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第八届可持续发展能源国际论坛 哈萨克斯坦·阿斯塔纳



Part 1: *The important role of CMM in energy substitution and its significance to the transition of coal enterprises*

第一部分：*煤矿瓦斯在能源替代中的重要作用及其对煤炭企业转型的意义*

Panel discussion 专题讨论
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A brief introduction to Shanxi Coking Coal

山西焦煤集团简介

- * The largest coking coal producer in China, has an annual operating income of 31 billion US dollars, with a total assets of 40.19 billion US dollars, ranking the 337th in the Fortune 500 in 2016
中国最大的炼焦煤生产企业，年营业收入310亿美元，总资产401.9亿美元，位居2016年财富世界500强第337位
- * State-owned enterprise
国有企业
- * Operating 100 coal mines, production capacity of 174 million tons/year; 28 coal washing plants, washing capacity of 126 million tons/year; 5 coking plants, coke production capacity of 11.8 million tons/year
现有100座煤矿，生产能力1.74亿吨/年；28座选煤厂，入洗能力1.26亿吨/年；5座焦化厂，焦炭产能1180万吨/年
- * Planning to shut down some small coal mines to eliminate backward production capacity, and release high yield and high efficiency coal mines
计划关闭一些小煤矿以淘汰落后产能，释放高产高效煤矿的产能
- * Business scope also includes coal-fired power plants and chemicals, operating 9 coal-fired power plants, with an installation capacity of 3468MW; 14 gas and heat power plants, with an installation capacity of 221MW; salinization and daily chemicals production capacity of 2.56 million tons/year
经营范围还包括火力发电和化工产品，现有9座燃煤电厂，装机容量3468MW；14座瓦斯及余热电厂，装机容量221MW；盐化日化产能256万吨/年

CMM achievements

煤炭瓦斯业绩

- ✧ Total drained gas in 2016 = 598 million m³
2016年的瓦斯总抽采量5.98亿立方米
- ✧ Showed that with attention to management detail, concentration of drained gas can be maintained above 30% for safer and more efficient extraction and use
实践证明：强化细节管理可使得抽采瓦斯的浓度高于30%，实现更安全更高效的瓦斯抽采和利用
- ✧ Demonstrated potential of Near-Zero emissions mining
展示了瓦斯近零排放开采的可能性
- ✧ Operating 11 gas power plants, with an installation capacity of 113MW, all of them are seasonal co-generation schemes, including 3 world-class CMM projects with an installation capacity of 31MW, which have realized clean energy power generation, surplus methane flaring and waste heat utilization
运营着11座瓦斯电站，装机容量113MW，全部是季节性热电联产项目，其中3个世界级项目装机容量31MW，实现了清洁能源发电、富余瓦斯火炬燃烧和余热利用三联产

CMM technology

煤炭瓦斯技术

- ※ **Applying state-of-the-art equipment for gas extraction and use**
采用最先进的瓦斯抽采和利用设备
- ※ **Equipment can only be used effectively when operated in accordance with best practice – new standards have been developed for CMM power plant management and operations**
根据最佳实践来操作，设备能够发挥其高效性能——新标准已经用于煤炭瓦斯电厂的管理和运营方面
- ※ **A limitation to pre-drainage is low permeability of coal seams – fracture enhancement techniques are being developed**
预抽的一个局限性在于煤层的低透气性差——正在开发裂缝增强技术
- ※ **Opportunities for increasing gas availability for power generation include drainage of sealed areas to the surface and surface to in-seam horizontal drilling**
针对瓦斯发电，提高气量的方法包括：地面采空区抽采以及从地面到煤层的水平钻孔抽采
- ※ **Use of waste heat from power generation is seasonal – 150 degrees cylinder cooling water → plant ground heating; 450 degrees engine exhaust gas → shaft heating. All-year round uses are being sought that are financially viable**
目前瓦斯发电站的余热利用是季节性的：150度缸套冷却水→地面厂区供暖；450度发动机烟气→风井供热。正在研究全年余热利用经济上的可行性

CMM financing

煤炭瓦斯利用的融资

- ✧ In the past, CDM financing mechanisms were highly effective but recently, within the framework of China's national Emission Trading Scheme(ETS), the effective development of carbon financing will take time since CCER is used to offset carbon quotas only in 7 pilot provinces (municipalities)
过去，CDM融资机制是非常有效的，但是目前，在中国国家减排交易（ETS）框架下，由于CCER用于抵消碳配额仅在试点的七个省（市）实行，碳融资的有效开展需要时日
- ✧ In the future, Chinese government will compulsively require the traditional coal-fired power plant to assort 10% power generation project of new energy; coal mining companies with coal power plants may benefit in 3 ways through methane generation: clean electricity production, meeting the requirements of government and offsetting emission allowances
未来，中国政府将强制要求传统火力发电厂配套10%的新能源发电项目，拥有火电厂的煤炭企业可以通过瓦斯发电产生三重效益：生产清洁电能、满足政府要求、冲抵减排配额
- ✧ Large state-owned enterprises have access to state bank loans to develop clean energy projects
大型国有企业开发清洁能源项目具有获得银行贷款的优势

Regulatory and policy incentives

法规和政策激励

- ✧ The government has introduced incentives to encourage CMM capture and use for power generation, these are: the consumption of 1m³ pure methane will be subsidized 0.4RMB by the government; CMM power price 0.25RMB higher than benchmark price
政府已出台奖励机制以激励煤炭瓦斯抽采和发电利用，包括：每消耗1m³纯甲烷政府补贴0.4元；瓦斯发电上网电价在标杆电价的基础上增加0.25元/度
- ✧ Some 70% of the methane emitted from coal mines is in low concentration in the ventilation air (VAM)
煤矿释放出的瓦斯中70%是低浓度的风排瓦斯
- ✧ Some coal mine groups have developed VAM power generation projects but there are cost issue. Government subsidies are required for financial feasibility.
一些煤炭生产集团公司已开发了风排瓦斯发电项目，但存在成本问题。就财务可行性而言，政府补贴是必要的
- ✧ For VAM project only with emission reduction benefits, the significant reduction of VAM emissions only depends on CCER projects
对于只有减排收益的风排瓦斯项目，排放量的显著降低完全取决于CCER的价格
- ✧ An environmental regulation requires that CMM of 30% or more must be utilized, thus the drainage and utilization project of high-concentration methane will be limited, making it impossible to pass CCER financing, also cannot get governmental subsidies which will go against the implementation of *Best Practice for methane drainage and use* (under an NDRC additionality rule)
环境法规要求30%以上的甲烷必须利用，这样就限制了高浓瓦斯的抽采利用项目，使其无法通过CCER融资，也不能取得政府补贴，不利于瓦斯抽采和利用的最佳实践的实施（根据国家发改委额外性规定）

Environment and social

环境和社会

- ※ Gas utilization not only improves the working environment of coal mines, promotes the occupational health level of employees, but also makes clean energy instead of coal, reducing carbon emissions which produces social and economic benefits
瓦斯利用既改善了煤矿作业环境提升了员工职业卫生水平，也使清洁能源取代燃煤，减少碳排放，产生了社会效益和经济效益
- ※ Waste heat from the generators can be used for heating and hot water supply in winter mines and plants, ensuring safe production and improving the working environment on the ground and underground
发电的余热可用于冬季矿井和厂区供暖及热水供应，保障安全生产，改善地面和井下的工作环境
- ※ Each project has created employment for some 20-30 site staff and workers. At Shanxi Coking Coal CMM power generation sites there is no gender discrimination with half of the operators being women.
每个项目可创造20~30个就业机会。在山西焦煤瓦斯电站的现场操作和技术人员中，一半以上是女性，没有性别歧视
- ※ Improvements in access to CMM sites and local infrastructure benefits the local communities and their economy
瓦斯电厂道路和当地基础设施的改善，有利于促进当地居民及经济的发展
- ※ The introduction of new technology on gas drainage and use reduces emissions and improves the safety and economy of coal production
应用瓦斯抽采和利用的新技术，减少了排放，提高了煤炭生产的安全性和经济性