

Andrew Leung International Consultants Ltd

EU-Asian Energy Politics in the 21st Century

Macro-Economics & Micro-Business of Changing Energy Markets
(Rapporteur's brainstorming teaser)

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10-12 March, 2016

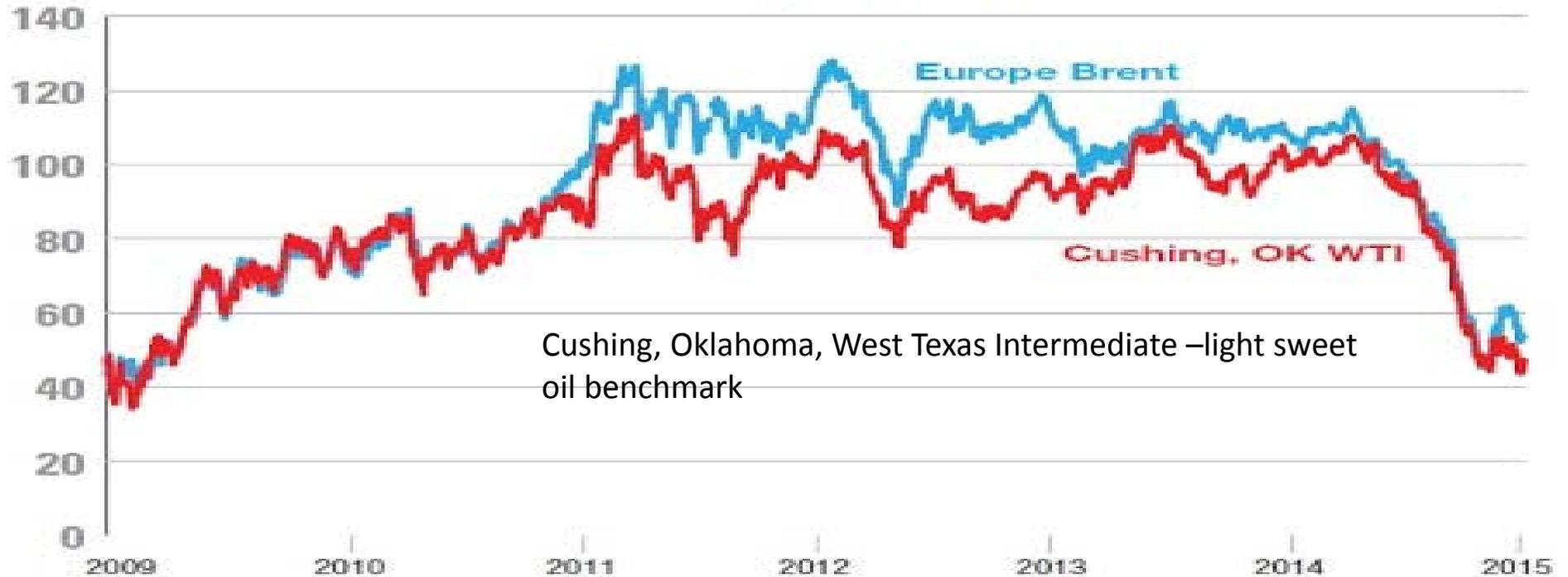
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(1) Plummeting oil prices – back to the future?

Oil Prices Jan 2009-Mar 2015 Dollars per Barrel



Cushing, Oklahoma, West Texas Intermediate –light sweet oil benchmark

Source: Thomson Reuters

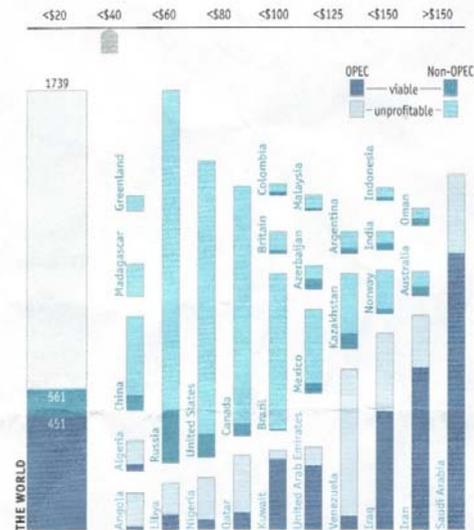
Struggling oil exporters change global energy politics

2/8/2015 Daily chart: Adjusting the taps on oil price | The Economist

Oil reserves

Economically viable oil reserves by price of Brent Crude, bns of barrels

Oil price
\$34.06/barrel
as of 05 Feb 2016



Sources: Rystad Energy; Quandl

HOW will the falling oil price affect profitability and production? Who pumps how much at what price? Depending on geography, some reserves are more expensive to exploit than others and only a high oil price can justify the costs. This interactive graphic allows you to choose an oil price and see its effect on OPEC and non-OPEC production and viability, broken down by country. Saudi Arabia and its Gulf neighbours, blessed by geology, manage to make a profit even when oil is at \$20 due to its readily accessible reserves.

America's shale belt used to only be profitable with oil at around \$100. But now efficiency gains have sent that down sharply. It takes a soaring oil price for Russia's giant but costly reserves to kick in. Oil firms involved in other hard-to-reach and inefficient reserves, such as oil sands in Canada, ultra-deep offshore deposits, and the Arctic, are also hoping for a return to three-digit oil. Using the graphic above, take your turn at the tap, tighten the squeeze, and feel the oil magnates' pain.

<http://www.economist.com/node/21957505print>

Oil price required for countries to balance their budgets

CURRENT PRICE
\$62



IRAN
\$137



OMAN
\$113



SAUDI ARABIA
\$105



IRAQ
\$98



RUSSIA
\$90



UAE
\$76



QATAR
\$65



KUWAIT
\$63

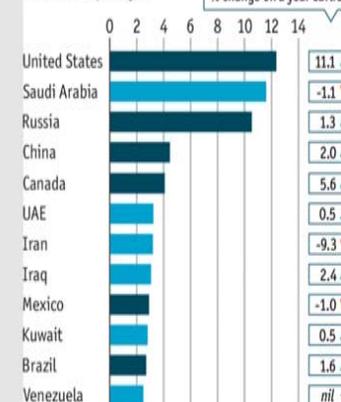


Sources: Bloomberg, IIF, Citi Research

The plunge in petroleum

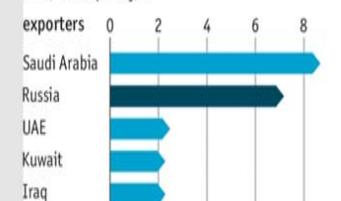
Biggest oil producers

2013, barrels per day, m



Biggest net oil exporters

2013, barrels per day, m



Biggest net oil importers

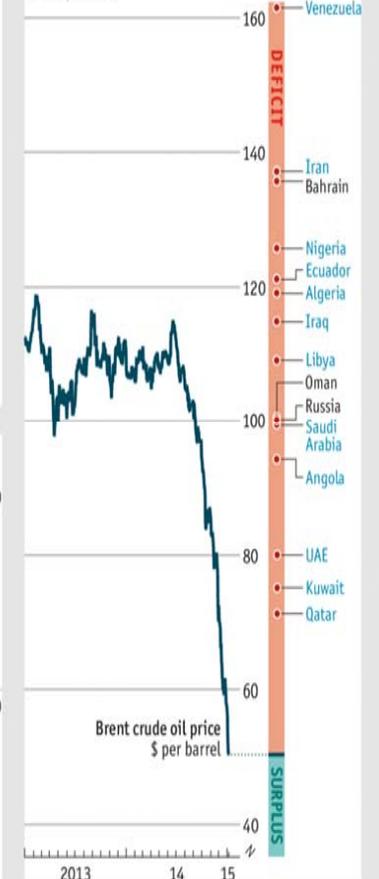
2013, barrels per day, m



Sources: EIA; Deutsche Bank; Bloomberg

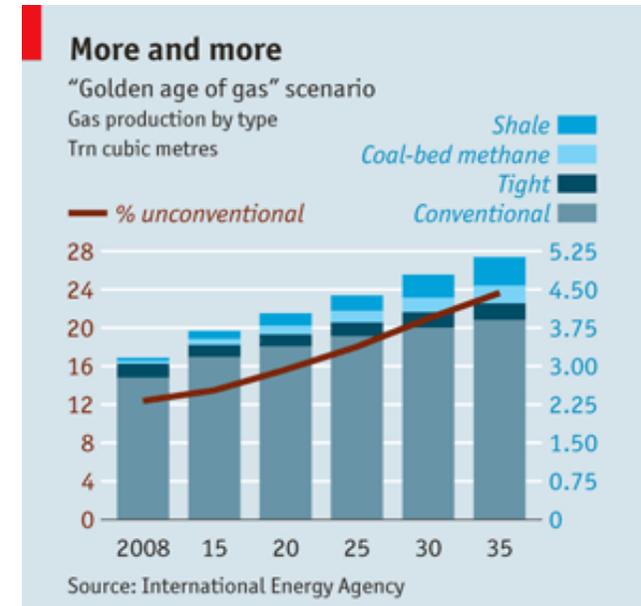
Government budgets' break-even oil price

2014, \$ per barrel



Economist.com/graphicdetail

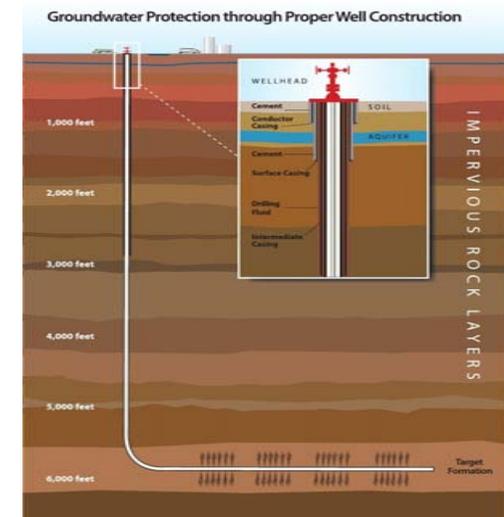
(2) The Golden Age of Gas



- **Conventional recoverable** = 120 yrs current consumption
- **Total recoverable** = 250 yrs
- **All major regions** at least 75 yrs
- **Share of natural gas** in global energy mix to increase from 21% to 25% overtaking coal by 2035
- **Non-OECD** = 80% total increase

Shale fracking's hidden environmental challenges

- **Massive water usage** - 1 – 5 m gallons@; surface or aquifer water depletion; ecological/ bio-diversity impact; truckloads of water transport –congestion and emission. *Xinjiang rich in shale but water scarce. Coalbed methane needs de-watering in extraction, highly salty and sodic.*
- **Toxic fracking fluid** (“múd”) - 750 secret ingredients, such as methanol.
- **Methane leakage** during production and transportation
- **Fluid leakage and seepage** to *aquifers*
- **Treatment of waste water** return rate (20 - 50%, *saline and slightly radioactive*)
- **Noise and fume**
- **Abandoned wells**
- **Liabile to cause earthquakes**
- **Highly energy- intensive, net energy- loser, worse than coal in carbon lifecycle**
- **Exponential depletion rate** –output *declines 60% - 70% 1st year*; maximum production a few years
- **Need to drill more and more wells.** Roughly 7,200 new shale gas wells to be drilled each year at simply to maintain current levels of production. As most productive locations are drilled, **drilling rates and costs will only increase** over time.
- Upfront funding turns increasingly to **high-interest junk-bonds** (20% of market)
- Massive supply drops as *crude prices below \$60@barrel in May, 2015 > ~ \$48 @barrel for shale drilling viability*, while higher efficiency may lower threshold.
- **China has 50% more shale gas reserve, though in much more difficult terrain.**
- **US to share technology** with China, likely biggest customer for US shale gas.



http://www.youtube.com/watch?v=dEB_Wwe-uBM

(3) Energy implications of a global era of massive urbanization

CHINA'S URBANIZATION

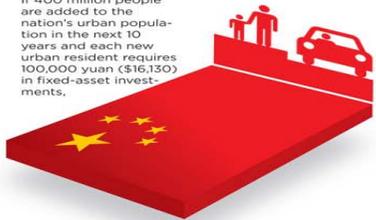


China's urbanization over the past three decades is a massive phenomenon of scale and speed. In the 1980's, in a very much "different" China, there were less than 200 million of "urban" population (a fifth of the total population). However, by 2011, 700 million (half of the total population) leave in urban areas, marking the ever largest population movement in the history of mankind. In 2012, China and EU have signed a cooperation partnership to for jointly addressing the challenges of urbanization.

HOUKOU

Urbanization in China is controlled by the hukou system, a household registration system introduced in 1958. The hukou system legally ties migrant workers to their rural home and was designed to keep rural residents working on the farms.

If 400 million people are added to the nation's urban population in the next 10 years and each new urban resident requires 100,000 yuan (\$16,130) in fixed-asset investments,



40 trillion yuan at least would be required for total investment in urbanization

120 million hectares of agricultural land, mark the «red line», for the Country being able to feed itself.

2011-2015 is the enforcement period of China's 12th Five Year Plan which explicitly calls for more urbanization and supports the emergence of giant megacities.

36 million units of social subsidized housing would be built in China by 2015 as central government declared in 2011.

In February 2010, the ministry issued the "National Urban System Plan" and designated five major cities as National central cities

Guangzhou
Beijing
Tianjin
Chongqing
Shanghai

70 years is the lease duration of urban land which is owned by the state to developers, enterprisers and private owners

30 years with extension option is the lease period of rural land which belongs to farmers.



During these 30 years, China's Urbanization rate has increased to 51%

China's urbanization

1980/200 million people approximately lived in cities.

2011/691 million people lived in cities, taking China's urbanization ratio to 51% and making China



During the last three decades, the Chinese urban population expanded by nearly 500 million - the equivalent of adding USA, UK, France and Italy

China has around 700 small cities with populations below 1.5 million.

Urban residents spend nearly 4 times than rural residents. In 2010 rural residents spent US\$600 per year.

The cost for extending the urban benefits and welfare to 300 million migrant workers, will be around US\$ 230 billion or 3,8% of 2010 GDP



1,25 million USD (\$m) is the least amount for entrepreneurs that have to invest in company creation in Beijing to be granted hukou.



20 million new inhabitants must be absorbed every year by China's cities



2020 is the year by which 10 million rural residents (the population of Greece) will have been moved into cities, as Chongqing plans.



60.000 bicycles available at 2200 rental points constitute the world biggest public bicycle rental scheme, established in Hangzhou.



The proportion of people cycling to work in Beijing, fall from 75% in 1986 to 18% in 2010.



Only 20% of Chinese cities meet the WHO standards for Sulphur dioxide and nitrogen dioxide, while almost no city meets the standards for particulates.

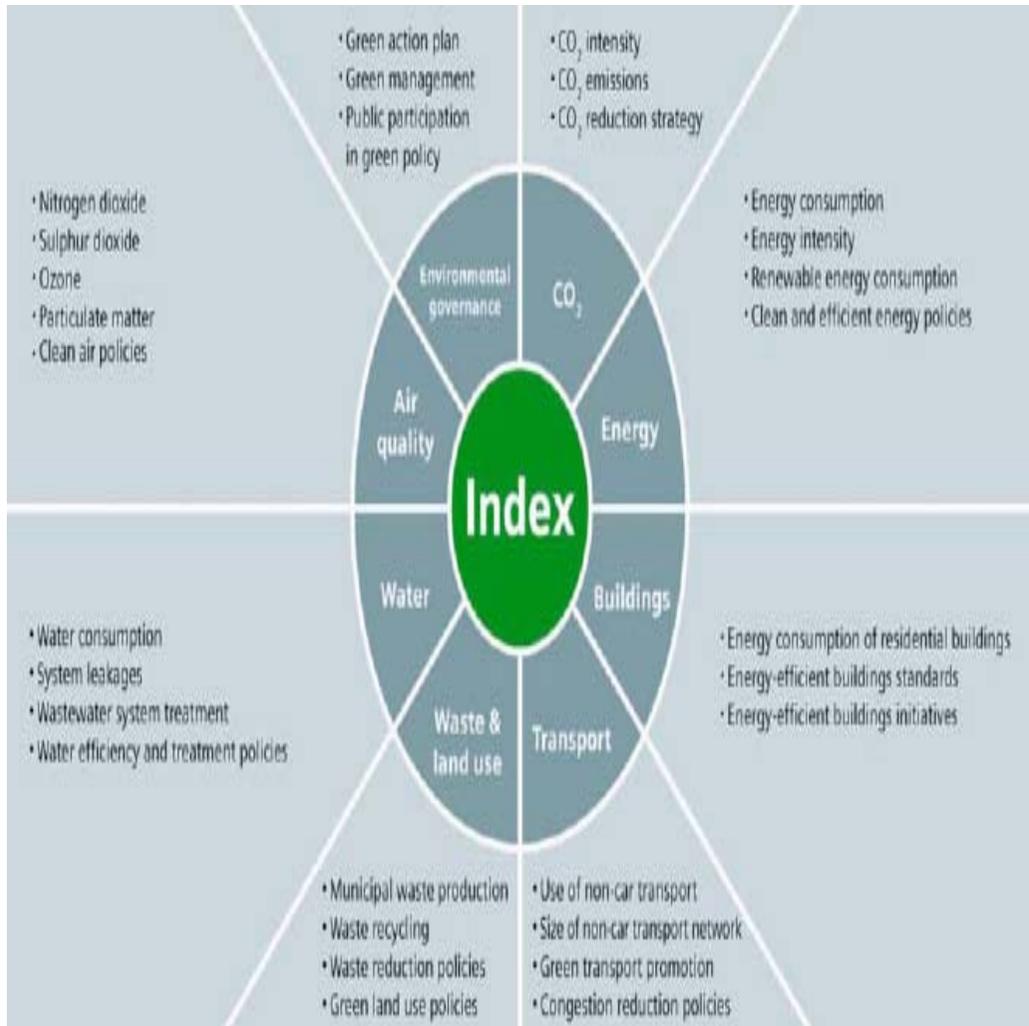


China cities emit 75% of the country's greenhouse gases.

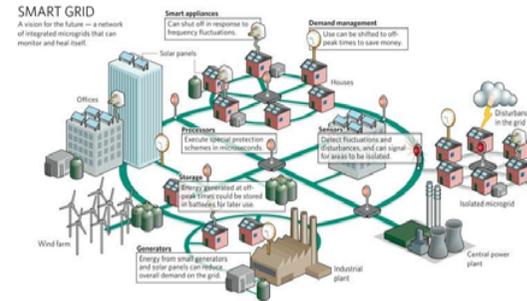
Produced by project or funded by member's PPP cooperation but wasn't part of the bilateral EU and China 5th year goal to address common challenges.

www.dragon-star.eu
The infographic is designed by GREEK INFOGRAPHICS

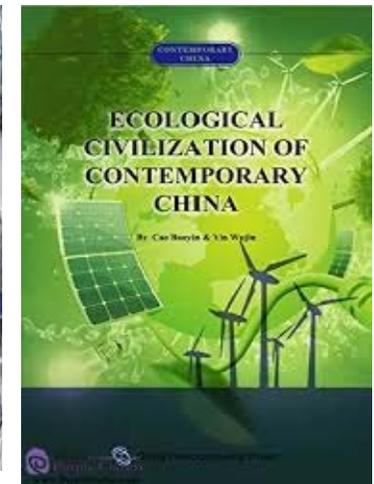
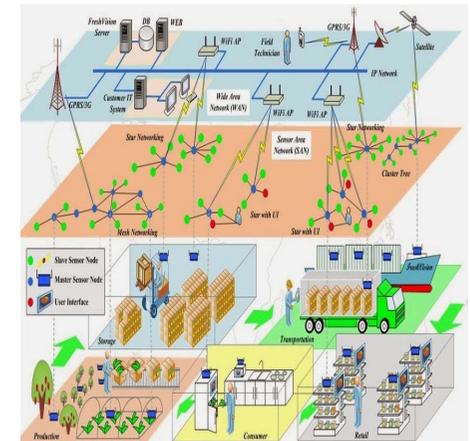
The holy grail of green and smart cities



Bloomberg (19 February, 2014), China spent more on smart grids than the U.S. for the first time in 2013, with \$4.3 billion invested, accounting for almost a third of the world's total.



Internet of Things

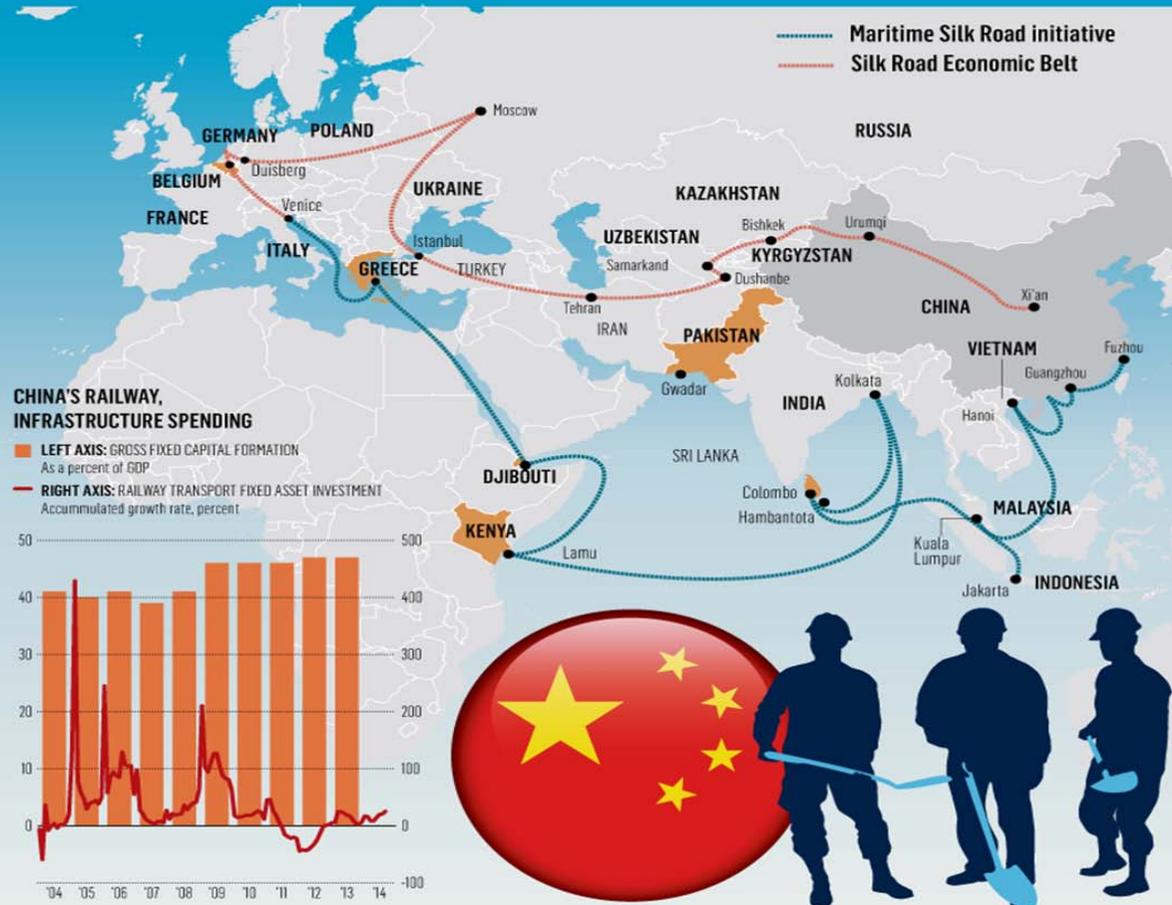


(4) China's monumental Silk Road game-changer

81,000 km (50,000 miles) high-speed rail to be built in 65 countries. Potential investment estimated at \$1.4 trillion = 12 x Marshal Plan (\$120b in today's prices)

CHINA'S SILK ROAD PUSH

China has just announced a multi-billion dollar fund to revive pancontinental land routes and develop maritime links, aiming to both expand commerce and perhaps give it more influence in a freight system dominated by European shippers.



According to Reuters calculations, China's state-backed firms have already invested at least \$5 billion in transport infrastructure over the past decade.

BELGIUM Antwerp	At least \$3.94 million
*Cosco Pacific bought a 25% stake in 2004. China Merchants later got a stake through its part-purchase of Terminal Link. The two now have a 25% interest in Antwerp.	
GREECE Piraeus Port	At least \$624 million
*Cosco Pacific, for the right to run and upgrade part of the port.	
DJIBOUTI Port of Djibouti	\$185 million
*China Merchants, for a 23.5% stake	
KENYA Lamu Port	Mombasa port \$484 million Lamu Port \$66.7 million
*China Road & Bridge *China Communications Construction Company	
Pakistan Gwadar port	\$198 million
*China paid for 80% of the port's Phase I	
SRI LANKA Hambantota port	At least \$1.9 billion Colombo Port City \$1.43 billion Colombo Port \$500 million
*China Exim Bank *China Harbour Engineering *China Communications Construction Company *China Development Bank	

Sources: World Bank, National Bureau of Statistics of China, Reuters

Silk Road Infrastructure Fund

- China contributes **\$40 billion** to set up a **Silk Road infrastructure fund** to boost connectivity across Asia, through **building roads, railways, ports and airports** across **Central Asia and South Asia**.
- To focus on **China's Silk Road Economic Belt** and the **21st Century Maritime Silk Road** initiative.
- To be **"open"** and **welcome investors** from Asia and elsewhere.



Wang
Yang,
vice-
premier

50
countries
are covered by the Silk Road
Economic Belt

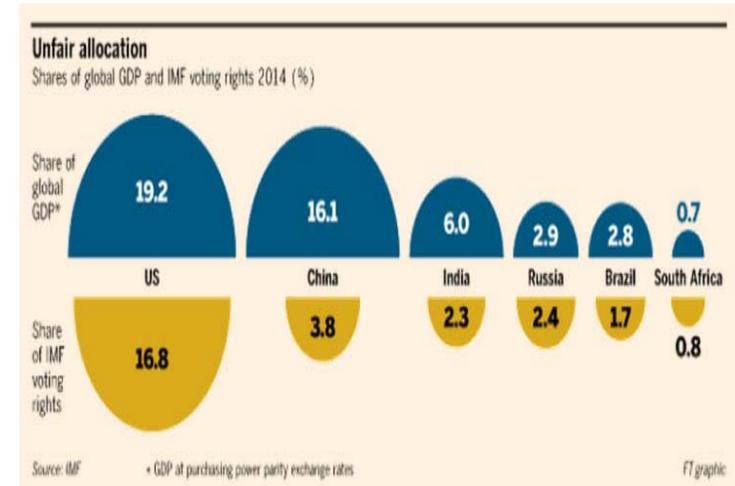
3.8
billion people
could benefit from the Silk Road
Economic Belt

60

The fund will help more than
this many Eurasian
countries upgrade their
infrastructure

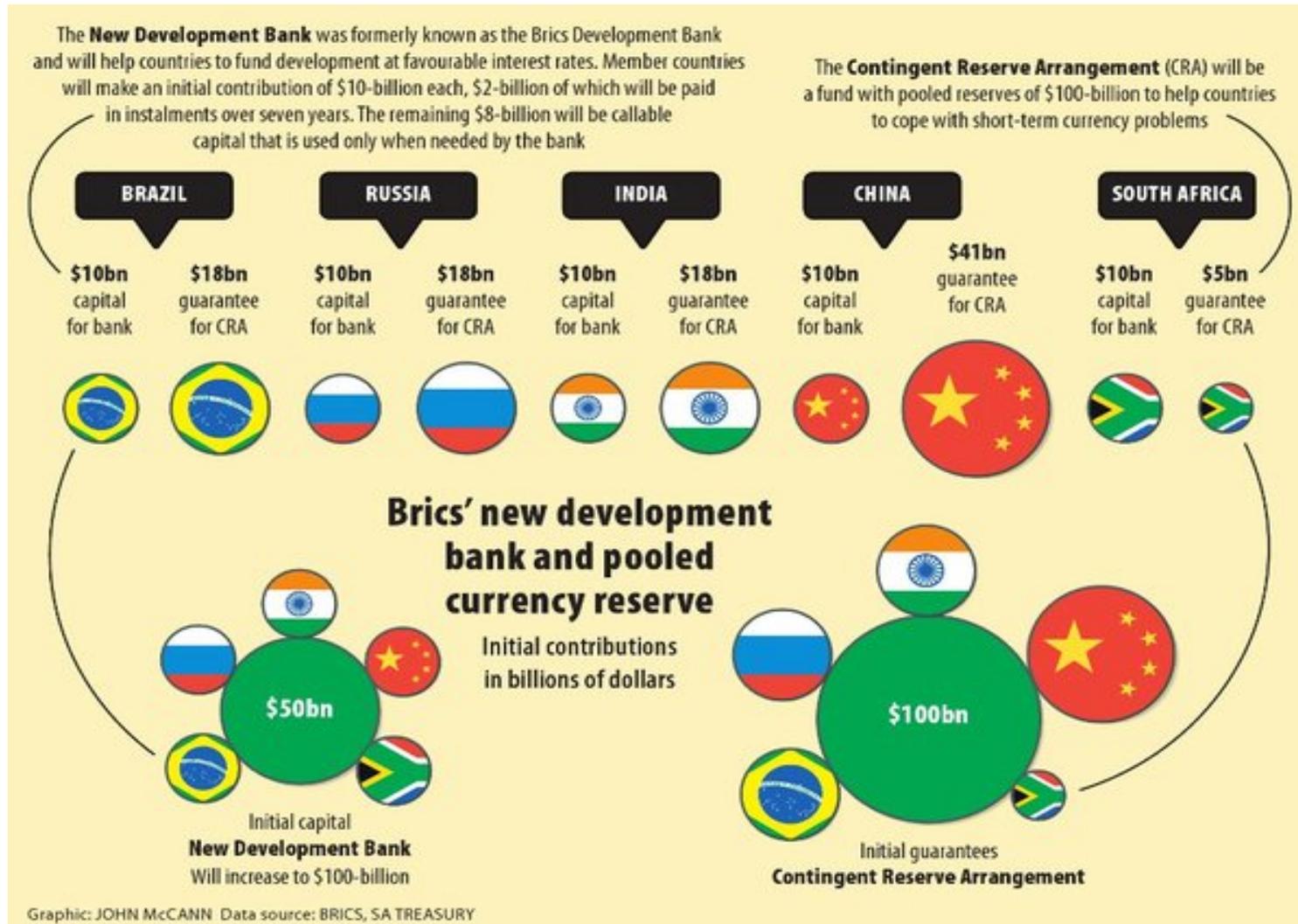
AIIB as an alternative global financial institution

AIIB - 57 Founding Member Countries including key US allies, \$50b paid-in capital, \$100b authorized capital



- **World Bank president** reserved for an American
- **IMF head** for an European
- **ADB** – Japan’s voting power 2X China’s
- Bretton Woods institutions follow **Washington Consensus** – full privatization and liberalization of markets, exchange rate, interest rates, trade and investment, tight budget – Not working for most developing countries

New Development Bank (BRICS Bank)



Graphic: JOHN McCANN Data source: BRICS, SA TREASURY

- Representing **41.4% (3 b)** world population, **25% of world land mass and GDP**
- **HQ in Shanghai; African regional centre in Johannesburg**
- **Inaugural President from India**
- **Inaugural Chairman of B of Directors from Brazil**
- **Inaugural Chairman of B of Governors from Russia**
- **No veto power for any Member**
- **No increase in any Member's share without other 4 Members agreeing**
- **Non-BRICS country can join but BRICS share > 55%**
- **Authorized lending up to \$34 b p.a., to start in 2016**

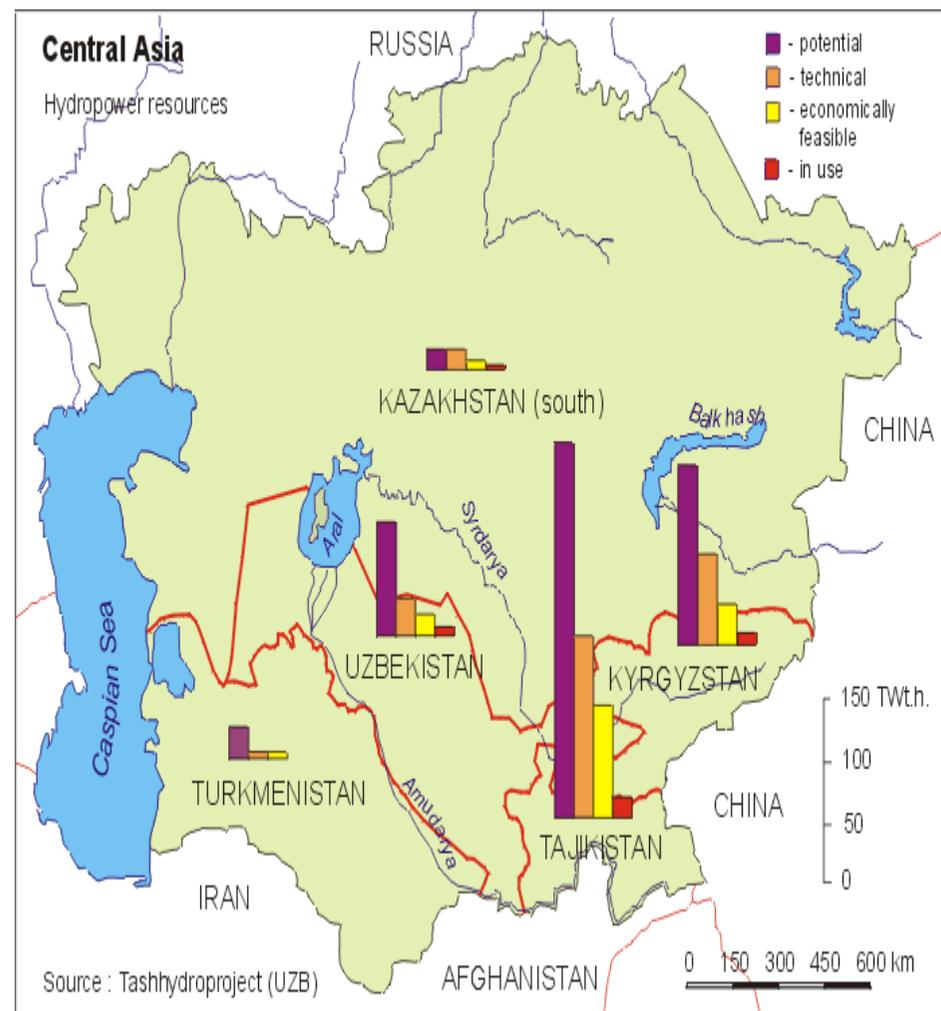
Example of potential investments in Central Asia natural resources

Joint Chinese investment in Central Asia natural resources

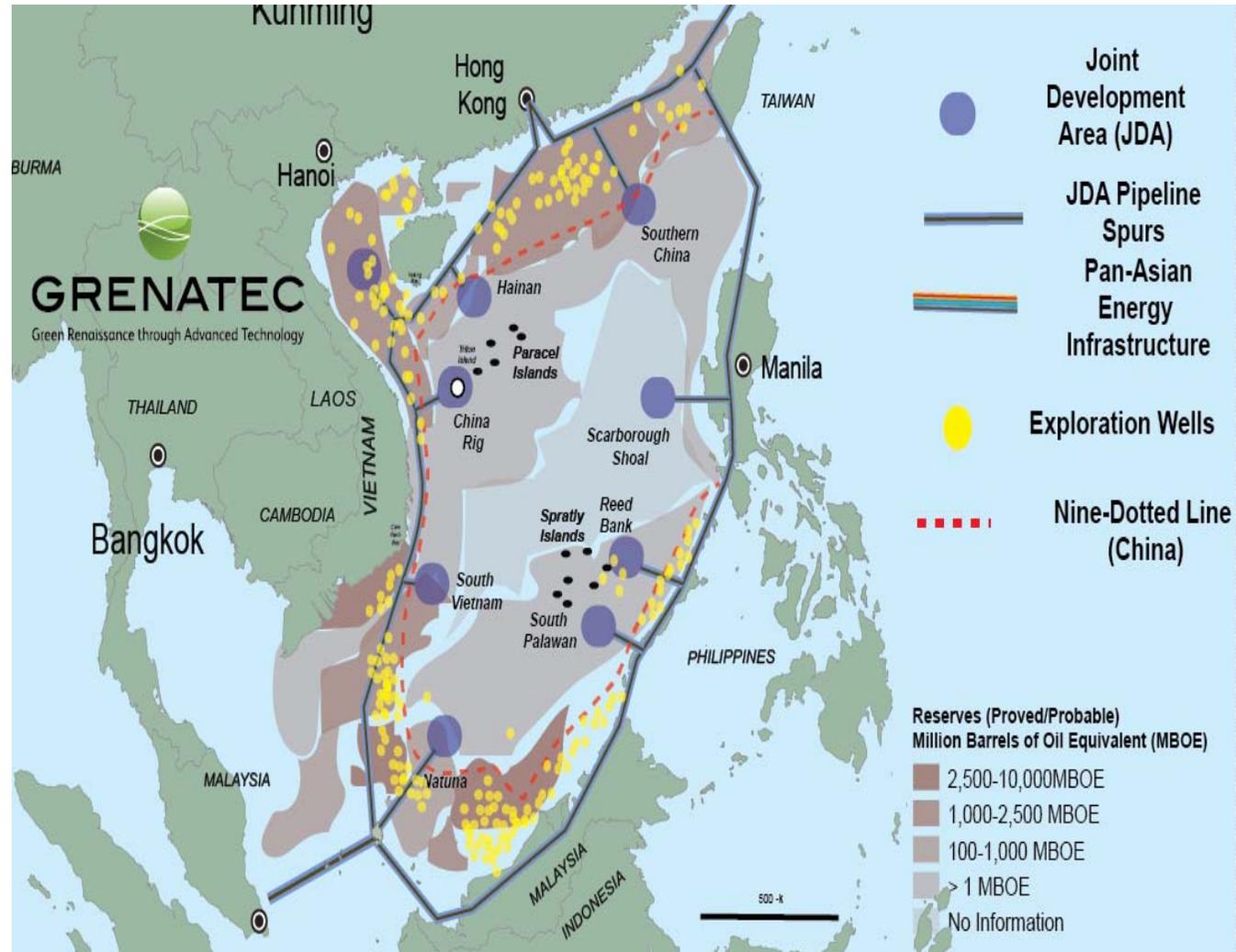
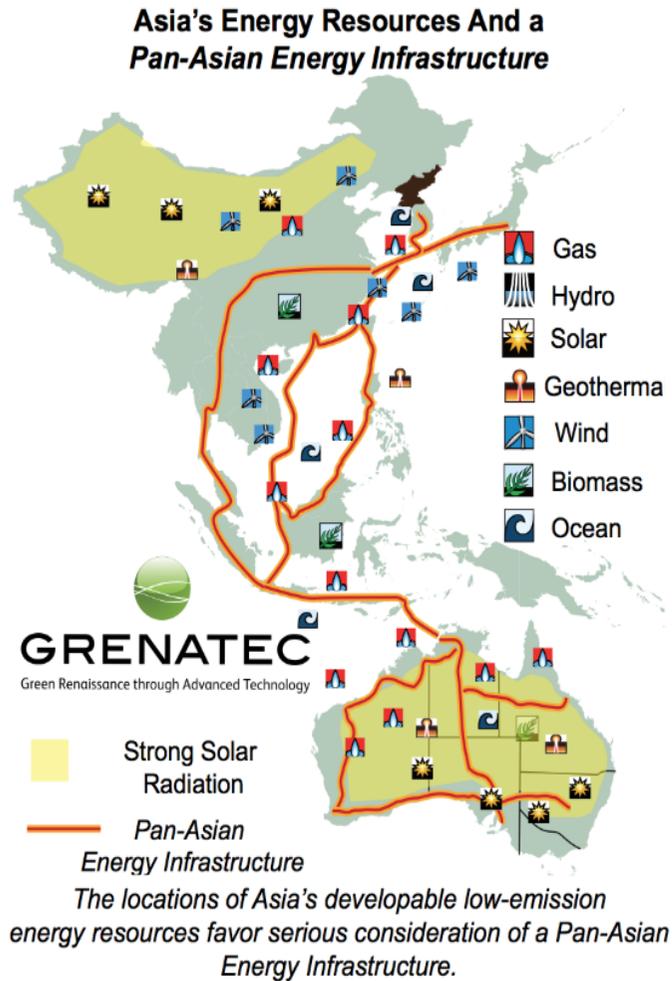
CENTRAL ASIA, XINJIANG PRC MARKETS AND TRADING PARTNERS*

Country/region	Principal natural resources	Primary farm products and industries	Major exports	Major imports	Major trading partners	
					Former Soviet Union	Other
Kazakhstan	Oil and gas, chrome, iron ore, coal, gold, copper, lead-zinc ore, tungsten	Wheat, barley, meat, wool, metallurgy, textiles, machine building, petrochemicals	Oil and gas, coal, nonferrous metallurgy, grain, garments, footwear	Machinery, oil and gas, processed food and beverage, ferrous metallurgy	Russia, Ukraine, Uzbekistan, Kyrgyzstan	China, Germany, Sweden, Switzerland
Kyrgyz Republic	Hydroelectricity, gold, mercury, uranium, coal, cesium, antimony	Tobacco, livestock, wool, metallurgy, agro-processing, electronics, textiles, sugar	Agro-machinery, wool, tobacco products	Oil and gas, wheat, processed food, machinery, chemicals, light industrial products	Russia, Ukraine, Kazakhstan, Uzbekistan	Germany, Bulgaria, Czech & Slovak Republics, China
Uzbekistan	Oil and gas, gold, coal, silver, copper, lead-zinc ore, tungsten	Cotton, fruits and vegetables, textiles, cotton harvesters, textile machinery, metallurgy	Cotton, gold, gas, fertilizers, light industrial goods	Machinery, oil and gas, chemicals	Russia, Ukraine, Kazakhstan, Kyrgyzstan	Switzerland, South Korea, Turkey, China
Xinjiang PRC	Oil and gas, coal, gold, cotton, grapes	Cotton, corn, sugar beet, animal husbandry, minerals extraction, textiles	Sugar, maize, tomato ketchup, pears, hops, cotton, sheep's casings, wool, garments, carpets	Steel products, chemical raw materials, fertilizers, building materials	Kazakhstan, Uzbekistan, Kyrgyzstan, Russia, Ukraine	NA

*For purposes of this study, Central Asia refers to Uzbekistan, Kazakhstan, Kyrgyz Republic, and Xinjiang PRC.

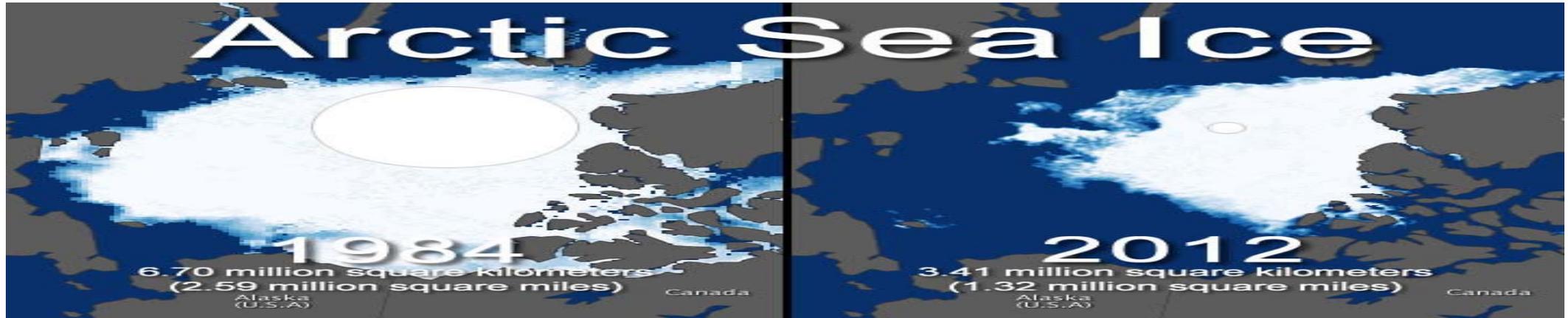


Thinking outside the box in the South China Sea



(5) Arctic geo-economic and geopolitical promises

How the World Will Change With Global Warming, Trausti Valsson, University of Iceland Press, 2006



Potential shipping routes will alter geo-economics and geopolitics



So will new energy discoveries



Thank you

Andrew K P Leung, SBS, FRSA

www.andrewleunginternationalconsultants.com

International and independent China Specialist with over 40 years professional experience covering Hong Kong and Mainland China. Chairman of Andrew Leung International Consultants, founded in London now relocated to Hong Kong. Provides strategic advice on China-related finance, investment, politics and economics globally, including both business and governments. China Futures Fellow selected worldwide by Berkshire Publishing Group, Massachusetts. On the Brain Trust of Evian Group, a Lausanne-based think-tank. Founding Chairman of China Group of Institute of Directors City Branch, London. Advisory Board Member of China Policy Institute, Nottingham University, 2005-10. Governing Council, King's College London, 2004-10. Visiting Professor with Metropolitan University Business School. Helped set up Standard Chartered Bank's first merchant-banking subsidiary in Hong Kong (1983); oversaw the trans-migration of industries into China as Deputy Director-General of Industry; US-government sponsored month-long visit to brief Fortune 50 CEOs on China beyond Tiananmen Square (1990); Editor-at-Large of a London-based international consultancy on China's energies (2007). Sponsored Speaker on China at international conferences, including Forum Istanbul, Turkey, Annual African Banking and Financial Institutions Conference in Accra, Ghana, and Low Carbon Earth Summit in Dalian, China. Regular interviewee on live television with CNBC, Aljazeera English, Times Now of India, BBC and other international channels. Awarded Hong Kong's Silver Bauhinia Star (SBS) and included in UK's Who's Who since 2002.