research, Sept 2012

The background of the slide is a large, dark, and somewhat blurry photograph of an industrial construction site, likely a power plant. Several tall, dark smokestacks or chimneys are visible, rising from the ground. In the foreground, there are some lower-level structures and what appears to be a body of water reflecting the scene. The overall tone is dark and industrial. The text is overlaid on this background in white and yellow. The HSBC logo is in the top right corner, with the text 'HSBC Climate Change' and 'Global Research' below it. The date '8th September 2012' is also in the top right. The main title 'No water, no power' is in large, bold, white letters. Below it, a subtitle 'Is there enough water to fuel China's power expansion?' is in smaller white letters. The body text is in yellow and white, providing a summary of the report's findings. The authors' names are at the bottom in white. The footer contains the 'Disclosure and Disclaimer' section in white.

HSBC Climate Change Global Research

8th September 2012

No water, no power

Is there enough water to fuel China's power expansion?

China plans to add more than the total installed power capacity of the US, the UK and Australia by 2020

Consequently, industry faces more water and electricity shortages

Project financiers, investors and companies should consider resource shortages and more efficient options before funding, investing and expanding

HSBC Climate Change Centre commissioned China Water Risk to research and analyse the activities which form the basis of this report

By Wai-kin Chan, Nick Robins, Zoe Knight

Disclosure and Disclaimer This report must be read with the disclosures and analyst certifications in the Disclosure appendix, and with the Disclaimer, which forms part of it

17 October 2012

HSBC China
Global



HSBC China
Global Research

Weaning China off coal

Efficiency, water, pollution and carbon drive lower intensity

China could deliver higher reductions in carbon intensity than expected on the back of structural changes in the economy, water scarcity, efforts to tackle air pollution and carbon intensity targets.

China's economically balanced growth model, with coal accounting for the three-quarter carbon emissions (CO₂) emissions, may help and drive growth in coal consumption to meet demand in a convergence of economic and environmental drivers.

We expect China to meet its 2020 target of 45% CO₂ reduction in carbon intensity (carbon/GDP) with a balance of several (a) economic and technological change in energy solutions (Chart 1). The resulting abatement is constrained by a lower technological advance, leading to a peak in coal use and a gradual decline in the remaining demand. Peak coal use in carbon intensity is over 10% of the 2005 level. However, we believe that peak demand growth is only 70% of what has been the case in the past. The amount of CO₂ required for a carbon intensity target of 50% from 2005 is 1.6 times. That's a reduction in demand would mean China needs to reduce CO₂ output 20%.

China's coal use is not 100% dependent on the domestic developed sources, but, largely, it is not a structural change. The power sector accounts for the almost 60% of total coal consumption in China. In *China Daily* (September 2012), an article states that the government will not give any support for the coal industry. The government is reducing subsidies and will not extend any of subsidies. As China's peak coal production in China may only peak 70% of the 2005 level, lower peak demand is mainly driven by technological and technological change, but, not coal. It is not likely to be brought in the management and carbon trading. The improved efficiency and management of resources could result in reduced demand and have a lower emissions.

Chart 1: China's demand for coal by peak demand growth scenario

Year	70% peak growth (Gt)	100% peak growth (Gt)	100% peak growth + 20% peak growth (Gt)
2005	0.00	0.00	0.00
2010	1.50	2.50	3.50
2015	4.50	6.50	8.50
2020	3.50	5.50	7.50

Source: HSBC Global Research, HSBC, IREX, EIA, BP, IEA, 2010

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Asia China

3 March 2013

Asia Economics Special

China: Big bang measures to fight air pollution

To produce air pollution to an enviable level, China will have to drastically change its policies on energy, auto, environment and public transport systems.

George J. P. WHO said to be health implications call for sign PM2.5 policy changes. With the onset of the air pollution in Beijing, the Chinese government has in mid-January issued a PM2.5 standard and the massive press coverage of air serious health implications, the public has been very concerned about the air quality. China's PM2.5 pollution is getting worse and worse.

Our PM2.5 reduction model shows that to reduce urban average PM2.5 to 35, by 2016, China should sharply reduce road and air consumption growth, and immediately increase investments in clean energy, public and suburban public housing. We propose a policy package that can achieve a reduction in the annual urban average PM2.5 by 20% in 2012, a 50% reduction in 2016 and a 75% reduction will require the following changes to current policies and programs, among others:

1. Reduce the annual average coal consumption growth by half (to 2%) from the current forecast of a 4% annual growth rate. This will reduce coal consumption by 25% from 247.5T, This means that China's coal consumption should peak in 2017, vs. the consensus picture of a peak around 2015.
2. Reduce cement emissions by about 76% in the coming 10 years vs. clean coal technologies.
3. Reduce emissions per car by more than 50% by enforcing high standards for gasol and car emissions and improving fuel efficiency.
4. Increase the annual growth rate of clean energy (gas, nuclear, hydro, wind and solar) by another 4pp to 26.1-26.5 vs the current forecast.
5. Reduce the 2016 target for passenger vehicles to 25.8mm vs the current expectation of 40mm. This will require a reduction in the annual average car sales growth to 5% during 2013-2015, or 20% in 2016, i.e. half the prior pace.
6. Increase the length of highways and subway by 60% and four-fold, respectively, from 28.5 to 46.5 thousand km by 2016. This will require a highway and a subway by 40% and 58%, respectively, from 2008-2016.

Our analysis shows that these new targets are technically achievable, and they target an economic growth, a fuel balance, and urban air quality. However, achieving a strong government will be the ultimate the opposition from interest groups.

Sectoral Implications

While our proposal is indicative in nature, we are confident that actual policy changes can move in the same direction as suggested. This would mean significant cuts in road and air consumption, and a massive increase in clean energy. It may be more cost-effective if the policy mix is adjusted to allow more use of alternative power sources and less use of coal. The impact on the auto industry will be limited as the new target level could offset it, domestic vs. imported.

Disclaimer: Asia (Hong Kong)

DISCLOSURES AND ANALYST CERTIFICATIONS ARE LOCATED IN APPENDIX

Deutsche Bank

Economics

China's GDP
China's GDP growth (YoY)
China's GDP growth (YoY)
China's GDP growth (YoY)
China's GDP growth (YoY)
China's GDP growth (YoY)

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Senior Director, China
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1. Reduce
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consum
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China
Power

28 March 2013

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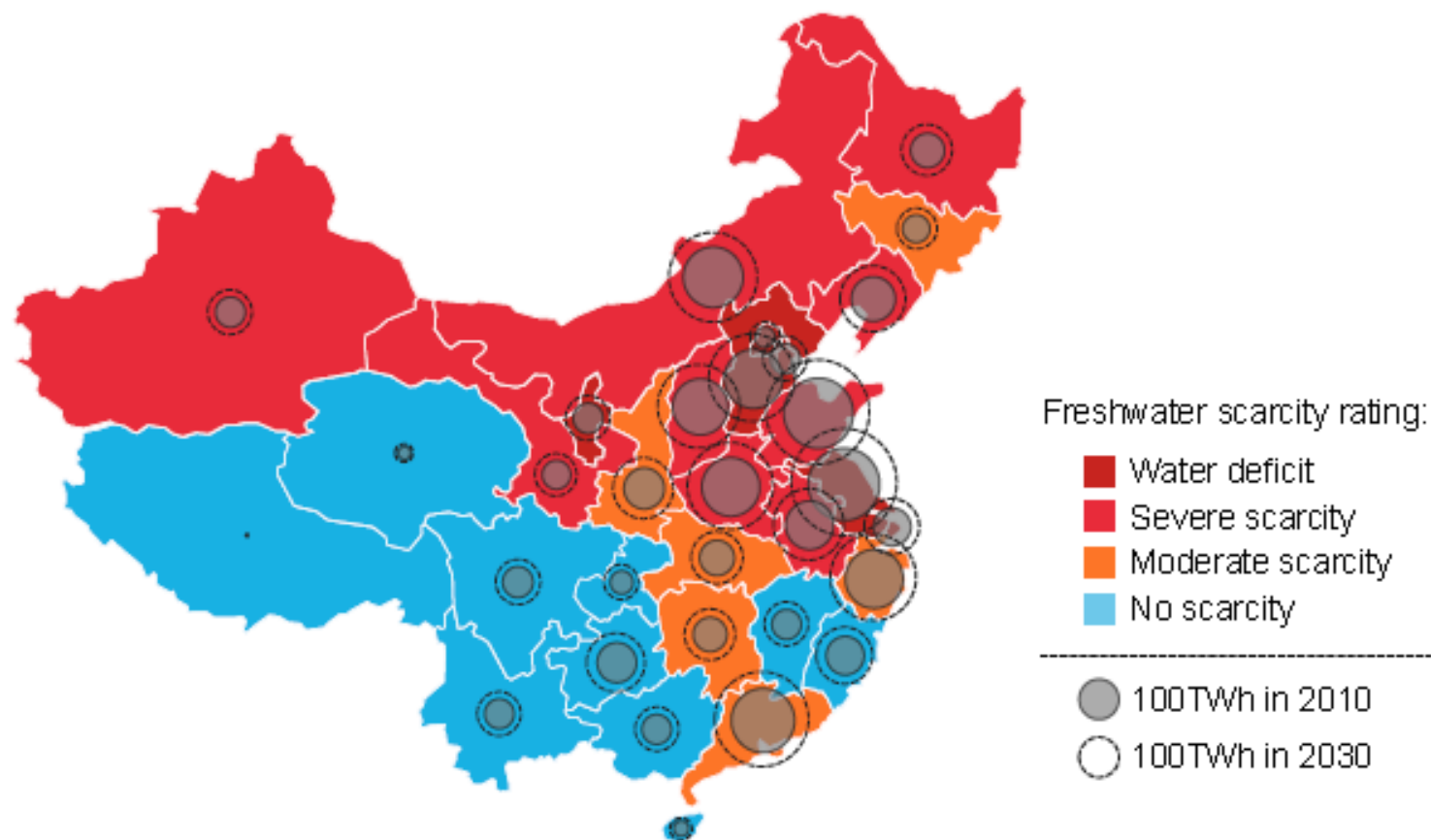
Water for coal
Thirsty miners will share the pain



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To produce air pollution to a safe level, China will have to drastically change its policies on energy, auto, environment and public transport systems.

Figure 9: Thermal power generation versus water scarcity by province in China, 2010 and 2030



Source: Bloomberg New Energy Finance, National Bureau of Statistics of China. Note: We define 'water scarcity' using a criticality ratio where a province is classified as having severe water scarcity if annual freshwater withdrawals account for 60-100% of the renewable resources, and moderate water scarcity if they account for 40-60%.

Air pollution



2013 twin conference. 3 blue sky during 14 days



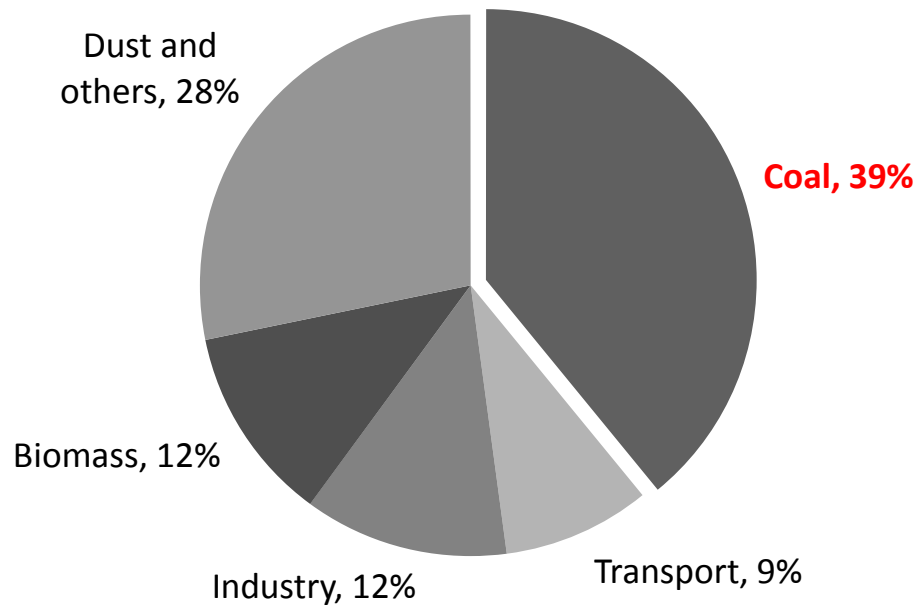
在宁夏内蒙古交界处，我看到一根根高大的烟囱吐着金黄色的烟尘遮蔽了蓝天，大片的草原成了工业废料的堆放场：刺鼻的气味让人咳嗽难忍：滚滚的工业污水流入黄河……

——卢广





Source contributions to PM2.5 in Beijing



National Wide

Coal contributes: SO₂ 75% NO₂ 85% NO 60% TSP 75%

CO₂ emission



Environment & Resource Constraints / Choke Points for unlimited growth of coal

Water Resource



Air Pollution



Carbon Emission





Environmental and Ecologic Losses from Coal Use and Exploitation Equivalent to 7-9% of Annual GDP



Policy dynamics

- Coal production and consumption revolution
- Accelerating coal bases development
- Systematically promote the shift of coal resource from a type of fuel to raw material (coal to gas, coal to oil, coal chemicals (olefin, etc.)



Is the future going to be greener?

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China's new premier Li vows to tackle pollution crisis

Mar 17, 2013

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Beijing: Chinese Premier Li Keqiang pledged on Sunday that his government would “show even greater resolve” in tackling China’s festering pollution crisis, a source of increasing public fury.

Li’s remarks at his debut press conference as premier were the highest-level public comments on the problem to date, though he gave few specifics about how the government planned to address the environmental effects of rapid economic growth.

Street-level anger over the air pollution that blanketed many northern cities this winter has spilled over into online appeals for Beijing to clean water supplies as well.



A coal cap?



Key Highlights



2 announced “allocated” caps:

- **Primary energy consumption cap:**
 - 4 billion metric tons of coal equivalent by 2015
- **Total Power use cap:**
 - 6.15 trillion kilowatt-hours in 2015

Repeat of previous targets:

2015 carbon intensity target: 16% drop from 2010

2015 energy intensity target: 17% drop from 2010

2020 carbon intensity target: 40 – 45% from 2005 levels

for 13th FYP: energy cap, but not coal cap





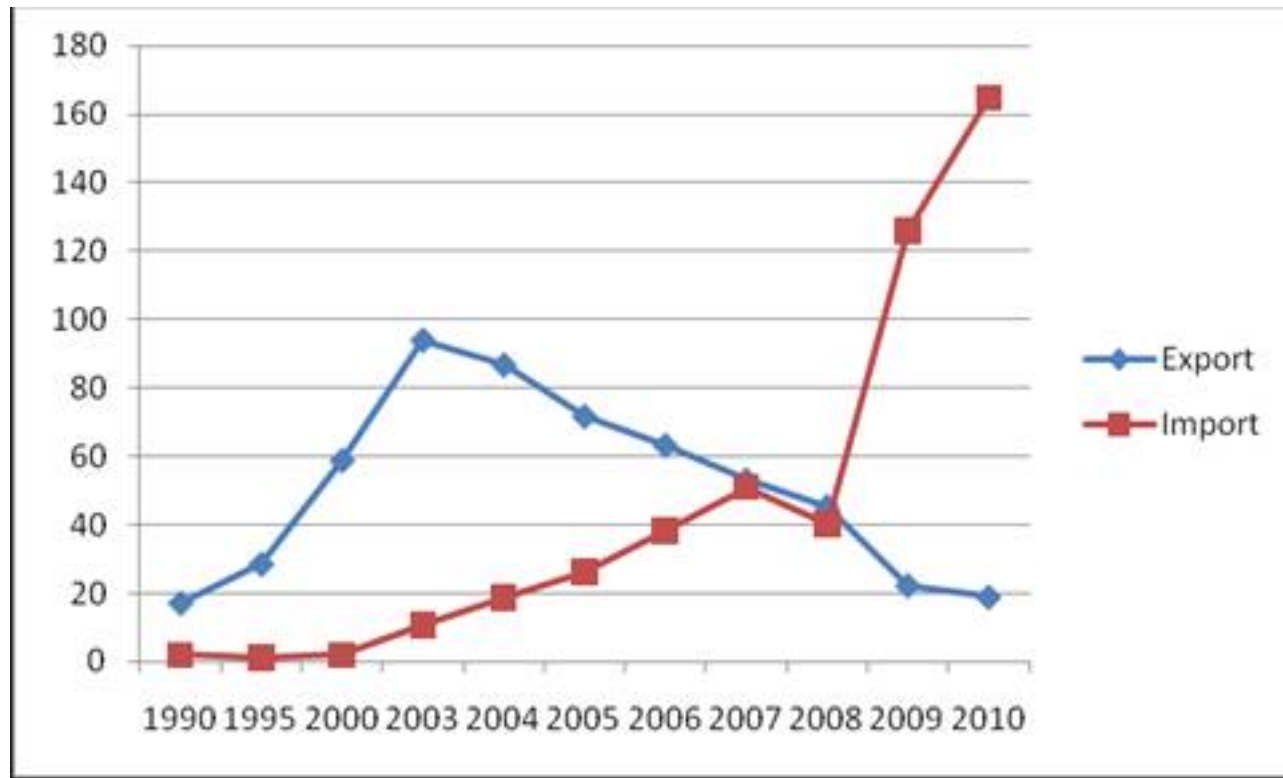
Breakthrough with
distributed Solar PV?

Coal import



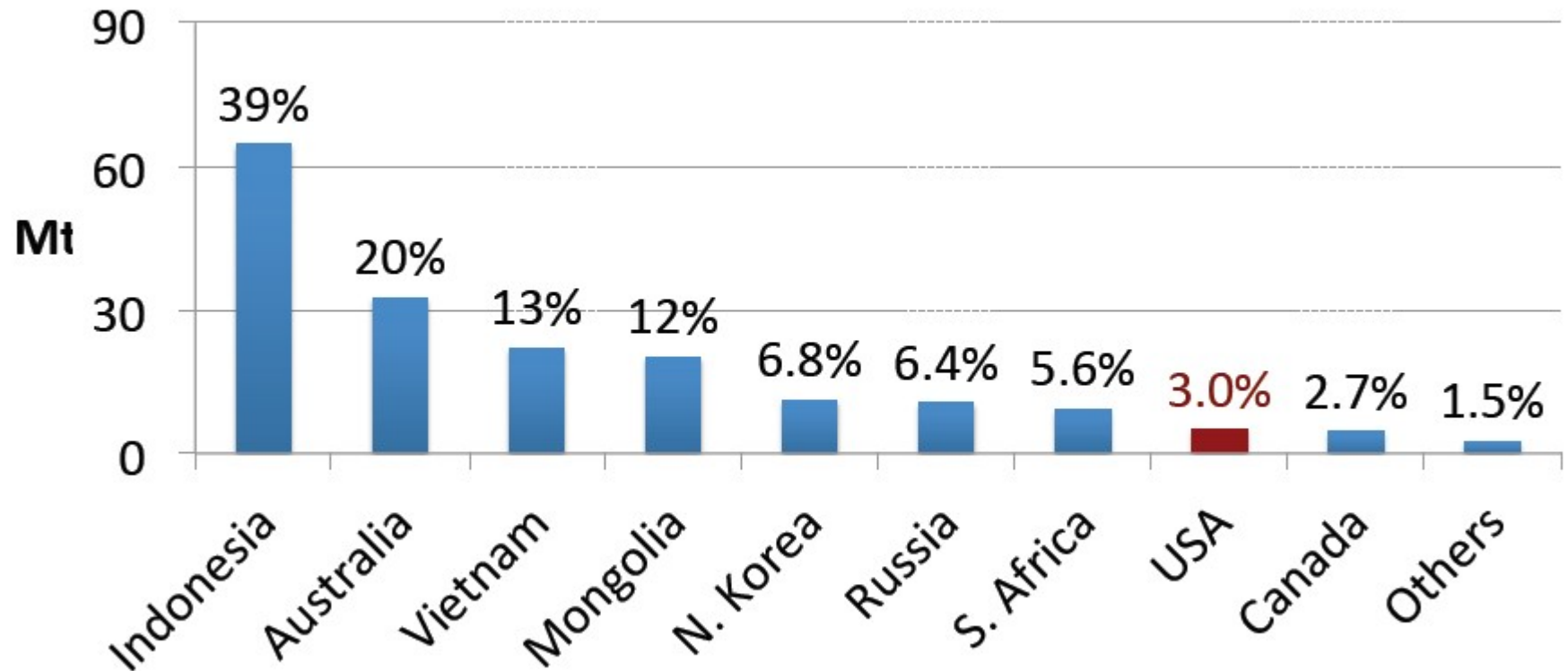
Surging coal imports

China's coal imports surged in 2009-2010, mainly due to rising domestic coal price. But imported coal is less than 5% of China's total coal consumption in 2010.



2013 coal import: **290 Mt**

Chinese Coal Imports by Country in 2011



Source: China Customs.

Outlook

- More in-depth research coal-environment conflict, particularly, coal-water nexus and air pollution, by government departments, financial communities, NGOs and academia circle
- Major coal policy adjustment in 13th FYP
- Energy cap, no coal cap
- Coal import sees great uncertainty in long term.

Thank you

qsun@greenpeace.org











Water grab

- Overexploit ground water
- Pump surface water
- Build dams
- Water diverting



Damages

- Ground water level decrease, vegetation die, and land degradation
- Water pollution
- Disadvantage groups exploited
- Social instability

