Asia Pacific | Oil & Gas

EQUITY RESEARCH

30 November 2010

Coalbed methane in China

Lying in wait

- **We believe coalbed methane (CBM) extraction in China is currently commercially viable**
- However technological and infrastructure constraints will limit the expansion the CBM industry, in our view.
- We believe the CBM industry will be dominated by owners of CBM reserves with access to distribution infrastructure.
- At the same time smaller players could co-exist profitably targeting smaller upstream projects and niche distribution channels.
- The Chinese government is encouraging CBM exploitation through subsidies and tax-holidays.
- We show that a typical China CBM project with government incentives will be able to generate an attractive IRR of 17%.
- Green Dragon Gas (GDG LN; NR), Enviro Energy (8182 HK; NR) and Sino Gas& Energy (SEH AU; NR) have direct exposure to CBM in China.

Abundant coalbed methane (CBM) reserves

China has the world's third-largest ready reserves of CBM, estimated at 36.8 trillion cubic metres (tcm), of which 10 tcm can be exploited, according to an *Oil & Gas Journal* report. Preliminary industry data suggests that China's reserves compare well to foreign blocks in terms of recovery factors. With ready reserves, the success of CBM development in China will depend on the cost of extracting resources and the eventual market prices.

Commercial viability

While we believe that CBM extraction in China is economically viable, technological and infrastructure constraints will likely limit the expansion of CBM as an industry. We believe the CBM industry will be dominated by owners of reserves with access to distribution infrastructure in the foreseeable future, while smaller players could co-exist profitably, targeting smaller upstream projects and niche distribution channels, like compressed CBM.

Favourable government policies, yet not totally transparent

The Chinese government is encouraging CBM exploitation through subsidies and tax holidays. There are, however, conflicts of interests between coal miners and pure-play CBM gas producers, due to unclear licensing policy governing the exploration areas, which can overlap with existing coal mining areas. Our DCF model shows that subsidies, currently at RMB0.2/m^3, and tax holidays are crucial to boost returns on CBM, especially given the technical risks of such projects.

Han Pin Hsi
Hanpin.Hsi@sc.com
+65 6596 8501

Evan Li
Evan.Li@sc.com
+852 3983 8524

At the right price

In our model, we show that a typical CBM project in China, given government-granted incentives, should be able to generate an attractive IRR of 17%, which we believe is higher than the associated cost of capital of c.10-12%. In our assumptions, we use a finding and development (F&D) cost of US$1.27/mcf and a selling price of US$6.55/mcf, which is equivalent to a wellhead gas price of RMB1.5/m^3. In our view, new gas projects (e.g. Sinopec's Sichuan Gas project) will be able to achieve a wellhead price of approximately RMB1.5/m^3.

Technology duplication is not straightforward

Due to geological differences, vertical wells utilised for deep drilling in the US are unsuitable for use in China. While US coalbed gas is concentrated in smaller areas at greater depth, China's coalbed contains shallower gas spread over a large surface area. Hence, development and exploitation of CBM reserves has only accelerated over the last few years, despite the success achieved in other countries in previous decades. In this report, we highlight three non-rated companies that have direct exposure in China's CBM industry: Green Dragon Gas (GDG LN; NR), Enviro Energy (8182 HK; NR) and Sino Gas & Energy (SEH AU; NR).

CBM economics in China

China CBM economics

China's coalbed is more compressed and dense than the deposits in the US, making it less permeable. High permeability is required for gas to flow to the surface (refer to Appendix 3: Extracting coalbed methane). The low permeability in the China coalbed results in higher extraction costs. Due to geological differences, current economically viable vertical well technology used in the US is unsuitable for deployment in China. Past results indicated that multi-lateral horizontal wells are more efficient than vertical wells in extracting CBM in China.

Horizontal wells are costlier

In China, the cost of a horizontal well is approximately US$2.26m or RMB15m (including drilling and surface engineering), according to recent well cost data published by PetroChina. Vertical wells are about one-third the cost of horizontal wells. For our model, we assume a horizontal well cost of US$2m and US$0.7m for a vertical well. Using the assumptions listed in the figure 1, our model shows profitable exploration and production of CBM, with a project IRR of 17%.

Assumptions based on a typical CBM acreage

For acreage of 400 km^2, with industry standard well spacing for vertical wells and horizontal wells at 400 acres/well and 200 acres/well, respectively, an initial capital expenditure of US$824m is required for the first two years of exploration. We assume an ongoing capital expenditure and abandonment cost of 2% and 10%, respectively, on the initial capital expenditure.

In our model we use a gas reserve assumption of 1,200 bcf, of which 54% is recoverable, and an operating cost of US$1/mcf (estimated from a production cost derived in a 2008 report by Harry Chernoff) for variable gas production volume. Based on the estimated recoverable reserves and capital expenditure, our calculated finding and development cost is US$1.27/mcf or US$1.34/mmbtu (1 mcf= 950 mbtu for CBM).

Fig 1: Summary of CBM project cost

Capital Expenditure	$mil/unit	$mil
Wells cost (vertical well)	0.67	329
Wells cost (horizontal well)	2.00	494
Ongoing capex		313
Abandonment cost		82
Opex		22
Capital expenditure		**1,241**

Fiscal terms		
Wellhead gas price	$/mcf	6.55
Opex	$/mcf	1.0
Inflation - gas price	%	3%
inflation- opex	%	3%
Corporate tax rate	%	25%
Discount rate	%	10%
Government subsidy	$/mmcf	847
Tax free period	years	3

Field description		
Area	km2	400
Recoverable reserves	bcf	648
Recovery ratio	%	54%
Well spacing (vertical)	acres	200
Well spacing (horizontal)	acres	400

Finding & development cost		
CBM production	total bcf	648
Capital expenditure	$mil	823.7
Finding and development cost	$/mcf	**1.27**

Source: Standard Chartered Research

Chinese government wants to encourage CBM exploitation

To encourage CBM exploration in China, the government grants a subsidy of RMB0.2/m^3 of CBM gas produced and provides a tax holiday period of 3 -5 years during the production phase. In our model, we assume a tax-free period of three years.

Fig 2: Sensitivity analysis

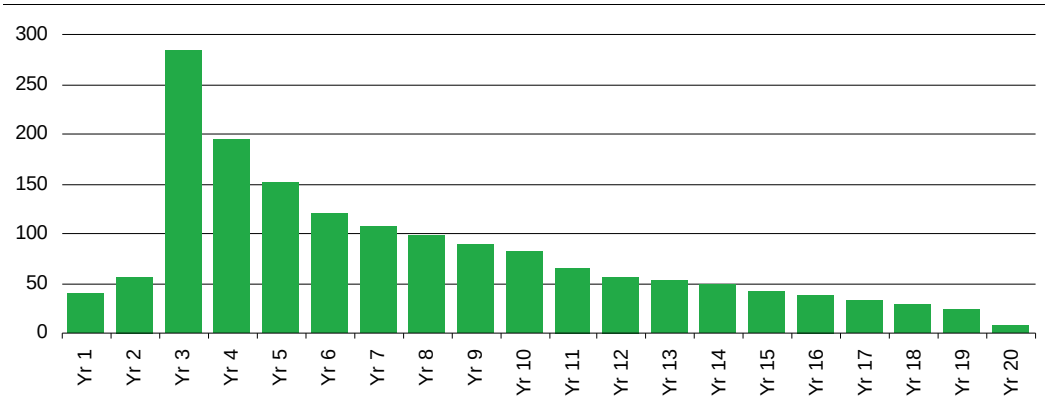
% IRR											
		Wellhead gas price ($/mcf)									
Finding & Development cost ($/mcf)		2.60	3.00	5.00	6.55	7.00	8.00	10.00	12.00	14.00	16.00
	0.57	13%	16%	31%	41%	43%	49%	58%	67%	75%	83%
	0.67	9%	13%	27%	35%	38%	43%	52%	60%	67%	74%
	0.76	7%	10%	23%	31%	33%	38%	46%	54%	61%	68%
	0.86	4%	7%	19%	27%	29%	34%	42%	49%	56%	62%
	0.95	3%	5%	17%	24%	26%	30%	38%	45%	51%	57%
	1.05	1%	4%	14%	22%	23%	27%	35%	41%	47%	53%
	1.14	-1%	2%	12%	19%	21%	25%	32%	38%	44%	49%
	1.27	-2%	0%	10%	17%	18%	22%	28%	34%	40%	45%
	1.43	-4%	-2%	8%	14%	15%	19%	25%	30%	36%	40%
	1.53	-5%	-3%	6%	12%	14%	17%	23%	28%	33%	38%
	1.62	-6%	-4%	5%	11%	12%	16%	21%	27%	31%	36%
	1.67	-6%	-4%	5%	10%	12%	15%	21%	26%	31%	35%

Source: Standard Chartered Research

Wellhead prices of gas projects could be c.RMB1.5/m3 (c.US$6.55/mcf)
We show that a well head gas price at US$3/mcf results in a negative IRR for CBM projects. Wellhead prices of some older gas fields in China are presently set at c.US$3/mcf. In figure 2 we show the project IRR based on gas prices ranging from US$2.6-16.0/mcf. Retail compressed natural gas (CNG) sells at US$13-16/mcf in China. This provides a ceiling for wellhead prices that CBM is likely to achieve.

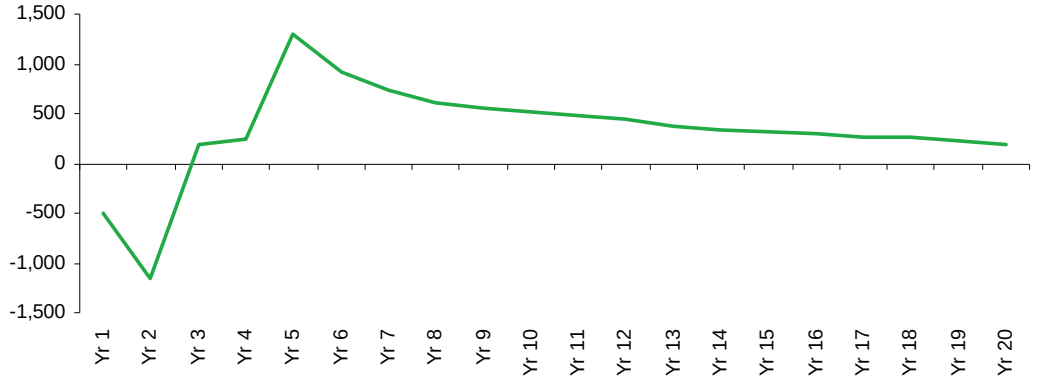
We believe the F&D cost will remain relatively stable in the near term. New technology and changes in policy/subsidies could change the effective F&D cost. We provide a sensitivity analysis on the IRR to changes in F&D cost in figure 2.

Fig 3: Production profile (bcf)



Source: Standard Chartered Research

Fig 4: Project cash flow (US$ m)



Source: Standard Chartered Research

CBM production profile differs to that of conventional gas

Production of CBM typically peaks in the third year of production, declining rapidly thereafter. In contrast, conventional gas peaks gradually. As with conventional gas projects, CBM projects are likely to produce negative cash flows for the first two years, given either low or zero production. In the final year of production, low gas volume production coupled with decommissioning and abandonment costs will reduce cash flow.

Fig 5: Project cash flow Analysis

1 Project cashflow																					
	Year	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Production	mmcf			16,200	22,680	113,400	77,760	60,588	48,276	42,768	39,528	35,640	32,400	25,920	22,680	21,384	19,440	16,524	15,552	12,960	11,340
Price per unit	*$/mmcf*			$ 6,747	$ 6,949	$ 7,157	$ 7,372	$ 7,593	$ 7,821	$ 8,056	$ 8,297	$ 8,546	$ 8,803	$ 9,067	$ 9,339	$ 9,619	$ 9,907	$10,205	$10,511	$10,826	$11,151
Gas revenue	*$mil*			109	158	812	573	460	378	345	328	305	285	235	212	206	193	169	163	140	126
Opex	*$mil*	*1*	*4*	18	26	131	93	75	61	56	53	49	46	38	34	33	31	27	26	23	20
EBITDA	*$mil*	(1)	(4)	92	132	680	480	386	316	289	275	255	239	197	177	172	161	141	137	118	106
Profit margin	*%*			*84%*	*84%*	*84%*	*84%*	*84%*	*84%*	*84%*	*84%*	*84%*	*84%*	*84%*	*84%*	*84%*	*84%*	*84%*	*84%*	*84%*	*84%*
Depreciation	*$mil*			56.84	56.84	56.84	56.84	56.84	56.84	56.84	56.84	56.84	56.84	56.84	56.84	56.84	56.84	56.84	56.84	56.84	56.84
Govt subsidy	*$mil*			14	19	96	66	51	41	36	33	30	27	22	19	18	16	14	13	11	10
Corporate tax	*25%*			-	18.81	155.84	105.89	82.18	64.89	57.97	54.50	49.60	45.54	35.03	30.17	28.88	26.14	21.12	20.04	15.19	12.28
Net income	***$mil***	**(0.71)**	**(3.54)**	**48.48**	**75.65**	**563.59**	**383.56**	**297.87**	**235.59**	**210.15**	**197.01**	**179.01**	**164.08**	**127.04**	**109.71**	**104.77**	**94.90**	**77.36**	**73.29**	**56.54**	**46.46**
Capex	*$mil*	247.11	576.59	16.47	16.47	16.47	16.47	16.47	16.47	16.47	16.47	16.47	16.47	16.47	16.47	16.47	16.47	16.47	16.47	16.47	16.47
Free Cash flow to project																					
+ Net income		(0.71)	(3.54)	48.48	75.65	563.59	383.56	297.87	235.59	210.15	197.01	179.01	164.08	127.04	109.71	104.77	94.90	77.36	73.29	56.54	46.46
- Capex		247.11	576.59	16.47	16.47	16.47	16.47	16.47	16.47	16.47	16.47	16.47	16.47	16.47	16.47	16.47	16.47	16.47	16.47	16.47	16.47
+ Depreciation		-	-	56.84	56.84	56.84	56.84	56.84	56.84	56.84	56.84	56.84	56.84	56.84	56.84	56.84	56.84	56.84	56.84	56.84	56.84
Operating free cash flow to project		(247.82)	(580.13)	88.84	116.01	603.95	423.92	338.23	275.95	250.51	237.37	219.37	204.45	167.41	150.07	145.13	135.26	117.72	113.65	96.90	86.82
FCF		(247.82)	(580.13)	88.84	116.01	603.95	423.92	338.23	275.95	250.51	237.37	219.37	204.45	167.41	150.07	145.13	135.26	117.72	113.65	96.90	86.82
Present value FCF		(225.29)	(479.45)	66.75	79.23	375.01	239.29	173.56	128.73	106.24	91.52	76.89	65.14	48.49	39.52	34.74	29.44	23.29	20.44	15.84	12.91

2 Projects returns	
Cost of capital	**10%**
Project IRR	**17%**

3 Production profile																					
		Yr 1	Yr 2	Yr 3	Yr 4	Yr 5	Yr 6	Yr 7	Yr 8	Yr 9	Yr 10	Yr 11	Yr 12	Yr 13	Yr 14	Yr 15	Yr 16	Yr 17	Yr 18	Yr 19	Yr 20
Production	bcf	16	23	113	78	61	48	43	40	36	32	26	23	21	19	17	16	13	11	10	3
Cumulative production	bcf	16	39	152	230	291	339	382	421	457	489	515	538	559	579	595	611	624	635	645	648

Source: Standard Chartered Research

Production sharing contracts

PSC for foreign companies
It is mandatory for foreign companies to enter into production sharing contracts (PSC) with either China United Coalbed Methane (CUCBM), Sinopec or PetroChina, to explore, develop and produce CBM resources in China.

A typical PSC consist of three phases: exploration, development and production. Capital expenditure during the exploration phase is borne by the foreign company. The contractor (foreign company) commits to an exploration work programme and expenditure schedule, typically over a five-year period, to earn an interest in a given block. The working interest of each party is determined in the PSC.

During the development and production phase, costs are borne according to the ownership of each party. The contractors, which subsequently become the operators, can recover up to 70% of the capital funding upon production. The role of the Chinese enterprises in the joint venture is to facilitate local approvals and to liaise with government bodies. Other stipulations of PSCs dictate engaging only Chinese goods and services, with the contractor bearing any training or technology transfer costs related to the project.

Contractor economics
CBM exploration policies governing PSCs awarded to foreign-owned exploration companies operating as joint developers with predominately Chinese local companies, are similar to the practices for oil exploration in China.

PSC terms in China:

- Gas sales: Solely for the domestic market.
- Royalties paid to the government: Capped at 3% of production.
- Cost recovery: 70% of gas production is set aside for cost recovery. The remainder is classified as profit gas. The contractor bears 100% of the initial capital expenditure in the exploration phase and only the working interest percentage of the operating cost in the production phase.
- The contractor's operating cost during the production phase is capitalised for cost recovery purposes.
- Profit gas: A contractor with a working interest of 50% is entitled to 50% of profit gas, which is the gas revenue available for split, post royalties and cost-recovery deductions.
- Tax regime for CBM: Corporate tax at 25% with a RMB0.2/m^3 subsidy. Tax free period generally for the first three years of production.

Based on the same project assumptions and with foreign contractors granted a 50% working interest, we arrive at an internal rate of return IRR at 13% using a 10% discount rate for the contractor.

Fig 6: Production Sharing Contract terms

PSC terms		
Royalties	**%**	3%
Cost recovery	**%**	70%
Tax free period	yrs	3
Corporate tax rate	**%**	25%
Government subsidy	RMB/m3	0.2
Participation		**Working Interest**
Contractor's allocated CBM	%	50%
Local government entity	%	50%

Source: Standard Chartered Research

CBM regulatory framework

Exploration and production is governed by the state Mineral and Resources Law, with licences approved at several levels by the Ministry of Land and Resources and by central and provincial governments.

Incremental royalties
Government royalties are incremental according to production, but capped at 3% of production.

- If annual CBM production is no more than 1×109 m3, the mining royalties are exempted
- If annual CBM production is between 1×109 m3 and 2.5×109 m3, the mining royalty rate is1%
- If annual CBM production is between 2.5×109 m3 and 5×109 m3, the mining royalty rate is 2%

Tax policy
The most significant tax policy is the exemption corporate tax for the first two years of production and a reduction of 50% over the following three years. This applies only to joint ventures between Chinese enterprises and foreign entities. Independent Chinese CBM E&P companies pay a flat corporate tax rate of 25%. Imported items for CBM exploration and extraction are exempt from import tariffs and regulatory taxes.

Constraints and risks

Constraints of CBM market development

Lack of pipelines
Relatively slow development in planned pipeline projects is a hurdle for foreign companies with no access to the national pipelines. This is in sharp contrast to China United Coalbed Methane or PetroChina, whose status as state-owned enterprises allows them full access. In China, Sinopec and PetroChina dominate the pipeline infrastructure. Without a ready distribution network, independent CBM producers sell only to localised regions.

Cost of drilling/technology/foreign participation
Substantial capital is required for investment in large-scale exploration and production programmes across China to develop its vast reserves. Foreign participation is, therefore, necessary to bring CBM technology and overseas capital into China.

The technology typically applied overseas is not, however, commercially viable in China due to geological differences. A higher number of more expensive wells (horizontal wells) are required for a given area, resulting in high extraction costs. We believe technological advancement must be made to increase CBM yield per well, or horizontal well production costs must decline to make large-scale commercialisation feasible.

From a technical perspective, another challenge is the difficulty of maintaining a steady supply of gas, which is mandatory for certain buyers, i.e. for combined cycle gas power plants or heavy industrial users. While high permeability is especially important for gas to flow easily into pipelines, China's coalbed permeability is low.

Excessive CBM supply may affect domestic gas price
In Canada, due to rising gas prices and shortage of supply, it has become economically attractive to exploit CBM resources, given a reduction in the drilling cost (lower capital investment) due to technological advancement. In China, however, competition from conventional energy sources, such as coal, which is abundant in China, has dampened coalbed methane's attraction as a fuel source to date.

Even with the NDRC increasing onshore wellhead prices by 25% in mid-2010, China's natural gas and retail oil prices remain regulated, with prices fixed based on the regional pipeline network and categories of industrial/residential users. Prices fixed at certain wellheads are still unattractively low and will form an economic barrier to CBM development in surrounding areas.

An excessive increase in CBM supply could pressure natural gas selling prices. China is presently a net importer of gas, so this risk is not a factor for the country. In the US, for instance, an increase in domestic gas supply from an additional energy source – unconventional gas – has led to a surplus of supply in its market. If China's reserves, estimated at a third of the world's total, are successfully exploited, the pricing dynamics of natural gas could change domestically, or even internationally.

Uncertain government policy
Conflicting interests of the coal miners and pure play CBM gas producers exist due to unclear licensing policy governing the definition of exploration areas, which may overlap with existing coal mining areas. Foreign entities operating in China are also subject to local regulatory and policy uncertainties. They have to navigate the acquisition of permits and licensing, obtain government approvals and consents in a developing country striving to establish a framework for its CBM market.

Reserves risk
As with general E&P projects, CBM E&P companies have to undertake the risks associated with exploration and with the potential that reserves prove unyielding.

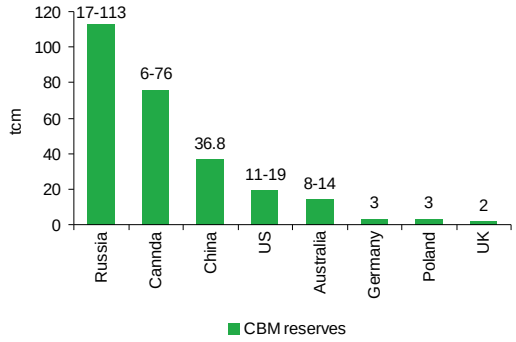
Current players
Small independent foreign E&P companies have done relatively well in China compared with the larger E&P companies, as they entered the country at a later stage, with better developed technology under more a favourable business operating environment. In some instances, they took over blocks that major E&P companies had exited (e.g. Sino Gas & Energy acquiring Chevron's share on its exit). We highlight the following non-rated CBM companies operating in China later in this note: Green Dragon Gas (GDG LN), Enviro Energy (8182 HK) and Sino Gas & Energy (SEH AU)

CBM reserves in China

China CBM reserves

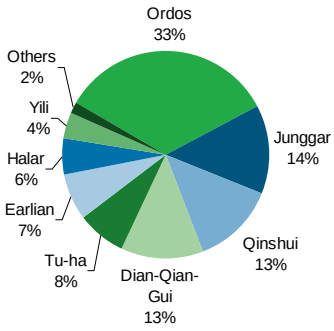
According to China United CBM and an *Oil & Gas Journal* report, China ranks third in the world, with CBM reserves of 36.8tcm, after Russia and Canada. China methane bearing coal in 42 major CBM basins is located over an area in excess of 415,000km^2. Out of this 36.8 tcm of methane (proven and yet to be proven) contained at depths of 2,000m, only 10.9 tcm is recoverable at depths of less than 1,500m.

Fig 7: Worldwide CBM reserves



Source: CUCBM

Fig 8: China CBM reserves by basins



Source: Facts Global Energy

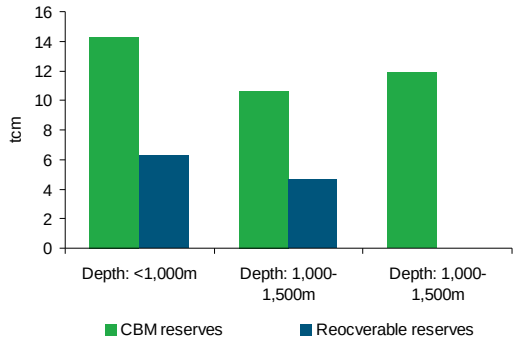
Reserves locations

Of the methane contained in the nine large basins, namely, Ordos, Qinshui, Junggar, Diandongqianxi, Erlian, Tuha. Tarim, Tianshan and Hailaer, 84% is estimated to be 30.9 tcm. The three major basins of Qinshui in Shanxi, Ordos in Inner Mongolia and Junggar in Xinjiang hold estimated CBM resources of 18.7 tcm, of which 7.4 tcm (40%) is recoverable. A total of 30% of China's oil and gas production is in the Ordos Basin. Due to the fact that the majority of CBM reserves sits in these basins, distribution infrastructure and pipeline networks within these basins needs to be well developed to enhance the downstream prospects of CBM in China.

Coal quality in China

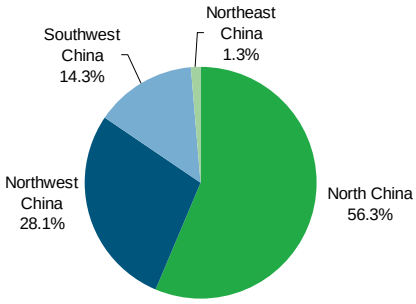
Coal grades are linked to CBM content. Higher grade coal generally corresponds to higher CBM content. China's coal is classified as low to medium, with a high water content (increasing dewatering cost). Still coalbed gas content in China is considered to be favourable for exploitation if exploration is focused on high gas content areas. However, China's coalbed permeability is low at 0.002-16.17 millidarcies (mD), which will restrict gas flow to the surface. US coal permeability typically ranges from 50μm² to 1μm² (1d = 1μm²),

Fig 9: China CBM reserves by depth



Source: Oil & Gas Journal

Fig 10: China CBM reserves by region



Source: Facts Global Energy

CBM Projections for leading CBM producers in China

PetroChina and Sinopec control the majority of the gas transmission pipelines in China. Using this duopoly as a competitive advantage, both companies have announced aggressive growth strategies for CBM development. PetroChina plans to invest US$1.5bn in coal bed methane this year, with a production goal of 4.5bn m^3/year by 2015. Sinopec targets an unconventional gas production volume of 2.5bn m^3 by 2015, after discovery of 2.5bn m^3 of CBM resources in Shanxi.

China United Coalbed Methane, another major Chinese CBM producer, aims to produce 10bn m^3 by 2020. With the commitment of substantial capital outlays from major Chinese companies to achieve their target CBM production, we think that the industry in China is set for unprecedented growth over the next few years.

CBM and natural gas: A comparison

Well size and well Spacing

CBM wells are shallower than conventional gas well, due to the physical characteristics of CBM gas, which is spread over a larger area at shallower depths. Hence, higher numbers of small CBM wells, with closer spacing, are developed together to reduce area pressure and enhance optimum production and gas recovery. CBM well spacing differs according to local laws and regulations relating to drilling of conventional gas wells. CBM wells tend to be closer than conventional wells, due to the need for greater density within an area. In the US, typical spacing is one well per 320, 160 or 80 acres.

Production profile

CBM wells initially produce large volumes of water, with small amounts of gas. During the dewatering phase, gas production peaks within 2-3 years with water reduction. Thereafter, CBM mirrors the production profile of conventional gas. Conventional gas reserves tend to peak initially and decrease over time gradually. CBM wells typically produce less gas at lower rates than conventional wells. Therefore, the cost of CBM wells is a major consideration influencing the economics of successful reserves exploitation.

Composition of gas

CBM gas is cleaner with a higher content of methane (more than 95%) than conventional gas (80-90%). CBM at the wellhead generally meets the quality for pipeline transmission and only small traces of carbon dioxide or nitrogen need to be removed. To meet the quality required for pipeline transmission, conventional gas requires purification from hydrocarbons, sour gas or other forms of gas. The heat content of CBM is 0.95 mmbtu/mcf, while for natural gas it is 1 mmbtu/mcf.

Replicating CBM success in China

CBM in US, Canada and Australia

CBM exploitation was highly successful in the US through the early 1990s, with full commercialisation of resources. Other countries with substantial CBM resources are now seeking to replicate the US example. Notable developments are progressing in Canada and Australia, with initial commercial production of CBM resources.

Canada ranks above China as the second-largest CBM resource rich country. It is exploiting its reserves in the Horseshoe Canyon, Mannville coal zone and Ardley formation. Australia ranks just below the US in terms of CBM resources and is exploiting its resources in the Sydney, Gunnedah, Bowen and Galilee Basins. In the US, over 80% of resources are contained in the west in four major CBM basins, namely the Black Warrior Basin, the San Juan Basin, the Powder River Basin and the Raton Basins.

China's coal structure is more similar to Canada and Australia than the US. Development in Canada's CBM technology on its densely compressed, low gas-content and low-permeability coal bed provides an excellent example for China. The success of Canada's CBM commercialisation at Horseshoe Canyon stems from the right pricing environment for natural gas, which incentivised CBM production. It also achieved a reduction in drilling costs for multi-well horizontal wells on its low permeability coal.

Beside high gas content, Australia's coalbed has similar characteristics as Canada in permeability, pressure and its densely compressed state. Australia's strategy is to focus on high-permeability areas to increase its success in CBM exploitation. For low permeability areas, multi-lateral horizontal wells are used. Australia has successfully developed low-cost technology for its exploitation of coalbed methane gas. Coupled with the commitment to develop cleaner energy through signing the "Kyoto Protocol" to reduce greenhouse emissions, Australia's regulatory framework incentivises CBM producers to accelerate the industry's development.

The conventional deep drilling technology the US utilises to exploit its CBM resources is unsuitable for Canada, Australia and China. The Canadian and Australian CBM exploitation technologies are more suitable for China.

Coalbed quality, coupled with the lack of existing pipeline infrastructure, delays in development and regulatory uncertainty have hampered CBM development in China. These are issues the country must overcome if it is to meet the government's production targets of 10bn m^3 and 20bn m^3 by year 2015 and 2020, respectively. These issues have affected production ramp up in the developing basins, such as Qinshui, Ordos and Junggar.

Appendix 1: CBM supply in China gas market

Impact of increasing CBM supply in China

The country's electricity generation costs remain the lowest worldwide across all energy sources. With abundant coal supplies, it remains the most commonly used fuel feedstock for power generation, reaching 74% of total energy consumption in 2008, while natural gas made up only 4% of the total energy consumption. CBM will be sold into this 4% natural gas market.

Fig 11: Electricity generating cost by fuel source (c/kWh)

	Nuclear	Coal	Coal with CCS	Gas CCGT	Onshore wind
Belgium	10.9	10	-	9.3-9.9	13.6
Czech R	11.5	11.4-13.3	13.6-14.1	10.4	21.9
France	9.2	-	-		12.2
Germany	8.3	8.7- 9.4	9.5-11.0	9.3	14.3
Hungary	12.2	-	-		
Japan	7.6	10.7		12	
Korea	4.2-4.8	7.1-7.4		9.5	
Netherlands	10.5	10		8.2	12.2
Slovakia	9.8	14.2			
Switzerland	9-13.6	-		10.5	23.4
USA	13.6	8.8-9.3	9.4	8.3	7
China	7.7	5.8	11.8	5.2	7.2-12.6
Russia	4.4-5.5	9			9

Source: OECD

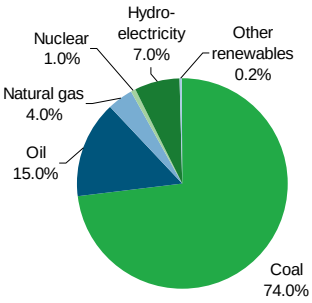
Assuming year-on-year increases in energy demand and that the pricing dynamics of both coal and gas remain unchanged, CBM supply could cater to the nation's increasing fuel demand. If CBM supply becomes abundant, however, it could result in a decline in natural gas prices. CBM could displace a portion of coal's market share, assuming electricity generation from gas is cheaper than coal.

The cost of electricity generation from gas is similar to that of coal in China. Coal-fired power stations are at present the preferred mode of energy generation in China, given the abundant supply of that fuel in the country. With an improved national transmission pipeline or any efficient transportation infrastructure in place, however, we could see a rise in the demand for CBM for use in power plants and industry.

The Chinese government aims increase natural gas usage as part of total energy consumption to 10%, from the current 4% by 2020, to alleviate high pollution from coal fired power stations. With a firm commitment from the government to up natural gas usage and as a net importer of natural gas, CBM supply could likely help to meet the likely shortfall.

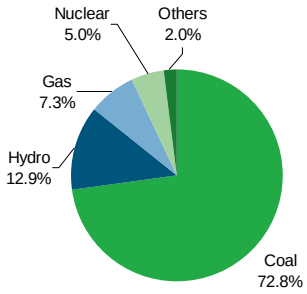
New gas power generating capacity, pipeline infrastructure development and the conversion of coal power stations to gas power are all underway to encourage the natural gas power market.

Fig 12: Total energy consumption in China (2008)



Source: EIA

Fig 13 : China electricity fuel source by 2030



Source: EIA

Appendix 2: Pipeline infrastructure in China

Pipeline infrastructure in China: Present and future development

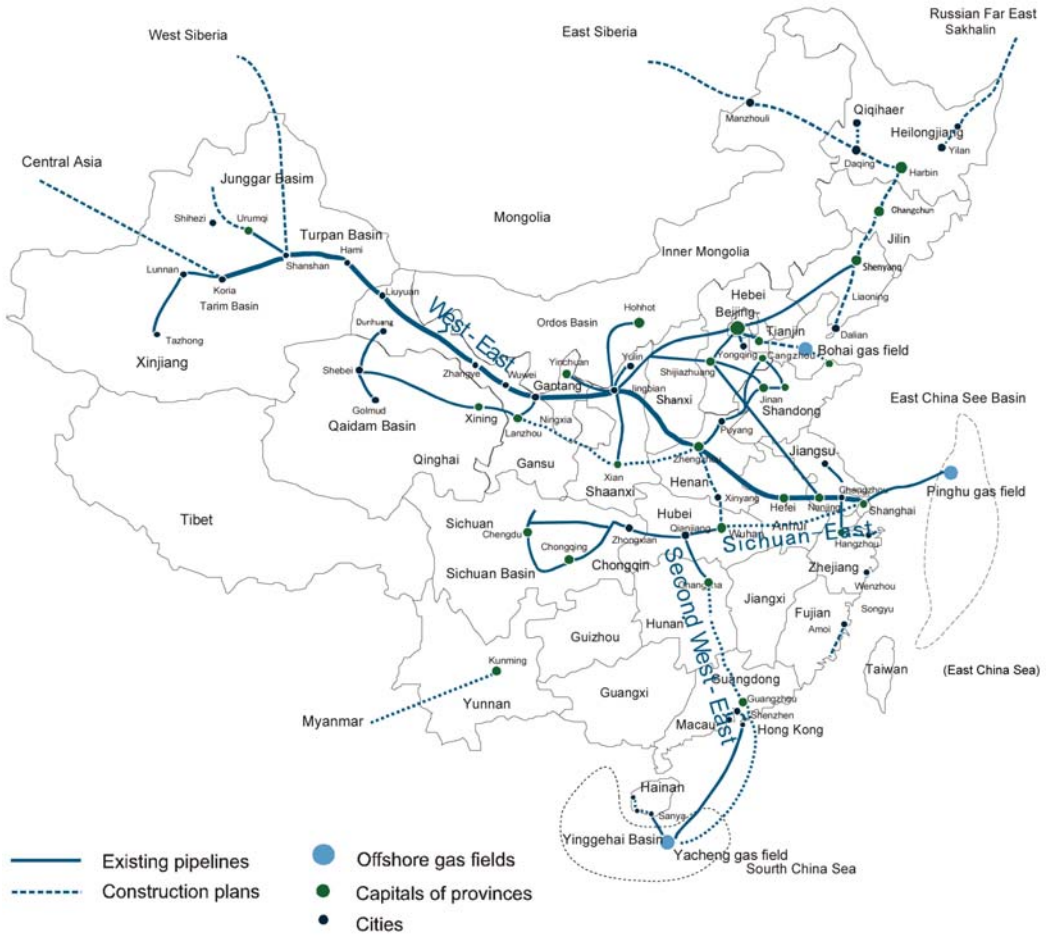
In late 2009, the first long-distance CBM pipeline came into operation, with an operating capacity of 290 mmcfd, connecting the Qinshui Basin to the West-to-to-East (W2E) pipeline. PetroChina delivered its CBM gas produced from the Qinshui Basin to W2E by first blending the gas with conventional gas to achieve the required calorific value, similar to that of natural gas. With the potential scale of CBM reserves in the Qinshui Basin, the PetroChina pipeline is expected to reach full capacity by the end of 2010. CUCBM is constructing a 98 km CBM pipeline, with an operating capacity of 194 mmcf/d from the same basin to Henan province.

Coal producers build short CBM connections from coal mines to end users

Gas from coalmines and newly developed CBM basins is mainly sold for use in areas within the vicinity of production for local consumers, light industries or the transportation sector. Most CBM is now processed into CNG for sale. CBM gas is used for internal power generation at nearby coalmines, compressed into CNG for the transportation sector or blended with higher calorific gas, such as natural gas, before feeding into the local pipelines.

With the development of the high capacity national CBM pipelines linking reserve-bearing basins to the national natural gas transmission pipelines, we believe this segment will achieve significant growth in a much wider market in future.

Fig 14: Gas Pipeline Infrastructure in China



Source: Standard Chartered Bank

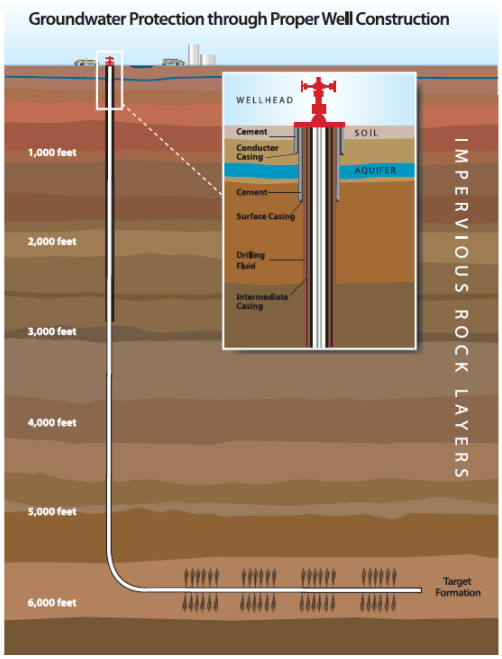
Appendix 3: Extracting coalbed methane

Coalbed methane basics

Coal seam gas is natural gas (methane gas) trapped in a near liquid state in the coalbed by ground pressure and water, either in the open factures between the coal (the cleats) or the within the coal (matrix).

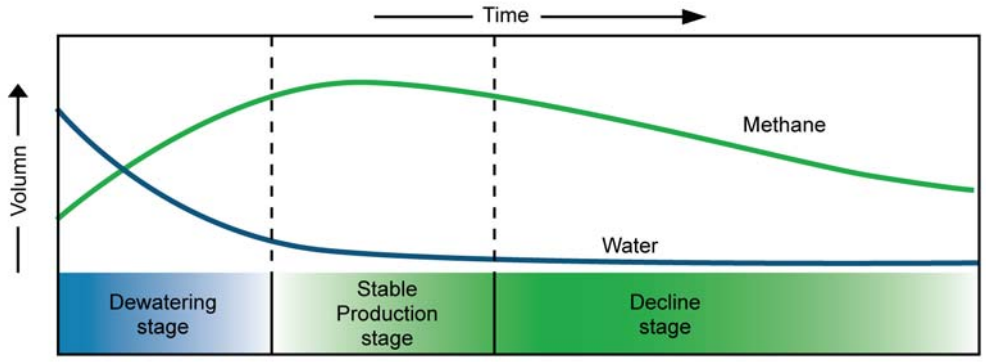
To extract coalbed methane gas, a steel-encased well is drilled 100-1,500m into the coal seam. If the coal permeability is low (as in China), the seams can be fractured (by pumping large amounts of water and sand) or cavitated (by lowering a rotating blade to the bottom section of the well to ream out cavities) to increase the rate of gas flow from the coal. As the gas is released from pores and cleats, the pores and seam cleats decrease in size, making it less permeable; however, pore shrinkage contributes more to the overall matrix shrinkage, thus allowing gas to flow from the cleats more easily.

Fig 15: Horizontal drilling



Source: API

Fig 16: Generalised production profile for CBM



Source: Standard Chartered Research

Water is first pumped out from the coal seams, resulting in reduced pressure in the coal seams, thus allowing trapped gas to be desorbed from coal flowing into the well. Both the water and gas are channelled to different pipes. High in moisture, the gas has to be first de-watered at the wellhead before being piped to a facility for further processing using compression and dehydration, after which the gas can be sold into pipelines.

Compared with the US, China's older geology means its coal seams are more compressed, with a denser coalbed resulting in lower permeability. This translates to lower gas and water flows out of the coal seams, making extraction more costly in China. The economically viable technology used in the US is undergoing a transitional phase, which could lead to successful large-scale deployment in China.

The quantity and quality of the gas extracted from a coalbed is determined by a combination of factors. These include the estimated CBM reserves in place, the size of coal bearing area, the thickness of the coal seam, the buried depth of coal seams, tectonic conditions and hydrological conditions of the coal seams.

The methane content determines the utilisation CBM gas. Gas with low CH_4 content and medium calorific value will be sold to residential and light commercial users, while high CH_4 content and high calorific value will cater to industrial end users, power generation or for automotive fuel. If the calorific value falls short, blending with higher BTU gas is required for pipeline gas.

Green Dragon Gas

NON-COVERED COMPANY NOTE

NOT RATED

Standard Chartered Equity Research does not cover this company and nothing herein should be interpreted to be a recommendation or price target with respect to the company.

Analyst
Han Pin Hsi
Hanpin.Hsi@sc.com
+ 65 6596 8501

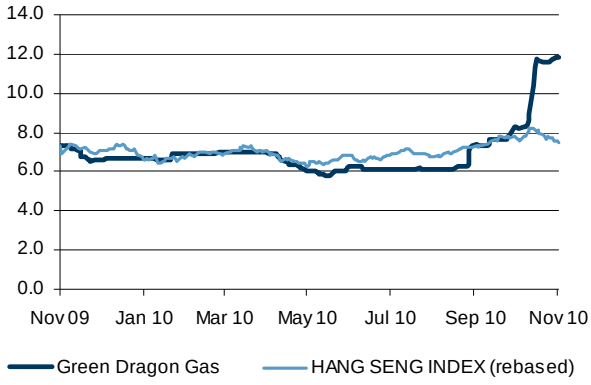
Price as at 29 November 2010
GBP11.85

- Green Dragon Gas (GDG), the parent company of GREKA China, is a gas supplier focused on the exploration, development, production, distribution and sales of coalbed methane (CBM).
- GDG's six major projects are located in Shanxi, Jiangxi, Anhui and Guizhou provinces, with the company estimating total proven CBM reserves of 33 bcf.
- GDG's gas production is sold wholesale or processed into compressed natural gas(CNG) for sale in the downstream market.

Bloomberg code:	GDG.LN	**PER historical (x)**	-56.4
Mkt cap (USDm)	1,428.3	**Yield historical (%)**	n.a.
12m range (USD)	6.03-11.6	**P/B historical (x)**	2.56
3m value traded (USDm)	12.5	**ROE (%)**	-5.67
No. of shares (m)	120.5	**Net gearing (%)**	-6.02
Est. free float (%)	20	**Net debt (cash) (USDm)**	25
Established	1997	**Historical EPS (USD)**	-0.28
Listed	2006	**EPS 3-yr CAGR (%)**	n.a.
Secondary placement	n.a.	**EPS 7-yr CAGR (%)**	n.a.
Auditors	BDO LLP	**Historical DPS (USD)**	0
Year-end	Dec	**DPS 3-yr CAGR (%)**	0
Major shareholders	GDG Holdings (73.0%), Blackrock (22%)		

Source: Annual report

Share price performance (GBP)



Source: Bloomberg

Production Sharing Contracts in detail

PSC	Gas in place bcf	Area km²	GDG share bcf	Working interests %
Shizhuang South	3,422	455	2,053	60%
Shizhuang North	3,609	375	2,165	60%
Fengcheng	3,342	1,541	1,638	49%
Qinyuan	9,470	3,665	5,682	60%
Panxie East	1,123	584	674	60%
Baotian-Qingshan, Guizhou	4,547	947	2,228	49%
	25,513	**7,567**	**14,440**	

Source: Green Dragon Gas

Upstream business
GDG holds six CBM PSCs in four provinces over an area of 7.556km2, with proven gas reserves of 33 bcf. To date, 43% of the 203 wells drilled are on-stream and producing CBM.

Midstream/wholesale distribution
GDG sells its gas production directly into the wholesale sector through its gas distribution centres. In October 2010, the company's acquisition of a 33-59.3 % equity stake in Sinoenergy for c.US$35m gave GDG increased access to midstream and downstream infrastructure.

Sinoenergy's new midstream distribution assets, with a total capacity of 8.8 bcf, increases GDG's wholesale gas locations from two to five. The five distribution centres are located in Hubei, Henan and Anhui provinces.

Retail sales distribution
GDG processes its gas production into CNG for sale into the retail sector. The acquisition of Sinoenergy's 13 CNG retail locations adds to GDG's existing 27 locations and increases total annual sales capacity to 9.6 bcf.

Manufacturing and technology
GDG manufactures its own customised CNG trailers to transport CGG gas and related CNG distribution equipment.

Enviro Energy

NON-COVERED COMPANY NOTE

NOT RATED

Standard Chartered Equity Research does not cover this company and nothing herein should be interpreted to be a recommendation or price target with respect to the company.

Analyst
Han Pin Hsi
Hanpin.Hsi@sc.com
+ 65 6596 8501

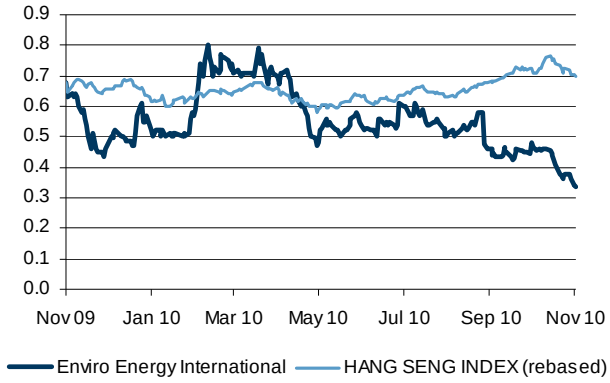
Price as at 29 November 2010
HKD0.31

- Enviro Energy (EE) is focused on exploring, developing and producing coalbed methane (CBM) in China.
- The company has developed in-house environmental technologies in oil recovery, coal mine methane (CMM), CBM and enhanced coalbed methane (ECBM). Its major technical partner is Petromin Resources, a Canadian company.
- EE upped its stake in TerraWest Energy (Liuhuanggou) by 10.4% (US$18.9m) in June 2010, increasing its total shareholding to 71.61%.

Bloomberg code:	8182 HK	**PER historical (x)**	16.06
Mkt cap (HKDm)	861.0	**Yield historical (%)**	0
12m range (HKD)	0.34-0.8	**P/B historical (x)**	1.47
3m value traded HKDm)	5.45	**ROE (%)**	-15.7
No. of shares (m)	2,777.6	**Net gearing (%)**	-9.76
Est. free float (%)	52	**Net debt (cash) (HKDm)**	-83.45
Established	2002	**Historical EPS (HKD)**	-0.05
Listed	2003	**EPS 3-yr CAGR (%)**	n.a.
Secondary placement	n.a.	**EPS 7-yr CAGR (%)**	n.a.
Auditors	PriceWater	**Historical DPS (HKD)**	0
Year-end	Dec	**DPS 3-yr CAGR (%)**	n.a.
Major shareholder	Wing Kim Chan (35.81%), Legg Manson Inc(4.56%), Fidelity (1.14%)		

Source: Annual report

Share price performance (HKD)



Source: Bloomberg

Project 1 - Liuhuanggou Project, Xinjiang Province
EE, through TerraWest has a 47% working interest in the production sharing contract (PSC) with CUCBM for a block located in the Junggar Basin in Xinjiang covering an area of 653 sq km with estimated CBM reserves of 69 tcf.

Existing West-East pipelines: With WEP1 located 60 miles from the block and WEP2 under construction to pass through it, the distribution infrastructure is in place for Enviro to sell and pipe its CBM production.

Project 2 - Qinshui Basin in Shanxi province
EE and Petromin each have a 20% interest in PSCs with CUCBM for a block located in the Qinshui Basin in Shanxi to develop enhanced coalbed methane (ECBM).

Project 3 - Qian An Oilfield, Jilin Province
EE has entered into a 50% joint venture with PetroChina to develop a block located in Jilin to recover conventional oil and gas reserves estimated at 5 mmbbl (recovery rate of 28%).

Conclusion
EE's in house environmental technologies (Carbon Dioxide Capture and Storage) and other enhanced recovery techniques in CBM, CMM, ECBM, and oil recovery are key to its partnership with Chinese enterprises as the government seeks to bring in foreign companies with cutting-edge technology to boost CBM development.

Production Sharing Contracts in detail

PSC	Working interest	Type	Reserves
Liuhuanggou Project , Xinjiang Province	Enviro Energy 47% with CUCBM & Petrochina 53%	CBM and shale gas	653 sq km with an estimated CBM reserves of 69 tcf
Qinshui Basin, Shanxi Province	Enviro Energy 20% and Petromin 20% with Petrochina 60%	Enhanced Coalbed Methane ECBM	n.a.
Qian An Oilfield, Jilin Province	Enviro Energy 50% with Petrochina 50%	Oil recovery	Recoverable reserves of 5mmbbl (recovery rate of 28%)

Source: Enviro Energy

Sino Gas & Energy

NON-COVERED COMPANY NOTE

NOT RATED

Standard Chartered Equity Research does not cover this company and nothing herein should be interpreted to be a recommendation or price target with respect to the company.

Analyst
Han Pin Hsi
Hanpin.Hsi@sc.com
+ 65 6596 8501

Price as at 29 November 2010
AUD0.066

- Sino Gas & Energy is an Australian company focused on exploration and development of unconventional gas assets in China.
- In June 2010, the company completed a rights issue of AUD$29.5m to fund its work programme and retire debt.
- Sino Gas & Energy has signed a production sharing contract (PSC) for the development of assets located in the Ordos Basin in Shanxi.

Bloomberg code:	SEH.AU	**PER historical (x)**	n.a.
Mkt cap (AUDm)	61.69	**Yield historical (%)**	n.a.
12m range (AUD)	0.026-0.19	**P/B historical (x)**	n.a.
3m value traded (AUDm)	0.15	**ROE (%)**	n.a.
No. of shares (m)	934.7	**Net gearing (%)**	n.a.
Est. free float (%)	80	**Net debt (cash) (AUDm)**	n.a.
Established	2005	**Historical EPS (THB)**	n.a.
Listed	2009	**EPS 3-yr CAGR (%)**	n.a.
Secondary placement	$29.5m	**EPS 7-yr CAGR (%)**	n.a.
Auditors, since	n.a.	**Historical DPS (AUD)**	n.a.
Year-end	June	**DPS 3-yr CAGR (%)**	n.a.
Major shareholder			n.a.

Source: Annual report

Acquired 100% in PSC from Chevron farm-in

Sino Gas acquired 50% interests in its two PSC exploration phases through a farm-in from Chevron (CVX US; NR). In 2009, with Chevron's exit from the JV, Sino Gas now owns 100% of the PSCs for Linxing and Sanjiaobei blocks in the Ordos Basin, located in Shanxi. The Ordos Basin is the second-largest oil and gas basin in China.

Linxing PSC

For this PSC, Sino Gas & Energy is in partnership with China United Coal Bed Methane Company (CUCBM). Sino Gas & Energy has a working interest of 64.75% in the block, which has reached the production phase.

Sanjiaobei PSC

For this PSC, Sino Gas & Energy is in partnership with PetroChina Coal Bed Methane (PCBM). Sino Gas & Energy has a working interest of 49% in the block, which is in the production phase.

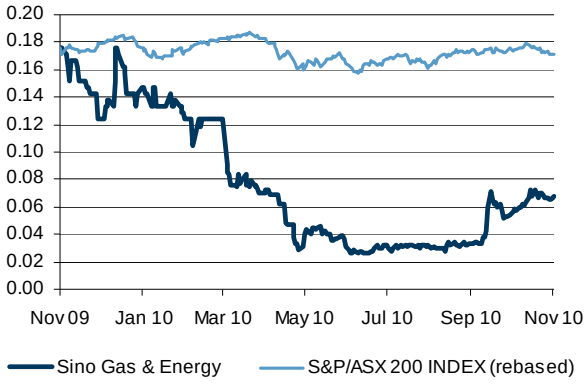
Prime location for gas distribution

Sino Gas & Energy's PSCs are located in Shanxi, a vicinity with relatively well-developed gas pipeline infrastructure.

Progress to date

Eleven wells drilled, 414km of seismic processed. Well flows tested for three wells, namely TB-07, TB-05 and TB-02, with 400,000 scf/day flow achieved on well TB-02. Estimated reserves of 2.7 tcf contingent and prospective resources in place.

Share price performance (AUD)



Source: Bloomberg

Production Sharing Contracts in detail

PSC	Working interest (Exploration)	Net interests (Production)	Current status
Linxing	Sino Gas 100%	Sino Gas 64.75% CUCBM 30.00% CBM Energy 5.25%	2 year extension of Exploration Period to 31 Aug 2011 – formalized
Sanjiaobei	Sino Gas 100%	Sino Gas 49.0% PCBM 51.0%	Exploration Period expired 31 Aug 08 – renewal being negotiated

Source: Sino

Disclosures appendix

Global disclaimer

The information and opinions in this report were prepared by Standard Chartered Bank (Hong Kong) Limited, Standard Chartered Bank Singapore Branch, Standard Chartered - STCI Capital Markets Limited and/or one or more of its affiliates (together with its group of companies,"SCB") and the research analyst(s) named in this report. SCB makes no representation or warranty of any kind, express, implied or statutory regarding this document or any information contained or referred to in the document.

DISCLOSURES INCLUDING THOSE REQUIRED BY THE UNITED STATES
The research analysts responsible for the content of this research report certify that

The view expressed and attributed to the research analyst or Analysts in the research report accurately reflect their personal opinion(s) about the subject securities and issuers and/or other subject matter as appropriate; and
No part of his or her compensation and other benefits was, is or will be directly related to the specific recommendations or views contained in this research report. On a general basis, the efficacy of recommendations is a factor in the performance appraisals of analysts.
Our ratings are under constant review.

Additional information with respect to any securities referred to herein will be available upon request.

THIS RESEARCH HAS NOT BEEN PRODUCED IN THE UNITED STATES.

Disclosures Appendix

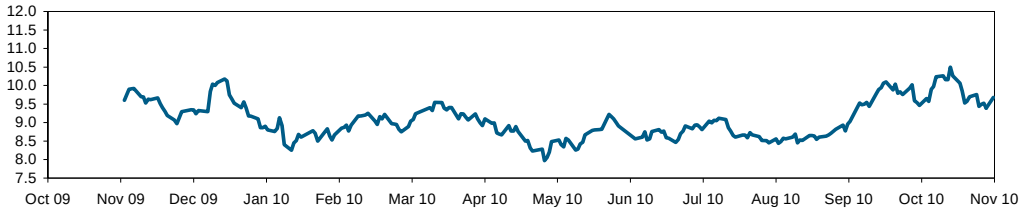
Where "disclosure date" appears below, this means the day prior to the report date. All share prices quoted are the closing price for the business day prior to the date of the report, unless otherwise stated.

Company PetroChina

As at the disclosure date, the following applies:

SCB makes a market in securities issued by this company

PetroChina - current rating is: IN-LINE



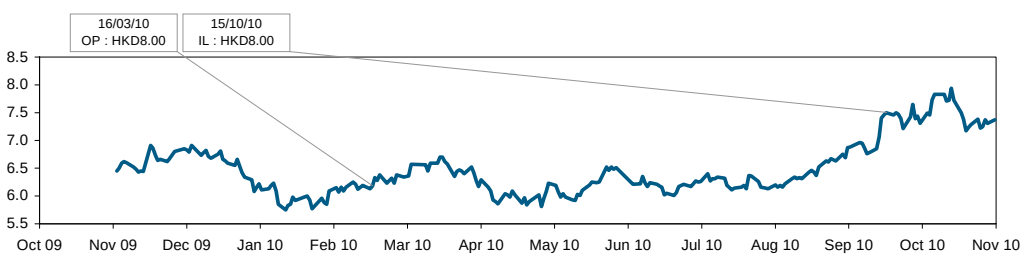
Source: FactSet prices / SCB ratings and price targets

Company Sinopec

As at the disclosure date, the following applies:

SCB and/or its affiliates owns 1% or more of any class of common equity securities of this company.
SCB makes a market in securities issued by this company

Sinopec - current rating is: IN-LINE



Source: FactSet prices / SCB ratings and price targets

Recommendation Distribution and Investment Banking Relationships

	% of covered companies currently assigned this rating	% of companies assigned this rating with which SCB has provided investment banking services over the past 12 months
OUTPERFORM	61.8%	16.8%
IN-LINE	27.2%	10.7%
UNDERPERFORM	11.0%	5.9%

Research Recommendation

Terminology	Definitions
OUTPERFORM (OP)	The total return on the security is expected to outperform the relevant market index by 5% or more over the next 12 months
IN-LINE (IL)	The total return on the security is not expected to outperform or underperform the relevant market index by 5% or more over the next 12 months
UNDERPERFORM (UP)	The total return on the security is expected to underperform the relevant market index by 5% or more over the next 12 months

SCB uses an investment horizon of 12 months for its price targets.

Country-Specific Disclosures

If you are receiving this document in any of the countries listed below, please note the following:

United Kingdom and European Economic Area: Standard Chartered Bank is authorised and regulated by the Financial Services Authority. This communication is not directed at Retail Clients in the European Economic Area as defined by Directive 2004/39/EC. Nothing in this document constitutes a personal recommendation or investment advice as defined by Directive 2004/39/EC.

Australia: The Australian Financial Services Licence for Standard Chartered Bank is Licence No: 246833 with the following Australian Registered Business Number (ARBN: 097571778). Australian investors should note that this document was prepared for wholesale investors only (as defined by Australian Corporations legislation).

Hong Kong: This document is being distributed in Hong Kong by, and is attributable to, Standard Chartered Bank (Hong Kong) Limited which is regulated by the Hong Kong Monetary Authority.

India: This document is being distributed in India by Standard Chartered - STCI Capital Markets Limited which is a SEBI registered broker and a member of the Bombay Stock Exchange Limited and The National Stock Exchange of India Limited.

Singapore: This document is being distributed in Singapore by Standard Chartered Bank Singapore Branch only to accredited investors, expert investors or institutional investors, as defined in the Securities and Futures Act, Chapter 289 of Singapore. Recipients in Singapore should contact Standard Chartered Bank Singapore Branch in relation to any matters arising from, or in connection with, this document.

United States: Except for any documents relating to foreign exchange, FX or global FX, Rates or Commodities, distribution of this document in the United States or to US persons is intended to be solely to major institutional investors as defined in Rule 15a-6(a)(2) under the US Securities Act of 1934. All US persons that receive this document by their acceptance thereof represent and agree that they are a major institutional investor and understand the risks involved in executing transactions in securities. Any US recipient of this document wanting additional information or to effect any transaction in any security or financial instrument mentioned herein, must do so by contacting a registered representative of Standard Chartered Securities (North America) Inc., 1 Madison Avenue, New York, N.Y. 10010, US, tel + 1 212 667 0700.
WE DO NOT OFFER OR SELL SECURITIES TO U.S. PERSONS UNLESS EITHER (A) THOSE SECURITIES ARE REGISTERED FOR SALE WITH THE U.S. SECURITIES AND EXCHANGE COMMISSION AND WITH ALL APPROPRIATE U.S. STATE AUTHORITIES; OR (B) THE SECURITIES OR THE SPECIFIC TRANSACTION QUALIFY FOR AN EXEMPTION UNDER THE U.S. FEDERAL AND STATE SECURITIES LAWS NOR DO WE OFFER OR SELL SECURITIES TO U.S. PERSONS UNLESS (i) WE, OUR AFFILIATED COMPANY AND THE APPROPRIATE PERSONNEL ARE PROPERLY REGISTERED OR LICENSED TO CONDUCT BUSINESS; OR (ii) WE, OUR AFFILIATED COMPANY AND THE APPROPRIATE PERSONNEL QUALIFY FOR EXEMPTIONS UNDER APPLICABLE U.S. FEDERAL AND STATE LAWS.

GENERAL DISCLAIMER
The information on this document is provided for information purposes only. It does not constitute any offer, recommendation or solicitation to any person to enter into any transaction or adopt any hedging, trading or investment strategy, nor does it constitute any prediction of likely future movements in rates or prices or any representation that any such future movements will not exceed those shown in any illustration. The stated price of the securities mentioned herein is as of the date indicated and is not any representation that any transaction can be effected at this price. While all reasonable care has been taken in preparing this document, no responsibility or liability is accepted for errors of fact or for any opinion expressed herein. The contents of this document may not be suitable for all investors as it has not been prepared with regard to the specific investment objectives or financial situation of any particular person. Any investments discussed may not be suitable for all investors. Users of this document should seek professional advice regarding the appropriateness of investing in any securities, financial instruments or investment strategies referred to in this document and should understand that statements regarding future prospects may not be realised. Opinions, forecasts, assumptions, estimates, derived valuations and target price(s) contained in this document are as of the date indicated and are subject to change at any time without prior notice.
The value and income of any of the securities or financial instruments mentioned in this document can fall as well as rise and an investor may get back less than invested. Future returns are not guaranteed, and a loss of original capital may be incurred. Foreign-currency denominated securities and financial instruments are subject to fluctuation in exchange rates that could have a positive or adverse effect on the value, price or income of such securities and financial instruments.
Past performance is not indicative of comparable future results and no representation or warranty is made regarding future performance. While we endeavour to update on a reasonable basis the information and opinions contained herein, there may be regulatory, compliance or other reasons that prevent us from doing so. Accordingly, information may be available to us

which is not reflected in this material, and we may have acted upon or used the information prior to or immediately following its publication.
SCB is not a legal or tax adviser, and is not purporting to provide you with legal or tax advice. If you have any queries as to the legal or tax implications of any investment you should seek independent legal and/or tax advice.
SCB, and/or a connected company, may have a position in any of the securities, instruments or currencies mentioned in this document. SCB has in place policies and procedures and physical information walls between its Research Department and differing public and private business functions to help ensure confidential information, including 'inside' information is not publicly disclosed unless in line with its policies and procedures and the rules of its regulators. Data, opinions and other information appearing herein may have been obtained from public sources. SCB makes no representation or warranty as to the accuracy or completeness of such information obtained from public sources. You are advised to make your own independent judgment (with the advice of your professional advisers as necessary) with respect to any matter contained herein and not rely on this document as the basis for making any trading, hedging or investment decision.
SCB and/or any member of the SCB group of companies or its respective officers, directors, employee benefit programmes or employees, including persons involved in the preparation or issuance of this document may at any time, to the extent permitted by applicable law and/or regulation, be long or short any securities or financial instruments referred to in this document and on the website or have a material interest in any such securities or related investment, or may be the only market maker in relation to such investments, or provide, or have provided advice, investment banking or other services, to issuers of such investments. Within the last three years, SCB may also have acted as manager or co-manager for a public offering of securities of issuers referred to herein. SCB may have received or may expect to receive remuneration for investment banking services from companies mentioned herein.
SCB accepts no liability and will not be liable for any loss or damage arising directly or indirectly (including special, incidental, consequential, punitive or exemplary damages) from your use of this document, howsoever arising, and including any loss, damage or expense arising from, but not limited to, any defect, error, imperfection, fault, mistake or inaccuracy with this document, its contents or associated services, or due to any unavailability of the document or any part thereof or any contents or associated services.
This material is for the use of intended recipients only and the contents may not be reproduced, redistributed, or copied in whole or in part for any purpose without SCB's prior express consent. In any jurisdiction in which distribution to private/retail customers would require registration or licensing of the distributor which the distributor does not currently have, this document is intended solely for distribution to professional and institutional investors.