

# Unconventional Gas in China









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## The Unconventionals

**Unconventional gas - coalbed methane, tight gas and shale gas** require unconventional methods and expertise to economically access and produce these hydrocarbons.

## Coalbed methane (CBM)

Also known as Coal Seam Gas (CSG), is a form of natural gas found in coal seams, rather than in the sandstone reservoirs that hold conventional natural gas.

## Tight gas

is found in relatively impermeable geological formations which means that the gas does not flow as well as it would in a conventional reservoir and it requires specialised technologies to bring it to the surface.

### Shale gas

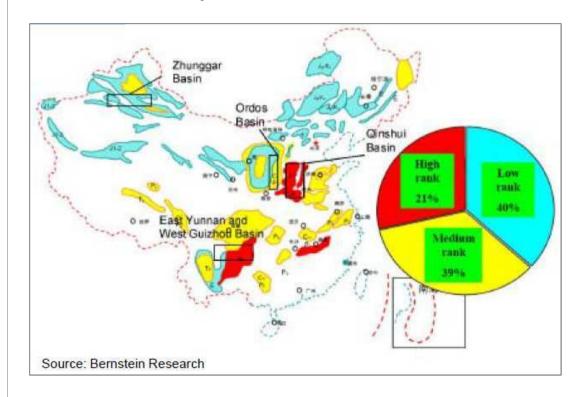
is found in shale deposits that can hold enormous quantities of gas, but this gas is more difficult and more expensive to extract than conventional natural gas.



# Coalbed Methane – China's Current Focus

- China is the world's third largest holder of coal-bed methane with estimated reserves of 36.8 Tcm, of which 10 Tcm is proven
- China government envisages greater production and utilization of the resource in the coming years as part of the effort to reduce coal mine accidents and promote clean energy
- Additional CBM pipeline infrastructure being developed under 12<sup>th</sup> Five Year Plan

## Key CBM Basins in China

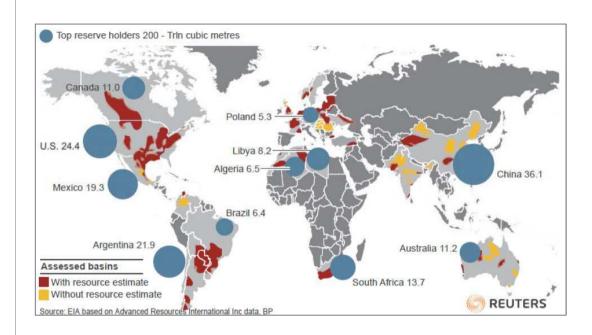




# Shale Gas in China – The Long Term Future

- According to recent EIA estimates, China holds the largest shale gas reserves in the world
- Geological differences make the current US technology challenging to duplicate in China
- Access to water in key basins
- Reserves not yet open to foreign bidders and consolidated in the hands of state-controlled oil companies
- Challenges can be overcome, China will develop own solutions

### Global shale gas basins, top reserve holders





# **Economic Viability**

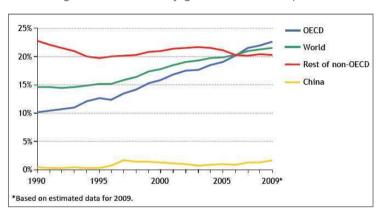
- Access, higher gas prices and advances in technology have made it possible to commercially develop unconventional gas resources in China.
- CBM reserves offer:
  - low drilling costs, shallow depths;
  - long life reserves, low decline rates and good production rates;
  - large areas to explore, including bypassed opportunities; and
  - advancing technology that can bring success in plays that failed earlier.
- CBM price, production rate and operating costs are the three major factors with most impact on the net present value of the CBM development in target areas in China.
- Continuing technological advances will further increase economic viability.
- Alternatives to domestic gas rely on higher cost, imported gas.



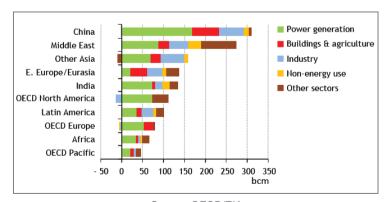
# The Opportunity

- Substitution for inefficient coal
- There is huge potential for additional gas use in China
  - China's recently adopted12th
     Five-Year Plan strongly favours
     gas consumption and provides
     economic incentives in the form of
     pricing structure and infrastructure
     investment.
  - Gas use in China today accounts for just 3% of total energy demand, compared with 21% globally.
  - There is significant scope for using more gas in China's quickly expanding power sector.

Share of gas-fired electricity generation in the power sector



Incremental primary gas demand by region and sector in the WEO New Policies Scenario, 2008-2035

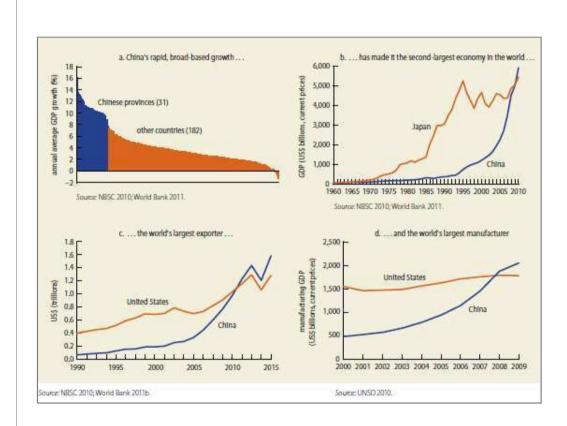


Source: OECD/EIA



## China's Current Economic Position

- In four decades of economic reform, the size of the economy has doubled every 7 years.
- Sometime in the 2020s (or possibly earlier) China will become the world's biggest economy – 9th in 1978.
- Per capita income still lags the rest of the world – ranked about 120th, the same as it was in 1978.
- BUT ... the current successful growth model based on high export growth and massive infrastructure investment is unsustainable.





# The Future

- China's growth story still has a long way to go – opportunity.
- Current Leadership group well prepared, with broader and higher educational qualifications, and a wider exposure to the outside world.
- Committed to maintaining China's growth and lifting living standards to those of developed countries.





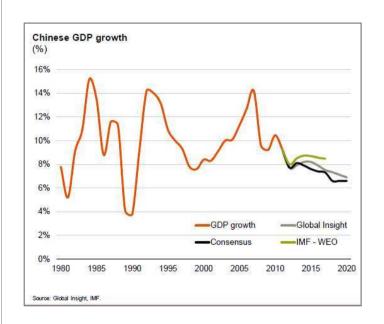
# China's slower growth in perspective

## Cyclical

- Economic difficulties in Europe and the US have negatively impacted on China's exports – will continue until the global economy picks up.
- Structural change will focus on sustainable and balanced economic growth for the future, driven by domestic consumption.

#### **Structural**

- 2011-2015 Five Year Plan mandates slower growth rate from double digit to 7-8 per cent – the new norm.
- Growth rates beyond 2020 will probably decline further to around 6 per cent as the economy continues to mature.
- At 7 per cent China's economy will double –
   and from a much higher base every 10 years.





# Shifting to a Sustainable Growth Model



# Energy – fundamental to China's future growth demands



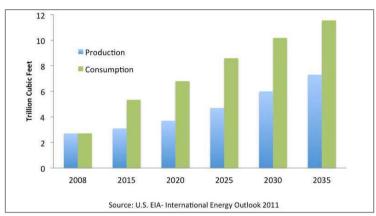
#### Current

- China accounts for 21% of world energy consumption
- Energy use up 150% in past decade, but per capita use is still low.
- Economic activity is energy-inefficient.

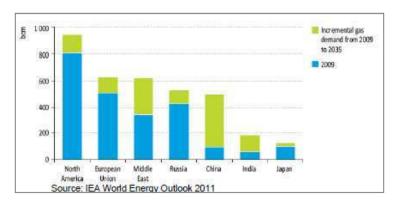
#### **Future**

- Continued urbanization, modernization and industrial growth will fuel further demand.
- Reducing dependence on imported energy, develop untapped indigenous energy sources especially gas and renewables.
- Challenge to meet future demand.

#### China Natural Gas Production and Consumption



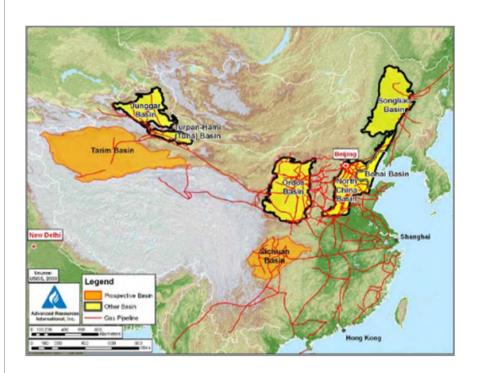
#### Global Natural Gas Demand





# **Current Developments**

- China's 12<sup>th</sup> Five Year Plan stipulates accelerated development of Ordos Basin gas
- Rated one of the world's largest gas basins<sup>1</sup>, current production ~1.5 bcf/day
- Plans to gasify local Shanxi province in the next five years will underpin future gas demand
- Government is actively investing to add to the existing infrastructure to access end market users
- China is targeting an increase in production of domestic origin gas by
   2.5x in the next five years
- Attractive gas pricing regime



# Sino Gas and Energy Holdings is proud to be playing a role in the China energy growth story



- Offers Australian investors a rare opportunity to participate through an ASX-listed company in China's domestic energy growth.
- Ordos Basin The Right Place at the Right Time

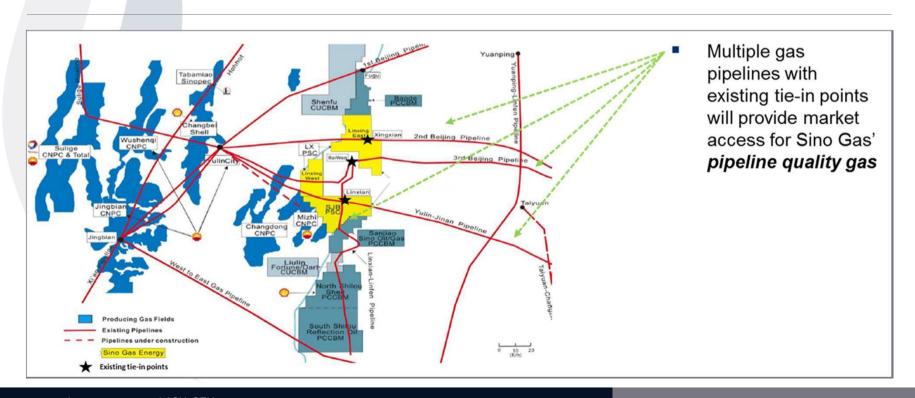






- Tier 1 exposure to Chinese Gas Demand
  - Size and Scalability
  - Funding Secured
  - Exceptional Economics

- Low Cost Access to Market
- Expertise to Deliver





## Disclaimer & Resources Statements

Sino Gas & Energy Holdings Limited ("Sino Gas" ASX: SEH) is an Australian energy company focused on developing Chinese unconventional gas assets. Sino Gas holds a 49% interest in Sino Gas & Energy Limited ("SGE") through a strategic partnership completed with MIE Holdings Corporation ("MIE" SEHK: 1555) in July 2012 to develop two blocks held under Production Sharing Contracts (PSCs) with CNPC and CUCBM. SGE has been established in Beijing since 2005 and is the operator of the Sanjiaobei and Linxing PSCs in Shanxi province.

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#### **Resource Statements**

The statements of resources in this Release have been independently determined to Society of Petroleum Engineers (SPE). Petroleum Resource Management Systems (SPE PRMS) standards by internationally recognized oil and gas consultants RISC and NSAI. These statements were not prepared to comply with the China Petroleum Reserves Office (PRO-2005) standards or the U.S. Securities and Exchange Commission regulations and have not been verified by Sino Gas' PSC partners CNPC and CUCBM. All resource figures quoted are mid case - 100% for project unless otherwise noted.





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# Appendix 1: Sino Gas & Energy (ASX: SEH) Hallmarks of a World Class Gas Producer

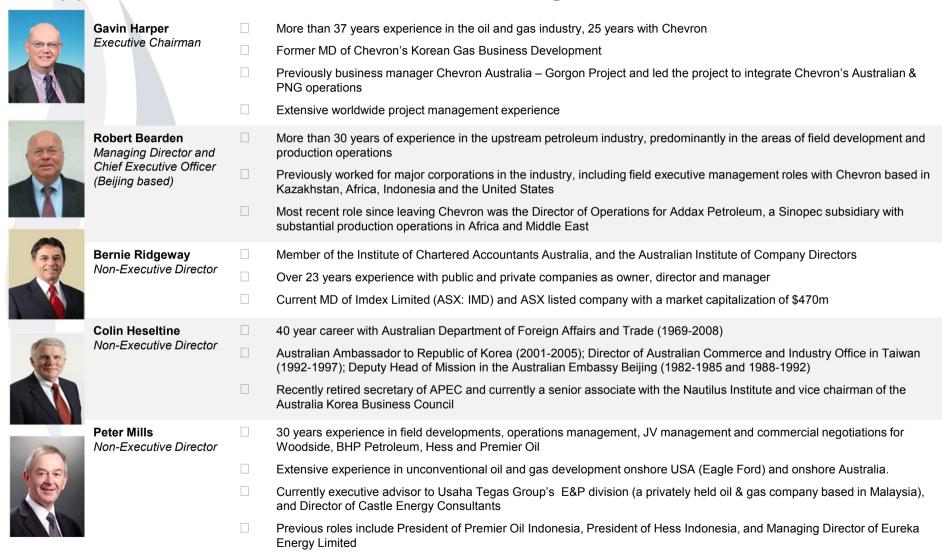


- Sino Gas has all the Size & Scalability
  - Currently 3.7 tcf of Gross Reserves & Resources<sup>1</sup> with Sino Gas' attributable Net Reserves & Resources of 1.05tcf
  - Significant upside remains, with only 40% of the blocks explored
  - PSC area covers 2,998 km<sup>2</sup> (740,822 acres)
- Funding Secured
  - All PSC expenditures funded by MIE Holdings Corporation up to US\$90m
  - Funding is anticipated to deliver PSCs through CRR and ODP submission
- Exceptional Economics and Low Cost Access to Market
  - Strong pricing regime to deliver high margins
  - Ready access to existing pipelines which traverse the PSCs
  - Current un-optimised IRR of 49%<sup>1</sup>
- Expertise to Deliver
  - Multi decades of technical and management experience in delivering Tier 1 projects
  - In-country experience and benefiting from strategic partner's proven track record of delivering ODP

<sup>1 –</sup> Figures are 100% project mid-case for the Linxing West & Sanjiaobei. Refer to Resource Statements at end of presentation for full disclosure. Independent Assessment by RISC January 2012, NSAI 2008.



# Appendix 2: Sino Gas Board and Management



# Appendix 3: Exceptional Returns with Significant SINO Upside



#### Sino Gas' Net Returns

\$US 1.1bn1

RISC Independent Economic Valuation as at 1/1/12 (Risked, P50 Discovered + Prospective, NPV10) 2

IRR~ 49%

Mid Case for Linxing West and Sanjiaobei development projects<sup>2</sup>

#### ~\$250 million annual net revenue

3 Year ramp-up. Planned development steady state production of Sanjiaobei 200mmscf/day (100%) and Linxing 250mmscf/d (100%) with a phased development. 1st Phase ~90 wells<sup>3</sup>

#### **Economic assumptions**

EUR Per Well 2 Bcf Well Head Gas Price \$7.64/mscf P50 Lifting Cost (opex + capex) \$1.80/mscf Average Cost Per Well \$2.1m

Average Flow Rate Per Well 430,000cf/d

Significant Upside Potential Still to be Evaluated

# Pad Drilling

Horizontal Wells

60% Unexplored Acreage

- 1 Net mid-case for the Linxing West & Sanjiaobei PSCs attributable to Sino Gas.
- 2 Project NPV<sub>10</sub> is based on a mid case gas price of US\$7.64/mscf. Lifting costs (opex+capex) ~US\$2/mscf mid case.
- 3- Based on internal model generated using RISC's reserves and cost assumptions.