

# COAL MINE METHANE PROJECT OPPORTUNITY

## Guizhou Qinglong Coal Mine CMM Comprehensive Utilization Project

### Guizhou Qinglong Coal Mine

#### Qianxi County, Guizhou Province, China

### OVERVIEW OF COAL MINE METHANE PROJECT:

Qinglong Coal Mine is located at Qianxi County, Guizhou Province, China. The geological reserve of coal in this mine is 190 million tonnes and the minable reserve is 89 million tonnes. Qinglong Coal Mine is designed to produce 1.2 million tonnes of coal per year. The mine is classified as a gassy coal mine. It has 2.85 billion m<sup>3</sup> of methane reserve, of which 1.34 billion m<sup>3</sup> methane is drainable. In 2012, 31.95 M m<sup>3</sup> CMM was drained underground and 6.25 M m<sup>3</sup> was utilized to feed six low-concentration CMM gas engines (3.2 MW total). Electricity was used internally within the mine and the rest of the CMM was vented to the atmosphere.

Starting from 2013, Qinglong coal mine will produce 1.2 million tonnes of coal and drain 40 million m<sup>3</sup> methane annually. There will be more than 30 million m<sup>3</sup> of CMM to be utilized. Qinglong Mine plans to add six 600 kw gas engines to the power station and is evaluating the technical feasibility of purifying CMM to compressed natural gas (CNG). The scale of the CMM-to-CNG project is likely between 12 -15 million m<sup>3</sup> methane per year and the investment is up to 50 million RMB (US \$8.2 million). Qinglong Coal Mine looks for technical partners in gas drainage (underground and surface) and utilization, as well as investors.

**ESTIMATED ANNUAL EMISSION REDUCTIONS: 171,360 MTCO<sub>2</sub>E**

### PROJECT DETAILS

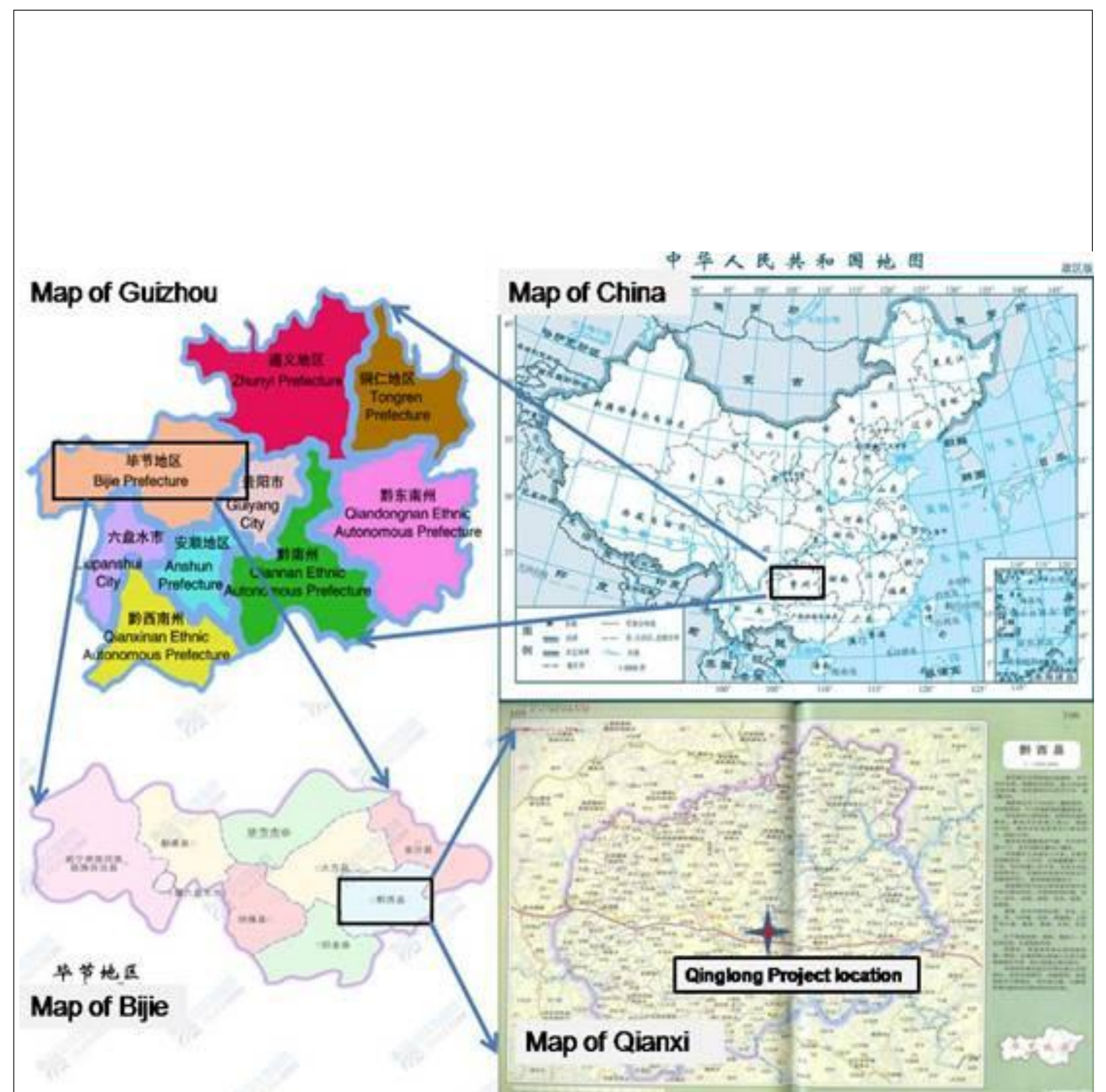
- Name of Project: Guizhou Qinglong Coal Mine CMM Comprehensive Utilization Project
- Name of Mine: Guizhou Qinglong Coal Mine
- Type of Ownership: Public
- Type(s) of assessments performed: Pre-feasibility
  - When performed: Dec. 2011
  - By whom: Guizhou International Cooperation Centre for Environmental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

### MINE INFORMATION

- Mine owner: Guizhou Qianxi Energy Development Co., Ltd
- Percent ownership: 100 %
- Parent company: Yankuang Guizhou Energy and Chemical Industry Co., Ltd
- Status and type of mine: Active / Underground
- Mining Method: Longwall
- Service Life of Mine: 53 years

### PROJECT FINANCES

- Assumptions : CNG12 M m<sup>3</sup> /a
- Estimated revenue : US\$ 4.92 Million/a
- Projected capital costs: US\$ 6.61 Million (not including land)
- Projected operation and maintenance (O&M) costs for fully implemented project: US\$ 2.52 Million/a
- Estimated Return on Investment (ROI): 4.38 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)	2,542	251,656	140,876	553,066	807,800	805,318	1,041,425	1,080,000	1,120,000
<i>Methane (Mm<sup>3</sup>/yr)</i>									
Emitted from ventilation system(s)				21.78	21.54	20.87	20.88	18.10	20.73
Liberated from drainage systems	0.16	4.46	4.37	6.47	7.65	11.28	16.21	21.6	31.95
Vented to atmosphere	0.16	4.46	2.67	5.73	4.28	7.85	11.1	16.39	25.7
Total Methane Emissions				27.51	25.82	28.72	31.98	34.49	46.43

## PROJECTED COAL PRODUCTION AND METHANE EMISSIONS

YEAR	2013	2014	2015	2016	2017	2018	2019
Coal (tonnes/yr)	1,200,000	1,200,000	1,200,000	1,200,000	1,200,000	1,200,000	1,200,000
<i>Methane (Mm<sup>3</sup>/yr)</i>							
Emitted from ventilation system(s)	21.6	21.6	21.6	21.6	21.6	21.6	21.6
Liberated from drainage systems	40	40	40	40	40	40	40
Vented to atmosphere	30	27	27	27	27	27	27
Total Methane Emissions	51.6	48.6	48.6	48.6	48.6	48.6	48.6

# GREENHOUSE GAS EMISSION REDUCTIONS

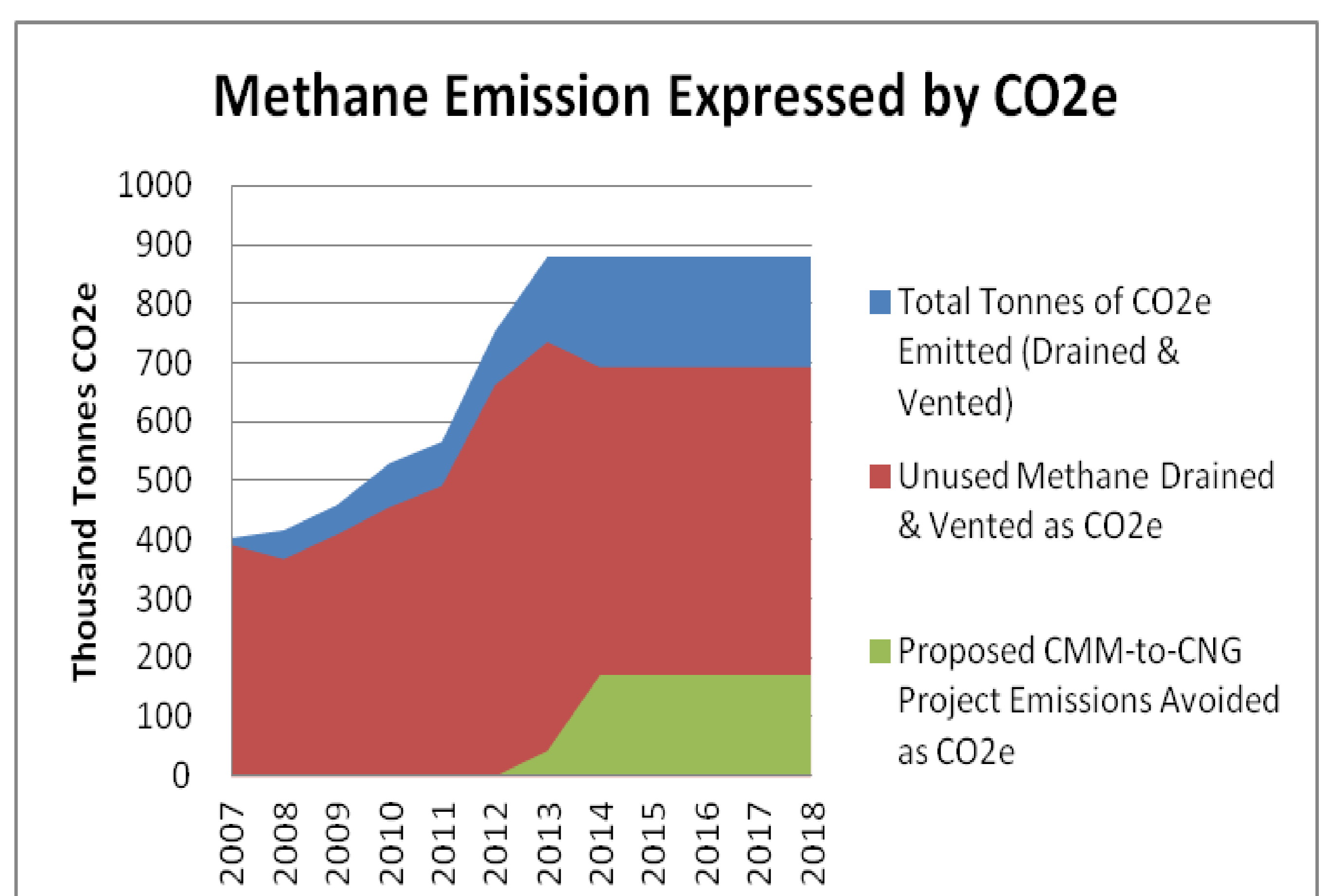
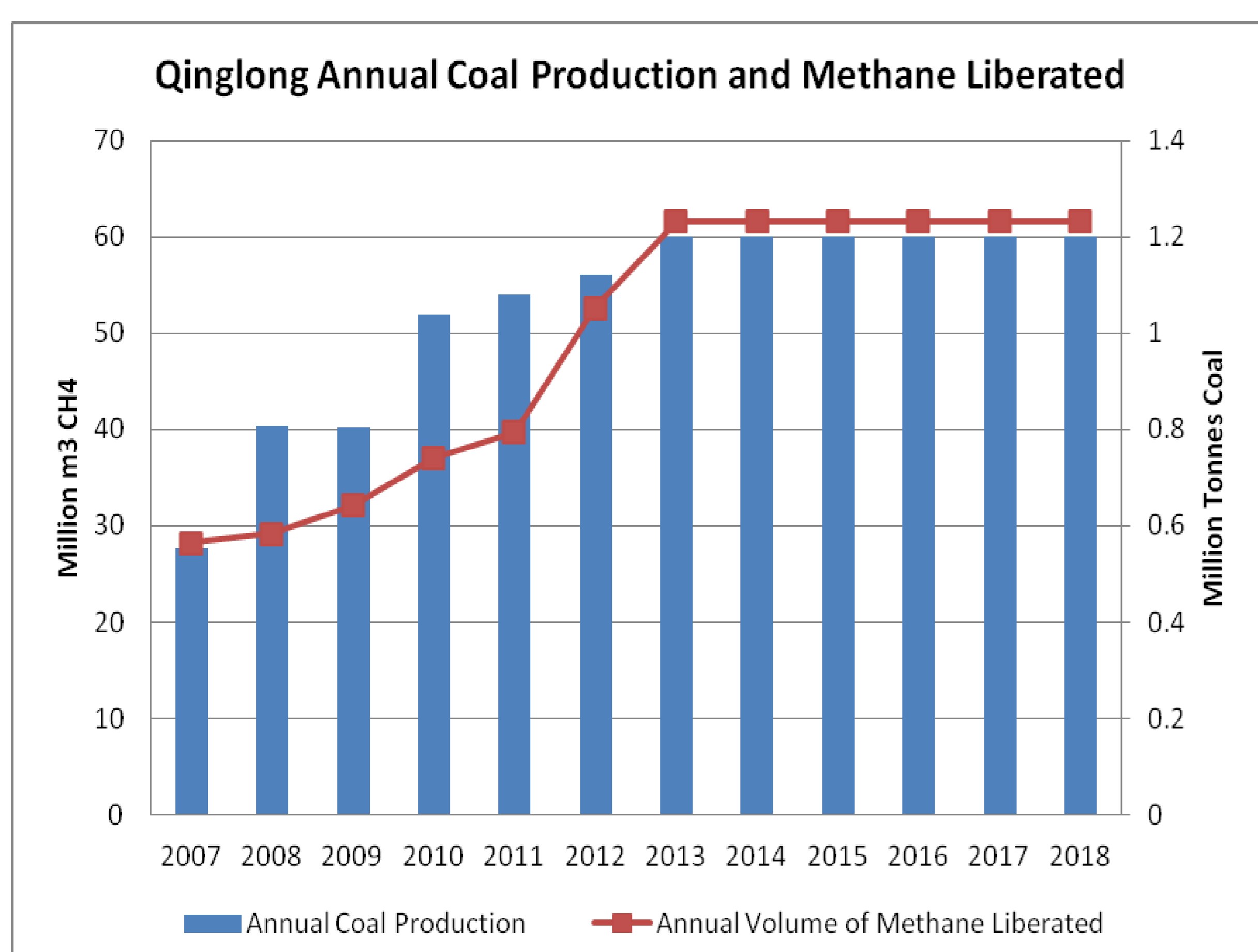
## ESTIMATED GHG EMISSION REDUCTIONS AND TOTAL VOLUME OF METHANE ALREADY RECOVERED/UTILIZED

YEAR	2004	2005	2006	2007	2008	2009	2010	2011	2012
Total CH <sub>4</sub> vented (ave. m <sup>3</sup> /min)				54	56	61	71	76	100
Average CH <sub>4</sub> concentration				20%	21%	23%	24%	26%	27%
Total CH <sub>4</sub> recovered and utilized (Mm <sup>3</sup> /year)			1.71	0.74	3.37	3.43	5.11	5.21	6.25

## 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)	13.00	25.00	25.00	25.00	25.00	25.00	25.00

# 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 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 of Guizhou.

## TYPE(S) OF ASSISTANCE SOUGHT

- Financial Assistance: \$6 million for equipment and construction costs.
- Technical Assistance : Underground/surface drainage practices to improve methane concentration and mature CMM purification technologies.

## PROPOSED TECHNOLOGIES



Pump station in Qinglong Coal Mine



CMM to CNG technology applied in Shanxi, China

## FOR MORE INFORMATION, CONTACT:

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