Colorado State Senate State, Veterans and Military Affairs Committee April 8, 2013.

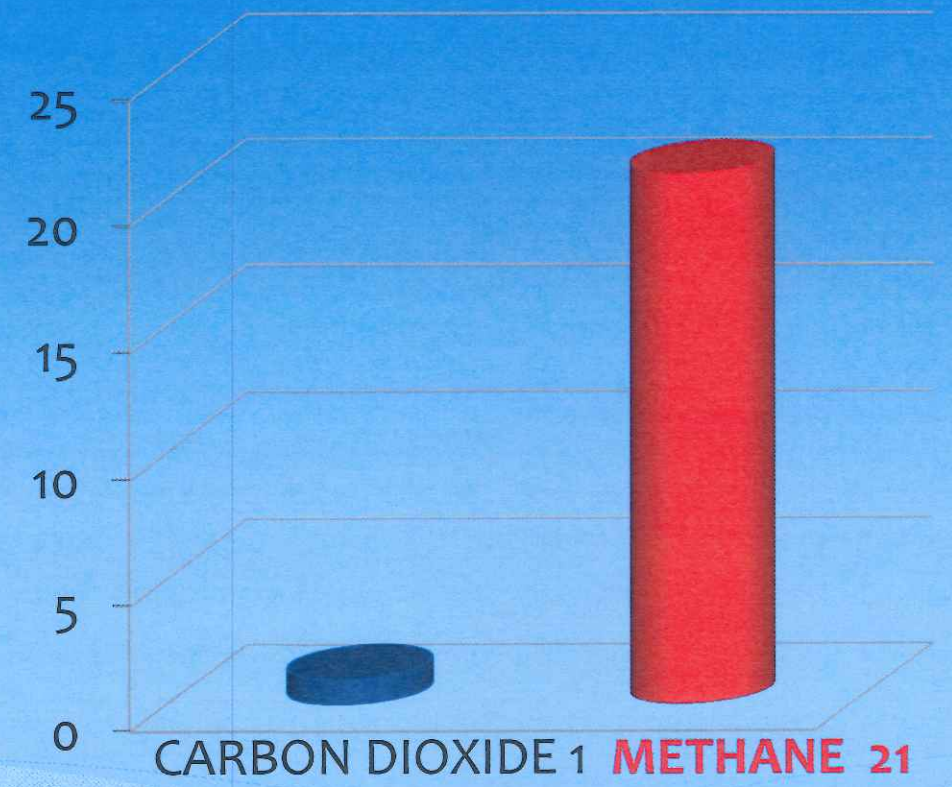
Senate Bill 13-252

WASTE METHANE TO ENERGY,
TOM VESSELS, VESSELS COAL GAS

Attachment A

2012: Hottest Year Ever for Lower 48.

Science Magazine recently published a study showing that **METHANE** and soot reduction would have the most significant, immediate, and cost effective impact on global warming.



Vessels Coal Gas INC™

This incinerator at the Elk Creek Mine in Gunnison County Colorado burns enough methane to generate **16 Megawatts** of electricity.

It makes more sense to turn it into electricity instead but without being eligible for the Renewable Portfolio Standard the only price we can get is three cents per 1,000 kilowatt hours—not enough to make it cost effective to install generation equipment.

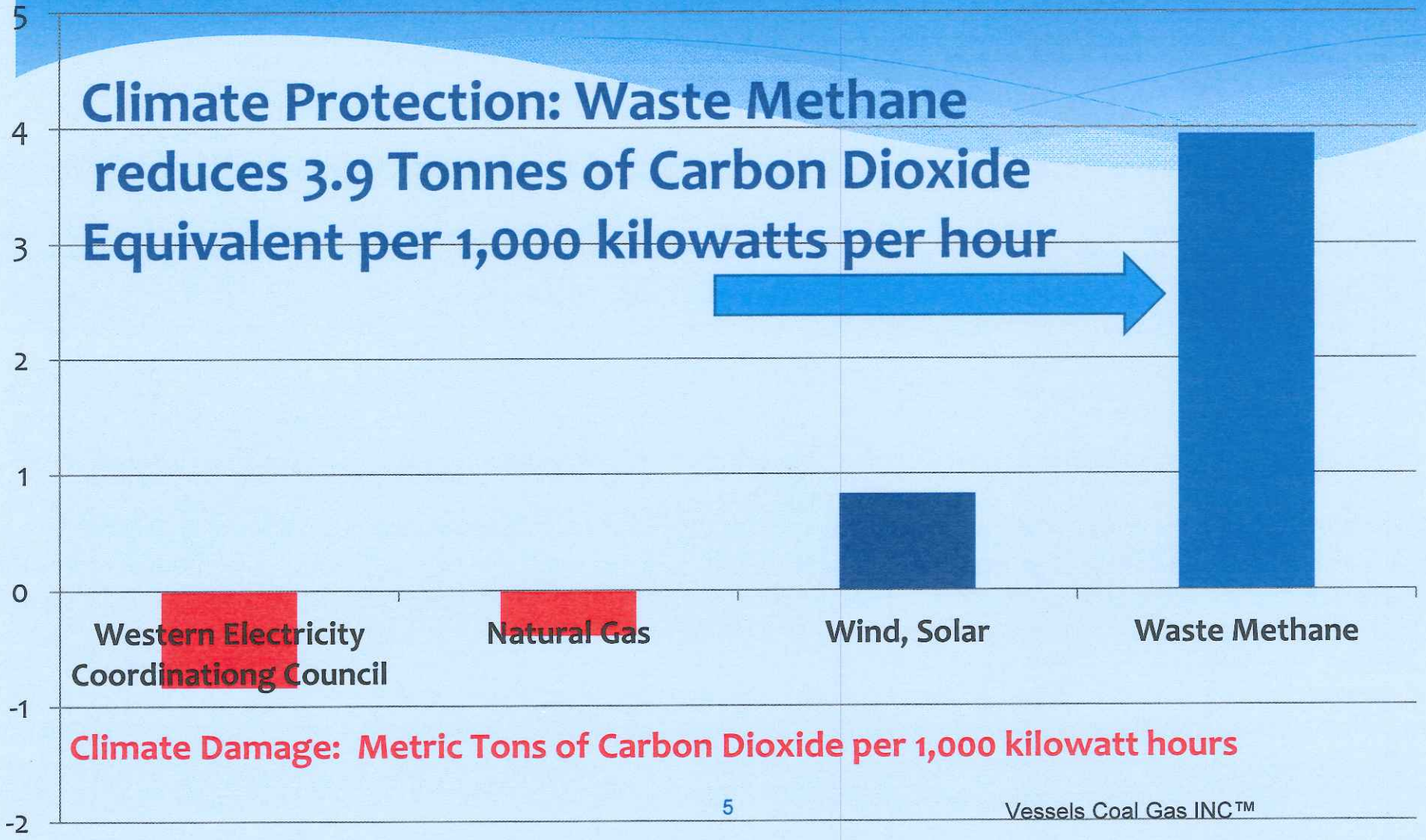
16,000 Kilowatts of electricity from WASTE METHANE Prevents over 500,000 Tonnes of CO2 from going into the atmosphere each year.

Same as PLANTING 400,000+ ACRES

Same as REMOVING 90,000 CARS

Source: U.S. EPA

Metric Tons of Carbon Dioxide equivalent per 1,000 Kilowatt Hours



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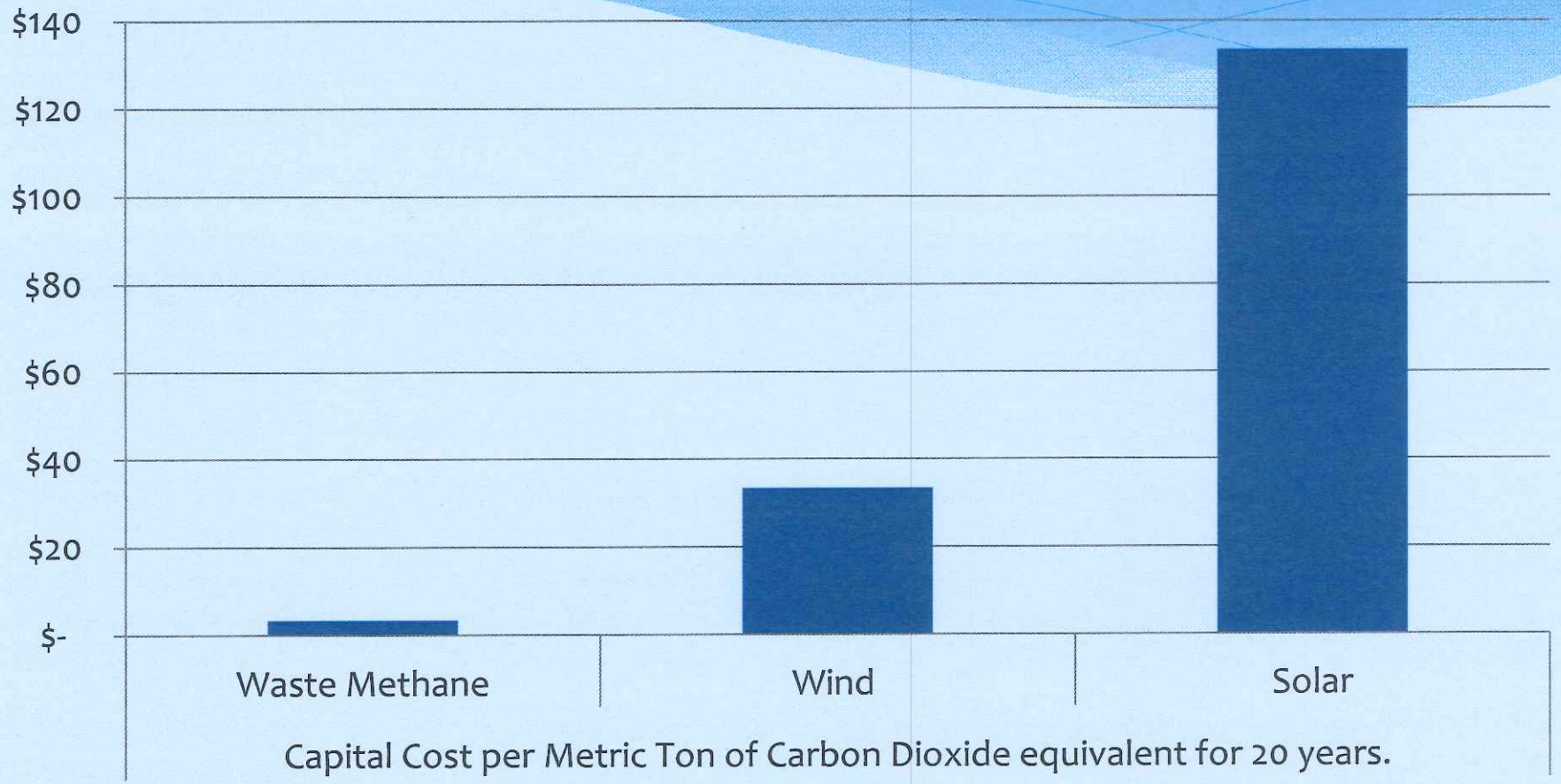
Waste Methane can be one of Colorado's most cost effective Climate Investments.



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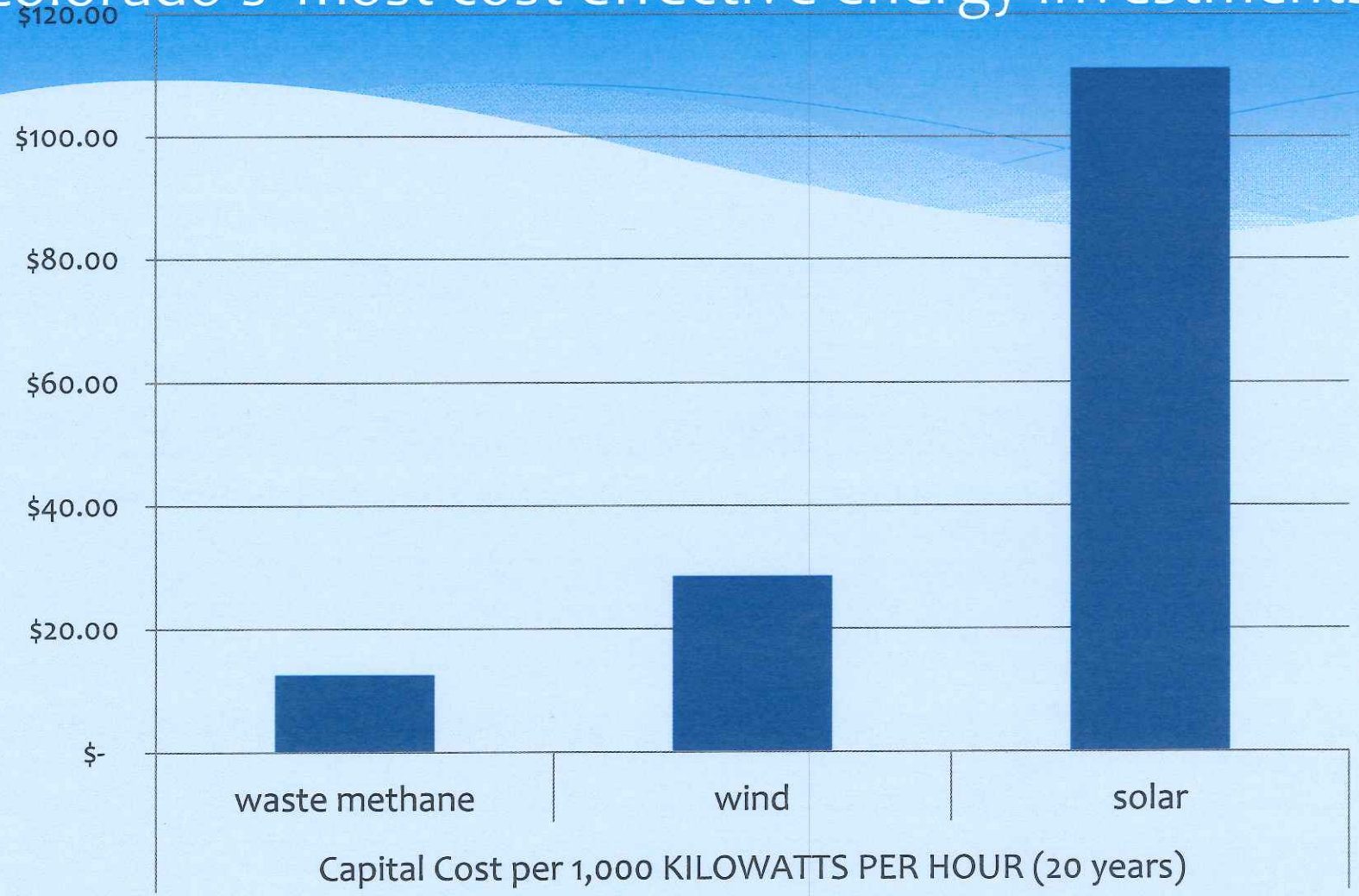
Comparative Capital Cost - Waste Methane is one of Colorado's most cost effective energy Investments.



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Cambria 33 Resources LLC

Greenhouse Gas Recovery at an abandoned mine in PA since 2008

On Site Electric Generation using low quality mine gas since 2010

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Coal Gas, Inc.
www.vesselscoalgas.com

Electric Generation & Thermal Oxidation at Oxbow Mining LLC's Elk Creek Mine in Somerset, Colorado November 2012.

3,000 kilowatts (3MW) of electrical generation prevents over 100,000 Tonnes of CO2e from going into the atmosphere each year.

PLANTING 75,000+ ACRES

REMOVING 17,000 CARS

Vessels Coal Gas INC™

PROJECT SCOPING AND PARTNERING

Oxbow

ASPEN SNOWMASS. GREENTRACK

HOLY CROSS ENERGY · HOLY CROSS ENERGY ·

GUNNISON ENERGY CORPORATION
AN OXBOW COMPANY

Vessels
Coal Gas, Inc.

TM

Methane Drainage System

Methane over 5% concentration in air produces a combustible mixture. Greater concentrations of methane are vented in order to to keep below 2% concentration where the mine personnel are working.

United States Mine Safety and Health Administration carefully monitors methane concentration in gassy mines.

Electric Generation Equipment

* Engines capable of combusting low methane concentrations
* < 25% methane

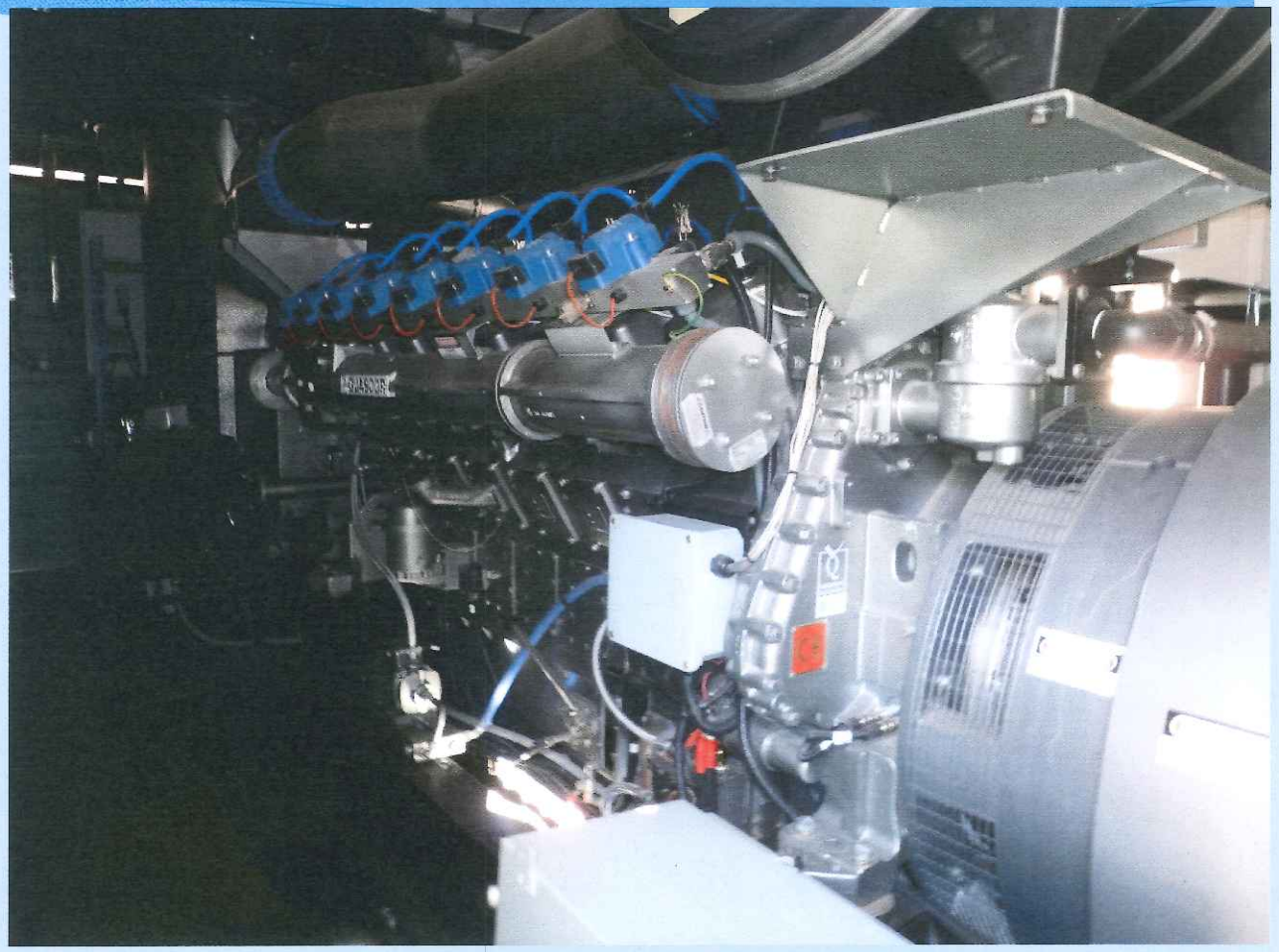
  design basis for fuel gas
* Selected 1,000 kilowatt units
  * Operational flexibility
  * Portability

Gas Conditioning

* Split stream between Thermal Oxidizer & Generators
* Monitor methane concentration
* Compress & condition for delivery to generators

Electric Generation

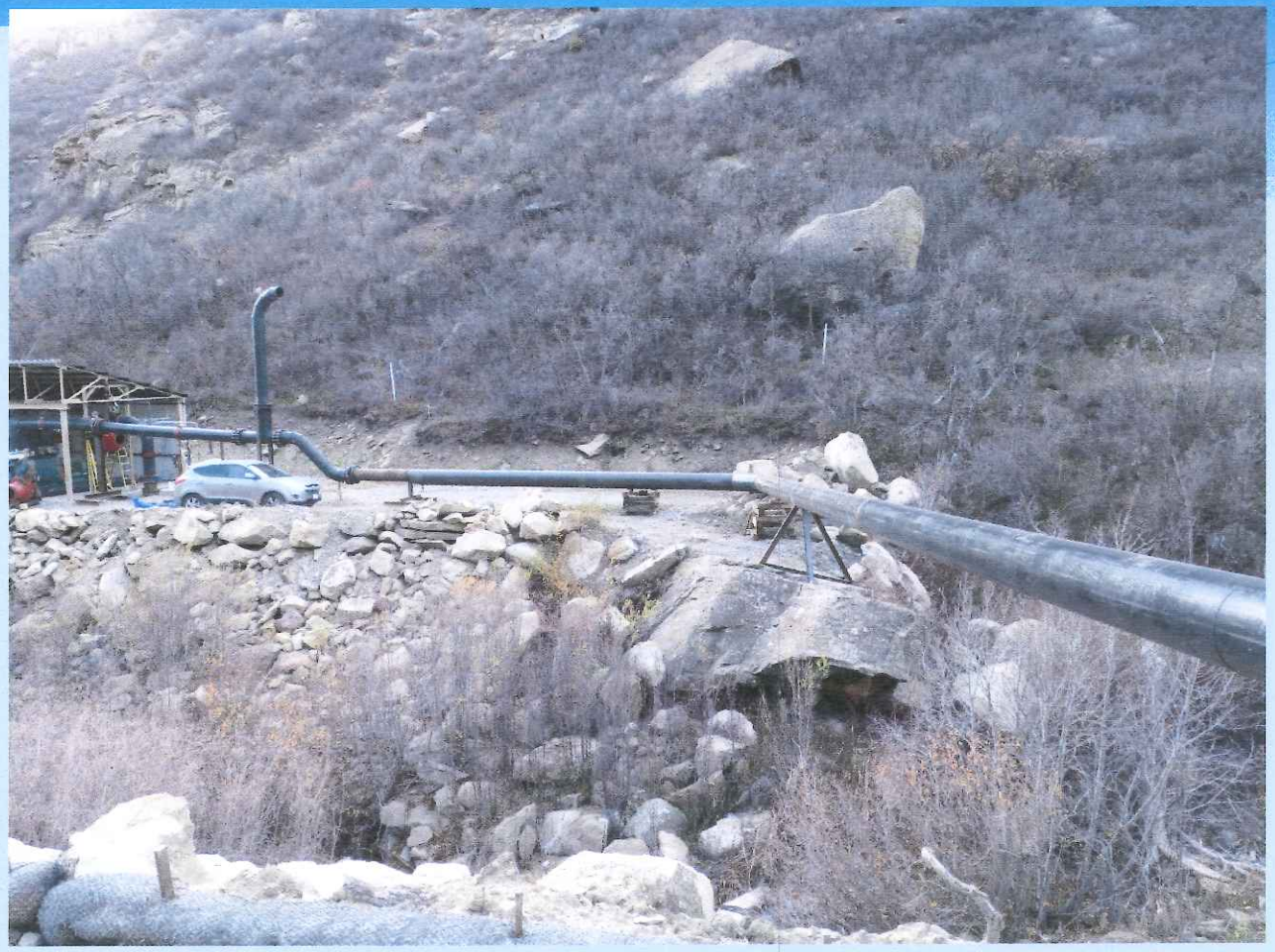
* 1500 hp engines each consume 230,000,000Btus per day.
* Each generator nominal 1,100 kilowatts of electricity



Substation

* Steps up to 46 kiloVolts
* 9,000 Kilowatts rated transformer
* Spare switchgear
* Ready expansion capability

Methane Drainage System Modification & Inlet Gas Piping



Motor Control Center & Measure, Monitoring and Communication Buildings

Substation: 9,000 kilowatt Transformer

Exhaust Heat Recovery

Currently waste heat from one of the 3 new electrical generators is used to heat process water for the mine.

High Voltage Utility Tie To DELTA MONTROSE ELECTRIC ASSOCIATION

Electricity is transmitted Across 4 separate utility grids to Holy Cross Energy

JOB CREATION

Assuming around 30,000 kilowatts (30MW) we estimate the jobs impact around 8 fte and 15 man years of employment during construction. Estimated capital investment of $50 million to $60 million.

"Thank you fort contacting the U.S. EPA Climate Change Division Non-CO_2 Programs Branch. Methane has a global warming potential 23 times greater than carbon dioxide and U.S. EPA has been working cooperatively with states and industry since 1994 to minimize methane emissions. Our mission is to promote the profitable recovery and utilization of methane, a potent green house gas that contributes to climate change when emitted into the atmosphere. When collected and used for energy, methane is a valuable fuel source. Some of the benefits of utilizing methane are:

Provides a local, clean energy source
Improves air quality and safety
Reduces greenhouse gas emissions
Generates revenue and jobs."

Felicia Ruiz
Coalbed Methane Outreach Program, Climate Change Division
US Environmental Protection Agency
http://www.epa.gov/methane/index.html

THE CONSERVATION CENTER

CONSERVATION ACHIEVEMENT AWARD 2013

The NFRIA-WSERC Conservation Center presents
The Conservation Achievement Award to

Vessels Coal Gas Inc.

for its exceptional conservation commitment and vision in the creation of
The Elk Creek Coal Mine Methane Capture Facility.

Sarah Sauter, Executive Director

Andrea Robinsong, Board Chair

2011 Pennsylvania Governor's Environmental Excellance Award Cambria 33 Project

Vessels Coal Gas INC™