7 CHINA

Note: Abbreviations & acronyms used are listed on the last page of the chapter.

7.1 Summary of Coal Industry

7.1.1 ROLE OF COAL IN CHINA

Coal accounts for 69.91 percent of total national energy consumption in China (EIA, 2007a). Ranking first in the world in production and consumption of coal, China exported 2.15 million tonnes (Mmt) of coal in 2007 (China Securities News, 2008). However, from January 1 to March 31, 2008, China consumed over 570 Mmt and produced only 569 Mmt, causing a net import of 1.06 Mmt (NDRC, 2008a). Table 7-1 provides recoverable reserve and recent coal production data for China.

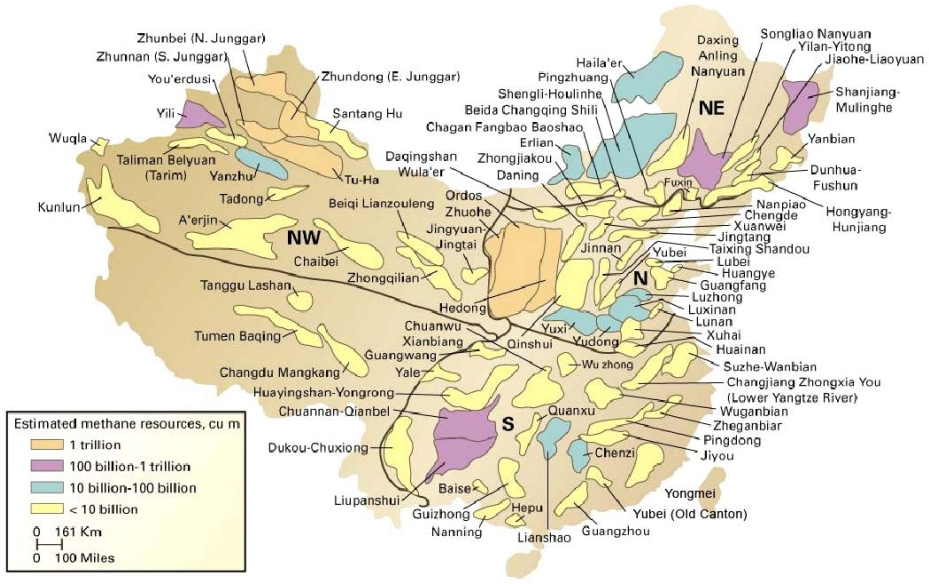
Table 7-1. China's Coal Reserves and Production

Indicator	Anthracite & Bituminous (million tonnes)	Sub-bituminous & Lignite (million tonnes)	Total (million tonnes)	Global Rank (# and %)
Estimated Proved Coal Reserves (2005)*	62,200.4	52,300.3	114,500.7	3 (13.2%)
Annual Coal Production (2007)**	2,066.6	0	2,066.6	1 (37.6%)

Source: *EIA (2007b); **IEA (2007a) Note: Numbers may not add due to rounding of digits

Figure 7-1 shows estimated methane resources in China, illustrating the wide and abundant dispersion of coalfields in China.

Figure 7-1. China's Coal Fields



Source: Liu (2007)

As reflected in Table 7-2, coal basins and CBM resources are spread throughout the country (China University of Petroleum, 2008).

Table 7-2. Regionalization of Coalfields/CBM Resources in China

Zone	Region
East	Heilongjiang, Jilin and Liaoning I (northeast China)
	Heibei, Shandong, Heinan and Anhui II (north and east China)
	South China III
	East Inner Mongolia IV
Central Zone	Shanxi, Shaaanxi, and Inner Mongolia V (north and northwest China)
	Yunnan, Guizhou, Sichuan, and Chongqing VI (southwest China)
West Zone	North Xinjiang VII
	South Xinjiang-Gansu Tsinghai VIII
	Yunnan-Tibet IX
Offshore Zone	Taiwan X

7.1.2 STAKEHOLDERS

Table 7-3 identifies potential key stakeholders in China's coal mine methane (CMM) development.

Table 7-3. Key Stakeholders in China's CMM Industry

Stakeholder Category	Stakeholder	Role
Mining companies	Large coal groups, such as: ▪ Yangquan Coal Group ▪ Huainan Mining Group ▪ Jincheng Anthracite Coal Group ▪ Fushun Mining Group ▪ Songzai Coal & Power Group ▪ Panjiang Coal & Power Group ▪ Shuicheng Mining Group ▪ Tiefa Mining Group ▪ Huaibei Mining Group ▪ Si Chuan Coalmine Group	Project hosts
Equipment Manufacturers	▪ Shengdong Group ▪ See also www.epa.gov/coalbed/networkcontacts.html	Methane utilization equipment

Stakeholder Category	Stakeholder	Role
Developers	▪ China United Coalbed Methane Corporation Ltd. (CUCBM) ▪ CBM Exploitation and Development Company of the PetroChina Company Ltd. ▪ Lanyan CBM Company of the Jincheng Anthracite Coal Mining Group	CUCBM - Project opportunity identification and planning
	▪ Power Generation Machinery Plant of Shengli Petroleum Administration (SPA), China Petrochemical Group ▪ See also www.epa.gov/coalbed/networkcontacts.html	SPA - Producing CMM power generation units and ventilation air methane oxidizers
Engineering, Consultancy, and Related Services	▪ China Coalbed Methane Clearinghouse of China Coal Information Institute ▪ Guizhou International Cooperation Center for Environmental Protection ▪ See also www.epa.gov/coalbed/networkcontacts.html	Technical assistance
Universities, Research Establishments	▪ China Coal Research Institute ▪ China University of Mining and Technology ▪ China National Administration of Coal Geology ▪ China Coal Information Institute ▪ China University of Petroleum, Beijing	Technical assistance
Regulatory Agencies and Government Groups	▪ Bureau of Energy at the National Development and Reform Commission ▪ State Administration of Coal Mine Safety ▪ China National Coal Association ▪ International Exchange Center of National Work Safety Administration	Project identification and assessment support

Source: M2M-China (2006); Huang (2007); IEA (2007b); Yang (2008)

7.1.3 Status of Coal and the Coal Mining Industry

China produced a total of 2.523 billion tonnes of coal in 2007 (CGC, 2008) (Table 7-1). It is estimated that there are close to 27,500 mines in China, with roughly 3,000 mines that are state owned (see Table 7-4). The majority of mines belong to villages and towns. China has initiated a program to close down underperforming or unsafe mines, especially town and village coal mines, with the target of reducing the number of non-state mines to fewer than 10,000 by 2008.

As per the U.S. Environmental Protection Agency (EPA), underground mining accounted for 95 percent of Chinese coal production in 1996 (USEPA, 1996). Today that number has reduced to roughly 90 percent.

Table 7-4. China's Mines by Category and Percent of Total Production (2004)

Mine Category	Number of Mines	Percent of Total Production
45 State-owned Key Coal Mine Groups	414	25.7
Other State-owned Key Coal Mine Groups	322	21.3
Local State-owned Key Coal Mine Groups	2,176	15.1
Mines Belonging to Villages and Towns	24,500	37.9

Source: Huang et al. (2005)

7.2 Overview of CMM Emissions and Development Potential

About 49.8 percent of large, state-owned mines are considered gassy (Huang, 2007); these mines accounted for 86.3 percent of CMM emissions in 2000, and as of 2004, produced 42 percent of total coal in China (Zhang et al., 2004).

The Methane to Markets International CMM Projects Database currently identifies 41 active or proposed CMM projects in China. All but one are confirmed in active underground mines: 2 projects provide boiler fuel; 4 provide methane for industrial use; 1 injects the gas into pipelines; 19 are for power generation; 11 provide town gas; 3 provide vehicle fuel; and 1 is a ventilation air methane (VAM) project (M2M Projects, 2008). The VAM project is in the proposal stage and will be one of the first (following an exploratory project in the United States, and the active WestVAMP project in Australia) to utilize the new VAM use technology.

According to a different source, China's CMM use projects were utilizing 1.15 billion m^3 of methane as of 2007. The CMM-to-power projects were generating more than 400 MW of power (Huang, 2007).

7.2.1 CMM Emissions from Operating Mines

According to one source, more than 300 mines had established CMM drainage systems in China by 2006, removing more than 3.24 billion m^3 of CMM; 80 percent of the methane drained was from key coal mines in the country. With more than 30 CMM use projects in operation by 2006, China has been utilizing 35.5 percent of the total drained gas. The National Development and Reform Commission (NDRC) had approved 25 more projects by August 2007 (Huang, 2007).

Table 7-5 captures available data on CMM emissions, drainage and utilization levels in China.

Table 7-5. China's CMM Emissions (million cubic meters)

Year	CMM Emissions	CMM Drainage	CMM Utilized
1987	6450		
1990	8830*		
1992	8320		
1993	8550		
1994	8950		
1995	8900; 10441*		
1996	9280		
1997		760	
1998		740	361.78
1999		790	362
2000	9630; 8235*	870	318.4
2001		980	458.28
2002	9871	1150	455.67
2003	11674	1521	629.21
2004	13535	1929	603
2005 (projected)	9500*		

Source: M2M-China (2006); *USEPA (2006a)

As technology is advancing, the utilization efficiencies of CMM projects are improving (Huang, 2007), helping to increase the size of individual projects. The largest CMM power project in the world is at Jincheng; the project uses power generation equipment from a U.S.-based manufacturer, Caterpillar Inc., to supply a 120-MW power plant that utilizes both coal bed methane (CBM) and CMM from the Sihe mine (USEPA, 2006b).

Internal and external investments in Chinese projects are increasing, with involvement of companies such as China Shandong Shengdong, Jenbacher, and Deutz (Huang, 2007). Furthermore, use of CMM resources is being expanded for application in the chemicals industry in China. For example, formaldehyde and carbon black are being produced using CMM in Fushun, Huainan, Zhongliangshan, Songzao, and Tianfu.

7.2.2 CMM Emissions from Abandoned Coal Mines

The China Coal Information Institute (CCII) has established the Abandoned Mine Methane Project Advice Centre (AMMPAC) to advise and promote country's abandoned mine methane (AMM) use (Sage, 2003). The closing of state-owned coal mines and town and village coal mines that do not meet production and safety requirements leaves many mines abandoned, emitting a large amount of AMM. Though hundreds of coal mines have been abandoned since the 1950s and abandoned reserves are estimated at more than 30 billion tonnes, no AMM projects have been initiated in China so far.

Conferences, technology exchanges, and assessments have been carried out with experts from the United Kingdom, which has extensive experience in AMM efforts (Ren, 2004). CCII has carried out studies of potential AMM sites and has produced three reports: Status of CBM/CMM Recovery and Utilisation in China's Coal Mining Areas, Coal Mine Closure Conditions in China, and AMM Resource Estimation Methods. The CCII estimate of AMM resources was calculated by subtracting gas lost to ventilation and gas recovered by drainage from the gas content of known reserves.

The China Coal Research Institute studied AMM use as well, focusing on detailed geological conditions (such as stratigraphy, structure of the coal, identification of coal-bearing property, hydrogeology, and measurements of the geological features of methane-containing mines), characteristics of AMM reservoirs (such as thickness of coal seams, gas content, and adsorption characteristics), gob/goaf area and coal reserve estimation, ground water study and mine gas sampling, and AMM resource estimation (using either the Mass Conservation Law or Free State Gas and Residual Gas Pressure Theory in Adjacent Seams).

7.2.3 CBM from Virgin Coal Seams

China's CBM resources contained in bituminous and anthracite coal deposits at a depth of less than 2000 meters are estimated at 35 trillion m^3 by the China University of Petroleum (2008). The geological resources in the northern, northwestern, southern, and northeastern regions account respectively for 56.3, 28.1, 14.3, and 1.3 percent of these CBM resources. About 46 percent (the largest share) of the total CBM resources are distributed in the early Jurassic coal seams, and 43.5 percent (the second largest share) in Carboniferous-Permian coal seams (China University of Petroleum, 2008).

The total production of CBM in 2006 was estimated to be 1.4 billion m^3, with a target production of 10 billion m^3 by 2010 (Huang, 2007; Merrill, 2007). The 200 CBM wells in production in 2000 decreased to about 100 as of 2005, but by September 2007, the Jincheng Group alone had drilled a total of 626 CBM wells.

Over the next five years, Sinopec in Shanxi Province will be working with an international consortium which will invest $1.14 billion to provide approximately 50 billion m^3 of CBM by 2010. The project will supply 189 MW of power generation (Merrill, 2007).

7.3 Opportunities and Challenges to Greater CMM Recovery and Use

China is a signatory to both the UNFCCC and the Kyoto Protocol (Table 7-6). As a Non-Annex I Party to the Kyoto Protocol, China has no national emissions targets; it is, however, eligible to host greenhouse gas mitigation projects, such as CMM projects, under the Clean Development Mechanism (CDM). The CDM can create additional revenues for CMM projects in China through carbon credits trading.

Table 7-6. China's Climate Change Mitigation Commitment

Agreement	Signature	Ratification
UNFCCC	June 11, 1992	January 5, 1993
Kyoto Protocol	May 29, 1998	August 30, 2002

Source: UNFCCC (2004); UNFCCC (2005)

7.3.1 Market and Infrastructure Factors

China is implementing several efforts to promote CMM projects. The State Council, China's highest organ of State administration, allocated a fund of 3 billion Yuan (US$ 430 million) in 2005 to support gas control projects in key state-owned mines and established a CBM/CMM Engineering Research Center. The State Council has also mandated methane emission monitoring at 45 large, state-owned, gassy coal mines (Huang, 2005a). Furthermore, the Chinese government included the development of CBM in China's 11th Five-Year Energy Development Plan (2005-2010) (CCII, 2005). End use options for CMM projects include power generation, feedstock for the chemicals industry (e.g., methanol, formaldehyde, carbon black, and fertilizer), natural gas-fueled vehicles, and VAM used as part of mixed fuel for coal-fired boilers and gas turbines (Zhang et al., 2004).

Many organizations in China and abroad have financially sponsored the research and development of CMM projects (M2M-China, 2006). They include the China Coalbed Methane Clearinghouse of CCII, NDRC, State Administration of Coal Mine Safety (SACMS), U.S. Trade and Development Agency, World Bank, Asian Development Bank (ADB), Global Environment Fund, and Japan Development Fund.

China is currently limited in increasing its underground drainage implementation by inadequate technologies and low drainage rates (Huang, 2005b). Barriers to increased CMM utilization include small project sizes, unstable methane supplies, and the cost of power generation projects. However, one of the biggest challenges faced by CMM use projects is that most of the mines in China are located in remote mountain areas, and it is difficult to construct long-distance pipelines to deliver the drained CMM to cities. Only some coal mining areas are close enough to the West-East (W2E) Natural Gas Pipeline to use it for the delivery of drained CMM. Beginning to operate in October 2004, the pipeline supplies 12 billion m^3 of natural gas to 10 provinces across China's Eastern and Western regions. Capacity is expected to be increased to 17 billion m^3 by the end of 2007. Infrastructure for drainage is also present in East China's Huainan mining area and the Yangquan and Fushun mining areas (Zhang et al., 2004).

As part of the 11th Five-Year Plan (2006-2010), China will spend US$375 million to build two pipelines for CBM transmission (with total length of 1,390 km). The first pipeline from Qinshui County in Shanxi Province to Boai County in Henan Province will allow natural gas to be pumped from energy-rich West China to energy-poor East China. The other pipeline will carry CBM from Songzao in southwestern Chongqing. The pipelines will each have a capacity of 8.5-10 billion m^3 (Merrill, 2007).

Further, PetroChina plans to expand the pipeline network by connecting four main pipelines – the W2E pipeline, the Shaanjing pipeline, the Zhongwu pipeline, and the Seninglan pipeline. It is also planning four CBM pipeline networks. Three of the networks will run from north to east and one from north to south in the Shanxi Province. The north line will run from Xingxian County to Shuoxian County to Datong City. The middle line will run from Liulin-Jie (xiu) Ping (yao) to Taiyuan to Yangquan to Shijiazhuang (Merrill, 2007).

The ADB also funded a local pipeline in the southern Qinshui basin to transport low-quality gas from its mines to where supplementation with higher-quality gas from other mine operations is available. This helps upgrade the low-quality gas to pipeline quality that will be acceptable by PetroChina.

One developing alternative to pipelines is liquefied natural gas (LNG) production. Low-temperature liquefaction reduces the volume of CMM by a factor of 625, and a standard liquefied gas tanker can hold 21,000 m^3 of CMM. Recent advances in cryogenics have enabled technologies in the United States that provide liquefaction rates of 1,000 to 10,000 gallons/day; these technologies are rapidly finding global markets. The Yangquan Coal Industry Group and the Cryogenics System Key Technology Group of the Technical Institute of Physics and Chemistry of the Chinese Academy of Sciences have been exploring the separation and liquefaction of CMM, and by July 2007, had shown success in concentrating the liquid to 99 percent (Huang, 2007).

7.3.2 Regulatory Information

Recovery and utilization of CMM can only be exercised by coal enterprises with legal mining licenses and require approval from the NDRC at each level. Projects with an investment greater than 30 million Yuan (US$ 4.3 million) should be submitted to the NDRC for approval. Projects with an investment less than 30 million Yuan (US$ 4.3 million) should be examined and approved by the provincial Development and Reform Commission. No royalties are imposed on coal enterprises with approved mining licenses. Coal enterprises conducting CMM recovery and utilization projects with approved mining licenses receive preferential state policies on the resources tax, value added tax (VAT), income tax of enterprises, and the tariff tax, as well as other benefits. On October 25, 2006, the Ministry of Finance, the State Administration of Taxation, and China Customs exempted import tariffs and VATs for CMM equipment. Since January 1, 2007 the same bodies have implemented a "levy-first-refund-later" policy on CMM drainage and sales (Huang, 2007).

The rights to exploration and development of CMM or CBM projects in China have been recently modified to be more inclusive. Initially, the China United Coalbed Methane Corporation (CUCBM) had the monopoly rights to CMM or CBM exploration, development, and production in cooperation with foreign firms. If a commercial CBM field was found, CUCBM and the foreign party would jointly establish an organization and conduct development and production. However, on September 24, 2007, the State Council modified the relevant regulations, "Regulations of the People's Republic of China on Exploitation of On-shore Petroleum Resources in Cooperation with Foreign Countries," to effectively eliminate the CUCBM monopoly. The law

now includes the option for "other companies designated by the State Council" to join with foreign businesses in exploiting CMM resources (Huang, 2007). Alternatively, if a CMM development project is to be realized by foreign grants or free technical assistance (i.e., if the projects are non-profit and non-commercial in nature), it is not necessary to involve CUCBM (CBMC, 2004).

All CMM projects must conform to relevant environmental and safety regulations before operating. Projects should focus on waste water drainage, atmospheric pollution, and noise pollution. Energy use during the projects should be in accordance with the "Energy Conservation Law of the People's Republic of China" and the energy-saving regulations and measures of the state and local governments. The State Administration of Work Safety (SAWS) monitors worker safety in China. Laws and regulations such as the "Coal Mine Safety Regulation" should be followed when developing CMM exploitation and utilization projects.

The price structure in China favors use of CMM over natural gas, with the price of CMM for civil and industrial consumption set far lower than that of natural gas (M2M-China, 2006). In 2004, the average price of natural gas for residential and commercial users in China was 1.6 Yuan/m^3 (US$ 0.23/ m^3) and the average price for industrial users was 1.9 Yuan/m^3 (US$ 0.27/ m^3). The wellhead gas price was about 1.3 Yuan/m^3 (US$ 0.19/ m^3) for 100 percent methane. The price of natural gas in China has doubled over the past few years. For example, the price in Wen Zhou City of Zhe Jiang Province reached 4.9 Yuan/m^3 (US$ 0.7/m^3) for non-household sectors and 3.1 Yuan/m^3 (US$ 0.44/ m^3) for household sector in May 2008 (Wen Zhou Municipal Government 2008). As a further boost, in April 2007, the Ministry of Finance provided a subsidy of 0.2 Yuan/m^3 (US$ 0.03/m^3) for CMM exploitation enterprises. The local finance departments are allowed discretion to increase their own subsidies based on this standard (Huang, 2007; Guizhou, 2008).

Effective January 1, 2005, SAWS and SACMS released a Coal Mine Safety Regulation relevant to the CDM. Section 148 requires that in order for CMM projects to be registered as CDM projects, they must make use of gas concentrations not lower than 30 percent methane. This regulation is based on safety needs, the need to efficiently produce quality gas, and the need to maintain the value of the CDM process. Since many coal mines in China can recover only low concentration gas, many prospective CMM projects will be unable to qualify for the incentive (Guizhou, 2007).

7.4 Profiles of Individual Mines

Profiles of individual mines in China are available at the CMOP website: http://www.epa.gov/cmop/resources/international.html

7.5 References

CCII (2005): CBM Resources in China. Transmitted via e-mail by China Coal Information Institute, May 2006.

CBMC (2004): Investment Guide for China CMM/CBM. China Coalbed Methane Clearinghouse, Beijing, China. http://www.epa.gov/cmop/docs/guildline3.doc

CGC (2008). China Coal Industrial Association: Coal Output in 2007 Amounted to 2.523 billion tonnes. http://www.gov.cn/jrzg/2008-02/29/content_905792.htm 29 February 2008 in Chinese

China Securities News (2008) China's Coal Export and Import in 2007. Issue time: 2008-01-24 15:35. http://www.cs.com.cn/sylm/jsbd/200801/t20080124_1355338.htm in Chinese. in Chinese

China University of Petroleum (2008): Feasibility Study of Coal Bed Methane Production in China. A final report for the EU-China Energy and Environment Programme. March 2008. Beijing.

EIA (2007a): Data obtained from *International Energy Annual 2005*. U.S. Energy Information Administration, Washington, DC, tables posted September 21 and 17, 2007, respectively; http://www.eia.doe.gov/pub/international/iealf/tablee1.xls (total consumption) http://www.eia.doe.gov/pub/international/iealf/tablee4.xls (coal consumption)

EIA (2007b): *International Energy Annual 2005*. U.S. Energy Information Administration, Washington, DC, table posted June 21, 2007. http://www.eia.doe.gov/pub/international/iea2005/table82.xls (reserves)

Guizhou (2007): The Insider, CMM Recovery and Utilization Initiative Guizhou Province, China, Autumn Issue, 2007 at http://www.gzcmm.org/en/admin/web_edit/uploadfile/20071017174327765.pdf

Guizhou (2008): The Insider, CMM Recovery and Utilization Initiative Guizhou Province, China, Winter Issue, January 2008 at http://www.gzcmm.org/Newsletter/Winter_2007_English.pdf

Huang (2005a): Overview of Coal Mine Methane to Markets Partnership in China, Huang Shengchu, China Coal Information Institute & National Institute for Occupational Safety, presented at the Methane to Markets Regional Workshop, Beijing, China, December 2, 2005.

Huang (2005b): Potential of Developing Coal Mine Methane CDM Projects, Huang Shengchu, President, China Coal Information Institute & National Institute for Occupational Safety, October 21-23, 2005, http://cdm.ccchina.gov.cn/UpFile/File410.PDF

Huang (2007): Progress and Project Opportunities of the CMM Development and Utilization in China, Huang Shengchu, presented at the Methane to Markets Partnership Expo, Beijing, China, October 30 - November 1, 2007.

Huang et al. (2005): New Development of CMM Projects in China, Huang Shengchu, Liu Wenge, Zhao Gouquan, Sun Qinggang, Liu Xin, and Dou Xiaodong, China Coal Information Institute & National Institute for Occupational Safety, presented at the 5th International Symposium on CBM.CMM in China, Beijing, China, November 30 - December 2, 2005.

IEA (2005): Data obtained from International Energy Agency Energy Statistics - Coal. table posted 2005. http://www.iea.org/Textbase/stats/coaldata.asp?COUNTRY_CODE=CN

IEA (2007a): *International Energy Agency Energy Statistics – Coal.* International Energy Agency, Paris, France. http://www.iea.org/Textbase/country/index.asp

IEA (2007). Methane to Market in Gui Zhou and Si Chuan Provinces, China - A Mission Report, by Ming Yang, Paris, France, December 27.

Liu (2007): Case Study on CMM/CBM projects in China, Liu Wenge, China Coal Information Institute, presented at CMM Development in the Asia-Pacific Region: Perspectives and Potential, Brisbane, Australia 4-5 October 2006.

M2M-China (2006): Methane to Markets, 2006, China Profile. http://www.methanetomarkets.org/events/2006/coal/docs/china.pdf

M2M Projects (2008): Methane to Markets International Coal Mine Methane Projects Database, Methane to Markets, accessed August 2008. http://www2.ergweb.com/cmm/index.aspx

Merrill (2007): CBM - Another green solution (Industry Overview), David Yip and Joseph Jacobelli, Merrill Lynch, June 18, 2007. http://www.ml.com/media/79662.pdf

NDRC (2008): Coal Production in The First Quarter of 2008 and the Next Key Stage of Work. National Development and Reform Commission of China. NDRC News, April 29, 2008. http://www.ndrc.gov.cn/xwfb/t20080429_207961.htm (in Chinese)

Ren (2004): Methane Extraction And Utilisation From Abandoned Coal Mines- China/UK Technology Transfer, T X Ren, and Wardell Armstrong, University of Nottingham, 2004. http://www.berr.gov.uk/files/file20542.pdf

Sage (2003): Reducing The Environmental Impacts Of Abandoned Coal Mines In China, P.W. Sage, D.P. Creedy, and Wardell Armstrong, Future Energy Solutions, 2003. http://www.coalinfo.net.cn/coalbed/meeting/2203/papers/coal-mining/CM015.pdf

Sun and Liu (2006): Information provided by Sun Quinggang and Liu Wenge, CCII, 2006.

UNFCCC (2004): United Nations Framework Convention on Climate Change - Status of Ratification, August 17, 2007. http://unfccc.int/files/essential_background/convention/status_of_ratification/application/pdf/unfccc_conv_rat.pdf

UNFCCC (2005): Kyoto Protocol - Status of Ratification, December 12, 2007. http://unfccc.int/files/kyoto_protocol/background/status_of_ratification/application/pdf/kp_ratification.pdf

USEPA (1996): Reducing Methane Emissions from Coal Mines in China: The Potential for Coalbed Methane Development, U.S. Environmental Protection Agency, Coalbed Methane Outreach Program, 1996. http://www.epa.gov/cmop/docs/int004.pdf

USEPA (2006a): Global Anthropogenic Non-CO_2 Greenhouse Gas Emissions: 1990-2020, U.S. Environmental Protection Agency, Office of Atmospheric Programs, Climate Change Division, June 2006. http://www.epa.gov/nonco2/econ-inv/downloads/GlobalAnthroEmissionsReport.pdf (Appendix B-2)

USEPA (2006b): Power Plant to be Largest Run on Coal Mine Methane, Coalbed Methane Notes, U.S. Environmental Protection Agency, Coalbed Methane Outreach Program, May, 18, 2006. http://yosemite.epa.gov/opa/admpress.nsf/4d84d5d9a719de8c85257018005467c2/8ec89e33e48a863f852571720063e8d7!OpenDocument

Wen Zhou Municipal Government (2008) Raising Natural Gas Prices in Wen Zhou City. May 18, 2008. http://www.wenzhou.gov.cn/art/2008/5/18/art_34_43127.html (in Chinese)

Yang (2008): Personal communication with Ming Yang, International Energy Agency. May 22, 2008.

Zhang et al. (2004): Potential for Development of CMM Projects in China, Zhang Binchuan, Huang Shengchu, Hu Yuhong, Liu Wenge, and Liu Xin, 2004, China Coal Information Institute, 2004. http://cdm.ccchina.gov.cn/english/UpFile/File6.DOC

7.6 Abbreviations and Acronyms

ADB	Asian Development Bank
AMM	Abandoned Mine Methane
AMMPAC	Abandoned Mine Methane Project Advice Centre
CCII	China Coal Information Institute
CDM	Clean Development Mechanism
CMOP	Coalbed Methane Outreach Program
CUCBM	China United Coalbed Methane Corporation
EPA	U.S. Environmental Protection Agency
LNG	Liquefied Natural Gas
NDRC	National Development and Reform Commission
SACMS	State Administration of Coal Mine Safety
SAWS	State Administration of Work Safety
VAM	Ventilation air methane
VAT	Value Added Tax