

服务安全生产 促进节能减排 推进采气采煤一体化 建设新型能源基地

——晋城煤业集团煤层气开发利用情况介绍

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尊敬的各位领导，各位专家、学者：

下午好！

首先，我代表山西晋城无烟煤矿业集团有限责任公司（以下简称“晋城煤业集团”），向各位的到来，表示热烈的欢迎！下面，我就晋城煤业集团的基本情况、煤层气开发利用情况向各位作简要介绍。

一、企业概况

晋城煤业集团的前身为晋城矿务局，始建于1958年。2000年通过公司制改革、2005年通过实施债权转股权，成为由山西省国资委控股的、股权结构多元化的有限责任公司。晋城煤业集团是国家规划的13个大型煤炭基地中晋东煤炭基地的重要组成部分，是19个首批煤炭国家规划矿区晋城矿区的骨干企业，是我国优质无烟煤重要的生产基地，位列2008中国企业500强第149名、中国最大500家企业第139名、中国煤炭工业企业100强第9名。

晋城煤业集团主营煤炭开采、洗选加工、煤层气开发利用、煤化工、坑口电厂等。现有八对生产矿井，批准生产能力 4010 万吨/年。2008 年，原煤总产量 3709.5 万吨，公司优质煤炭资产重组后的“晋城煤业”正在进行上市前的准备工作；现有煤化工控股企业 17 家，分布在山东、安徽、江苏、湖北、河北、河南、浙江以及山西等全国八个省份，2008 年，总氨产量 546 万吨，占全国总氨产量的 8.83%，是目前全国最大的煤化工企业集团；现有地面煤层气抽采井 1453 口，2008 年，抽采煤层气 7.76 亿立方米（包括井下），居全国首位；现有发电装机容量 23.9 万千瓦。其中，亚洲装机容量最大的寺河 12 万千瓦煤层气发电厂已完成竣工验收投入运行。

截止 2008 年底，企业总资产 634.09 亿元。拥有 44 个控股子公司、21 个参股子公司，12 个分公司。在岗员工 65928 人（不含省外）。2008 年完成生产经营总额 445.5 亿元，实现利润 39.32 亿元。

近年来，晋城煤业集团加快实施“煤气电化综合发展、建设环保型绿色矿山”的中长期发展战略，形成了以煤炭为基础，煤气、煤电、煤化三大主导产业和其它非煤产业竞相发展的产业格局。在此基础上，晋城煤业集团立足当前，着眼长远，积极抢抓国家加快构建煤炭大集团、大基地的战略机遇，确立了打造“亿吨基地、千亿规模、百年企业、能源旗舰”的战略愿景，努力把企业建设成为主业规模大、体制机制活、创新能力强、经济效益

高、生态环境美、跨区域、跨行业、跨所有制、跨国界、极具国际竞争能力的现代化能源旗舰型集团。

二、煤层气开发利用情况

晋城煤业集团所处的晋城矿区面积约 7538.2 平方公里，含煤层气总面积 3901.65km²，煤炭资源储量 50124.61Mt。西部和北部均属于高瓦斯矿区，蕴藏有丰富的煤层气资源，煤层气资源丰度为 2.32 亿立方米/km²，吨煤瓦斯含量达到 16.6 立方米以上。根据煤炭科学研究总院重庆分院和西安分院的评估报告，晋城矿区规划区预测煤层气储量 6000 亿立方米，探明储量 1040 亿立方米，可采储量 728 亿立方米。其可采资源总量相当于一个中等规模气田。矿区范围内煤层中瓦斯含量呈“东低西高、南低北高”分布，且煤层埋藏越深，瓦斯含量越高。瓦斯生成和保存条件较好，储量大；甲烷含量高，超过 96%；煤层渗透率为 0.1~5 毫达西，具有较好的可抽采性；矿区瓦斯原始赋存压力高，寺河井田一般在 0.2~1.6MPa 左右，局部可达到 1.9MPa；矿区西北部更高（潘庄井田内胡底小井揭露的煤层瓦斯压力高达 3.3 MPa），属国内罕见。这同时也给矿井的安全生产带来了严重威胁。

作为以煤为主的企业，晋城煤业集团始终坚持把安全发展作为实现可持续发展的第一要务和首要目标。早在 20 世纪 90 年代，为解决新建矿井的瓦斯问题，晋城煤业集团的前身—晋城矿务局就开始筹划组建瓦斯治理、研究和开发的专门机构。1992 年 7 月，美国美中能源公司与晋城矿务局签订了“煤层甲烷合作开发协

议”，启动了开发利用潘庄矿区煤层气项目。1993年，在国内率先引进了美国的地面煤层气开发技术，在潘庄井田施工了7口煤层气试验井，近十年来，单井日产气能力始终保持在2000立方米以上，至今仍在产气。

1995年，成立了中外合资经营企业—山西晋丹能源研究开发有限公司，负责煤层气及其产品的研究、开发和经营。

2003年，为了解决制约企业安全生产的瓦斯危害问题，提高高瓦斯矿井的安全生产能力，晋城煤业集团组建了专门从事煤层气地面开发利用以及煤田地质勘探的专业化子公司—沁水蓝焰煤层气有限责任公司，打造了一支技术精湛、素质过硬的煤层气开发利用团队。取得了山西省国土资源厅颁发的固体矿产勘查乙级资质，气体矿产勘查乙级资质，勘查工程施工（钻探）丙级资质，获得了山西省发改委下发的煤层气开发利用经营许可，并配置了先进的技术装备。

2008年，集团公司抽采煤层气7.76亿立方米，约占全国抽采总量的15%，其中井下抽采煤层气4亿立方米，约占全国抽采总量的8%，地面抽采煤层气3.76亿立方米，约占全国抽采总量的75%。地面煤层气钻井总数达到1453口（包括两口水平井），约占全国地面煤层气钻井的60%，其中在抽钻井713口，日产气量140万立方米以上，地面形成了6亿立方米的煤层气抽采能力。井上、井下形成了10亿立方米的煤层气抽采能力。

多年来，晋城煤业集团坚持“服务安全生产，提高矿井安全

保障能力，促进节能减排，最大限度地回收利用煤层气资源，实现产业化经营”的指导思想和“井上下抽采相结合，井上抽采先行；抽采利用相结合，以用促采”的工作方针，经过十多年的积极探索与实践，取得了令人瞩目的成绩。主要做法是：

一是坚持理念创新，创建并实施了“采气采煤一体化”、“三级瓦斯治理”等新的瓦斯治理模式和方法。

我们认为，实施采气采煤一体化，就是要通过实施地面钻井、井下顺煤层长钻孔预抽、边采（掘）边抽、采空区抽放相结合的单一中厚煤层瓦斯综合治理模式，实现煤炭与煤层气资源的合理开发、综合利用及两类产业的健康发展。

“采气采煤一体化”的内涵主要包括三方面内容：一是在时间上，保持瓦斯预采与矿井的开发协调一致，形成地质勘探、地面预抽、矿井建设、煤炭开采、采中抽采、采后抽采的煤与煤层气开发的科学序列；二是在空间上，保证地面煤层气抽采井位的布置与矿井开拓与采掘布置衔接相适应；三是在功能上，努力实现煤层气井“地质勘探、采前抽、采动抽、采后抽”的一井多用，达到经济的目的。

实施采气采煤一体化的关键，在于实现地面井下相互结合。布置地面抽采钻井，从钻井密度上讲：一要考虑单井的抽采效果；二要考虑允许抽采的时间；三要考虑使煤层瓦斯均匀地降低，不留下局部瓦斯含量仍大、压力仍高，有突出危险的隐患。从给煤炭开采创造安全条件角度讲：一要考虑避让井下采掘巷道和井筒

硐室；二要考虑使采面抽采效果达到最佳；三要考虑在抽采全程中，真正做到“一井多用”。

“三级瓦斯治理”。即：对于瓦斯含量高于 16 立方米/吨的开采煤层或区域，首先应提前 5-8 年实施地面钻井预抽煤层瓦斯，使瓦斯含量降到 16 立方米/吨以下，达到建设条件；对于瓦斯含量在 8-16 立方米/吨的开采煤层或区域，要根据本矿煤层赋存特性，提前 3-5 年或更长时间，采用井下千米钻机等钻具实施井下大面积区域递进式预抽采。当预抽区域内瓦斯含量降至 8 立方米/吨以下时，方可在本区域有效抽采范围的边界以内不小于 30 米的煤层中施工巷道，并布置下一个抽采区域进行接替。

二是坚持技术创新，实现了地面煤层气抽采、井下区域性递进式预抽采等关键技术和配套工艺的全面突破。

多年来，晋城煤业集团不断加大科技投入，加强研发攻关，努力增强自主创新能力，开发出了具有自主知识产权的地面预抽瓦斯技术，初步掌握了“清水钻井、活性水压裂、定压排采、低压集输”的煤层气开发技术体系。不仅突破了国际专家公认的无烟煤不适合地面煤层气开发的“禁区”，为我国无烟煤的煤层气地面预抽奠定了理论基础，而且为我国煤层气地面开发利用创出了第一个成功范例。

井下区域性递进式预抽采，就是在瓦斯含量较小的煤层（岩层）中先掘进巷道，利用此类巷道引进千米钻机向其两帮施工长钻孔，形成一个范围很大的瓦斯预抽区域，一个抽采区域一般涵

盖 2-4 个工作面，在该区域抽采瓦斯达到预定效果后，再在此区域的边缘施工巷道，再打长钻孔，形成下一个接替预抽区域，实现井田抽采区域有序衔接。

我们还全程观察了我国第一口被揭露的煤层气井，CZ-024 的揭露过程，得到了压裂井对煤层及煤层顶底板的伤害程度、压裂效果、固井质量等情况的第一手资料，为今后煤层气井位的布置和进行采空区煤层气地面抽采提供了依据。

2006 年 4 月，晋城煤业集团与中国地质大学、中国矿业大学、中国石油大学、河南理工大学、中国煤炭科学总院西安分院、重庆分院“四校两院”合作建设煤层气开发工程产学研基地。成立以来，产学研基地开展了“晋城矿区煤层大裂隙系统的研究”、“煤层气井控制区域地质条件研究”等科研课题，编制了“煤层气数字化管理系统”软件，建成了“煤层气井自动监测监控系统”。中国矿业大学、中国地质大学、河南理工大学的多批学生在基地进行了课程和毕业实习。

三是坚持综合利用，开创了变“杀手”为“帮手”的新局面，取得了显著的综合效益。

为实现煤层气资源的最大化利用，变害为宝，晋城煤业集团在煤层气利用项目及输送管网建设方面进行了大量投入，不断拓展煤层气利用领域。目前，晋城煤业集团煤层气已广泛用于发电、民用燃气与采暖、汽车燃料、工业燃料等领域，形成了全国最大的煤层气开发利用规模。2008 年，煤层气利用量超过了 3.17 亿

立方米，约占全国利用总量的 20%，其中地面煤层气利用量 1.59 亿立方米，井下瓦斯利用量 1.58 亿立方米。

煤层气发电。利用寺河矿井下抽采的瓦斯，建成了装机容量 1.5 万千瓦的瓦斯发电试验厂，于 2001 年投运；对成庄热电厂、金驹煤矸石电厂实施了煤改气改造；亚洲最大的煤层气发电厂——寺河 12 万千瓦煤层气发电厂已投入运行。煤层气发电总装机容量达到了 18.9 万千瓦，年可利用煤层气约 3.3 亿立方米。

民用燃气。煤层气用作民用燃气，有安全、清洁、热值高等优点。晋城煤业集团于 2005 年对矿区民用燃气系统进行改造，用煤层气代替了水煤气，受到了职工家属的欢迎。同时，我们积极开拓周边市场，利用专用煤层气运输槽车，向晋城市、长治市、太原市以及河南省等居民供应清洁、高效、安全的煤层气。晋城市周边县市——陵川、高平、巴公等地储配站项目也在积极推进中。

CNG 清洁能源汽车。据测算，1 立方米煤层气可代替 1.13 升 93 号汽油，以现行市场油价和气价计算，每使用 1 立方米煤层气代油可节约 2 元以上。2005 年 7 月，晋城煤业集团在晋城市建成了第一座 CNG 加气站，并改装完成第一辆 CNG 汽车。目前，晋城市所有出租车全部改装使用煤层气作为燃料。汽车加气业务已拓展至长治、太原、焦作、洛阳、济源、郑州等地市场。山西晨光物流有限公司煤层气能源新干线汽车运输网络项目也于 2008 年 2 月 16 日正式启动，率先推广使用重型燃气卡车。

工业用气。煤层气的甲烷含量高，杂质少，用于玻璃、陶瓷

等行业有很大的优势。目前，晋城煤业集团已实现向晋城市及周边地区的陶瓷、玻璃、钢铁等生产企业提供工业燃料。

煤层气压缩（CNG）及液化项目（LNG）。晋城煤业集团拥有目前国内最大规模的煤层气压缩站，日设计压缩能力共达 74 万立方米。同时，为了扩展煤层气应用的地域空间（CNG 运输的经济半径 150 公里左右，LNG 运输的经济半径约 1000 公里），与香港中华煤气公司正在合作，建成并投产了全国第一个、规模最大、工艺最新，一期日处理能力为 30 万立方米的煤层气液化（LNG）厂，实现了我们在煤层气液化技术上的突破，为今后我们扩大煤层气液化规模，实现煤层气的长距离运输奠定了基础。

煤层气输送管网建设：

晋城煤业集团西区瓦斯（煤层气）东输管道工程。该项目主要目的是为了保证晋城市区和晋城煤业集团矿区（老区）范围内工业企业、煤矸石电厂、锅炉、民用等领域用气。线路总长 45.2 公里，共设 6 座站场和两条支线，设计输气能力 10 亿立方米/年。该管道目前已投入试运行。

胡底—李庄、岳城—李庄、郑庄—李庄和郑庄—沁水县煤层气管道工程。这些管道是将胡底、郑庄、潘庄井田煤层气输送联结在一起。四条管道总长度约 60 公里。项目建成后不仅便于合理调配各区块间煤层气的用量，同时，将大大提高煤层气对外销售能力。

亚行贷款山西省沁水煤田煤层气利用工程。该项目是晋城煤

业集团的控股子公司：山西能源煤层气有限公司承担建设的亚行贷款项目。该项目已于 2007 年 8 月 8 日在高庄集气总站举行了奠基仪式，力争在 2009 年完成建设。

此外，设计年输气能力 5 亿立方米的晋城—长治煤层气输送管网已在省发改委立项，预计 2010 年建成。

积极运作 CDM 项目。近年来，我们积极利用清洁发展机制，先后与世界银行碳基金、日本碳基金、荷兰清洁发展机制机构、英国爱思凯公司、英国气候变化资本集团碳贸易公司签订了“碳减排购买协议”，共出售二氧化碳减排额度 1780 万吨。在第一个减排期（2008 年—2012 年），可获收益 15 亿元人民币。

四是编制煤层气利用标准，争取国家优惠政策。

编制了《山西省煤层气和压缩煤层气质量标准》。根据晋城市质量技术监督局的要求，晋城煤业集团下属的蓝焰煤层气公司编制的《山西省煤层气和压缩煤层气质量标准》已获山西省技术监督局的批准，已于 2007 年 11 月 12 日出台，12 月 12 日执行。这是我省第一部煤层气行业标准，通过试行后，将上升为国家标准。另外，煤层气行业其它标准，山西省有关部门将编制工作委托晋城煤业集团，此项工作正在进行中。

争取国家产业优惠政策。在科技资金方面，分别于 2006 年和 2008 年成功地争取到了国家发改委“先采气、后采煤，瓦斯综合治理”项目资金支持 6100 万元和国家《大型油气田及煤层气开发》中山西晋城矿区采气采煤一体化煤层气开发示范工程科

技资金 8600 万元。2008 年争取煤层气开发利用补贴资金 4853 万元。

综上所述，晋城煤业集团从治理瓦斯危害起步，逐步培育和发展的煤层气产业。尤其是近几年来，我们在地面钻井，输气管道、集输管网、输气场站等方面投入了约四十个亿的资金，使煤层气产业得到了快速发展，也取得了良好的综合效益：

一是亮点效应。通过“采气采煤一体化、开发利用商业化”的发展模式，煤层气抽采技术不断成熟，开采能力稳步提升，利用规模不断扩大，输送管网建设初具规模，引起了社会各界的广泛关注，煤层气产业发展已经成为晋城煤业集团“煤、电、气、化”综合发展战略的重要组成部分。

二是安全效益。煤层气的抽采有效减少了煤层瓦斯含量，降低矿井瓦斯压力，从源头上治理瓦斯灾害，对煤炭安全生产起到了有力的保障作用。计算表明，当地面一个钻孔的煤层气日抽采量达到 2500 立方米时，每个钻孔每年可使 0.105 平方公里范围内的吨煤瓦斯含量减少 0.9—1.0 立方米。

三是环保效益。以汽车加气为例，燃气与燃油相比具有很好的环保效果。燃煤层气车可使 CO 排放量减少 97%，碳氢化合物减少 72%，氮氧化合物减少 39%，CO₂ 减少 24%，SO₂ 减少 90%，噪音减少 40%，而且不含铅笨等致癌的有毒物质。

四是经济效益。在目前能源价格飞涨的时代，煤层气的经济效益越来越显现出来。汽车加气代油的经济效益尤为显著。目前，

煤层气的开发利用还处于投入期。利用煤层气发电、民用、工业、汽车燃料等正处于大规模的市场开发和铺垫阶段。随着利用领域和规模的不断扩大，将会取得可观的经济效益。

五是社会效益。煤层气产业的发展，促进了资源的综合利用，为社会提供了清洁的新型能源。如在民用方面，利用煤层气代替水煤气，不仅清洁卫生，而且彻底解决了一氧化碳中毒问题，大大提高了居民的生活质量。2005年，中央电视台“焦点访谈”栏目以“变‘杀手’为‘帮手’”为题，报道了晋城煤业集团煤层气开发利用情况，引起了社会各界的强烈反响。

三、发展前景

根据我们的初步规划，从2009年开始力争用5年左右时间，在晋城矿区形成50亿立方米/年的煤层气生产能力；到“十二五”末，在晋城矿区、阳泉矿区、武夏矿区、河东煤田和内蒙古阿拉善盟地区总计形成100亿立方米/年的煤层气抽采能力。同时，我们也正在积极寻求更广泛地交流与合作。最后，诚邀各界有识之士与我们进行合作，共同探索煤层气开发利用的新途径，开创煤层气产业更加美好的明天。

谢谢大家！

Service for Production Safety, Facilitate Energy-Saving
and Emission Reduction Accelerate Integration of
Coal-mining and Coal Gas Development,
Build a New-type Energy Base

——Introduction of CMM/CBM Development and Utilization of JMC

February, 2009

He Tiancai Shanxi Jincheng Anthracite Coal Mining Group Co. , Ltd.

Dear Guests, Ladies and Gentlemen:

Good afternoon!

First of all, I sincerely on behalf of Shanxi Jincheng Anthracite Mining Group Co. , Ltd. (hereinafter referred to as "Jincheng Coal Mining Group") would like extend a warm welcome to your arrival! Now, I will give a brief introduction to you on coal-bed methane development and utilization of Jincheng Coal Mining Group.

1. Brief Induction

Shanxi Jincheng Anthracite Mining Group Co. , Ltd. , (hereafter called Jincheng Coal Mining Group) its anteriority is Jincheng Coal Mining Administration Bureau, is established in 1958. In 2000, it finished corporate

institution reform. In 2005, after the conversion of debt to equity, Jincheng Coal Mining Group became a limited liability company of the diversified shareholding structure controlled by the Shanxi State-owned Assets Management Committee. Jincheng Coal Mining Group is the important component of East Shanxi Coal Industry Base---one of the 13 State Planned Large Coal Industry Base, and it is one of the first batch of 19 State Planned Coal Mining Area. It is an important production base of high quality anthracite of China. It lists the 149th in “the Top 500 Enterprises of China 2008” , the 139th in “the Largest 500 Enterprises of China” , and lists the 9th in “the Top 100 Coal Industry Enterprises of China 2008” .

The main businesses are coal mining, coal washing and processing, CBM development and utilization, coal chemical and pit-head power plant etc. There are eight production mines, and the approved capacity is 41.1 million tons/year. In 2008, the raw coal output is 32.21 million tons. After the recombining of the high quality coal assets, “Jincheng Coal Mining” are preparing for listing. There are 17 controlling subsidiaries of coal-chemical, they are Located in Shandong, Anhui, Jiangsu, Hubei, Hebei, Henan,

Zhejiang and Shanxi etc. eight provinces in the country. In 2008, the total synthetic ammonia production is 5.46 million tons, account for 8.83% in China, is the largest coal-chemical group. There are 1453 CBM surface wells, the coalbed methane production is 776 million cubic meters (including CMM production) in 2008, is ranking the first in China. The total installed capacity of power generation is 239 MW, among of it, the largest CMM-fired power plant in Asia---Sihe 120MW CMM-fired Power Plant has completed the acceptance checking and put into operation.

Till the end of 2008, the total assets of the Group are RMB 63.409 billion yuans. There are 44 controlling subsidiaries, 21 equity participation subsidiaries and 12 branches. The total employees are 66928. (not including the employees in other provinces) In 2008, the Group achieved the total production and operation revenue of RMB 44.55 billion yuan, the total benefit of RMB 3.932 billion yuan,

This few years, Jincheng Coal Mining Group speed up the implementing of the medium and long-term development strategy Mid-long of “the comprehensive development of coal, gas, power and chemistry industry, to build a green environment protection coal mine”. It constructed a new

pattern of basing on the coal industry, three main industries of “coalbed methane, power generation and coal-chemistry” complement each other and develop competitively with other non-coal industries. On this basis, the Jincheng Coal Mining Group based on the current and keep the long-term plan in mind, and actively seized the opportunities of the state’s strategic of speeding up building a large coal group and large coal base, established a strategic Prospect of creating “A 100 million tons coal production base, A scale of one hundred billion revenue, A hundred years of Enterprise and An energy flagship”. We strive to create the enterprise to a modern energy flagship Group with the main business of large-scale, living mechanisms, high innovation ability, high economic benefits, good ecological environment, cross-regional, cross-sectoral, cross-ownership, cross-border and with high international competitiveness.

2. CMM/CBM Development and Utilization

Jincheng mining area where Jincheng Coal Mining Group located is about 7538.2 square kilometers, a total area of 3901.65km² is rich in coal-bed methane content. The coal resource reserves are about 50124.61Mt. The west and north

part are all high gas mining area, with rich reserves of coalbed methane resources. The coal-bed methane resources in abundance are about 232 million tons / km², the gas content is more than 16.6 cubic meters per ton. According to the assessment report of the Chongqing Branch and Xi'an Branch of Coal Science Research Institute, it is forecasted that the coalbed methane reserves is about 600 billion cubic meters in Jincheng Mining Area Planning Area, the proved reserves is about 104 billion cubic meters, the recoverable reserves is about 72.8 billion cubic meters. Its recoverable resources are equivalent to a medium-sized gas fields. The gas content distribution in the Coal Mining Area is "lower in the east, Higher West, Lower South, Higher North", and the more deeply coal seam buried, the higher gas content. It is in better conditions of gas generation and preservation, large reserves. The methane content is high, more than 96%; seam permeability is 0.1~5 md, and it is suitable for recovery. The gas primary pressure is high in this Mining Area, it is generally around 0.2 ~ 1.6MPa in Sihe Area, it is 1.9MPa in partial area of it. The northwest part is much higher (the exposed Hudi shaft within Panzhuang Mining Area showed that the coal seam gas

pressure is up to 3.3 MPa), it is very rare in China. It would also be a serious threat to safety production of coal mine.

As a coal-based enterprise, Jincheng Coal Mining Group always adhere to the safe development is a top priority and primary objective of sustainable development as. As early as the 20th century, 90's, in order to solve the gas problem of new mine, Jincheng Coal Mining Bureau - the predecessor of Jincheng Coal Mining Group began planning for the formation of the specialized gas control, research and development agencies. July 1992, and Sino-American Energy Company of the United States signed a "Coal bed Methane Cooperation Development Agreement" with Jincheng Coal Mining Bureau, initiated the Panzhuang coal-bed methane development and utilization project. In 1993, Jincheng Coal Mining Bureau introduced surface coal-bed methane development technology from the United States first in China, there are seven coal-bed methane test wells were drilled in Panzhuang Area. Over the past decade, the daily single-well gas production capacity has always been maintained at more than 2000 cubic meters, is still producing gas now.

In 1995, a joint ventures–Shanxi Jindan Energy Research Development Co., Ltd. was established, responsible for the research, development and operation of coal-bed methane and its products of JMC.

In 2003, in order to treatment the gas hazards of enterprises’ safety production, improve the safety production capacity of high-gas coal mine, Jincheng Coal Mining Group organized a specialized subsidiary for coal-bed methane surface development and utilization, as well as working on coalfield geological exploration – Qinshui Lanyan Coalbed Methane Co., Ltd., to build a highly skilled, excellent professional team of coal-bed methane development and utilization. This team has obtained a solid mineral exploration B qualification; qualification B gas mineral exploration, prospecting engineering (drilling) C qualification issued by Shanxi Land and Resources Department. Shanxi Development and Reform Commission had issued a license of coalbed methane development and utilization construction to the Company, and the team was equipped with advanced technology and equipment.

In 2008, the Group had extracted coal-bed methane 776 million cubic meters, accounting for 15% of the total

extraction volume in China, among of it, CMM 400 million cubic meters is from underground extraction, accounting for 8% of the total extraction volume in China; the national total extraction of 8%; CBM 376 million cubic meters is from surface extraction, accounting for 75% of the total extraction volume in China. The Group has drilled a total of 1453 (including two horizontal wells) CBM surface wells, accounting for 60% of all the CDM surface wells in China, of which, 713 wells are in pumping, the daily gas production is more than 1.4 million cubic meters. The extraction capacity of surface wells 600 million cubic meters of coalbed methane. The total extraction capacity of surface and underground drainage is one billion cubic meters of coalbed methane.

Over the years, Jincheng Coal Mining Group always adheres to the guiding ideology of "Service for production safety, enhance mine safety and security capabilities, to promote energy-saving and emission reduction, recover coal-bed methane resources furthest, realize the industrialization of CBM" and working principle of "Combining the gas recovery with the underground drainage and surface development, surface developing first;

Combining the gas recovery with utilization, gas utilization facilitate recovery” . After more than ten years’ active exploration and practice, the group has made remarkable achievements. The main practices are:

We innovate gas concept, technology and management methods, and actively explore new channels of coal-bed methane development and utilization.

The First, insisting the idea innovation, put forward creatively the idea and methods of “Coal Mining and Gas Recovery Integration” and “Three phase gas treatment” .

We believe that the implementation of Coal Mining and Gas Recovery Integration is the implementation of a single gas integrated governance model of combination with surface well drilling, underground long-hole cross coal seam pre-drainage, drainage while mining (excavation), drainage in goaf in middle-thick coal seam, carry out the coal and gas resource development reasonably, comprehensive utilization and two industries development exuberantly.

The meaning of “ Coal Mining and Gas Recovery Integration” includes mainly three aspects: First, in terms of time, corresponds the gas pre-recovery with

coalmine development. It forms a science sequence of coal and coal-bed methane development of the geological exploration, surface pre-recovery, mine construction, coal mining, drainage during mining, drainage post-mining. The second, from the space, to ensure that the layout of coal-bed methane surface wells will be a adapted compound to the mine development and the coal excavation and mining layout. The third, from the functions, strive to use CBM well as wells of “geologic prospect, pre-drainage, drainage during mining, and post-drainage”. A well should be used as multifold function, to achieve good economic objectives.

The key point of carrying out “Coal Mining and Gas Recovery Integration” is to realize the combination surface extraction with underground drainage. The Surface wells laying, the wells’ number will consider. The first, the drainage effect of single well must be considered; the second, it is necessary to consider the longest extraction time; the third, decreasing the coal seam gas equably, try to not leave the high gas content parts with high pressure, it will be the potential danger of gas burst. For Providing safety condition for coal production: the first, it should

avoid the underground mining roadway and shaft chamber; the second, try to achieve the best drainage effect of working face; the third, the well should be used as multifold function.

“Three phase gas treatment” namely: For the mining seam or area which the gas content is higher than 16 cubic meters / tons, the first way is 5-8 years prior to carry out surface wells’ pre-extraction , so that the gas content can drop down below 16 cubic meters / tons, it will be the conditions of coal mine building. For the mining seam or area which the gas content is in the 8-16 cubic meters / tons, we will advance 3-5 years or more, use the underground 1000 meters drilling rig to implement large-scale regional progressive pre-drainage according to the coal seam occurrence characteristics. When the gas content in the pre-drainage region drops below 8 cubic meters / tons, we can construct roadways in the effective extraction region within the boundary of not less than 30 meters, and lay out the next extraction region for succeeding.

The Second, insist the technical innovation, realize all-round breakthrough on the key technology of surface CBM development, underground regional stepping-in pre-drainage

etc..

Over the years, the Jincheng Coal Mining Group has continuously intensified its investment in science and technology, strengthening research and development to tackle key problem, and strive to enhance the capability of independent innovation, developed the surface CBM pre-recovery technology with independent intellectual property rights, we have mastered the CBM development technology system of “the clear water drilling, the active water fracturing, the constant pressure pumping and the low pressure gas gathering etc.” . It broke through the “forbidden area” of CBM surface extraction in anthracite area, which the international experts recognized. It not only has laid a theoretical foundation for China’ s CBM surface pre- extraction in anthracite area, but also set up the first successful example for China's coal-bed methane surface development and utilization.

Underground regional progressive pre-drainage, that is, excavating roadway first in the lower gas content coal (rock) seam, drill long directional hole to the two side of the roadway, using the imported 1000 meters drilling rig. It will form a large range of gas pre-drainage area. A gas

pre-drainage area can generally cover 2-4 working face. After achieving intended effect in this gas extraction region, then construct roadway at the edge of this area, drilling long-hole again, and that it will form the next succeeding pre-drainage region, realize orderly convergence of pre-drainage region in the coal field.

We also observed the entire exposure process of China's first coal-bed methane well--CZ-024 have been exposed. We has got the first-hand information about of the damage degrees of fractured well to coal seam roof and floor, fracturing effect, cementing quality etc., it provides a basis for the arrangement of coal-bed methane wells and coalbed methane surface extraction in goaf in future.

In April 2006, Jincheng Coal Mining Group co-operated with the "four universities and two institutes" ---China University of Geosciences, China University of Mining and Technology, China Petroleum University, Henan Polytechnic University, Xi'an Branch of China Coal Science Institute and Chongqing Branch of China Coal Science Institute, to set up a production, teaching and research base of CBM development project. Since the establishment of bases, it carried out the research subject of "the Research on Large

Coal Seam Crack System of Jincheng Mining Area", "the Study on the control regional geological conditions of CBM wells", preparing the software of "CBM Digital Management System", and built a "CBM wells automatically monitoring and controlling system". Many groups of students of China University of Mining and Technology, China University of Geosciences, Henan Polytechnic University carried courses and graduation practices in the base.

The Third, insist in the comprehensive utilization of CBM, build a new situation of turning the gas "killer" to "underservant", we have got a remarkable social, environmental and economic benefit.

To achieve the maximize utilization of coal-bed methane resources, change the disaster to treasure, Jincheng Coal Mining Group invested a lot in the coal-bed methane utilization projects and pipeline network construction, expand substantially the use area of coalbed methane. At present, the coal-bed methane developed by Jincheng Coal Mining Group has been widely used for power generation, civil fuel and heating, vehicle fuel, industrial fuel and other areas, formed the largest scale of coal-bed methane development and utilization in the

country. In 2008, the coal-bed methane utilization volume exceeded 317 million cubic meters, accounting for 20% of the total volume in the country, among of it, CBM utilization 159 million cubic meters, CMM utilization 158 million cubic meters.

Coalmine methane power generation: Using the CMM drained from Sihe underground as fuel, we built up a pilot gas power generation station with an installed capacity of 15 MW, it put into operation in 2001. We reconstructed Chengzhuang Thermal Power Plant, Coal Gangue Power Plant of Jinju Company to gas fuels. The largest of CMM-fired power plant in Asia – Sihe 120 MW CMM-fired Power Plant have been put into operation. The total installed capacity of coalmine methane power generation has reached 189 MW. The annual coalmine methane utilization can be about 330 million cubic meters.

Civil fuels. Coalbed methane used as a civil fuel, it has the advantages of safety, cleaning and high calorific value. In 2005, Jincheng Coal Mining Group reconstructed the civil gas system in the mining area, we use coal-bed methane instead of water gas, it has been welcomed by the families of workers. At the same time, we actively explore

the surrounding markets, we supply the clean, efficient and safe coal-bed methane to residents of Jincheng City, Changzhi City, Taiyuan City and Henan Province, using of the dedicated coal-bed methane transportation trucks. As well as, the project of the construction of CBM storage and distribution station in Jincheng surrounding counties--Lingchuan, Gaoping, Bagong and other places is also actively promoting.

Clean Energy CNG Cars. It is tested that 1 cubic meter of coal-bed methane can replace 1.13 liters of 93# gasoline. Based on the prevailing market price of oil and gas, to use coalbed methane instead of the oil, 1 cubic meter will save RMB 2 yuan or more. In July 2005, Jincheng Coal Mining Group built the first CNG filling station in Jincheng City, and completed the conversion the first CNG car. At present, all the taxis in the City were modified as using the coal-bed methane as fuel. Automobile gas-filling business has extended to Changzhi, Taiyuan, Jiaozuo, Luoyang, Jiyuan, Zhengzhou and other cities' markets. The Coalbed Methane Energy Shinkansen Transportation Network Projects of Shanxi Chenguang Logistics Co., Ltd. has officially started on February 16, 2008, it takes the lead of using

of heavy-duty gas trucks.

Industrial Fuels. Coal-bed methane with the advantages of high methane content, and impurity less, it is used as fuels for glass, ceramics and other industries. At present, Jincheng Coal Mining Group has supplied CBM as industrial fuels to the ceramics, glass, steel and other production enterprises of Jincheng City and the surrounding areas.

Compressed coal-bed methane (CNG) and Liquefied project (LNG). Jincheng Coal Mining Group owns the largest coal-bed methane compression stations in China, the total designed compression capability is 740,000 cubic meters per day. At the same time, in order to expand the geographical space of coal-bed methane application (CNG economic transport radius is around 150 kilometers, LNG economic transport radius is about 1000 kilometers), Jincheng Coal Mining Group cooperate with Hong Kong and China Gas Company Limited (Towngas) to build and put into operation the first, largest, the newest technology Coalbed Methane Liquefaction (LNG) Plant with the liquefaction capacity of 300,000 cubic meters per day. It makes a breakthrough on our coalbed methane liquefaction technology, has laid a foundation for the expanding of the

scale of coal-bed methane liquefaction and coal-bed methane the long-distance transport in the future.

Build CMM/CBM Transmission Pipeline Networks:

The West CBM East Transmission Pipeline Project of Jincheng Coal Mining Group: The main purpose of the project is to ensure gas using of industrial enterprises, Coal Gange Power Plants, boilers, civil fuels and other fields in the areas of Jincheng City and Jincheng Coal Mining Group (old district). The length of pipeline is 45.2 kilometers, a total of six stations and two Extensions. The designed gas transmission capacity is one billion cubic meters / year. At present, the pipeline has already been put into trial operation.

Hudi - Li Zhuang, Yuecheng - Li Zhuang, Zhengzhuang - Li Zhuang and Zhengzhuang - Qinshui County coal-bed methane pipeline project. These pipelines will connected all the pipelines of Hudi, Zhengzhuang and Pnazhuang Coal Fields together. The total length of the 4 pipelines is about 60 KM. After the completion of the project, it cannot only adjust the rational utilization amount of coal-bed methane between the blocks, at the same time, it will greatly enhance the external sales capacity of coal-bed methane.

ADB-loaned Shanxi Qinshui coalfield Coal-bed methane Utilization Project: Shanxi Energy Coalbed Methane Co., Ltd.--the controlling subsidiary of Jincheng Coal Mining Group takes the charge of the construction of the project. It is a ADB-loan project. The project held a groundbreaking ceremony on August 8, 2007 in its Gaozhuang the gas-gathering terminal, and has strived to complete the building in 2009.

In addition, Jincheng - Changzhi Coal-bed Methane Pipeline Network Project with 500 million cubic meters of the designed annual gas transmission capacity has been approved to build by Shanxi Provincial Development and Reform Commission, and is expected to complete in 2010.

Developing CDM projects actively. In recent years, we actively make use of the Clean Development Mechanism, signed "carbon emission reduction purchase agreement" with the PCF of the World Bank, Japan Carbon Fund, the Netherlands Clean Development Mechanism Facility, ICECAP Carbon Trading Company of the United Kingdom and Climate Change Capital Group of the United Kingdom one after another. The total sale amount of CERs is about 17.8 million tons. In the first crediting period (2008 -2012), it can

get benefit of RMB 1.5 billion yuan.

The forth, make up CMM/CBM utilization standards, try to get preferential policies of the State

Made up the <Shanxi Coal-bed Methane and Compressed Coal-bed Methane Quality Standards>. In accordance with the request of Jincheng City Quality and Technical Supervision Authority, Qinshui Lanyan Coal-bed Methane Company of Jincheng Coal Mining Group has made up <Shanxi Coal-bed Methane and Compressed Coal-bed Methane Quality Standards>, and it has been approved by Technical Supervision Bureau of Shanxi Province, was issued in November 12, 2007, and was enforced from December 12, 2007. This is the first coal-bed methane industrial standard of Shanxi province. After a trial application, it will rise to a national standard. In addition, the preparation of other industrial standards relevant to coal-bed methane was trusted to Jincheng Coal Mining Group by the relevant departments of Shanxi province. This work is in progress.

Try to get preferential policies of the State. On the science and technology fund: In 2006 and 2008, we have got project fund of RMB 61 million yuans of “First gas production, then coal mining, gas integrated governance

project” of NDRC; and got the national science and technology fund of RMB 86 million yuan on Shanxi Jincheng Coal Mining Area coal mining and coal-bed methane recovery integration-- coal-bed methane development demonstration project in National “Large Oil and Gas Fields and Coal-bed Methane Development “. In 2008, we tried to get subsidies for coal-bed methane development and utilization of RMB 48.53 million yuan.

To sum up, Jincheng Coal Mining Group started the way from treatment against gas harm, and foster and develop gradually the coalbed methane industry. In particular, in recent years, we invested about 4 billion yuans funds on the surface drilling, gas transmission pipeline, gathering and transmission pipeline networks, gas station etc.. It makes a rapid development on coal-bed methane industry, and also achieved good comprehensive benefits.

The first, Highlight effect: Through the development model of "Coal Mining and Gas Recovery Integration, Commercial Development and Utilization", coal-bed methane extraction technology continues to mature, mining capacity is improved steadily, the utilization scale is expanding. The pipeline network construction has taken shape. It cause

a wide range concern of social community. the development of coalbed methane industry has become an important part of "coal, electricity, gas and chemical" comprehensive development strategy of Jincheng Coal Mining Group.

The second, Safety Benefits: Coalbed methane extraction effectively reduce the gas content of coal seam, lower underground gas pressure, treatment gas disaster from the source, and it provides a powerful protection to the coal safe production. Calculations show that a surface well with extraction capacity of 2500 cubic meters/day, will enable reduce the gas content of 0.9-1.0 cubic meters/ton of 0.105 square kilometers area.

The third, Environmental Benefits: Taking an example for filling a car up with gas, gas has a better environmental effect than oil. Vehicles using coalbed methane can reduce CO emissions by 97%, 72% reduction in hydrocarbons and nitrogen oxides reduced 39%, CO₂ reduction of 24%, SO₂ reduction of 90%, 40% noise reduction, and no lead, benzene and other carcinogenic toxic substances.

The fourth, Economic Benefits: In the current era of soaring energy prices, the economic benefits of coal-bed

methane appears increasingly. At present, the development and utilization of coalbed methane is still in the investment period. The use of coal-bed methane on power generation, civil use , industry, automotive fuel is in the large-scale stage of market development and paving the way. With the expansion of use fields and scope, it will achieve considerable economic benefits.

The fifth, Social Benefits: The development of coal-bed methane industry promoted comprehensive utilization of resources and provided the community with a new type of clean energy. Such as in the civilian utilization, the use of coal-bed methane gas instead of water gas, not only hygienic, but also solved the problem of carbon monoxide poisoning, greatly improved the residents quality of life. In 2005, CCTV "Focus Interview " Column reported on Jincheng Coal Industry Group coal-bed methane development and utilization with the title of "changing 'killer' into 'helper'", which had aroused strong reaction from the whole society..

3 The Development Prospects

According to the preliminary plan, we will try to form a capacity of 5 billion cubic meters / year of coal-bed

methane production in Jincheng mining area within about 5 years from 2009. Till the end of the “Twelfth-Five Years Plan”, form a coal-bed methane recovery capacity of total 10 billion cubic meters / year in Jincheng mining area, Yangquan mining area, WuXia mining area, Hedong Coalfield and the Inner Mongolia Alashan Region. Finally, we would like to invite all the friends who have same insight to cooperate with us to explore new ways of the coal-bed methane development and utilization and create a more beautiful tomorrow of coal-bed methane industry.

Thank you!