Profiting from the reduction of greenhouse gases and helping the fight against climate change

Executive Summary

THE PROJECT

Blackstone Green Energy, Inc. ("**Company**") has developed a patent-pending technology[1] ("**Blackstone Method**") for converting zinc ore into hydrogen fuel. While the science underlying the technology is well established, the Blackstone Method is a disruptive technology that offers four unique competitive advantages:

1. Unlike conventional hydrogen-production methods (such as steam reformation) that dump noxious gases into the atmosphere from the burning of natural gas, the Blackstone Method creates strictly *green hydrogen.* The technology requires no fossil fuels, operates closed-circuit without any harmful emissions, and is significantly less expensive than conventional hydrogen-manufacturing methods.
2. The only raw material needed for the Blackstone Method is a *continuous supply of zinc ore,* which the Company obtains from its wholly owned 100-acre zinc, copper, lead, silver, and gold deposit in southwest Idaho ("**Blackstone Complex**").[2]
3. The Blackstone Method can *create hydrogen at the point of use,* eliminating transportation costs and the need for expensive infrastructure buildouts, both of which have been major impediments to development of the hydrogen economy.
4. As a byproduct of the process, the Blackstone Method also yields commercial amounts of copper, lead, silver, and gold matte bullion.

Technology creates 100% green hydrogen from zinc ore
Patent-pending conversion technology

No fossil fuels or greenhouse gases used in production
Only byproducts are water & zinc oxide

Technology can be deployed at point of use
Eliminates transportation costs

Self-sustaining production cycle
Multiple hydrogen extractions can be made from a single zinc charge

Game-changing disruptive technology
Combats pollution and global warming

Virtually endless zinc supply
Company owns the Blackstone Mine (Zinc, Silver, Copper, Gold)

Polymetallic byproducts
Copper, silver, and gold matte bullion plus zinc oxide and zinc powder

The Company is planning a 10-ton per day pilot plant using an 8.5 percent zinc ore feed projected to produce 1 kilograms of hydrogen per 7 lbs. of fumed zinc ore (3.18 kg) or a total of about 1450 kg of hydrogen from the initial feed. The aggregate hydrogen production is based on 10 zinc oxide dissociation cycles producing elemental zinc powder for repeated zinc hydrolysis at an 8 percent attrition rate. In addition to production of hydrogen, zinc oxide, and zinc powder, the primary production phase produces a polymetallic matte bullion consisting primarily of copper, silver, lead, and gold.

[1] *Blackstone Method for Producing Zinc Oxide, Zinc Powder, Hydrogen Fuel, Matte bullion, and Potable Water from Zinc Ore.* United States Patent and Trademark Office file no. 62602684 050317.

[2] The Blackstone Complex is owned in fee simple title by the Company's parent organization, Blackstone Mining Company, Ltd. The 100-acre complex located in sections 13, 14, and 15, T.2 S., R.10 E., Boise Meridian, approximately 80 miles southeast of Boise, Idaho.

Advantage 1: 100 percent green hydrogen

The Blackstone Method creates only green hydrogen through zinc hydrolysis (water-splitting). Finely ground zinc ore is roasted at a temperature of about 400 °C in a rotary kiln to remove the sulfur content. The fumes are evacuated to a calcium oxide (lime) scrubber and converted to calcium sulfate and sold as fertilizer. The roasted ore is then fired in a two-stage, graphite-lined solar powered electric kiln at temperatures above 907 °C – the point at which zinc boils.

The zinc vapors collect in a pneumatic filtered hydrolysis reactor (bag house) and mix with water liberating the hydrogen molecule and creating zinc oxide as a by-product of the reaction. When the hydrogen process is complete the remaining ore (calcine) is mixed with soda ash, borax glass and the kiln temperature raised above 1200 °C. The molten metals are tapped from the bottom of the kiln into molds forming polymetallic bars of lead, silver, gold, and copper (matte bullion) which is sent to a refiner for final separation and sale.

Blackstone zinc powder is produced by dissociating the zinc oxide from the initial hydrogen production cycle using a solar-hydrogen powered graphite-lined reactor designed to produce temperatures in excess of 1800 °C. Adding biomass reduces the zinc oxide dissociation temperature (1792 °C) to a more manageable 1300 °C to 1500 °C. The dissociation reaction typically completes to above 90 percent.

The point-of-use hydrogen process injects Blackstone zinc powder and water into a zinc hydrolysis reactor producing hydrogen and zinc oxide which is dissociated to zinc powder for repeating the hydrogen production cycle multiple times. A single charge of Blackstone zinc powder can be used repeatedly to generate more hydrogen. The number of times zinc powder can be reused is a function of both attrition and mechanical losses during multiple dissociation reactions. As long as there is a supply of zinc ore, which is readily available at the Company's Blackstone complex, the production of zinc powder can continue.

Advantage 2: Continuous supply of zinc ore

The Company's parent corporation, Blackstone Mining Company, Ltd. is the owner in fee simple title of the Blackstone complex ("**Property**"), one of the oldest and largest properties in Idaho's Volcano Mining District.[3] The 100 acres were patented[4] in the early 1900s by former Idaho Governor James H. Hawley, who formed the Company's parent corporation in 1899. The known[5] ore bodies at the Property consist of 765,500 tons of proven and 3.186 million tons of probable zinc-rich reserves.[6] In a 2016 report, the U.S. Geological Survey gave the property its highest classification as a major mineral deposit.[7]

[3] Robert N. Bell, M.E. (1930), "Another Butte in Southern Idaho?" Northwest Mining Truth. http://www.blackstonemine.com/BellAll.pdf.

[4] A patented mining claim is one in which the federal government has passed title to the claimant, making the claimant the owner of the surface and mineral rights. The five patented claims are designated as the Kentucky, Ohio, Iowa, Illinois, and Oregon Lode Mining Claims (Mineral Survey No. 1662), more particularly described in Book 15 of Patents at page 407, *et seq.,* in the Office of the County Recorder, Elmore County, Idaho.

[5] Known ore bodies are based on mineral reserves that have been identified through approximately 7,600 feet of reverse-circulation and diamond-core drilling.

[6] Richard E. Kucera, Ph.D. and Andrew Egan, B.Sc. (2015), *Certification of Proven Ore Reserve Values: Blackstone Mine Project, Elmore County, Idaho.* http://www.blackstonemine.com/Revaluation.pdf. A "proven" mineral reserve implies a high degree of confidence in factors that demonstrate, at the time of reporting, that economic extraction is justified. A "probable" mineral reserve implies a lower degree of confidence than a proven mineral reserve. Both reserve types are based on supporting studies that include adequate information on mining, processing, metallurgical, economic, and other factors. http://web.cim.org/UserFiles/File/CIM_DEFINITON_STANDARDS_Nov_2010.pdf.

[7] Lund, et al., "Geology and Mineral Resources of the North-Central Idaho Sagebrush Focal Area. Chapter C of *Mineral Resources of the Sagebrush Focal Areas of Idaho, Montana, Nevada, Oregon, Utah, and Wyoming.* Scientific Investigations Report 2016-5089-C. (Washington, D.C.: United States Department of the Interior and United States Geological Survey, 2016).

Advantage 3: Creating hydrogen at the point of use

The Blackstone Process can be deployed directly on site or at the point of distribution rather than requiring extensive infrastructure buildouts or expensive transportation. The Company believes this will prove to be a significant advantage inasmuch as most centrally produced hydrogen is delivered to customer sites by tube trailer or liquid tanker truck adding as much as $9 per kilogram to the cost. Historically, the cost of manufacturing hydrogen fuel has been higher than the cost of the energy used to make it. This is the dilemma of the hydrogen economy that the Company's process can resolve.

Advantage 4: Commercially valuable polymetallic matte

In addition to its high zinc content, the Blackstone complex contains commercially valuable amounts of copper, gold, silver, lead, and manganese. The current reserves at the Blackstone, based on recent commodities prices, are valued at approx. $483 million, not including income from hydrogen production. Blackstone documented hydrogen-compatible reserves to date include:

- 30,000 tons of stockpiled hydrogen compatible ore with an average zinc content of 8.5 percent;
- 220,000 tons of proven and probable hydrogen compatible ore (average zinc content of 8.5 percent) contained in a near-surface ore block accessible with minimal excavation.

The zinc content in the reserves translates into about 4.25 million pounds of readily recoverable zinc powder.