

# COAL MINE METHANE PROJECT OPPORTUNITY

## Guizhou Zhongling Coal Mine CMM To LNG Project

### Guizhou Zhongling Coal Mine

#### Nayong County, Bijie Prefecture, Guizhou, China

### OVERVIEW OF COAL MINE METHANE PROJECT:

Zhongling Coal Mine is located in Nayong County, Guizhou Province, China. Zhongling mine has two minefields: the Zhongling field (Field 1) with two mining areas (Area 11 and 12) and the Pingshan field (Field 2) with one mining area (Area 21). Each mining area's designed production capacity is 1 million t/a. Based on Zhongling mine's geological coal reserve (710.43 million t) and average methane content (12.54 m<sup>3</sup>/t), it is estimated that its geological methane reserves are 8.91 billion m<sup>3</sup>.

Zhongling Mine is one of the earliest coal mines in Guizhou that uses CMM for power generation. Currently there are 15 x 500 kw low concentration gas engines installed in three mining areas. However, these gas engines only utilize about 20% of the CMM resource on average. In 2012, 26 million m<sup>3</sup> CMM was vented to the atmosphere.

Due to its remote location, Zhongling Mine is considering a CMM purification project for LNG. The gas processing capacity is at 15 million m<sup>3</sup> methane/year (11,300 t LNG). Total investment (not including the land and infrastructure) is estimated at up to \$10 million. In order to carry out such a project, the mine needs to significantly improve its drainage practices. The mine looks for technical partners to improve its gas drainage quality and quantity (underground and/or surface), and for investors.

**ESTIMATED ANNUAL EMISSION REDUCTIONS: 218,427 MTCO<sub>2</sub>E**

## PROJECT DETAILS

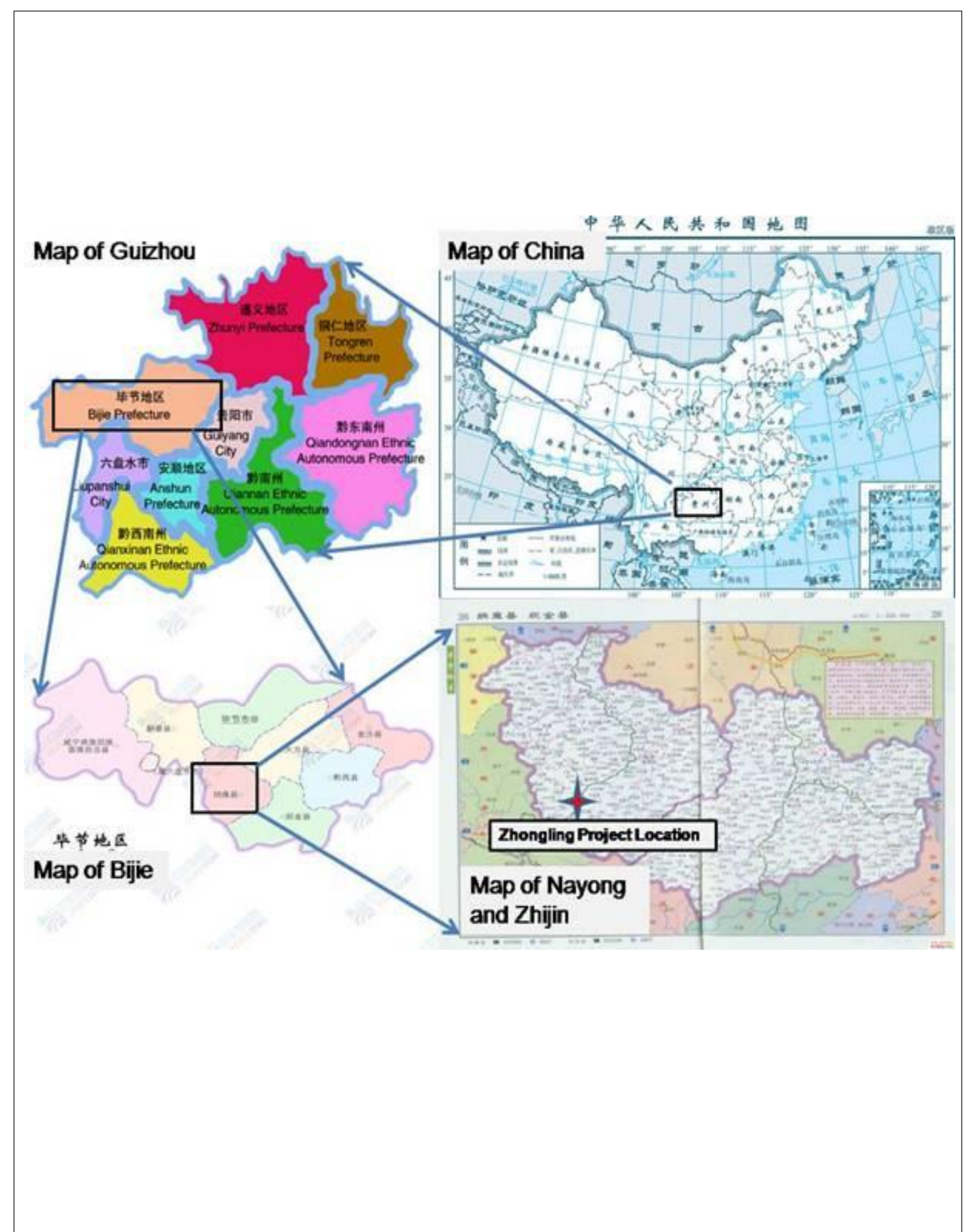
- Name of Project: Guizhou Zhongling Coal Mine CMM to LNG Project
- Name of Mine: Guizhou Zhongling Coal Mine
- Type of Ownership: Public
- Type(s) of assessments performed: Pre-feasibility
  - When performed: Dec. 2011
  - By whom: Guizhou International Cooperation Centre for Environmental Protection

## MINE INFORMATION

- Mine owner: Guizhou Zhongling Mining Co., Ltd
- Percent ownership: 100%
- Parent company: Guizhou Shuicheng Mining (Group) Co., Ltd
- Status and type of mine: Active / Underground
- Mining Method: Longwall
- Service Life of Mine: 76 years

## PROJECT FINANCES

- Assumptions : 15 million m<sup>3</sup> methane/a (11,300 t LNG)
- Estimated revenue : \$6.14 Million
- Projected capital costs: \$9.73 Million
- Projected operation and maintenance (O&M) costs for fully implemented project: \$2.95 Million
- Estimated Return on Investment (ROI): 5.34 years



# HISTORICAL AND PROJECTED MINE DATA

## HISTORICAL COAL PRODUCTION AND METHANE EMISSIONS

YEAR	2004	2005	2006	2007	2008	2009	2010	2011	2012
Coal (tonnes/yr)							721,800	983,400	1,033,900
<i>Methane (Mm<sup>3</sup>/yr)</i>									
Emitted from ventilation system(s)							24.76	19.37	24.70
Liberated from drainage systems							37.47	42.85	32.33
Vented to atmosphere							27.70	36.99	26.06
Total Methane Emissions							52.46	56.36	50.76

## PROJECTED COAL PRODUCTION AND METHANE EMISSIONS

YEAR	2013	2014	2015	2016	2017	2018	2019
Coal (tonnes/yr)	1,560,000	2,480,000	3,200,000	3,200,000	3,200,000	3,200,000	3,200,000
<i>Methane (Mm<sup>3</sup>/yr)</i>							
Emitted from ventilation system(s)	24.70	24.70	24.70	24.70	24.70	24.70	24.70
Liberated from drainage systems	26.56	32.00	38.00	38.00	38.00	38.00	38.00
Vented to atmosphere	19.26	24.70	30.70	30.70	30.70	30.70	30.70
Total Methane Emissions	43.96	49.40	55.40	55.40	55.40	55.40	55.40

# GREENHOUSE GAS EMISSION REDUCTIONS

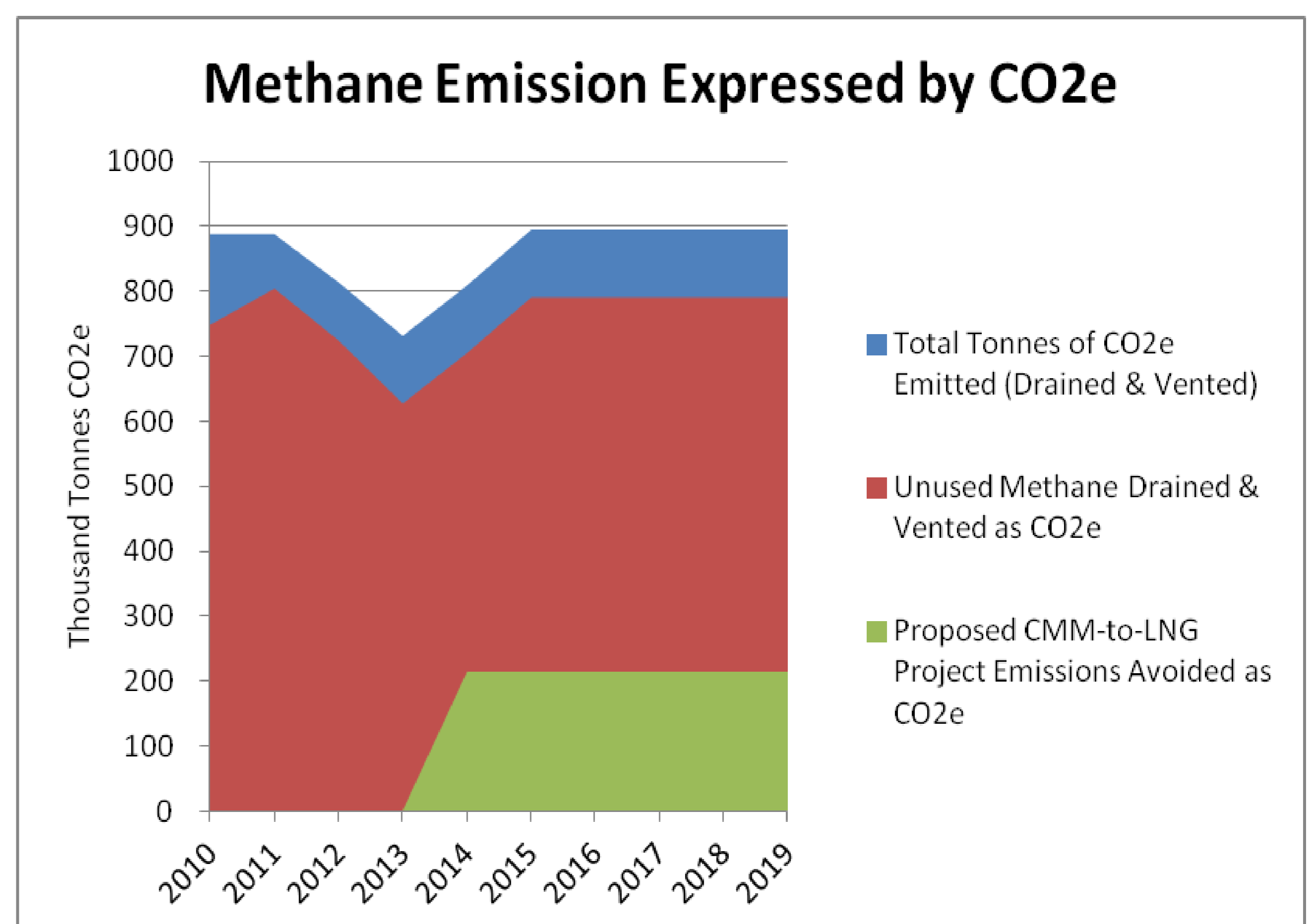
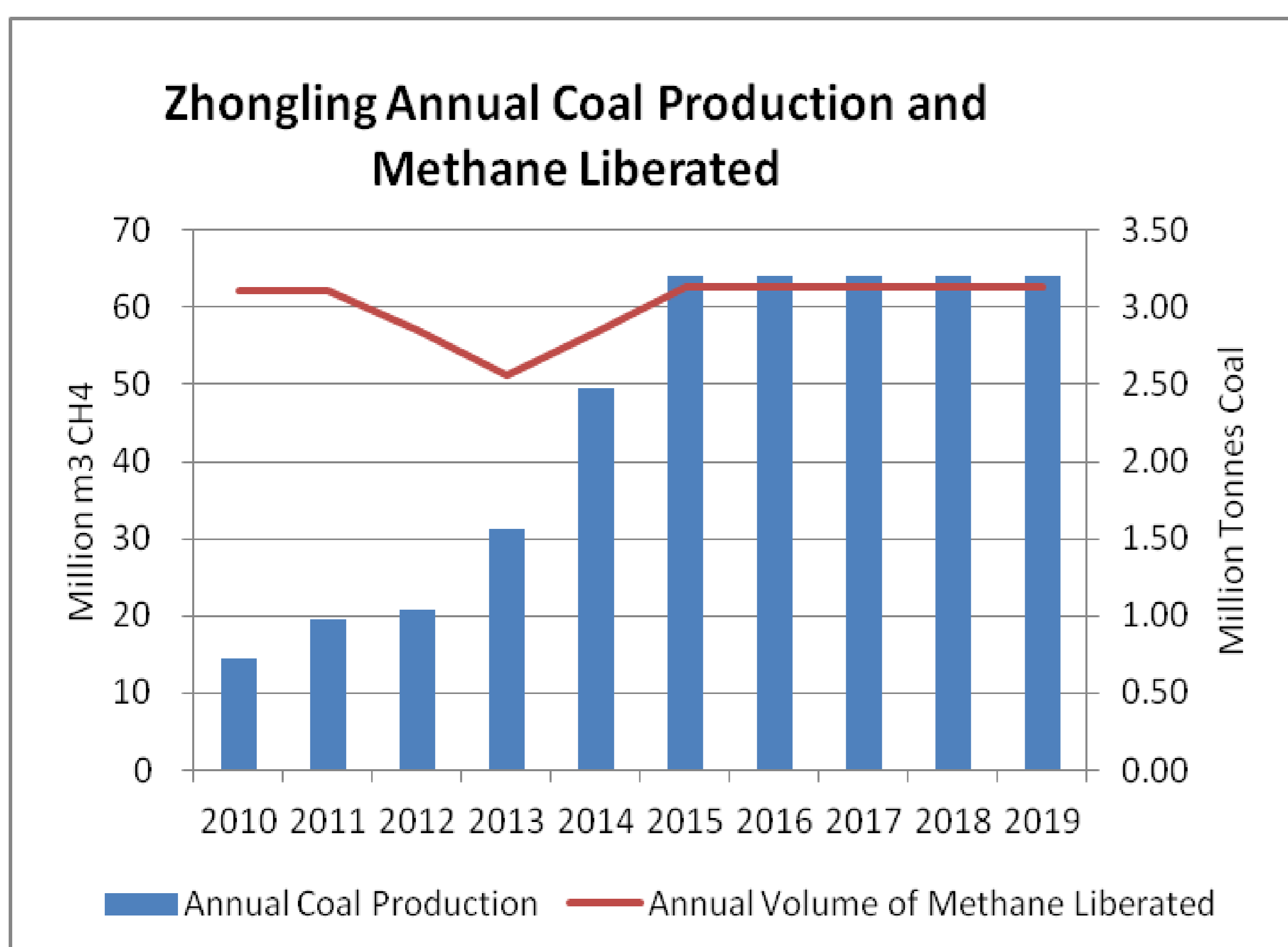
## ESTIMATED GHG EMISSION REDUCTIONS AND TOTAL VOLUME OF METHANE ALREADY RECOVERED/UTILIZED

YEAR	2004	2005	2006	2007	2008	2009	2010	2011	2012
Total CH <sub>4</sub> vented (ave. m <sup>3</sup> /min)							72	81	102
Average CH <sub>4</sub> concentration							12%	12%	12%
Total CH <sub>4</sub> recovered and utilized (Mm <sup>3</sup> /year)							9.77	5.86	6.27

## TOTAL VOLUME OF METHANE EXPECTED TO BE RECOVERED/UTILIZED

YEAR	2013	2014	2015	2016	2017	2018	2019
Total CH <sub>4</sub> recovered and utilized (Mm <sup>3</sup> /year)	7.30	22.30	22.30	22.30	22.30	22.30	22.30

# COAL PRODUCTION AND METHANE EMISSION CHARTS



## MARKET ANALYSIS / DEMAND ANALYSIS

Gas Market: It is expected that in 2015, total gas supply for Guizhou will be only 2.137 billion cubic meters, while the gas demand of Guizhou is expected to increase to 6.538 billion cubic meters, resulting in a huge gap between supply and demand. Once CMM-based CNG is produced, it is expected to be sold to Guizhou Natural Gas Company, which could use CNG as a supplementary gas source locally, for town gas, industrial fuel, or even as fuel for vehicles in other cities in Guizhou.

## TYPE(S) OF ASSISTANCE SOUGHT

- Financial Assistance: \$10 million for equipment and construction cost.
- Technical Assistance: Underground / surface drainage practices to improve methane concentration and mature CMM purification technologies.

## PROPOSED TECHNOLOGIES



Pump station at mining area 12, Zhongling Coal Mine



A pilot surface drilling project in Zhongling Coal Mine, 2010

## FOR MORE INFORMATION, CONTACT:

**Guizhou International Cooperation Centre  
for Environmental Protection /  
ZHENG Mingjie**

No. 40, Zunyi Road, Guiyang, Guizhou  
Province, China, 550001  
Tel:86-851-5577314  
Fax:86-851-5577314  
Email: [epbfaec@163.com](mailto:epbfaec@163.com)

*DISCLAIMER: The information and predictions contained within this poster are based on the data provided by the site owners and operators. The Global Methane Initiative cannot take responsibility for the accuracy of this data.*