

Natural Gas Beyond Transition

BioGem Inc.

Moving from Fossil to Non-Fossil Renewable Natural Gas

BioGem has developed:

RNG

- The first Renewable Natural Gas (RNG) from microbes in aquifers and the first carbon-neutral RNG.

Tool™

- A patented energy-free downhole Tool™ that eliminates environmental concerns and reduces cost 80%.

Two Important BioGem Developments

RNG

BioGem is the only company developing RNG from microbes in coalbed aquifers.

The microbes are fed carbohydrate nutrients more than 1,000 ft. downhole.

The nutrient formulas and the process are proprietary and protected by patents.

Tool™

The patented Tool separates the gas from the water in the well. The gas can then be brought up from the well without having to pump any water from the well. This eliminates the heavy cost and environmental concern of lifting and disposing of water. And it leaves the aquifer undisturbed.

Significant Advantages of RNG

- BioGem's RNG is generated in months, not millennia.
- The RNG is produced in the same wells as native coalbed natural gas.
- It is produced by feeding certain carbohydrates to microbes 1000+feet below surface.
- The RNG is scalable. It can be applied in any number of existing and 5,900 neighboring wells.
- RNG is identical to native natural gas and is pipeline ready.
- It is not flow-limited (like hydro).
- It is continuous (unlike wind, solar).
- It requires no processing or expensive equipment (as does biomass).
- RNG feeds into the natural gas grid with no extra capital cost.
- Low carbon and no carbon RNG has a higher selling price than market for standard natural gas.
- It has no environmental impact.
- CO2 generated by the microbes is sequestered in the coal.
- Methane is not emitted since water with dissolved gas is not brought to surface.



Significant Advantages of Patented Tool™

- The BioGem Tool™ (aka Tool™) has no moving parts and does not harm the aquifer.
- The Tool™ is carbon-neutral because it requires no energy input, does not use electricity.
- Eliminates 80% of operating costs by not removing and disposing of well water, required in conventional extraction.

BioGem's two intrinsic hedges against low natural gas prices

RNG

RNG selling prices are typically 3x-5x the natural gas prices. If the natural gas selling price is \$3 Mcf, the RNG selling price is \$9-\$15 Mcf.

Tool™

Patented Tool™ produces natural gas economically at selling prices as low as \$3 Henry Hub due to 80% lower cost than conventional production.



Competition

BioGem has no known competitors.

The market for Renewable Natural Gas is identical to the market for natural gas.

As RNG is brought into production wherever CBM is produced, it will begin to displace native gas.

Market Size

As Electric Vehicles become standard, those vehicles need to be charged.

All that electricity has to come from somewhere.

That's where RNG comes in.

BioGem's Assets

- Operates wells on approximately 3,680 gross acres comprising four separate but contiguous shallow gas PODs in the Powder River Basin, Wyoming (Campbell county).
- 36 active gas wells from zones ranging from 450 ft. to 1,800 ft. in depth.
- 35 inactive gas wells being activated for production of RNG.
- 1 issued design patent for the Tool™.
- 1 issued process patent for RNG. BioGem is the only company in the U.S. that can continuously generate RNG in coalbed aquifers combined with using the Tool™. This results in a low carbon intensity score, necessary for premium pricing and unavailable to competitors.

Founding management has invested \$26.5 million in cash and sweat equity as follows:

- Drilled and completed 71 wells.
- Developed and patented the Tool™.
- Generated small quantities of RNG and renewable hydrogen.
- Demonstrated that RNG production doesn't alter water characteristics in its coalbed aquifers.
- Established capability to distinguish RNG from native gas at the wellhead.

Series A of \$3.5 million will fund:

- Bench tests to ensure that the nutrient formulas currently being applied downhole are optimal for Commercialization. This will be done by scientists at the Colorado School of Mines.
- Obtain Renewable Identification Number (RIN) from the EPA to qualify for premium pricing of RNG for transportation, currently granted to RNG from biomass.
- Establish relationships with utilities, corporations, and consumers buying low carbon fuel.
- Contingencies.
- Timeline for this is between 1 and 2 years. This period could overlap the start of Commercialization, if desirable.

BioGem Commercialization Plan for RNG

Robust revenues

- Decades old shut-in wells are immediately available for acquisition and use.
- Combine with current government incentives for premium pricing.

Extraordinarily low costs

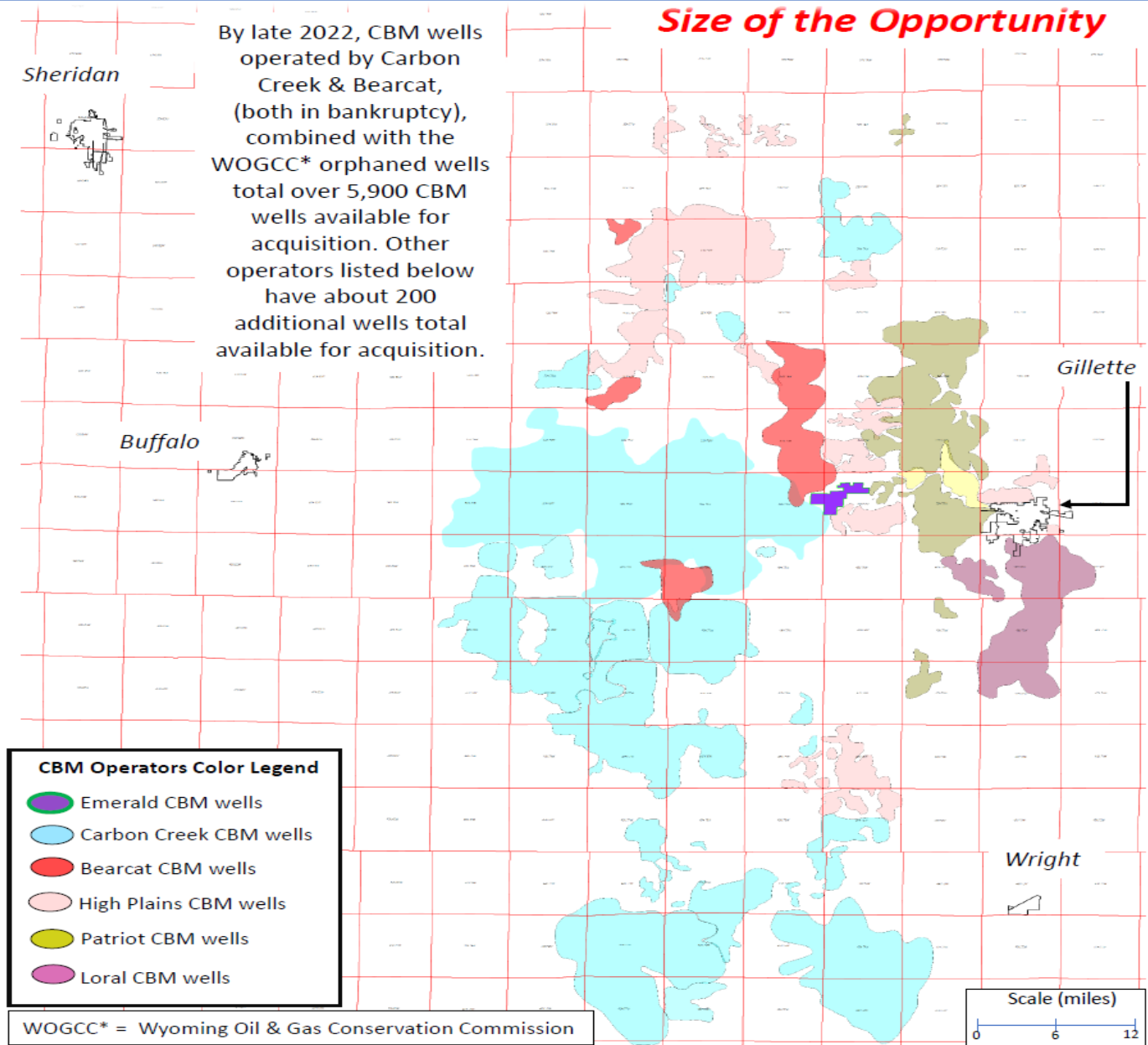
- Capex of low to no well acquisition cost.
- Operating economically at \$3 Henry Hub.
- Common nutrients to feed microbes.

Substantial cash

- Minimal capital required for Commercialization.
- Outsized returns to stakeholders.

Size of the Opportunity

- BioGem will acquire and restart 20 wells per month to expand RNG production.
- By the end of Commercialization Year 3, BioGem will operate 720 additional natural gas wells.
- These represent only 12% of the 5,900 wells available for acquisition that are contiguous to its 71 present wells.
- The 5,900 wells occupy more than 800 square miles or 4% of the 20,000 square miles of the Powder River Basin.



RNG Cash Flow And Returns Are Enhanced Because:

- Management—been there, done that.
- RNG selling prices are multiples of regular natural gas prices.
- Low well acquisition cost from bankruptcies due to low gas prices a decade ago.
- Low CAPEX and the acquired wells are producing in the month of acquisition.
- Low operating cost after years of testing and improving the patented Tool™
- Low G&A and management salaries due to entrepreneurial founders.
- Sharply reduced investment capital needed because of 90% cash margins (% net revenues).
- High barriers to competition, including patents.

RNG Annual Net Cash Before Income Taxes in Commercialization Year 3

BioGem expects Annual Net Cash in Commercialization Year 3 to be between Scenarios #1 and #3 at about \$100 million.

This table shows that the most important input is the selling price of Natural Gas with production volume as a lesser consideration.

BioGem is targeting 5,900 PUDs (Proved Undeveloped Reserves controlled in a lease) that meet its criteria. It is forecasting control of only 1,000 PUDs at the end of Year 3, a ratio of PUDs to producing wells of 1.4.

Annual Net Cash Before Income Taxes in Commercialization Year 3 (adding 20 wells/month)			
Scenarios	Starting Daily Production Per Well	Average Gas Price \$/Mcf (BTU Adjusted)	Annual Net Cash
1	100 MCFD	\$12.06	\$123,855,227
3	75 MCFD	\$12.06	\$89,271,318
5	50 MCFD	\$12.06	\$54,687,409
2	100 MCFD	\$5.48	\$50,716,991
4	75 MCFD	\$5.48	\$34,461,396
6	50 MCFD	\$5.48	\$18,118,281
Scenarios	Starting Daily Production Per Well	Average Gas Price \$/Mcf (BTU Adjusted)	Annual Net Cash + PUDS
1	100 MCFD	\$12.06	\$289,876,397
3	75 MCFD	\$12.06	\$206,906,835
5	50 MCFD	\$12.06	\$123,937,274
2	100 MCFD	\$5.48	\$110,924,641
4	75 MCFD	\$5.48	\$72,693,019
6	50 MCFD	\$5.48	\$34,461,396

Scenario #1 has a total PUD value of \$166,021,070 and Scenario #6 has a total PUD value of \$16,343,105, which amounts are added to Annual Net Cash for the Annual Net Cash + PUDS.

RNG Exit Proceeds in Commercialization Year 3 (Project Year 5)

The multiples assume a sale of the company or an IPO. The Exit Proceeds exclude PUD values and are based on a 1 multiple and a 5 multiple of Annual Net Cash Before Income Taxes.

Exit Proceeds in Commercialization Year 3 (Adding 20 Wells/Month) Sale Multiples of 1 and 5 Without PUD Values						
Scenarios	Starting Daily Production Per Well	Average Gas Price \$/Mcf (BTU Adjusted)	Annual Net Cash	Investor Equity Total (yrs 0 & 3)	100% PROCEEDS Annual Net Cash Before Income Taxes X 1 Sale Multiple	100% PROCEEDS Annual Net Cash Before Income Taxes X 5 Sale Multiple
1	100 MCFD	\$12.06	\$123,855,227	(\$3,673,445)	\$123,855,227	\$619,276,135
3	75 MCFD	\$12.06	\$89,271,318	(\$3,799,334)	\$89,271,318	\$446,356,590
5	50 MCFD	\$12.06	\$54,687,409	(\$4,120,828)	\$54,687,409	\$273,437,045
2	100 MCFD	\$5.48	\$50,716,991	(\$4,368,601)	\$50,716,991	\$253,584,955
4	75 MCFD	\$5.48	\$34,417,641	(\$4,798,347)	\$34,461,396	\$172,088,205
6	50 MCFD	\$5.48	\$18,118,291	(\$5,810,964)	\$18,118,281	\$90,591,455

Column 5 *Investor Equity Total* includes the \$3.5 million currently being raised.

The additional funds needed in Commercialization Year 1 range from a low of \$173,433 in Scenario #1 to a high of \$2,310,964 in Scenario #6.

Leadership

- Michael Perry leads principals that have worked their entire careers in Wyoming and and have extensive management and ownership experience in the coalbed natural gas industry and in RNG in the Powder River Basin. They have developed expertise over decades in exploration, drilling, production, operations, land management and title, geology, geochemistry, microbiology, and regulatory and legal matters.
- Michael Perry, Founder and CEO. Since 1993, Perry has owned and operated oil and gas wells in Wyoming and North Dakota. He has owned and operated conventional vertically drilled oil and gas wells, unconventional horizontal wells in the Bakken, and coalbed methane (CBM) wells in Wyoming. After leasing 160,000 mineral acres in North Dakota, he participated in the horizontal drilling of 100 Bakken wells. Perry drilled, completed, and operated 213 CBM wells in the Powder River Basin, deploying \$22 million in capital expenditure and generating \$56 million in revenues. He managed all operational functions, including office staff and field staff. He sold off some wells, and then as natural gas prices declined, Perry plugged 100 wells and retained 71 stranded CBM wells. Later, these wells were set aside and used for testing of the BioGem Tool™ and RNG. Perry is a registered Professional Geologist, with a BA and MS in Geology from the University of Kansas.

Team

- Thomas Throne, Throne Law Office, PC, Sheridan, WY. 40 years of experience representing oil and gas companies in Wyoming. BS University of Denver, JD University of Wyoming.
- Gerald Luken, Manager Field Operations. 30 years' experience in all aspects of oil and gas production. Expert in gas projects in Northeast Wyoming.
- David Seneshen, Head of Geochemical, supervises viability and commercialization of RNG. Extensive experience in analytical methods. Ph.D., Exploration Geochemistry, Queen's University, Ontario.
- Sandra Perry, Professional Geologist. Head of Technology. 40 years of experience in Wyoming exploration strategy. Managed multi-million dollar projects on 6 continents. MS, Geology, Colorado School of Mines.
- Laurie LaPat-Polasko, Former Chief Science Officer for Ciris Energy. LaPat-Polasko led a team of more than 35 scientists and engineers in applied research and development for in situ bioconversion of coal to natural gas. She evaluated a variety of amendments and microbial consortia to biodegrade various low-rank coals. Qualified Environment Professional (QEP), PhD, Stanford University.

Post Script

BioGem is exploring hydrogen generation from its coalbed aquifers that have all the needed species.

It is:

- Generating small quantities of the first renewable Hydrogen from microbes in aquifers.
- Experimenting with various nutrient formulas (“amendments”) downhole to produce new hydrogen and has made dramatic improvements in output.
- The RNG process is used that results in carbon-neutral hydrogen.

More to come.

Innovation is the ability to see change as an opportunity- not a threat.

Steve Jobs

Join forces with BioGem

Emerald Operating Company
predecessor firm to BioGem Inc.
Website:emeraldoperating.com

BioGem Inc.
1807 Echeta Rd., Ste. 1
Gillette, WY. 82716

See RNG
Business Plan
&
Commercialization Plan

Mike Perry, CEO, 9105 E. Wesley Ave., Denver
CO 80231, Ph: 720-838-8338
mike@emeraldoperating.com

Katherine Davis, Investment Banker,
New York City, Ph. 917-697-0100,
kdavis@portobene.com