China’s Energy Development and Its Global Implications

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Energy

• Energy is NOT just Energy.
• Energy has a direct impact on almost all the major issues in the world today:
  – Development (*in all its aspects*);
  – Food;
  – Science & technology;
  – Capital & finance;
  – Climate change;
  – Environment;
  – Population;
  – Military;
  – Geopolitics;
  – War & peace; etc.
How Big Is China’s Economy?

China’s GDP as % of US GDP (2012):

- **China:**
  - Official Exchange Rate: 52.67%
  - PPP: 79.05%

- **Greater China:**
  (China + HK + Macau + Taiwan)
  - Official Exchange Rate: 57.53%
  - PPP: 87.35%
OECD re China as No. 1

- **OECD announced on November 2012 and reiterated this spring that:**
  - By 2016, China’s GDP will surpass USA.
  - By 2060, China’s GDP will be 28% of the world.
The Largest Energy Producer

• In 2012, China was the largest energy producer in the world.

• Total energy production was the equivalent of 3.62 billion ton of standard coal.
  – Coal at 66.4%;
  – Oil at 18.9%;
  – Gas at 5.5%.

• Per capital energy consumption was 2.68 ton standard coal.
  – About world average, but
  – Below developed countries.
Astounding Growth of Power

• In 2012, total installed capacity for power generation in China increased by 800 Million megawatts;

• Reaching a total capacity of 11.4 Billion megawatts.

• China’s TIC is growing the size of Britain's TIC every year.
Production vs. Consumption

– Coal
  • Domestic production = 3.52 Billion ton;

– Crude oil
  • Consumption = 490 Million ton
  • Domestic production = 207 Million ton;
  • Import = 283 Million Ton;
  • Finished oil products = 270 Million ton;

– Natural gas
  • Consumption = 147.1 Billion cm (13.0% increase);
  • Domestic production = 107.7 Billion cm (6.5% increase);
  • Import (including LNG) = 42.5 Billion cm (31.1% increase).
Energy Sufficiency

- China’s energy sufficiency rate was 91.4% in 2012.

- Self-reliance in energy development.
The Dominance of Coal

• In 2012, coal accounted for 66.4% of China’s energy production.

• (Globally, coal accounts for less than 30% of energy production.)

• Oil and gas = 24.4% of China’s energy production.
  – Gas @ 5.5%
Low Per Capita Energy Ownership

- **Coal:** 67% of the world average;
- **Crude oil:** 5.4% of the world average;
- **Natural gas:** 7.5% of the world average.

- Per capita energy consumption compared with the developed countries: $\approx \frac{1}{3}$. 
Natural Gas Consumption in China

- Natural gas: 5.5% of China’s energy production in 2012.

- (Globally, natural gas accounts for about 24% of energy production.)

- This means that even if China quadruples natural gas consumption, it will just reach the world average.
Non-fossil Energy

• In 2011:
  – #1 in hydro power capacity;
  – #1 in wind power production;
  – #1 in solar power manufacturing;
  – Growing solar power generation aggressively;
  – #1 in the construction of new nuclear power generating sets (26 under construction);
    • Nuclear generating capacity will reach 39 Million kw by 2015; and 86 Million kw by 2020 (reaching 5% of China’s total power generating capacity).
    • Total investment of Rmb1.2 Trillion from 2011 to 2020.
Non-fossil Energy (2)

• Non-fossil energy in China’s energy production:
  – 8.3% in 2011;
  – 9.1% in 2012;
  – 11.4% by 2015;
Non-Conventional Energy

• Increasing investment in E&P of shale gas, shale oil and oil sands.

• Goal: producing 6.5 Billion cm of shale gas in 2015.
  
  (Still a fraction of the US shale gas production of 180 Billion cm in 2011.)
Achilles’ Heel: Imported Oil

- Dependence on imported oil has increased from 32% around 2000 to ≈ 58% in 2012.
- Dependence on imported oil expected to go up to 70%.
- Consumption of oil by 2020: ≈ 700 Million Ton
- Potential dangers:
  - Maritime security for oil shipping;
  - Safety and security of cross-border oil & gas pipelines;
  - Major jump in imported oil & gas price;
  - Insufficient strategic reserves.
New Achilles’ Heel: Imported Gas

• Dependence on imported natural gas:
  – Became net natural gas importer in 2006;
  – Import @ 5.8% of total gas consumption in 2007;
  – Import @ ≈ 30% of total gas consumption in 2012.

• Consumption of natural gas:
  – 2001: 27.4 Billion cm;
  – 2012: 147.1 Billion cm;
  – 2020: ≈ 350 Billion cm.
  – At present
    • Natural gas = 5.5% of China’s energy production.
    • Only ≈ 14% of China’s populations is using natural gas.
  – 2015:
    • ≈ 250 Million people will use natural gas
    • (18% of the total population).
“We will go wherever there is oil!”

- Promoting international energy cooperation almost in all parts of the world: Africa, Central Asia, Gulf & Middle East, North America, South America, Australia, ASEAN.

- Improving coordination of domestic energy production and international supply.

- Promoting the establishment of a new international energy order.
Mega Trends in China’s Energy Sector

- **Gas**: Ordered to go up; to double in five years;
- **Crude oil**: Has to increase; adding at least 200 million tons to total consumption by 2020; may add 300 million tons instead;
- **Coal**: Ordered to go down: to 60%, or even 50%?
- **Nuclear**: Need to go up: to 5%, or even 10%?
- **Hydro**: How much more can it grow?
- **New & Renewable**: Has to keep faith and keep making efforts. But, alas, when can they really hold up a piece of the sky?

- **The great variables**:
  - Shale gas & gas hydrate: When and how can they be developed en masse? (Shale gas as a bonus; or as an insurance policy)
  - Improving energy efficiency: How to improve? How much to improve?
Pillars of China’s Energy Strategy

- Energy savings!
- Maintain more or less energy sufficiency at home;
- Diversify energy supplies, especially oil and gas;
- Total energy policy: leave nothing out;
- Environmental protection;
- Deepen political and economic reform: how to deal with the SOE monopoly?
- Increase international cooperation;
- Improve people’s livelihood;
- Promote innovation in energy production and consumption;
- Build a safe, stable, economic and clean modernized energy structure;
- Promote sustainable energy development.

- Since China lives in a glass house as far as energy is concerned, China wants to be friends with all, and be enemy with none.
If There Were No SG

• For China:
  – Continue to rely heavily on coal;
  – Need to dramatically increase import of oil;
  – Dependence on imported oil may go up to as high as 80%;
  – Worsening emission problem;
  – Greater environmental degradation;
  – Increasingly fragile and unstable geopolitical situation relating to energy security.
If There Were No SG

• For the USA:
  – Continue to rely heavily on imported O&G, especially from politically unstable countries and regions;
  – Deteriorating job crisis;
  – Worsening federal and local budget deficits;
  – Worsening debt crisis;
  – Increasingly pessimistic prospect for the future of America.
If There Were No SG

• For China and the USA:
  – China and USA would continue to import a lot of O&G;
  – China and USA would eventually compete for the same barrel of oil;
  – Greater shortage of oil;
  – Higher oil prices,
  – Eventual confrontation or even war over energy.

• The world without SG would be a terrifying world.
America’s Energy Independence

• Energy independence will be America’s Second Independence.

• America is moving aggressively to achieve EI, mainly by focusing on SG.

• By 2020, half of its crude oil consumption may be domestically produced.

• By 2035, America may no longer need to import crude oil from the Middle East.
What Will SG Bring?

• Abundant supply of gas;
• Cheaper gas prices;
• Cheaper oil prices;
• Less dependence on oil;
• Less dependence on coal;
• Less emission and pollution;
• Etc.
What Will SG Bring?

• Less dependence on the Middle East;
• De-strategization of oil;
• Moot the potential competition between China and USA over the same barrel of oil;
• Moot the potential confrontation between China and USA over energy competition.
• This will help significantly reduce the potential friction and confrontation between China and USA. This has profound war & peace implications for decades to come.
The Abundance of Gas

“The Abundance of Gas

“Gas, gas, everywhere, 
Quite a lot is from shale.

“Gas, gas, everywhere, 
Not a single cube to waste.

“Gas, gas, everywhere, 
Age of oil is to end.”

“Gas, gas, everywhere, 
Age of gas is at hand.”

--- Victor Gao (at the 2nd Int’l SG Conference in Seoul, September 10, 2013)
SG in Transition

- Moving from “unconventional energy” to “mainstream energy”;
- Moving from a possibility to a reality;
- Moving from a dispensable and insignificant thing to a major energy contributor;
- Moving from the margin of the energy sector to its center stage;
- Creating a real revolution in energy;
- The SG revolution will spread from USA to China and elsewhere.
From O&G to G&O

• The age of O&G will come to an end.

• The age of G&O will arrive.
From O&G to G&O

• Personal disclaimer:
  – GAO 高
  – G&O
Global Implications

• The SG-triggered global energy revolution will have profound implications to many stakeholders in the world:
  – Producers of O&G;
  – Exporters of O&G;
  – Importers of O&G;
  – Traders of O&G;
• The current supply & demand patterns in O&G will change profoundly.
• The prices of O&G will change profoundly.
• Anyone who fails to grasp the profound significance of the SG-triggered global energy revolution will do so to his or her own harm.
How Much SG Does China Have?

- China is the most “substantive” country in the world: average altitude at 1,141 meters;
- 6 million sq.km of land (total = 9.6 million sq.km) has SG reserves.
- China has the largest SG reserves in the world;
- Total SG reserves at 134.42 trillion cubic meters (not including the Qinghai-Tibet plateau and China’s off-shore areas).

- The abundant SG reserves will boost China’s confidence in its energy security and reduce its fear of vulnerability.
Gas Hydrate

• Preliminary estimates also indicate:
  – China has gas hydrate reserves equal to 60 billion tons oil equivalent in the offshore areas; and
  – Equal to 35 billion tons oil equivalent in the permafrost areas in the Qinghai-Tibet areas.

• This will further enhance China’s confidence in its energy security.
Barriers to Overcome

- Legal ownership structure;
- Water resources;
- Potential underground water contamination;
- Geological conditions;
- Pipelines and other infrastructures;
- Technologies and know-how;
- Economy of scale;
- Who wants to do what, why, when, and how?
China and SG

• Will China ever be a net exporter of G&O?
  – Impossible w/o SG, unless renewable sources of energy dramatically increase and become a major contributor to China’s energy consumption;
  – No longer impossible with SG.

• China itself controls the pace and process of how to develop its SG resources.

• The key is good speed, not great haste.
China Fully Supports America’s EI

• America needs to achieve EI:
  – To reduce dependence on imported energy;
  – To increase revenue and reduce deficit and indebtedness; and
  – To create more jobs.

• China has all the reasons to fully and wholeheartedly support America’s EI.

• The faster and the better America achieves EI, the better for China.
AmeriChina

• AmeriChina = America + China

• China will fully support America’s EI and is willing to provide:
  – Capital;
  – Equipment; and
  – Uptake for oil & gas produced in other countries thus freed up by America’s EI.
Chinada

• Chinada = China + Canada
• CNOOC + Nexen
• China can significantly help Canada to become an “energy superpower”, by providing:
  – Capital (US$100 Billion earmarked for the coming few years);
  – Equipment; and
  – Long-term, reliable and increasing demand.
Americhinada

• Americhinada = America + China + Canada
• A new trilateral oil & gas relations?
• China can provide capital and equipment to help America achieve EI.
• China does not need to import oil & gas from America, if US doesn’t want to sell it to China.
• China can provide capital, equipment and demand to Canada, especially when America no longer needs to import that much oil & gas from Canada in the future.
• A win-win-win situation.
The Rest of the World

- With America achieving EI, China can provide demand for the O&G that America will no longer import from the rest of the world, including the Middle East, Africa and Latin America.
- China will also increase energy cooperation with Russia, Central Asian countries, Australia, etc.
- What are the economic, strategic and geopolitical implications from this major shift in the global O&G market?
China & OPEC

• At present, half of China’s imported oil comes from the Middle East, and 1/3 of its imported oil comes from Africa.

• China will continue to heavily depend on OPEC members for its imported O&G for many years to come.
Energy Revolution

• We are faced with an energy revolution in the world, triggered mostly by SG.

• The rigid divide between conventional vs. non-conventional energies is fast coming down.

• America’s EI will profoundly change the existing supply-and-demand equations in the global energy sector, and will create profound geopolitical implications.
The De-Strategization of Oil

• Ever since the WWI, oil has been an important strategic commodity.
• Many wars have been fought for control of oil.
• Kissinger: Control of oil means control of the world.
• The energy revolution will result in the de-strategization of oil.
• America’s restless engagements in the Middle East and other regions are expected to be reduced significantly in the coming decades.
• America will be reshaped by its EI.
The Trans-Asia Pipelines?

- China and Turkmenistan already linked by pipelines, at 10,000 km at the longest.
- Turkmenistan gas is being supplied to China all the way to the Chinese coast.
- Turkmenistan is just one or several steps away from Iran and other Middle East countries.
- The closest distance between China and South Korea at sea is about 300 km;
- The closest distance between South Korea and Japan is about 100 km.
- Thinking the unthinkable?
- Making the impossible possible?
- A Trans-Asia Pipelines from the Middle East to East Asia, including China, South Korea and Japan?
China’s Ultimate Goals

• 20% of global economy
  – 11.51% in 2012 (official exchange rate).
  – 14.87% in 2012 (ppp).

• 20% of global trade
  – 2012 total foreign trade @ US$3.87 Trillion; at 47% of GDP.
  – 10.58% of global trade.

• 20% of IPR
  – China surpassed USA in 2011 as the largest country in the world in new patent applications.

• 20% of Fortune 500 companies
  – 95 in 2012 (Mainland China, Hong Kong and Taiwan).
China in the Coming Decade

• China will be the largest economy in the world.
  $\approx 20\%$ of the global economy; $\approx 20\%$ of global trade.

• China will be the largest importer of G&O, and will continue to invest in mega deals in G&O throughout the world.

• China will be a major investor in America’s G&O sector.

• America may start to export some G&O to China.

• Rmb will become a major reserve currency.

• China will have greater democracy and transparency and better governance and rule of law than today.
Thank you very much!

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