



MEETING CHINA'S SHALE GAS GOALS



David Sandalow
September 25, 2014

View of Pudong, Shanghai (1983)

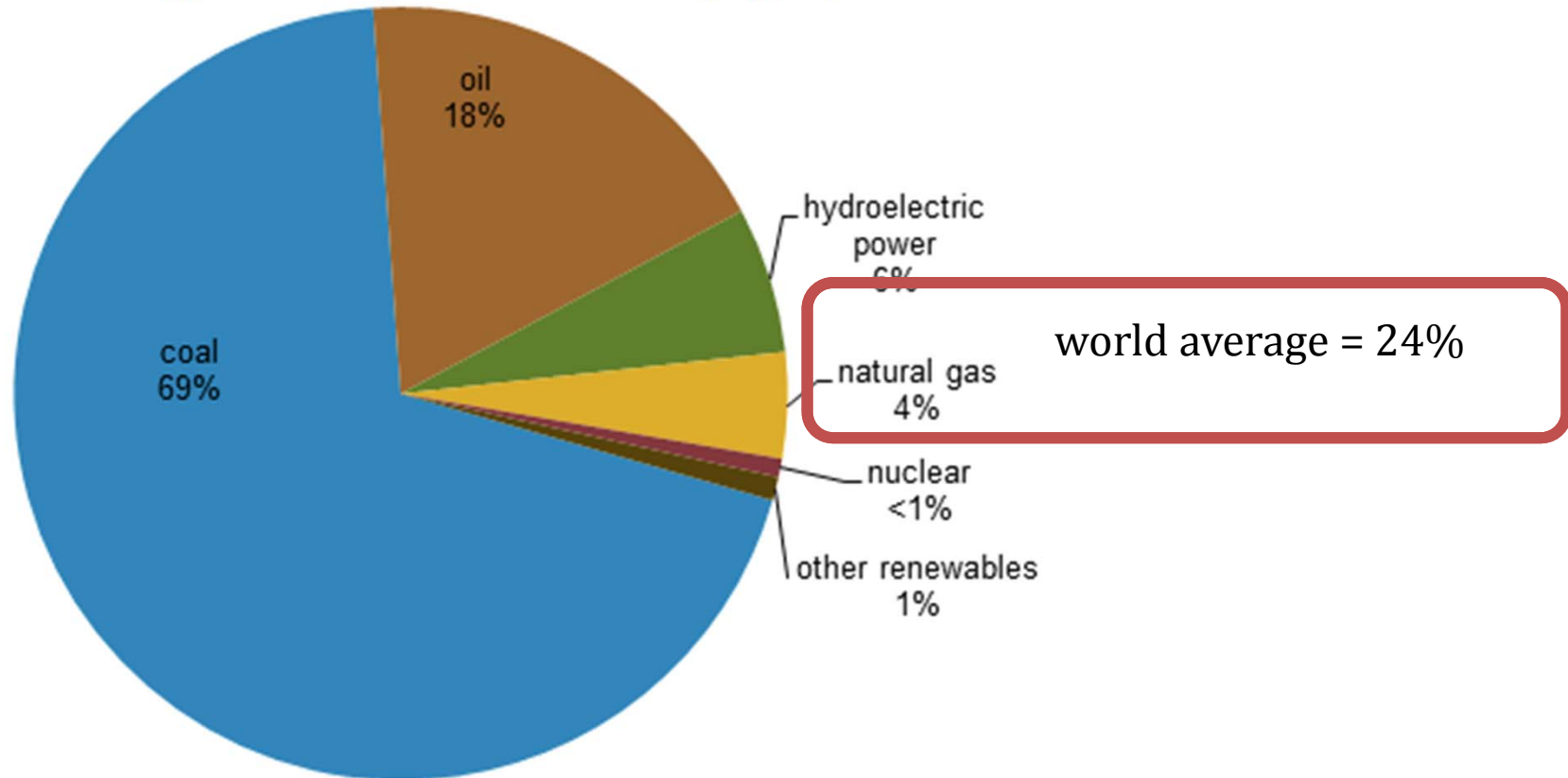



View of Pudong, Shanghai (2010)



Chinese energy sources

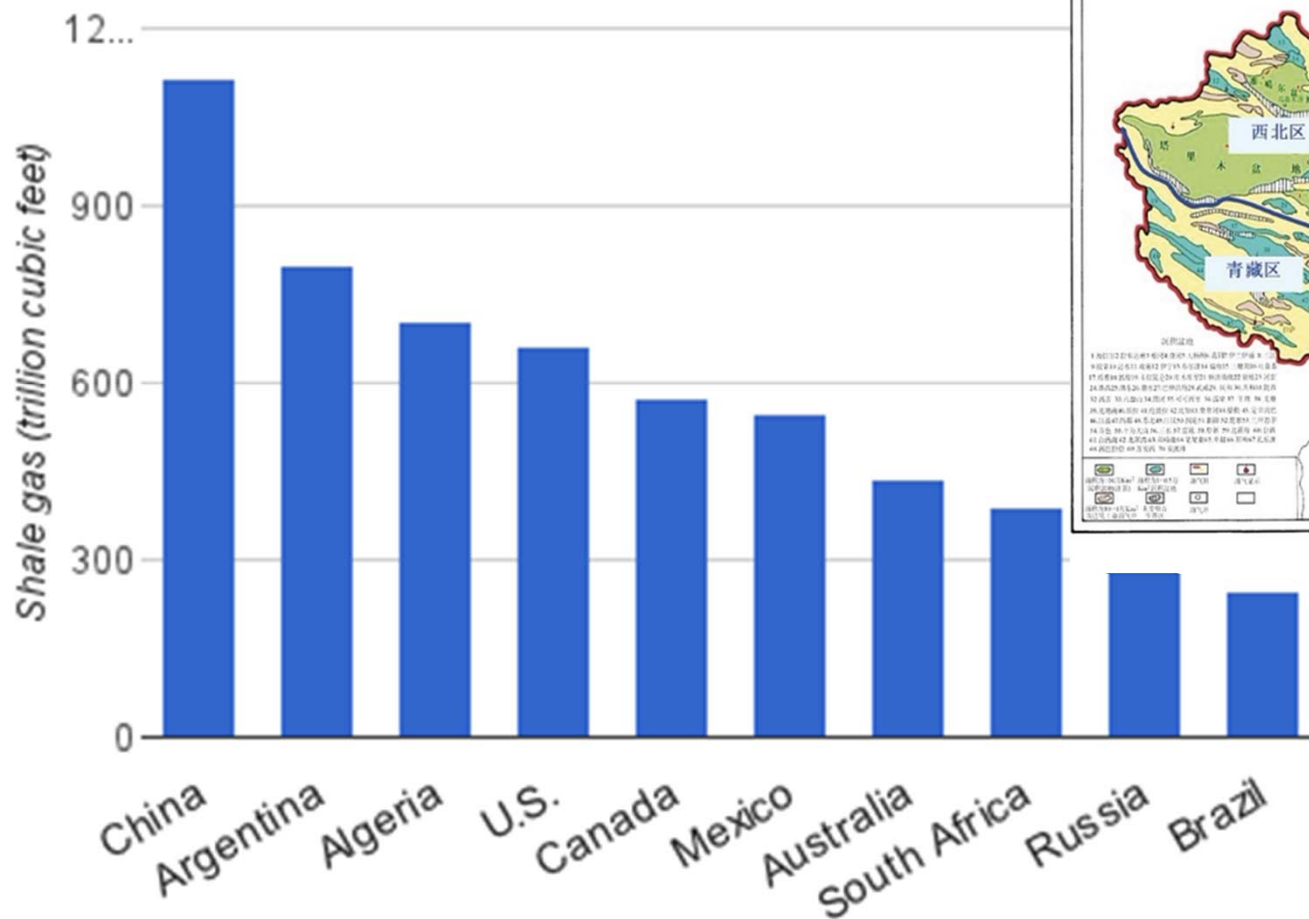
Total energy consumption in China by type, 2011



 Note: Numbers may not add due to rounding.
Source: U.S. Energy Information Administration *International Energy Statistics*.

Chinese Shale Gas Resources Are Vast

Top 10 countries with technically recoverable shale gas resources



Sources: U.S. Energy Information Agency; Ministry of Land and Resources (MLR), National Survey and Assessment of Shale Gas Resource Potential 2013



Drilling furiously: Chinese energy giants turn upbeat on shale gas

Fri, Aug 29 2014

By Charlie Zhu

HONG KONG, Aug 29 (Reuters) - China's energy heavyweights Sinopec Corp and PetroChina have upgraded their outlook on the country's shale gas industry, citing steadily declining costs, but stopped short of predicting a near-term boom.

China, estimated to hold the world's largest technically recoverable shale resources, is hoping to replicate the shale boom that has transformed the energy landscape of the United States. Industry experts caution that it would be much more difficult for China to monetise its shale gas reserves than the U.S. as it faces serious challenges from water shortages to complicated geological structure and a lack of infrastructure.

The
Economist

Natural gas in China Shale game

China drastically reduces its ambitions to be a big shale-gas producer

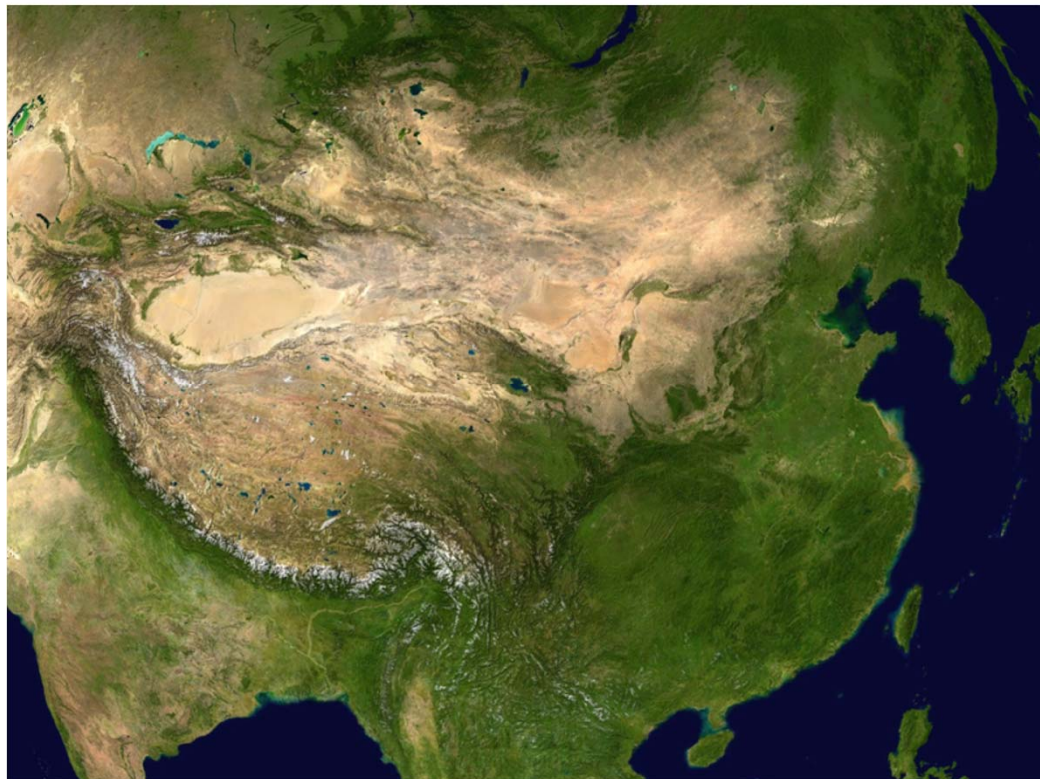
Aug 30th 2014 | From the print edition

IN 2012 China's main planning agency, the National Development and Reform Commission, declared that the country would produce 60 billion-100 billion cubic metres of shale gas a year in 2020. It needed those forecasts to be accurate.

They weren't. Wu Xinxiong, the director of China's National Energy Administration, recently predicted that only 30 billion cubic metres a year will come on stream by 2020. That would barely meet 1% of China's energy needs now, let alone in 2020.

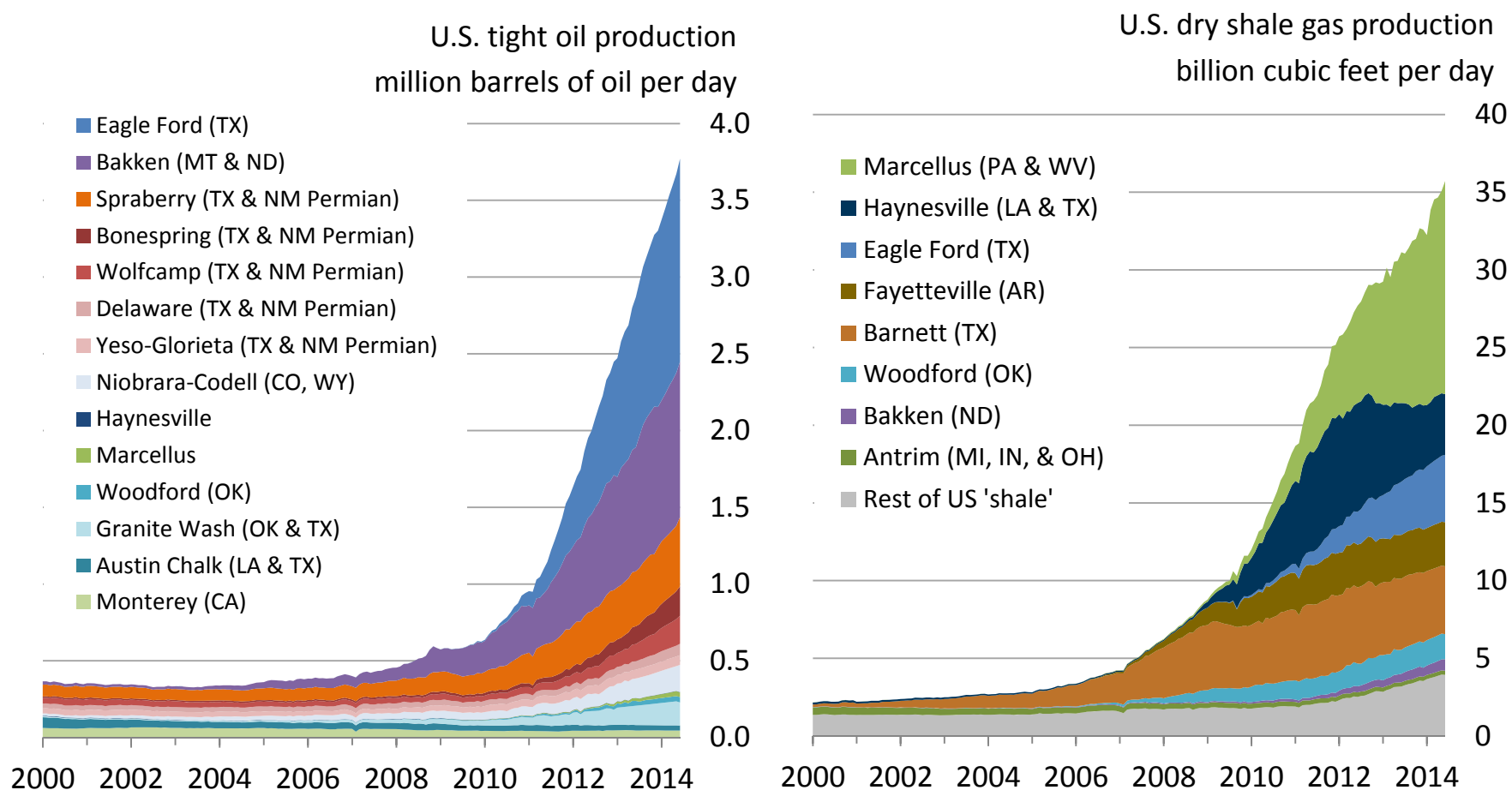
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US Tight Oil and Shale Gas Production 2000-2014

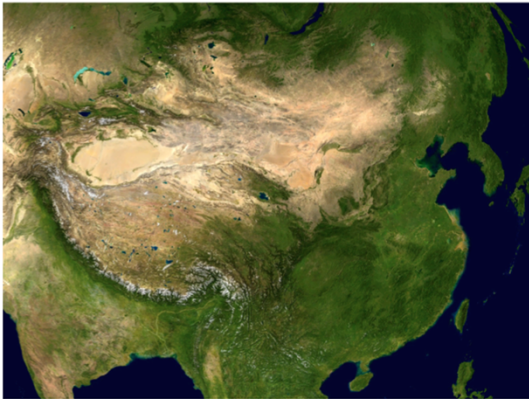


Sources: EIA derived from state administrative data collected by DrillingInfo Inc. Data are through June 2014 and represent EIA's official tight oil & shale gas estimates, but are not survey data. State abbreviations indicate primary state(s).

What Led to the US Shale Revolution?

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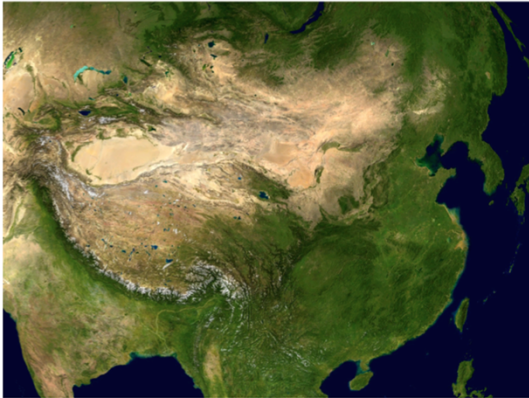
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- a large and high-quality shale resource
- a competitive market system
- private property rights
- federal government support for R&D
- federal tax incentives
- publicly available data
- an extensive pipeline network
- an entrepreneurial culture

Findings

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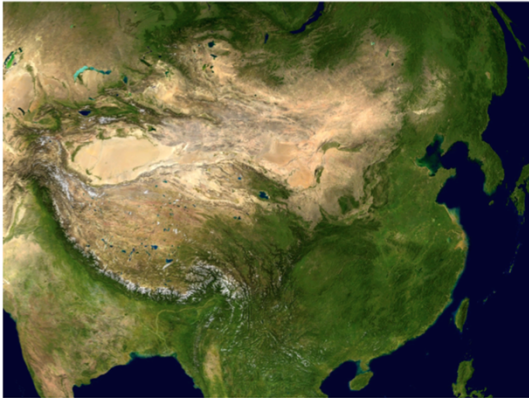
- *In the next few years, **Chinese shale gas production** will not be substantial.*
- *After that, high growth and low growth scenarios are both plausible.*

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Findings

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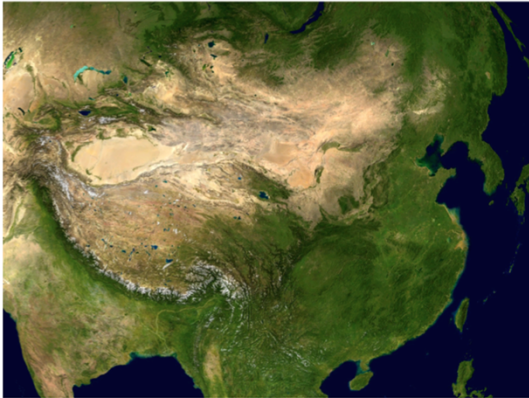
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- *Key barriers to growth include*
 - *high production costs*
 - *weak incentives for state-owned enterprises*
 - *lack of competition*
 - *restrictions on foreign businesses*
 - *limited data availability*

Findings

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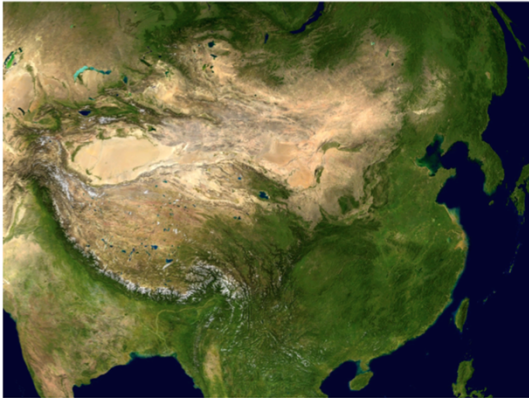
- ***POLICIES ARE KEY***

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Chinese Shale Gas Policies

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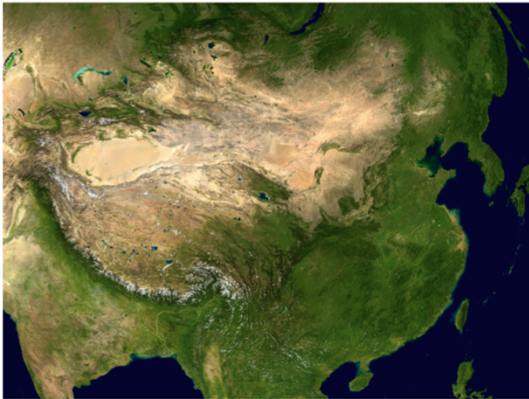
- Annual **production targets** of 6.5 bcm in 2015 and 60-100bcm in 2020.
- **Production subsidy** of 0.4RMB/cubic meter (roughly \$1.83/thousand cubic feet), which expires in 2015
- **Waivers of price controls and fees**
- **Provincial policies** (including shale gas development plans in Sichuan, Chongqing and Guizhou)

Findings (cont.)

- *Environmental impacts could range from very positive to very negative*

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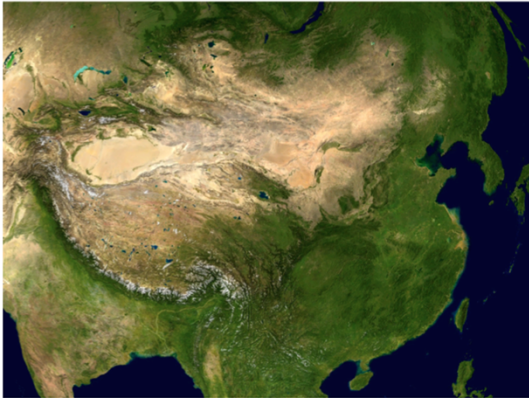


Findings (cont.)

- *Water supply constraints could be a factor in medium and long term*

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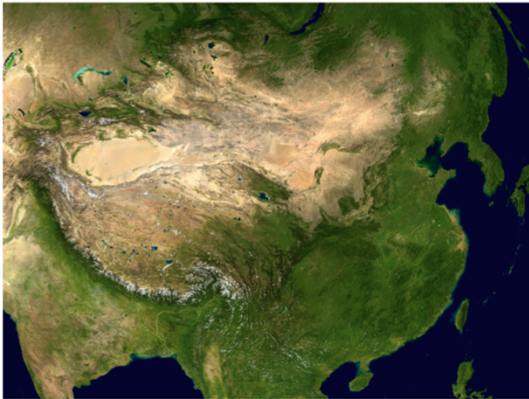


Findings (cont.)

- *U.S. and Chinese governments share common goals with respect to shale gas.*

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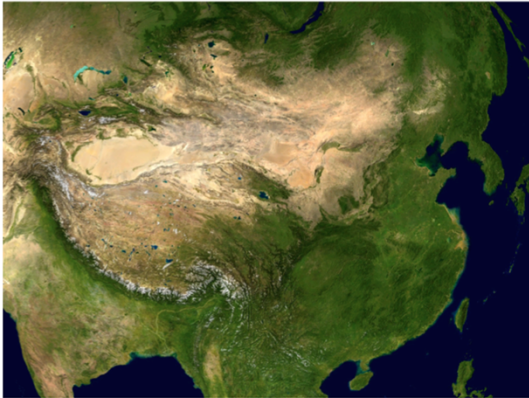
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Recommendations

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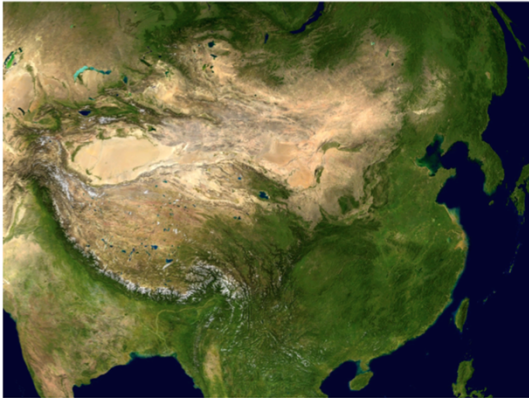
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- Accelerate market-based reforms
 - Continue natural gas price reforms
 - Speed pipeline reforms
 - Encourage competition for mineral rights
 - Improve data availability

Recommendations

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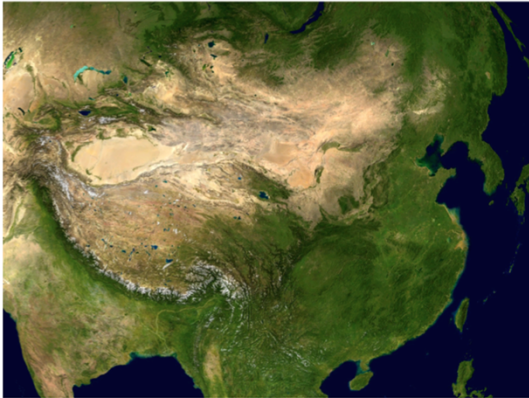
Provide clear roadmap for foreign companies

- Develop a model PSC
 - longer Production Period
 - no relinquishment oblig
 - right to participate in other hydrocarbons discovered
- Use “Rolling ODP’s”

Recommendations

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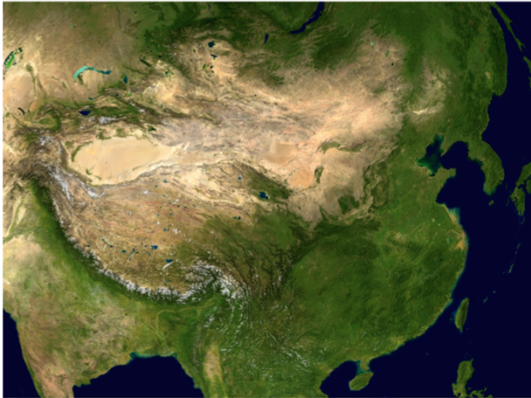
- Accelerate market-based reforms
- Provide clear roadmap for foreign companies
- Build regulatory capacity
- Invest in innovation



Recommendations

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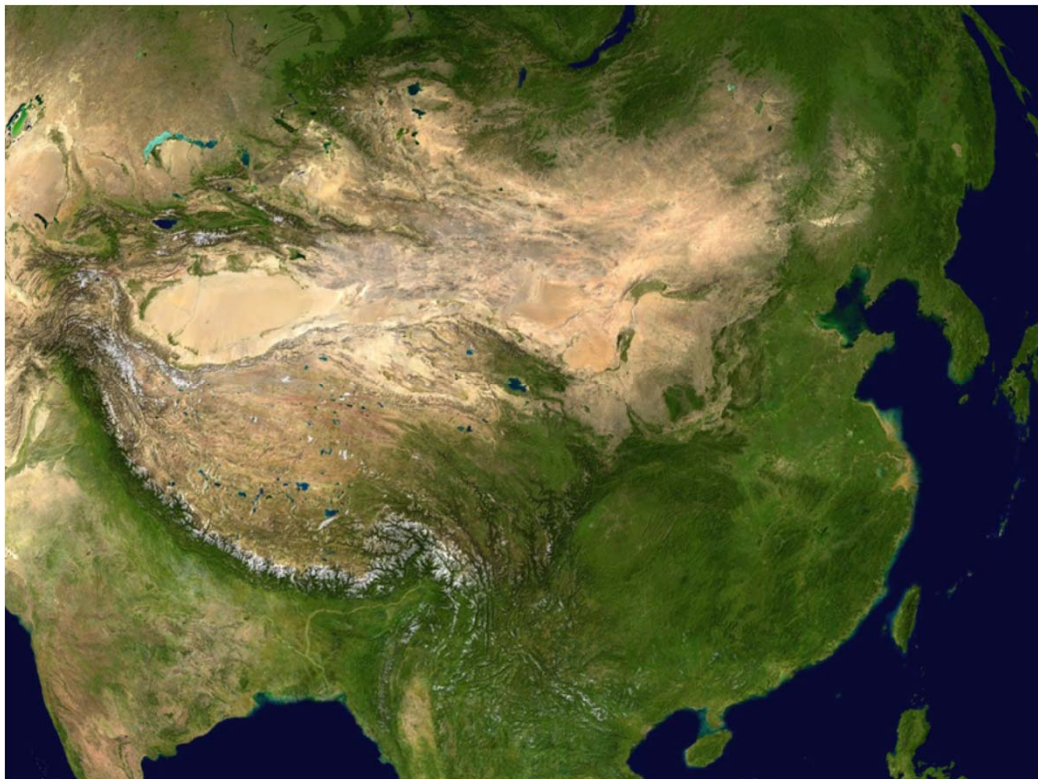


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- Accelerate market-based reforms
- Provide clear roadmap for foreign companies
- Build regulatory capacity
- Invest in innovation
- Coordinate among ministries

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