



PyroGenesis Provides Update on its Iron Ore Pelletization Torch Business

MONTREAL, Quebec (GlobeNewswire – November 12, 2020) - PyroGenesis Canada Inc. (TSX-V: PYR; OTCQB: PYRNF; FRA: 8PY) (the “Company” or “PyroGenesis”), a high-tech company that designs, develops, manufactures and commercializes advanced plasma processes and products, is pleased to provide an update on the Company’s iron ore pelletization plasma torch business.

Mr. P. Peter Pascali, CEO and Chair of PyroGenesis, provides this update in the following Q&A format. The questions, for the most part, are derived from inquiries received from investors, and analysts:

Q1. For those who are new to the story, could you please provide us with some background on your high-powered (~ 1 MW range) plasma torch business and how it relates to the iron ore pelletization industry?

A. Most certainly.

For background, pelletization is the process in which iron ore is concentrated before shipment, thus significantly reducing the cost of transportation, and providing a required feedstock for blast furnaces. In conventional technologies, the process heat is provided by fuel oil or natural gas burners (both environmentally damaging). The combustion, in the burners, of fossil fuels results in the production of greenhouse gases (“GHG”), mainly CO₂. Plasma torches, by contrast, utilize renewable electricity and as such offer an environmentally attractive alternative to fossil fuel burners.

In January 2019, PyroGenesis was contracted for a 900kW plasma torch with a client which we later disclosed to be RISE Energy Technology Center AB (“RISE”) of Sweden. RISE was engaged in addressing the Swedish government’s commitment to zero carbon emissions¹; namely that within the iron ore pelletization industry. The ultimate objective was to determine the benefits, if any, of replacing traditional fossil fuel burners used in iron ore pelletization with plasma torches. We delivered the plasma torch and completed testing in 9 months.

Of note, PyroGenesis has a patented process to replace fossil fuel burners with PyroGenesis’ clean burning plasma torches, thereby reducing GHG emissions, for the iron ore pelletization industry.

Q2. So, PyroGenesis has the patent to replace fossil fuel burners with plasma torches in the iron ore pelletization industry?

A. Yes, we do. In other industries, we expect to leverage off of our first mover advantage developed in the iron ore pelletization industry.

¹ <https://www.ssab.com/company/sustainability/sustainable-operations/hybrit>

Q3. The RISE contract went well. What happened next?

A. Our original goal was simply to have our torches be a contender in Sweden's strategy to reduce GHG emissions in the iron ore pelletization industry. What we did not realize at the time, was the impact this would have on the industry as a whole. As noted above, we successfully completed the RISE contract in 9 months, which once made public, had a resounding effect as we apparently were addressing a significant concern in the industry with respect to GHG emissions reduction. Given this interest, we were approached by several companies in the industry which we have come to term Client A, B and C. Two of the three wanted to immediately engage in a modelling contract, and the third is in the process of considering such. We prefer to engage in a modelling-first-step as it helps quantify parameters that may be specific to the client.

Modelling is a computer-based simulation of the performance of PyroGenesis' proprietary plasma torches using the specific parameters in a particular iron ore pelletization plant. The goal is to demonstrate the benefits of replacing existing fossil fuel burners with plasma torches and/or identify unanticipated or hidden costs/side effects.

To date, between RISE and the modelling we have done, two of the most important benefits demonstrated were i) that replacing fossil fuel burners with plasma torches was a simple replacement, plug and play process, and ii) that PyroGenesis' proprietary plasma torches significantly reduce GHG emissions. There have been no unanticipated or hidden costs.

Furthermore, we have noticed that our patented plasma torch technology, not only has economic and environmental advantages, but may also address environmental policies and legislation being implemented worldwide. For example, the European Union (EU), as part of the EU's 2030 climate and energy framework and contribution to the Paris Agreement², has put in place legislation to reduce emissions by at least 40% by 2030.

As a result, many companies in the field are implementing business strategies directed at reducing GHG emissions. As an example, a major international iron ore pelletizer has dedicated approx. US \$2B towards their goal of reducing their carbon emission by 33% by 2030³.

We believe PyroGenesis is uniquely positioned to address such opportunities.

Q4. Interesting...so replacing fossil fuel burners with plasma torches might be able to economically, and significantly, reduce the GHG emissions in the iron ore pelletization industry?

A. Correct.

Management has internally estimated that a typical pellet plant producing 10 million metric tonnes of pellets annually emits approximately one million metric tonnes of CO₂⁴. The total world pellet production of 400 million metric tonnes of pellets represents a potential market for torch sales in excess of \$10B worldwide. The world pellet industry generates about 40 million metric tonnes of CO₂ every year. The use of plasma

² https://ec.europa.eu/clima/policies/strategies/progress_en

³ <http://www.vale.com/brasil/EN/sustainability/Pages/carbonneutral.aspx>

⁴ M. Huerta, J. Bolen, M. Okrutny, I. Cameron and K. O'Leary, "Guidelines for Selecting Pellet Plant Technology", Iron Ore Conference 2015 Proceedings, Perth, WA, July 13-15, 2015

torches running off a clean electrical grid would reduce these emissions significantly. For reference, 40 million tonnes of CO₂ represent the combined yearly emissions of 8.7 million US passenger vehicles⁵.

The impact of replacing fossil fuel burners with plasma torches not only resonates in the iron ore pelletization industry, where we are patent protected, but also in other industries such as the aluminum, cement and glass industries, who are also pressured to reduce GHG emissions.

Q5. What is your business model for replacing fossil fuel burners with plasma torches, specifically in the iron ore pelletization industry which seems to be the low-hanging fruit?

A. This is a very good question.

Our offering is geared to address the need to develop fossil fuel free energy-mining-iron-steel value chain and thereby provide a basis for governance and industrial strategies for transformative change. Until recently, the business model was simply to sell torches (with an internal target of \$3MM NPV per torch) with the recurring revenue derived from typical maintenance and spare parts contracts.

We now have come to appreciate the economics of leasing torches instead of an outright sell. This model has clear advantages to both parties; little-to-no CAPEX to the buyer, healthy recurring revenue stream to the seller. At this stage, we see this to be the fastest way to grow this business segment, and is a significant strategy-shift for the Company as it relates to this offering, and which we expect will play a key role in our position/ongoing discussions with clients.

Q6. Wouldn't this leasing model be capital intensive?

A. Yes and no.

It is capital intensive of course, however, there are major leasing companies we can team up with to provide this service. Given the size and credit worthiness of the client, together with a proven technology, we do not see this to be an issue. Had the client been small, their credit worthiness not be conducive to leasing, or the technology not be proven, then the burden would be on PyroGenesis to provide that capital, and we do not see ourselves engaging in that type of financing.

Q7. In closing, can you give us a status/update on the existing agreements/contracts under discussion?

A. Certainly.

All of our projects are on track and progressing nicely. As previously disclosed on September 1st, 2020, we have received a draft contract from Client A, which is still in the final stages of completion. The fact that we received this contract from Client A, on the heels of a successful modelling contract, who is a significant player in the industry, clearly demonstrates the impact that PyroGenesis' proprietary plasma torches are having on iron ore pelletization GHG reduction strategies. If signed, and successfully deployed, one might expect they would start a program to replace their fossil fuel burners with PyroGenesis' plasma torches. Although nothing is certain, we are definitely on the right track with Client A.

⁵ <https://www.epa.gov/greenvehicles/greenhouse-gas-emissions-typical-passenger-vehicle>

Client B has finalized their modelling contract, and like Client A, has moved to contract negotiations and requested a quote for an initial order of four torches which we have recently provided.

Client C is moving forward as well. We are confident that they will agree to enter into a modeling contract before an initial order of torches is placed. We find this to be the most prudent next step.

We are also in discussion with potential clients in other industries to replace their fossil fuel burners with PyroGenesis' plasma torches.

About PyroGenesis Canada Inc.

PyroGenesis Canada Inc., a high-tech company, is a leader in the design, development, manufacture and commercialization of advanced plasma processes and products. The Company provides its engineering and manufacturing expertise and its turnkey process equipment packages to customers in the defense, metallurgical, mining, advanced materials (including 3D printing), and environmental industries. With a team of experienced engineers, scientists and technicians working out of its Montreal office and its 3,800 m² manufacturing facility, PyroGenesis maintains its competitive advantage by remaining at the forefront of technology development and commercialization. The Company's core competencies allow PyroGenesis to provide innovative plasma torches, plasma waste processes, high-temperature metallurgical processes, and engineering services to the global marketplace. PyroGenesis' operations are ISO 9001:2015 and AS9100D certified. For more information, please visit www.pyrogenesis.com.

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