UNITED STATES
SECURITIES AND EXCHANGE COMMISSION
Washington, D.C. 20549

FORM 6-K

REPORT OF FOREIGN PRIVATE ISSUER PURSUANT TO RULE 13a-16 OR 15d-16 UNDER THE SECURITIES EXCHANGE ACT OF 1934

For the month of August 2022

Commission File Number: **001-39989**

PYROGENESIS CANADA INC.
(Translation of registrant's name into English)

1744, William St. Suite 200
Montreal, QC, H3J1R4
Canada
(Address of principal executive office)

Indicate by check mark whether the registrant files or will file annual reports under cover of Form 20-F or Form 40-F.
Form 20-F [ ]   Form 40-F [X]

Indicate by check mark if the registrant is submitting the Form 6-K in paper as permitted by Regulation S-T Rule 101(b)(1): ___

Note: Regulation S-T Rule 101(b)(1) only permits the submission in paper of a Form 6-K if submitted solely to provide an attached annual report to security holders.

Indicate by check mark if the registrant is submitting the Form 6-K in paper as permitted by Regulation S-T Rule 101(b)(7): ___

Note: Regulation S-T Rule 101(b)(7) only permits the submission in paper of a Form 6-K if submitted to furnish a report or other document that the registrant foreign private issuer must furnish and make public under the laws of the jurisdiction in which the registrant is incorporated, domiciled or legally organized (the registrant's "home country"), or under the rules of the home country exchange on which the registrant's securities are traded, as long as the report or other document is not a press release, is not required to be and has not been distributed to the registrant's security holders, and, if discussing a material event, has already been the subject of a Form 6-K submission or other Commission filing on EDGAR.

EXHIBIT INDEX

Exhibit Number	Description
99.1	Press Release dated August 15, 2022
99.2	Condensed Consolidated Interim Financial Statements Three months ended June 30, 2022
99.3	Management’s Discussion and Analysis
99.4	Form 52-109F2 CEO Certification of Interim Filings
99.5	Form 52-109F2 CFO Certification of Interim Filings

SIGNATURES

Pursuant to the requirements of the Securities Exchange Act of 1934, the registrant has duly caused this report to be signed on its behalf by the undersigned, thereunto duly authorized.

PYROGENESIS CANADA INC.
(Registrant)

Date: August 15, 2022

/s/ P. Peter Pascali
P. Peter Pascali
Chief Executive Officer

EXHIBIT 99.1

PyroGenesis Announces Q2 2022 Results: Revenues \$5.8M; Gross Margin 43%; Current Backlog of Signed and/or Awarded Contracts \$35.3M

MONTREAL, Aug. 15, 2022 (GLOBE NEWSWIRE) -- PyroGenesis Canada Inc. (http://pyrogenesis.com) (TSX: PYR) (NASDAQ: PYR) (FRA: 8PY), a high-tech company (hereinafter referred to as the “Company” or “PyroGenesis”), that designs, develops, manufactures and commercializes advanced plasma processes and sustainable solutions which are geared to reduce greenhouse gases (GHG), is pleased to announce today its financial and operational results for the second quarter ended June 30th, 2022.

“We have posted Q2 2022 revenues of \$5.8M,” said Mr. P. Peter Pascali, CEO and Chair of PyroGenesis. “Our backlog remains above \$35M, a significant level and our pipeline continues to expand. Despite gross reported revenue continuing to be impacted by delayed client and contract decisions related to ongoing international and regional logistical and resourcing headwinds, our margins are at a level that puts us among industrial technology and manufacturing industry leaders. The 43% quarterly gross margin illustrates the combined strength of the company’s production process and the strategy and care taken with contract negotiations. Our trailing twelve-month (TTM) gross margin is a very healthy 32.4% despite the inclusion of the unusually low Q4 2021 gross margin of 18% that was seen as a result of the cost and resource synchronization process for Air Science Technologies acquisition (now Pyro Green-Gas). Both this quarter’s gross margin, and our TTM, are well above those of many of our contemporaries including the high-profit industries we primarily serve: the aluminum industry at 22.7%, iron and steel at 31.5%, and aerospace and defense at 22.8%.[1]”

Mr. Pascali remarked, “Concurrently, two of our flagship product lines, the NexGen plasma atomized metal powder system and our plasma torch system for iron ore pelletization furnaces, achieved long-anticipated milestones, placing both on the threshold of full commercialization and widespread adoption. Even more exciting is the momentum around reducing greenhouse gas emissions and fossil fuel use in heavy industry which continues to grow like never before. With the Inflation Reduction Act – the combined climate change and inflation-fighting bill recently passed by the US Congress – billions of dollars for clean energy research and implementation across several industries, billions more for targeted grant and loan programs to accelerate the transition to clean electricity, and extensive incentives to reduce emissions from industrial manufacturing processes – especially among the large emitters that PyroGenesis serves – are about to become law. We are well placed to benefit from this opportunity[2].

Q2 2022 results reflect the following highlights:

- Revenues of \$5,847,180,
- Gross margin profit of \$2,499,273 or 43% of revenue,
- Cash, cash equivalents and publicly traded shares at June 30, 2022 of \$9.4M
- Backlog of signed and/or awarded contracts of \$35.3M

<u>Post-Quarter End Events</u>

On July 5, the Company achieved a major milestone when it confirmed delivery and arrival of its plasma torch system to one of the world’s largest producers of iron ore. This delivery, for the \$1.8M order made by a multi-billion-dollar international producer of iron ore pellets who has committed to reducing its greenhouse gas emissions, is in preparation for first-ever live site usage and site acceptance testing (SAT) of plasma in the pelletization process – a major upstream step in the steelmaking process. The delivery comes after the client – who has over ten (10) iron ore pelletization plants globally, each possibly requiring up to 50 plasma torches, or more than 500 torches in total – conducted extensive modeling, simulations, business case development, and live factory acceptance tests of plasma torches over the course of a year, as a potential solution toward meeting their carbon reduction goals. The Company also previously disclosed that it has provided a cost estimate for 36 plasma torches to that same Client, at a value range of \$95-115 million.

On July 18, the Company provided a corporate update to its 3D printing metal powders business unit. The update indicated that, with the Company’s NexGen plasma atomization system now capable of production titanium powder at commercial bulk order scale, discussions are now underway between the Company and its European commercial partner Aubert & Duval for full distribution agreements, including broader distribution planning, order planning, and logistics. Additionally, the update indicated the Company has reached the final phase of the lengthy metal powder qualification process with a global aerospace company, with an anticipated end date during Q4 2022. If successful, the qualification will certify the Company’s metal powders for use by the Client and its component suppliers. The update also indicated the Company has commenced general inventory production of titanium metal powder, has started discussions with a major distributor for Asian market expansion, is pursuing ISO 13485:2016 certification for medical device usage, announced an intention to produce aluminum alloy powder, and is pursuing a strategy to build and operate a metal powder manufacturing facility in Europe.

<u>OUTLOOK</u>

The first half of 2022 has proffered an unusual combination of events and results.

The Company – as with much of the industrial technology and manufacturing sectors – has felt the repercussions of macro-economic headwinds that have affected the planning, logistics, and spending of its customers and of its sales pipeline targets.

These conditions have weighed, at times heavily, on both the Company's top and bottom lines, with potential or planned sales being impacted by customer resourcing, staffing, and purchasing delays, and with continued governmental and logistical issues preventing other customers from finalizing contract negotiations or taking delivery of their fully completed orders – orders that represent significant revenue and income to the Company once they can be moved out of our warehouse.

What was anticipated to be a major growth first half, has adjusted to be more of a modest stage-setting for the second half of the year and into 2023, as existing and prospective customers moved back their planning and decision-making in the quarter to accommodate their own interruptions.

However, in parallel, and in contrast, during the last quarter the Company achieved some of its greatest corporate milestones – achievements that are considered major advancements for both PyroGenesis and its customers' industries, and which are anticipated to provide potentially large sales bursts through to and beyond 2023.

These achievements include producing and delivering plasma torches for the first-ever in-factory use within an iron ore pelletization furnace – a major upstream step in the steelmaking process – and the movement from sample size to commercial-scale batch production of titanium metal powder production for 3D printing and additive manufacturing, from the Company's plasma atomization system.

These milestones continue to set the company up for the accelerated business growth that the previous three decades of research and development have made possible.

Importantly, as the global economy transitions out of the disruption stage it has found itself in for several quarters, we see a return to logistical and resourcing stability for our heavy industry and government customers throughout the rest of 2022 and 2023, but with a renewed sense of urgency.

Our value proposition remains the same, yet with the events of 2020-2022 revealing the precariousness of the world's supply chain, fossil-fuel energy availability, workforce, and material cost certainty, the Company's technology offering looks even better positioned.

Our ability to help impact and remake several of the major priorities facing heavy industry – priorities that have fallen further behind during these past two years – such as greenhouse gas emissions reduction, fuel switching to combustion-free electric sources, improved value recovery of metal waste-streams, enhanced metal production output from the same input, safe destruction of pervasive chemicals, and more rapid and higher quality metal powder production for component weight reduction – leaves us excited about our recent critical milestones and our long-term positioning.

All of these factors, bolstered by the quickening global push towards fossil fuel reduction at both industry and government levels that further showcases the PyroGenesis advantage, allows Management to state with continued conviction that despite the challenges seen in the year's first half, the company believes opportunities for PyroGenesis continue to expand.
To note, until such time as the Company produces consistent recurring revenue or continuous large scale orders and can offer forward-looking guidance, we will continue to provide an Outlook that is more descriptive, with a combination of actual achievements combined with working opportunities, and less focused on financial numbers.

Overall Strategy

The Company continues to build on its strategy to offer technology solutions that produce benefits through greenhouse gas ("GHG") emissions reduction, clean electric fuel sources, safe waste destruction, and improved production output and quality, that take advantage of the Company's expertise in patented ultra-high temperature processes for heavy industry.

We have acknowledged our strategy to be timely, as many governments in jurisdictions around the world promote and fund environmental technologies and infrastructure projects. After 2021 proved an even greater affirmation of this approach as major industries targeted by the Company not only recommitted to their targets, but in some cases raised them significantly, 2022 has brought about more circumstances that highlight how technology solutions like those from PyroGenesis will be in even greater demand.

In particular, the conflict in Ukraine has exhibited how geopolitical influences will continue to impact the supply of metals that are already under extraordinary market demand. As supply chain issues, worries about supply reductions, and additional sanctions on Russia (a major producer of the world's aluminum supply) caused massive fluctuations to aluminum spot-prices, the conflict also more fully exposed the vulnerability of aluminum producers to power availability and energy price uncertainty, as energy supply challenges that were already being experienced by European and Asian metal producers were exacerbated during the war.

All of these factors show that with global metal demand growing (anticipated to grow by 80% by 2050)[3], and industry carbon-reduction targets not yet on track to meet their goals, aluminum producers must find ways to improve their efficiency, and increase their yield of high-quality metal from current production – all while lowering their carbon footprint. PyroGenesis' range of technology solutions provide just such an opportunity, with the Company's DROSRITE™ systems providing industry-leading dross recovery rates of high-quality aluminum, inline and on-site, with a lower operating expense and lower carbon footprint than all competing technologies; meanwhile, the Company's mainstay plasma torch offering provides another technology-driven solution for metal producers looking to reduce their reliance on a volatile natural gas and diesel supply chain within any aspect of their operations that require metal melting or heating, while again eliminating fossil fuel emissions.

These same or similar pressures are affecting the global steelmaking industry, into which the Company has already sold and now delivered initial clean electric, non-combustion plasma torches for final pre-order test runs. Macroeconomic pressures may in fact serve to expedite the need for faster implementation over the next year or more.

For clarity, as stated often, PyroGenesis' product lines do not depend on environmental incentives (tax credits, GHG certificates, environmental subsidies, etc.) to be economically viable; with the increased industry carbon reduction commitments, it is anticipated that the Company's growth drivers will expand, and shareholders will see increased value.

While the Company is not immune to how COVID-19 and other external factors negatively impacted businesses over the past two years, specifically related to the work force and, more importantly, the supply chain, Management believes that – while it can do little about the strain on its customers' and prospects' – the Company itself is well structured, and through various mitigation measures these challenges continue to be dealt with in an effective manner. The Company expects even greater improvements as the impact of COVID-19 and other external factors continues to recede during the remainder of 2022.

Organic Growth

Organic growth will be spurred on by (i) the natural growth of our existing offerings; (ii) leveraging off the insider "golden ticket" advantage we have with several industrial customers due to how some of our industrial systems are installed inside a customer's facility (vs. the legacy systems that are installed off-site) – enabling us to see first-hand some of the additional daily challenges faced by our customers, and then upsell to them accordingly; (iii) exploring new ways scientifically (and to corresponding markets laterally) to provide unique solutions and value that helps industries deal with some of the most pressing environmental, engineering, and energy problems; and (iv) building new manufacturing and chemical recovery facilities in overseas markets, as per our recent announcement to pursue the construction of a European production facility for metal powder production.

Over the past several years, PyroGenesis has successfully positioned each of its business lines for rapid growth by strategically partnering with multi-billion-dollar entities. These entities have identified PyroGenesis' offerings to be unique, in demand, and of such a commercial nature as to warrant the unique, long-term, supportive relationships that the Company has experienced while it ramps up various technologies to commercialization. We expect that these relationships have us well positioned to transition into significant revenue streams once full commercialization is achieved.

Aluminum Industry Process Improvement

As mentioned in previous reports, momentum with PyroGenesis' aluminum Industry strategy and offering continues to expand.

During the quarter, the company announced that its DROSRITE™ waste metal recovery technology had been successfully commissioned for Ma'aden Aluminum in Saudi Arabia, one of the world's largest primary aluminum producers with 2021 revenue in excess of US $7 billion. There, the DROSRITE™ technology is helping to service the Ma'aden plant in Ras Al-Khair, a joint venture corporation with Alcoa that is the largest and most efficient vertically integrated aluminum complex in the world and includes one of the world's largest smelters. At Ma'aden, the first three DROSRITE™ systems passed site acceptance testing and were fully commissioned, with the remaining four already manufactured and awaiting final shipment at the end-user's request.

In addition to the DROSRITE™ waste metal recovery system – one of the largest and fastest growing dross recovery solutions in the world, with 11 large DROSRITE™ systems in use or slated for delivery to markets around the world, and three more LOI's in play – during the quarter the Company provided a comprehensive update on the aluminum business line as a whole, outlining how increasing demand, global supply shortages, and fluctuating prices and energy availability were impacting aluminum producers, allowing PyroGenesis to announce new-use markets after numerous inquiries for many different aspects of the aluminum production process. As the aluminum industry eyes greater technological innovation to improve production and reduce fossil fuel reliance, few technologies are as ready as PyroGenesis.

Subsequent announcements in the quarter outlined even more areas where the Company's technology is being considered. Combined, the various announcements revealed that PyroGenesis' technology is being used, studied, or actively evaluated for use in the upstream carbon anode baking process, as a fuel replacement in scrap re-melting furnaces, in molten holding furnaces, in new furnace production, in downstream cast-house furnaces, and in retrofitting of existing aluminum recycling furnaces.

With the relationships the Company has been developing throughout the industry, and as a result of the success seen by its technologies in the primary aluminum sector, interest has now expanded into secondary scrap-based producers, as well as downstream parts manufacturers. This represents a significant change and advancement from just 18 months ago.

Finally, the various joint ventures announced in prior quarters continue to evolve.

For the joint venture technology geared to handle the leftover residues resulting from the processing of waste stream metal dross, the pre-launch requirements and considerations have entered the final stage. Chemical residue samples from dross produced at one of the Company's clients' facilities are being tested in two different countries, and the results of those tests will inform final steps.

As stated previously, we believe that valorizing the residues and producing high end products will further define us as the go-to company for all dross-related processing.

For the partnership with Aluminerie Alouette (the largest primary aluminum smelter in the Americas and co-owned by Rio Tinto and Norsk Hydro), for the development of a solution to safely recover various metals and compounds from the heavily contaminated carbon lining of aluminum smelters (known as "spent pot linings"), work continues, with lab-scale tests concluded and initial pilot phase in development.

Steel Industry Process Improvement

With steelmaking being one of the most carbon-emission intensive industries in the world, estimated to be responsible for between 7 to 12 per cent of all global fossil fuel and greenhouse gas emissions, that industry continues to be under intense pressure, including huge financial penalties, to find emission reductions.

This pressure on the steelmaking industry allows PyroGenesis to expect demand for its upstream, iron ore pelletization solution to increase significantly, as steelmakers look to all aspects of the production lifecycle for carbon reduction opportunities.

As outlined in previous reports, serious consideration is being given to replacing large numbers of the fossil fuel burners in iron ore pelletization with PyroGenesis' proprietary and patented plasma torches.

During the quarter, the Company achieved a major milestone when, after extensive modeling, simulations, business case development, production, and live factory tests – during a period that was engulfed by a global pandemic – our plasma torch system for iron ore pelletization was produced, assembled, and shipped (as per the February 8 news release designating a Q2 quarter end shipping timeline) to the clients – in preparation for first-ever live factory usage and factory acceptance testing toward that carbon reduction goal.

As previously disclosed, that client is a multi-billion-dollar international producer of iron ore pellets and one of the largest in the industry, whose name will remain confidential for competitive reasons. The Client, which has committed to reduce its GHG emissions, has over ten (10) iron ore pelletization plants, each possibly requiring up to 50 plasma torches, or more than 500 torches in total. The Company has also previously disclosed, that we have provided a cost estimate for 36 plasma torches to that same Client A, at a value of $95-115 million. The range is an estimate due to usage and customization uncertainties which will be more clearly defined in due course.

Other previously announced clients – Client B, one of the largest iron ore processes in the world who has signed a $6M contract with the Company for 4 plasma torches for their pelletization system, and Client C, who is not only a significant player in the iron ore pelletization industry but is also a major player in the steel industry – continue to progress at their own pace.

For Client B, production of the four torches is underway. As previously announced, Client B has advised PyroGenesis that, upon the successful implementation of the torches, subsequent orders are expected to be for approximately 130 plasma torches.

PyroGenesis expects that the previously mentioned government initiatives, geared to stimulating their respective economies by promoting and funding environmental technologies and infrastructure projects, will only serve to increase interest in PyroGenesis' plasma torch offerings to other companies in this space. While potential clients seeking government support for large initiatives may draw out the onset of large contracts, the sheer number of potential customers, and the fact that the Company will engage with many of them in different stages at different times, will help to ensure a long, overlapping pipeline of potential projects.

In addition, PyroGenesis continues to target other industries which are experiencing significant pressure to reduce GHGs, and which utilize fossil fuel burners as well, such as the cement, aluminum, and automotive industries.

Plasma Torches for Emerging / Niche Markets

Separately, the Company also offers plasma torches to emerging / niche markets where there is a high probability of on-going sales from successful implementation.

One such example is when, in Q1 on February 7, the Company announced that it had signed a $273,000 contract with a European research centre, to manufacture and deliver a 50Kw methane plasma torch, which will be used by the client to develop a process to convert hydrocarbons, including methane (a greenhouse gas), into useful chemicals such as olefins (e.g. ethylene, propylene, etc.), thereby significantly reducing GHGs.

That torch and system is currently in production.

For each new market, the Company will also benefit from providing proprietary spare parts and service, which generates significant recurring revenue, thus complementing the Company's long-term strategy to build a recurring revenue model.

Additive Manufacturing (Metal Powders for 3D Printing)

Our metal powders business line also saw a major milestone in Q2.

The Company's NexGen™ facility, which incorporates all the previously disclosed benefits (increased production rates and lower capital & operating expenditures), was announced as having produced and delivered two separate 100kg orders for titanium powders – the first two commercial batch orders for the system, after months of testing and sample size production.

These orders were both an important commercial milestone, as well as further validation of the Company's process and ability to supply some of the highest quality powder produced to the AM industry using our NexGen™ plasma atomization process. This process is a significant departure and upgrade from conventional plasma atomization – a technology the Company also invented and coined the term for, and which is still considered the gold standard for the production of metal powder.

The two orders came via our European business partner Aubert & Duval, who is a world leader in industrializing high-performance steel, super alloy, aluminum and titanium alloys for over a century. More specifically, they are a recognized supplier of metal powders for additive manufacturing, serving the Aerospace, Energy, Transport, Medical, Defense, Automotive and other large scale, demanding markets.

Of note, a major tier-one global aerospace company has already entered into an agreement with the Company to formally qualify its metal powder, at considerable expense to the global aerospace company, with a view towards having the Company become a supplier.

Under this agreement, the Client has been performing an in-depth qualification process with PyroGenesis – a procedure typically required before a company can become an approved supplier. The process was established to, amongst other things, evaluate the Company's manufacturing methods, test samples of powder for batch-to-batch consistency, and determine various mechanical and chemical properties. Subsequently, larger volumes of powder will be used to print test coupons to further evaluate mechanical and chemical properties.

Upon passing all steps, including acceptance tests, the Company's process will be locked down specifically for each client, with no additional modifications permitted. Upon successful completion of the testing, PyroGenesis would expect to receive formal acceptance as an approved supplier. The formal and methodical process with this top tier aerospace company is on track and is nearing conclusion, with additional updates to investors expected throughout Q3.

There are additional major top tier aerospace companies and OEMs, in both Europe and North America, eagerly awaiting powders from this new state-of-the-art production line, and we are currently in the process of supplying sample powders to them for analysis.

The Company expects that such developments will continue and will translate into significant improvements in contributions to revenue by this segment in the mid-long term.

HPQ/PUREVAP™

With respect to HPQ, a PyroGenesis client and a company whom PyroGenesis owns significant shares and options, the goal is to continue to expand our role as HPQ's technology provider for the game changing family of silicon processes which we are developing exclusively for HPQ and its wholly owned subsidiaries HPQ Nano Silicon Powders Inc. and HPQ Silica Polvere Inc., namely:

The PUREVAP™ "Quartz Reduction Reactors" (QRR), an innovative process (patent pending), which should permit the one step transformation of lower purity quartz (SiO_2) than any traditional processes can handle into a silicon (Si) of a higher purity level (2N-4N) that can be produced by any traditional smelter, at reduced costs, energy input, and carbon footprint. The unique capabilities of this process could position HPQ as a leading provider of the specialised silicon material needed to propagate its considerable renewable energy potential; and

The PUREVAP™ Nano Silicon Reactor (NSiR), which, if successful, could position itself as a new proprietary low-cost process that can transform the silicon (Si) made by the PUREVAP™ QRR into the nano-silicon materials (spherical silicon powders and silicon nanowires) sought after by energy storage, batteries, electric vehicle manufactures and clean hydrogen sectors participants. The aim of the ongoing work is to position HPQ NANO as the first to market with a commercial scale low-cost nanoparticle production system.

A new plasma-based process that could convert Silica (Quartz, SiO_2) into fumed silica (Pyrogenic Silica) in one step. This new process could be a low-cost and environmentally friendly option that combines HPQ Silicon High Purity Quartz initiatives with PyroGenesis' industry leading know-how in the development of commercial plasma processes. It is envisioned that the process will eliminate harmful chemicals presently generated by traditional methods. This new process could revolutionize the manufacturing of fumed silica, while repatriating production back to North America.

Government participation in a $5.3M funding of the fumed silica project confirms our expectation that 2022 should be a year in which significant developments occur on all these fronts.

Land Based Units/Environmental

The Company did not previously aggressively target the Company's land-based/environmental solutions during the period where the Company's other offerings, such as in steelmaking and aluminum industry process improvement, were accelerating.

However, during 2021, interest in the Company's capabilities in this arena was renewed, and PyroGenesis' plasma-based solutions have generated interest in processing a waste stream that has recently been classified as hazardous.

In October of 2021, PyroGenesis was selected by a US municipal water utility to provide a C$9.2 million system to destroy perfluoroalkyl and polyfluoroalkyl substances (PFAs), a group of hazardous chemicals that have become pervasive in product manufacturing, and which are now understood to be harmful as they leech out of products and into farmland, soil, and the water system.

Planning and negotiations for this project have drawn out considerably, for various client-side reasons related to logistics, resourcing, competing municipal and state project priorities and funding, as well as extensive legal ramifications related to hazardous chemical processing and the newness of operating in this realm, for all parties. As a result, great care has been taken to ensure a proper project and contract framework. The effort involved and the framework created will be very useful for future projects of this nature, as well as in this area of PFAS and hazardous chemical processing that is so new to governments, but expanding rapidly.

Growth through Synergistic Mergers and Acquisitions

As previously disclosed, the Company is conservatively considering synergistic merger and acquisition strategies to augment its growth, and the Company has been very actively involved in pursuing several opportunities to support this strategy. In so doing, the focus has been on private companies exclusively which (i) primarily leverage the Company's Golden Ticket advantage, or (ii) could uniquely benefit from the Company's engineering advantage and/or international relationships.

Additional Opportunities for Plasma Torches

Within the general plasma torch line of business, the Company continues to consider options to leverage its plasma expertise. We continue to review torch technologies, pursue grant applications and government research involvement, and client participation partnerships, that could complement our existing torch offerings, leverage off our unique relationships, or explore new opportunities. We are in early stage discussion across many sectors and many potential customers; no additional details are available at this time.

CONCLUSION

In conclusion, while headwinds have interrupted the intentions of many clients and prospects during the first half of the year, PyroGenesis continues to see 2022 as a platform from which decades of growth will stem.

The Company plans to take advantage of its unique position in its main business offerings to accelerate growth, with a particular emphasis on offerings geared to aggressively reducing GHG emissions and the world's carbon footprint, while finding and offering solutions to pressing environmental, engineering, and energy challenges.

Financial Summary

Revenues

PyroGenesis recorded revenue of $5,847,180 in the second quarter of 2022 ("Q2, 2022"), representing a decrease of 29% compared with $8,280,572 (which includes 3.3M sale of intellectual properties) recorded in the second quarter of 2021 ("Q2, 2021"), Revenue for the six months of fiscal 2022 was $10,053,943 a decrease of 31% over revenue of $14,545,075 during the same period in 2021.

Revenues recorded in the three and six months ended June 30, 2022, were generated from:

(i) DROSRITE™ related sales of $436,538, $1,336,617 (2021 Q2 - $1,648,882, $4,389,606)
(ii) PUREVAP™ related sales of $727,378, $1,168,983 (2021 Q2 - $3,896,453, $4,521,539)
(iii) torch related sales of $1,550,201, $2,591,909 (2021 Q2 - $557,613, $752,835)
(iv) development and support related to systems supplied to the U.S. Navy of $591,099, $1,336,359 (2021 Q2 - $2,133,187, $4,719,208)
(v) biogas upgrading and pollution controls of $2,181,107, $3,171,152 (2021 Q2 - $Nil, $Nil)
(vi) other sales and services of $360,858, $448,922 (2021 Q2 - $44,437, $161,887)

Cost of Sales and Services and Gross Margins

Cost of sales and services before amortization of intangible assets was $3,129,148 in Q2 2022, representing a decrease of 6% compared with $3,340,312 in Q2 2021, primarily due to a decrease in direct materials of $1,612,969 (Q2 2022 - $2,547,913) and increases in employee compensation, subcontracting, manufacturing overhead & other of $1,987,111 (Q2 2022 - $829,736), offset by the increase in foreign exchange charge on materials of ($447,968) (Q2 2022 – ($1,023)).

The gross margin for the Q2 2022 three-month period was $2,499,273 or 43% of revenue compared to a gross margin of $4,933,481 or 60% of revenue for Q2 2021.

As a result of the type of contracts being executed, the nature of the project activity, as well as the composition of the cost of sales and services, as the mix between labour, materials and subcontracts may be significantly different. In addition, due to the nature of these long-term contracts, the Company has not necessarily passed on to the customer, the increased cost of sales which was attributable to inflation, if any.

Investment tax credits related to qualifying projects from the provincial government in Q2 2022 were $22,964 (Q2 2021 - $36,315). The Company also recorded for the six months ended June 30, 2022, $24,793 (2021 - $37,498) of the investment tax credits against cost of sales and services, $31,641 (2021 - $23,880) against research and development expenses and $15,000 (2021 - $15,979) against selling general and administrative expenses.

The amortization of intangible assets of $218,759 in Q2 2022 compared to $6,780 for Q2 2021 relates mainly to the intangible assets in connection with the Pyro Green-Gas acquisition, patents and deferred development costs. These expenses are non-cash items and will be amortized over the duration of their expected lives.

Selling, General and Administrative Expenses

Included within Selling, General and Administrative expenses ("SG&A") are costs associated with corporate administration, business development, project proposals, operations administration, investor relations and employee training.

SG&A expenses for Q2 2022 excluding the costs associated with share-based compensation (a non-cash item in which options vest principally over a four-year period), were $5,470,495 representing an increase of 62% compared with $3,371,888 reported for Q2 2021.

The increase in SG&A expenses in Q2 2022 over the same period in 2021 is mainly attributable to the Pyro Green-Gas acquisition and the net effect of:

(i) an increase of 45% in employee compensation due primarily to additional head count,
(ii) an increase of 89% for professional fees, primarily due to an increase in accounting fees and legal fees,
(iii) an increase of 109% in office and general expenses, is due to an increase in computer and internet expenses, security expenses and stationary and office related expenses,
(iv) travel costs increased by 1,305%, due to an increase in travel abroad,
(v) depreciation on property and equipment increased by 77% due to higher amounts of property and equipment being depreciated,
(vi) depreciation on right of use assets increased by 4% due to higher amounts of right of use assets being depreciated,
(vii) Investment tax credits decreased by 12%, due to a decrease in qualifying projects,
(viii) government grants increased by 220% due to higher levels of activities supported by such grants,
(ix) other expenses increased by 56%, primarily due to an increase in couriers & freight,

Separately, share based payments decreased by 51% in Q2 2022 over the same period in 2021.

Research and Development ("R&D") Costs

The Company incurred $804,564 of R&D costs, net of government grants, on internal projects in Q2 2022, an increase of 13% as compared with $710,734 in Q2 2021. The increase in Q2 2022 is primarily related to an increase in employee compensation, investment tax credits, subcontracting, materials and equipment, and other expenses and a decrease in government grants recognized. During the first six months of fiscal 2022, net spending on internal R&D was $1,286,996 as compared to $997,041 in 2021, primarily due to an increase in R&D activities performed.

In addition to internally funded R&D projects, the Company also incurred R&D expenditures during the execution of client funded projects. These expenses are eligible for Scientific Research and experimental Development ("SR&ED") tax credits. SR&ED tax credits on client funded projects are applied against cost of sales and services (see "Cost of Sales" above).

Financial Expenses

Finance expenses for Q2 2022 totaled $156,113 as compared with $40,086 for Q2 2021, representing an increase of 289% year-over-year. The increase in finance expenses in Q2 2022, is primarily attributable to higher interest and accretion due on the business combination.

Strategic Investments

The adjustment to fair market value of strategic investments for Q2 2022 resulted in a loss of $7,477,865 compared to a loss in the amount of $17,884,293 in Q2 2021. The loss is attributable to the decreased market share value of common shares and warrants owned by the Company of HPQ Silicon Resources Inc.

Comprehensive (Loss) Income

The comprehensive loss for Q2 2022 of $13,039,531 compared to a loss of $20,362,205, in Q2 2021, represents a decrease of 36% year-over-year. The decrease of $7,322,674 in the comprehensive loss in Q2 2022 is primarily attributable to the factors described above, which have been summarized as follows:

(i) a decrease in product and service-related revenue of $2,433,392 arising in Q2 2022,
(ii) an increase in cost of sales and services of $816, primarily due to increase in foreign exchange charge on materials and the decrease in direct materials, offset by the increase in employee compensation, subcontracting, manufacturing

overhead & other, investment tax credits, and amortization of intangible assets,

(iii) an increase in SG&A expenses of $430,962 arising in Q2 2022 primarily due to an increase in employee compensation, professional fees, office and general, travel, depreciation in property and equipment, depreciation ROU assets, government grants, and other expenses which is offset by a decrease in share-based expenses,

(iv) an increase in R&D expenses of $93,830 primarily due to an increase in subcontracting, material and equipment and other expenses and a decrease in government grants,

(v) an increase in financial expenses of $116,027 in Q2 2022 primarily due to interest on lease liabilities, interest accretion on balance due on business combination and other interest expenses,

(vi) an increase in fair value adjustment of strategic investments of $10,406,428 in Q2 2022,

(vii) an increase in income taxes of $19,542 in Q2 2022.

EBITDA

The EBITDA in Q2 2022 was $12,341,307 loss compared with an EBITDA loss of $20,082,063 for Q2 2021, representing a decrease of 39% year-over-year. The $7,740,756 decrease in the EBITDA loss in Q2 2022 compared with Q2 2021 is due to the decrease in comprehensive loss of $7,322,673, an increase in depreciation on property and equipment of $64,351, an increase in depreciation ROU assets of $6,181, an increase in amortization of intangible assets of $211,980, an increase in financial expenses of $116,028, and an increase in income taxes of $19,542.

Adjusted EBITDA loss in Q2 2022 was $10,720,267 compared with an Adjusted EBITDA loss of $16,793,378 for Q2 2021. The decrease of $6,073,111 in the Adjusted EBITDA loss in Q2 2022 is attributable to a decrease in EBITDA loss of $7,740,756, and by a decrease of $1,667,646 in share-based payments.

The Modified EBITDA loss in Q2 2022 was $3,242,402 compared with a Modified EBITDA gain of $1,090,915 for Q2 2021, representing a decrease of 397%. The decrease of $4,333,318 in the Modified EBITDA loss in Q2 2022 is attributable to the decrease as mentioned above in the Adjusted EBITDA of $6,073,111 and a decrease in the change of fair value of strategic investments of $10,406,428.

Liquidity

As at June 30, 2022, the Company has cash and cash equivalents of $1,291,508. In addition, the accounts payable and accrued liabilities of $9,404,542 are payable within 12 months.

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 sustainable solutions which reduce greenhouse gases (GHG), and are economically attractive alternatives to conventional “dirty” processes. PyroGenesis has created proprietary, patented and advanced plasma technologies that are being vetted and adopted by multiple multibillion dollar industry leaders in four massive markets: iron ore pelletization, aluminum, waste management, and additive manufacturing. With a team of experienced engineers, scientists and technicians working out of its Montreal office, and its 3,800 m2 and 2,940 m2 manufacturing facilities, PyroGenesis maintains its competitive advantage by remaining at the forefront of technology development and commercialization. The operations are ISO 9001:2015 and AS9100D certified, having been ISO certified since 1997. For more information, please visit: www.pyrogenesis.com.

This press release contains certain forward-looking statements, including, without limitation, statements containing the words "may", "plan", "will", "estimate", "continue", "anticipate", "intend", "expect", "in the process" and other similar expressions which constitute "forward- looking information" within the meaning of applicable securities laws. Forward-looking statements reflect the Corporation's current expectation and assumptions and are subject to a number of risks and uncertainties that could cause actual results to differ materially from those anticipated. These forward-looking statements involve risks and uncertainties including, but not limited to, our expectations regarding the acceptance of our products by the market, our strategy to develop new products and enhance the capabilities of existing products, our strategy with respect to research and development, the impact of competitive products and pricing, new product development, and uncertainties related to the regulatory approval process. Such statements reflect the current views of the Corporation with respect to future events and are subject to certain risks and uncertainties and other risks detailed from time-to-time in the Corporation's ongoing filings with the securities regulatory authorities, which filings can be found at www.sedar.com, or at www.sec.gov. Actual results, events, and performance may differ materially. Readers are cautioned not to place undue reliance on these forward-looking statements. The Corporation undertakes no obligation to publicly update or revise any forward- looking statements either as a result of new information, future events or otherwise, except as required by applicable securities laws. Neither the Toronto Stock Exchange, its Regulation Services Provider (as that term is defined in the policies of the Toronto Stock Exchange) nor the NASDAQ Stock Market, LLC accepts responsibility for the adequacy or accuracy of this press release.

SOURCE PyroGenesis Canada Inc.

For further information please contact:
Rodayna Kafal, Vice President, IR/Comms. and Strategic BD
Phone: (514) 937-0002, E-mail: ir@pyrogenesis.com

RELATED LINK: http://www.pyrogenesis.com/

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[1] https://csimarket.com/Industry/industry_Profitability_Ratios.php?ind=201

[2] https://www.democrats.senate.gov/imo/media/doc/inflation_reduction_act_of_2022.pdf

3 https://international-aluminium.org/iai-releases-aluminium-sectors-decarbonisation-dataset-in-line-with-the-international-energy-agencys-beyond-2-degrees-findings

PyroGenesis Canada Inc.

Condensed Consolidated Interim

Financial Statements

Three and six months ended June 30, 2022 and 2021

(Unaudited)

The accompanying unaudited condensed consolidated financial statements of PyroGenesis Canada Inc. have been prepared by and are the responsibility of the Company's management. The Company's independent auditor has not performed a review of these unaudited condensed consolidated interim financial statements for the period ended June 30, 2022.

June 30, 2022.

PyroGenesis Canada Inc.
Condensed Consolidated Interim Statements of Financial Position
(Unaudited)

	Notes	**June 30, 2022**	December 31, 2021
		$	$
Assets			
Current assets			
Cash and cash equivalents	6	**1,291,508**	12,202,513
Accounts receivable	7	**19,205,762**	17,639,616
Costs and profits in excess of billings on uncompleted contracts	8	**4,195,474**	4,922,710
Inventory	17	**1,549,038**	887,590
Investment tax credits receivable	9	**271,564**	256,513
Income taxes receivable		**45,098**	117,029
Current portion of deposits	11	**937,202**	1,328,452
Current portion of royalties receivable		**329,823**	311,111
Contract assets		**280,439**	375,789
Prepaid expenses		**2,100,820**	717,661
Total current assets		**30,206,728**	38,758,984
Non-current assets			
Deposits	11	**41,176**	248,756
Strategic investments	10	**9,251,702**	14,901,659
Property and equipment		**3,613,761**	3,712,937
Right-of-use assets		**5,336,105**	5,765,993
Royalties receivable		**967,743**	947,543
Intangible assets		**2,399,648**	2,774,198
Goodwill	4	**2,660,607**	2,660,607
Total assets		**54,477,470**	69,770,677
Liabilities			
Current liabilities			
Bank indebtedness		**941,180**	–
Accounts payable and accrued liabilities	12	**9,404,542**	10,069,177
Billings in excess of costs and profits on uncompleted contracts	13	**6,540,109**	9,400,231
Current portion of term loans	14	**81,805**	83,004
Current portion of lease liabilities	14	**3,134,421**	2,934,236
Balance due on business combination	4	**2,100,110**	2,242,503
Income taxes payable		**186,801**	23,048
Total current liabilities		**22,388,968**	24,752,199
Non-current liabilities			
Lease liabilities		**3,067,376**	2,389,729
Term loans	14	**308,950**	107,901
Balance due on business combination	4	**1,761,403**	1,709,700
Deferred income taxes		**–**	42,394
Total liabilities		**27,526,697**	29,001,923
Shareholders' equity	15		
Common shares and warrants		**82,104,086**	82,104,086
Contributed surplus		**23,169,725**	19,879,055
Accumulated other comprehensive income		**51,915**	3,444
Deficit		**(78,374,953)**	(61,217,831)
Total shareholders' equity		**26,950,773**	40,768,754
Total liabilities and shareholders' equity		**54,477,470**	69,770,677

Contingent liabilities, Note 22

PyroGenesis Canada Inc.
Condensed Consolidated Interim Statements of Comprehensive Income (Loss)
(Unaudited)

	Notes	Three months ended June 30, 2022	Three months ended June 30, 2021	Six months ended June 30, 2022	Six months ended June 30, 2021
		$	$	**$**	$
Revenues	5	**5,847,180**	8,280,572	**10,053,942**	14,545,075
Cost of sales and services	17	**3,347,907**	3,347,091	**6,502,947**	7,468,584
Gross profit		**2,499,273**	4,933,481	**3,550,995**	7,076,491
Expenses					
Selling, general and administrative	17	**7,091,535**	6,660,573	**12,703,903**	10,386,009
Research and development, net		**804,564**	710,734	**1,286,996**	997,041
		7,896,099	7,371,307	**13,990,899**	11,383,050
Net loss from operations		**(5,396,826)**	(2,437,826)	**(10,439,904)**	(4,306,559)
Changes in fair value of strategic investments	10	**(7,477,865)**	(17,884,293)	**(6,301,110)**	(12,249,571)
Finance costs, net	18	**(156,113)**	(40,086)	**(340,013)**	(93,172)
Net earnings (loss) before income taxes		**(13,030,804)**	(20,362,205)	**(17,081,027)**	(16,649,302)
Income taxes		**19,542**	–	**76,095**	–
Net earnings (loss)		**(13,050,346)**	(20,362,205)	**(17,157,122)**	(16,649,302)
Other comprehensive income (loss)					
Items that will be reclassified subsequently to profit of loss					
Foreign currency translation gain on investments in foreign operations		**10,815**	–	**48,471**	–
Comprehensive income (loss)		**(13,039,531)**	(20,362,205)	**(17,108,651)**	(16,649,302)
Earnings (loss) per share					
Basic	19	**(0.08)**	(0.12)	**(0.10)**	(0.10)
Diluted	19	**(0.08)**	(0.11)	**(0.10)**	(0.09)

The accompanying notes form an integral part of the condensed consolidated interim financial statements.

PyroGenesis Canada Inc.
Condensed Consolidated Interim Statements of Changes in Shareholders' Equity
(Unaudited)

	Notes	Number of common shares	Common shares and warrants	Contributed Surplus	Equity portion of convertible debentures	other comprehensive income	Deficit	Total
			$	**$**	**$**	**$**	**$**	**$**
Balance - December 31, 2021		**170,125,795**	**82,104,086**	**19,879,055**	**–**	**3,444**	**(61,217,831)**	**40,768,754**
Share-based payments	15	**–**	**–**	**3,290,670**	**–**	**–**	**–**	**3,290,670**
Other comprehensive income for the period		**–**	**–**	**–**	**–**	**48,471**	**–**	**48,471**
Net loss and comprehensive loss		**–**	**–**	**–**	**–**	**–**	**(17,157,122)**	**(17,157,122)**
Balance – June 30, 2022		**170,125,795**	**82,104,086**	**23,169,725**	**–**	**51,915**	**(78,374,953)**	**26,950,773**
Balance - December 31, 2020		159,145,993	67,950,069	10,480,310	–	–	(19,007,273)	59,423,106
Shares issued upon exercise of stock options	15	444,500	657,845	(253,400)	–	–	–	404,445
Shares issued upon exercise of warrants and compensation options	15	8,337,897	13,085,197	–	–	–	–	13,085,197
Share-based payments	15	–	–	4,211,024	–	–	–	4,211,024
Shares purchased for cancellation	15	(166,684)	(347,019)				(863,440)	(1,210,459)
Net earnings and comprehensive income		–	–	–	–	–	(16,649,302)	(16,649,302)
Balance – June 30, 2021		167,761,706	81,346,092	14,437,934	–	–	(36,520,015)	59,264,011

The accompanying notes form an integral part of the condensed consolidated interim financial statements.

PyroGenesis Canada Inc.
Condensed Consolidated Interim Statements of Cash Flows
(Unaudited)

	Notes	Three months ended June 30, **2022**	2021	Six months ended June 30, **2022**	2021
		$	$	**$**	$
Cash flows provided by (used in)					
Operating activities					
Net earnings (loss)		**(13,050,346)**	(20,362,205)	**(17,157,122)**	(16,649,302)
Adjustments for:					
Share-based payments	17	**1,621,040**	3,288,685	**3,290,670**	4,211,025
Depreciation of property and equipment	17	**148,412**	84,061	**291,402**	160,378
Depreciation of right-of-use assets	17	**155,398**	149,217	**321,622**	251,011
Amortization and write-off of intangible assets	17	**218,759**	6,779	**437,518**	13,559
Amortization of contract assets		**54,221**	171,206	**95,350**	306,069
Finance costs	17	**156,113**	40,085	**340,013**	93,172
Change in fair value of investments		**7,477,865**	17,884,293	**6,301,110**	12,249,571
Income taxes		**19,542**	–	**76,095**	–
Unrealized foreign exchange		**9,716**	–	**42,212**	–
		(3,189,280)	1,262,121	**(5,961,130)**	635,483
Net change in balances related to operations	16	**437,164**	(8,544,450)	**(4,528,614)**	(14,552,934)
		(2,752,116)	(7,282,329)	**(10,489,744)**	(13,917,451)
Investing activities					
Additions to property and equipment		**(66,054)**	(635,312)	**(192,226)**	(1,184,888)
Additions to right-of-use assets		**–**	(36,903)	**–**	(36,903)
Additions to intangible assets		**(38,280)**	(31,484)	**(62,968)**	(107,152)
Purchase of strategic investments	10	**(3,604,000)**	(5,804,327)	**(3,604,000)**	(9,196,511)
Disposal of strategic investments		**1,555,846**	1,507,746	**2,952,847**	12,374,048
		(2,152,488)	(5,000,280)	**(906,347)**	1,848,594
Financing activities					
Bank indebtedness		**(2,295)**	–	**941,180**	–
Interest paid		**(141,946)**	(101,427)	**(239,456)**	(151,636)
Repayment of term loans		**(8,223)**	(3,025)	**(16,389)**	(5,998)
Repayment of lease liabilities		**(145,415)**	(25,965)	**(192,575)**	(81,051)
Repayment of balance due on business combination		**(217,778)**	–	**(217,778)**	–
Proceeds from issuance of other term loans		**96,157**	–	**203,857**	–
Proceeds from issuance of shares upon exercise of warrants		**–**	5,027,616	**–**	13,085,197
Proceeds from issuance of shares upon exercise of stock options		**–**	398,065	**–**	404,445
Shares purchased for cancellation		**–**	(1,210,459)	**–**	(1,210,459)
		(419,500)	4,084,805	**478,839**	12,040,498
Effect of exchange rate changes on cash denominated in foreign currencies		**2,988**	–	**6,247**	–
Net increase (decrease) in cash and cash equivalents		**(5,321,116)**	(8,197,805)	**(10,911,005)**	(28,360)
Cash and cash equivalents - beginning of period		**6,612,624**	26,274,344	**12,202,513**	18,104,899
Cash and cash equivalents - end of period		**1,291,508**	18,076,539	**1,291,508**	18,076,539
Supplemental cash flow disclosure					
Non-cash transactions:					
Purchase of intangible assets included in accounts payable		**–**	136,101	**–**	40,092
Purchase of property and equipment included in accounts payable		**–**	2,263	**–**	55,539
Addition of right-of-use assets and lease liabilities		**–**	2,120,892	**–**	2,120,892
Accretion of balance purchase price payable		**44,115**	–	**127,088**	–
Accretion interest on royalties receivable		**37,549**	–	**38,913**	–
Accretion on term loan		**7,601**	–	**12,382**	–

The accompanying notes form an integral part of the condensed consolidated interim financial statements

1. Nature of operations

PyroGenesis Canada Inc. and its subsidiaries (collectively, the "Company"), incorporated under the laws of the Canada Business Corporations Act, was formed on July 11, 2011. The Company owns patents of advanced waste treatment systems technology and designs, develops, manufactures and commercialises advanced plasma processes and sustainable solutions to reduce greenhouse gases. The Company is domiciled at 1744 William Street, Suite 200, Montreal, Quebec. The Company is publicly traded on the TSX Exchange under the Symbol "PYR" on NASDAQ in the USA under the symbol "PYR" and on the Frankfurt Stock Exchange (FSX) under the symbol "8PY ".

2. Basis of preparation

(a) Statement of compliance

These financial statements have been prepared in accordance with International Financial Reporting Standards ("IFRS") as issued by the International Accounting Standards Board ("IASB"). These condensed consolidated interim financial statements do not include all of the necessary information required for full annual financial statements in accordance with IFRS and should be read in conjunction with the Company's audited financial statements for the year ended December 31, 2021.

These financial statements were approved and authorized for issuance by the Board of Directors on August 15, 2022.

(b) Functional and presentation currency

These consolidated financial statements are presented in Canadian dollars, which is the Company's functional currency.

(c) Basis of measurement

These financial statements have been prepared on the historical cost basis except for:

- (i) strategic investments which are accounted for at fair value,
- (ii) stock-based payment arrangements, which are measured at fair value on the grant date pursuant to IFRS 2, Share-based Payment; and
- (iii) lease liabilities, which are initially measured at the present value of minimum lease payments

(d) Basis of consolidation

For financial reporting purposes, subsidiaries are defined as entities controlled by the Company. The Company controls an entity when it has power over the investee; it is exposed to, or has rights to, variable returns from its involvement with the entity; and it has the ability to affect those returns through its power over the entity.

In instances where the Company does not hold a majority of the voting rights, further analysis is performed to determine whether or not the Company has control of the entity. The Company is deemed to have control when, according to the terms of the shareholder's and/or other agreements, it makes most of the decisions affecting relevant activities.

These consolidated financial statements include the accounts of the Company and its subsidiaries, Drosrite International LLC and Pyro Green-Gas Inc. and its subsidiaries. Drosrite International LLC is owned by a member of the Company's key management personnel and close member of the Chief Executive Officer ("CEO") and controlling shareholder's family and is deemed to be controlled by the Company. Pyro Green-Gas (formerly AirScience Technologies Inc. until the renaming on September 14, 2021) was acquired by the Company on August 11, 2021 (see note 5). All transactions and balances between the Company and its subsidiaries have been eliminated upon consolidation.

The accounting policies set out below have been applied consistently in the preparation of the financial statements of all years presented. Finance costs and changes in fair value of strategic investments are excluded from the loss from operations in the consolidated statement of comprehensive income (loss).

3. Significant accounting judgments, estimates and assumptions

The significant judgments, estimates and assumptions applied by the Company's in these condensed consolidated interim financial statements are the same as those applied by the Company in its audited annual financial statements as at and for the year ended December 31, 2021.

4. Business combination in fiscal 2021

On August 11, 2021, the Company completed the acquisition of Pyro Green-Gas Inc. and its subsidiaries (formerly AirScience Technologies Inc. prior to its renaming on September 14, 2021), a Montreal-based company which offers technologies, equipment, and expertise in the area of biogas upgrading, as well as air pollution controls, for a maximum purchase price consideration of $4.4 million in cash, subject to customary post-closing adjustments. In addition, the Company settled a pre-existing loan receivable from Pyro Green-Gas Inc. of approximately $1.7 million. The transaction was executed essentially through a purchase of the entirety of the common class "A" shares of Pyro Green-Gas Inc. This acquisition enables the Company to springboard into the renewable natural gas market and provides an advantage compared to building its own operations. In addition, the Company will now have a presence in Italy and India, and the acquisition will provide potential synergies with the Company's land-based waste destruction offerings. The purchase price will be paid upon the achievement of various contract and business-related milestones by Pyro Green-Gas Inc. The Company's assessment is that these milestones will be realized at various moments during the next 30 months. The contingent consideration was estimated using a discount rate of 8%.

The acquisition was accounted for using the purchase method and the final allocation of the purchase price is as follows:

	$
Total consideration	
Consideration paid at closing	**1**
Contingent consideration	**3,841,999**
Consideration paid at closing and continent consideration	**3,842,000**
Settlement of pre-existing loan receivable from Pyro Green-Gas	**1,744,400**
	5,586,400

	December 31, 2021 Final $
Net assets acquired	
Current assets [1]	**5,186,086**
ROU asset	**477,608**
Property and equipment	**42,552**
Intangible assets and Goodwill [2]	**4,780,607**
Deferred income tax asset	**79,360**
Current liabilities	**(4,507,907)**
Non-current liabilities	**(471,906)**
	5,586,400

[1] Includes $807,946 of cash and trade receivables with a net fair value of $3.3 million, including an allowance for doubtful accounts of $0.5 million.

[2] The goodwill of $2.7 million recorded on the transaction is mainly attributable to the expected growth in biogas upgrading market and the expertise of the workforce, and it is not expected to be deductible for tax purposes.

The maximum purchase price consideration of $4,355,600 was discounted to $3,842,000, at August 11, 2021 and an accretion expense of $127,088 was recognized in Net finance costs in the Consolidated Statement of Comprehensive Income for the six month period ended June 30, 2022.

5. Revenues

The following is a summary of the Company's revenues by product line:

	June 30, 2022	June 30, 2021
	$	$
Revenue from contracts with customers by product line:		
PUREVAP™	**1,168,983**	4,521,539
DROSRITE™	**1,336,617**	4,389,606
Development and support related to systems supplied to the U.S. Navy	**1,336,359**	4,719,208
Torch related sales	**2,591,909**	752,835
Biogas upgrading and pollution controls	**3,171,152**	–
Other sales and services	**448,922**	161,887
	10,053,942	14,545,075

The following is a summary of the Company's revenues by revenue recognition method:

	June 30, 2022	June 30, 2021
	$	$
Revenue from contracts with customers:		
Sales of goods under long-term contracts recognized over time	**9,408,591**	10,717,275
Sales of goods at a point of time	**645,351**	527,800
Other revenue:		
Sale of intellectual properties	**–**	3,300,000
	10,053,942	14,545,075

See note 24 for sales by geographic area.

Transaction price allocated to remaining performance obligations

As at June 30, 2022, revenue expected to be recognized in the future related to performance obligations that are unsatisfied (or partially satisfied) at the reporting date is $35,282,425 (2021 - $43,458,148). Revenue will be recognized as the Company satisfies its performance obligations under long-term contracts, which is expected to occur over the next 3 years.

6. Cash and cash equivalents

As at June 30, 2022, there are no restrictions on cash and cash equivalents. Cash and cash equivalents include the following components:

	June 30, 2022	December 31, 2021
	$	$
Cash	**646,751**	3,568,561
Guaranteed investment certificates	**644,757**	8,633,952
Cash and cash equivalents	**1,291,508**	12,202,513

7. Accounts receivable

Details of accounts receivable were as follows:

	June 30, 2022	December 31, 2021
	$	$
1 – 30 days	**2,180,264**	2,260,428
31 – 60 days	**496,113**	44,838
61 – 90 days	**554,351**	6,855,822
Greater than 90 days	**14,301,053**	7,357,825
Total trade accounts receivable	**17,531,781**	16,518,913
Other receivables	**85,633**	270,536
Sales tax receivable	**1,588,348**	850,167
	19,205,762	17,639,616

As at June 30, 2022 the allowance for expected credit loss is $520,000 ($520,000 at December 31, 2021), which was included through the business combination and has not changed throughout this six-month period of fiscal 2022.

8. Costs and profits in excess of billings on uncompleted contracts

As at June 30, 2022, the Company had eighteen contracts with total billings of $24,137,608 which were less than total costs incurred and had recognized cumulative revenue of $28,333,082 since those projects began. This compares with fourteen contracts with total billings of $16,676,700 which were less than total costs incurred and had recognized cumulative revenue of $21,599,410 as at December 31, 2021.

Changes in costs and profits in excess of billings on uncompleted contracts during the six month period are explained by $2,080,367 (2021 - $983,819) recognized at the beginning of the period being transferred to accounts receivable, and $1,353,131 (2021 - $4,832,968) resulting from changes in the measure of progress.

9. Investment tax credits

An amount recognized in 2022 included $71,433 (2021 - $202,472) of investment tax credits earned in the year, as well as $Nil (2021 - $706,000) of investment tax credits earned in prior years that no longer met the criteria for recognition in 2021. $24,388 (2021 - $148,695) of the investment tax credits recognized in the year was recorded against cost of sales and services, $32,045 (2021 - ($684,709)) against research and development expenses and $15,000 (2021 - $32,486) against selling general and administrative expenses.

10. Strategic investments

	June 30, 2022	December 31, 2021
	$	$
Beauce Gold Fields ("BGF") shares – level 1	**71,806**	123,095
HPQ Silicon Resources Inc. ("HPQ") shares - level 1	**8,067,338**	12,306,196
HPQ warrants – level 3	**1,112,558**	2,472,368
	9,251,702	14,901,659

The change in the strategic investments is summarized as follows:

	("BGF") shares – level 1		("HPQ") shares - level 1		HPQ warrants – level 3	
	Quantity	$	Quantity	$	Quantity	$
Balance, December 31, 2020	1,025,794	123095	14,990,200	16,489,220	25,844,600	23,379,435
Additions	–	–	8,268,000	8,070,109	–	–
Exercised	–	–	16,250,000	11,700,000	(16,250,000)	(9,181,250)
Disposed	–	–	(12,755,600)	(14,252,732)	–	–
Change in the fair value	–	–	–	(9,700,401)	–	(11,725,817)
Balance, December 31, 2021	**1,025,794**	**123,095**	**26,752,600**	**12,306,196**	**9,594,600**	**2,472,368**
Additions[1]	**–**	–	**6,800,000**	**3,196,000**	**6,800,000**	**408,000**
Disposed	**–**	–	**(7,942,000)**	**(2,952,847)**	**–**	**–**
Change in the fair value	**–**	**(51,289)**	**–**	**(4,482,011)**	**–**	**(1,767,810)**
Balance, June 30, 2022	**1,025,794**	**71,806**	**25,610,600**	**8,067,338**	**16,394,600**	**1,112,558**

[1]On April 20, 2022 the Company participated in an HPQ non-brokered private placement by acquiring 6,800,000 units at a price of $0.53 per unit for a total investment of $3,604,000. Each unit consists of one common share of HPQ and one common share purchase warrant. Each of these warrants entitles the Company to purchase one common share at a price of $0.60 for a period of 24 months from the closing date of the private placement.

At June 30, 2022 and December 31, 2021, the fair value of the HPQ warrants was measured using the Black-Scholes option pricing model using the following assumptions:

	June 30, 2022				**December 31, 2021**		
Number of warrants	1,200,000	4,394,600	4,000,000	6,800,000	1,200,000	4,394,600	4,000,000
Date of issuance	29-Apr-20	2-Jun-20	3-Sep-20	20-Apr-22	29-Apr-20	2-Jun-20	3-Sep-20
Exercise price ($)	0.10	0.10	0.61	0.60	0.10	0.10	0.61
Assumptions under the Back Sholes model:							
Fair value of the shares ($)	0.32	0.32	0.32	0.32	0.46	0.46	0.46
Risk free interest rate (%)	3.12	3.12	3.12	3.12	1.22	1.22	1.22
Expected volatility (%)	73.28	76.61	76.7	88.6	89.88	94.01	110.47
Expected dividend yield	–	–	–	–	–	–	–
Contractual remaining life (in months)	10	11	14	22	16	17	20

As at June 30, 2022, a gain from initial recognition of the warrants of $925,366 ($510,573 at December 31, 2021) has been deferred off balance sheet until realized.

11. Deposits

	June 30, 2022	December 31, 2021
	$	$
Current portion:		
Suppliers	**896,961**	1,236,211
Security deposit on leased premises	**40,241**	92,241
Total current	**937,202**	1,328,452
Non-current portion:		
Suppliers	**2,373**	1,952
Security deposit on leased premises	**38,803**	246,804
Total non-current	**41,176**	248,756
Total Deposits	**978,378**	1,577,208

12. Accounts payable and accrued liabilities

	June 30, 2022	December 31, 2021
	$	$
Accounts payable	**7,003,200**	5,457,259
Accrued liabilities	**1,519,528**	3,730,048
Sale commissions payable[1]	**737,364**	737,364
Accounts payable to the controlling shareholder and CEO	**144,450**	144,506
	9,404,542	10,069,177

[1] Sale commissions payable relate to the costs to obtain long-term contracts with clients.

13. Billings in excess of costs and profits on uncompleted contracts

The amount to date of costs incurred and recognized profits less recognized losses for construction projects in progress amounted to $23,173,751 (2021 - $21,834,137).

Payments to date received were $29,713,860 on contracts in progress (2021 - $31,234,368).

Changes in billings in excess of costs and profits on uncompleted contracts during the six month period are explained by $3,430,725 (2021 - $6,268,910) recognized at the beginning of the period being recognized as revenue, and an increase of $570,603 (2021 - $9,076,169) resulting from cash received excluding amounts recognized as revenue.

14. Term loans

	Economic Development Agency of Canada Loan[1]	Other Term Loans[2]	Other Term Loans[3]	Canada Emergency Business Account Loan[4]	Total
	$	$	$	$	$
Balance, December 31, 2021	87,985	24,700	28,220	50,000	190,905
Addition	292,942	–	–	–	292,942
Financing costs	(89,085)	–	–	–	(89,085)
Accretion	12,382	–	–	–	12,382
Payments	–	(6,429)	(9,960)	–	(16,389)
Balance, June 30, 2022	304,224	18,271	18,260	50,000	390,755
Less current portion	–	(13,545)	(18,260)	(50,000)	(81,805)
Balance, June 30, 2022	**304,224**	**4,726**	**–**	–	**308,950**

[1] Maturing in 2029, non-interest bearing, payable in 60 equal instalments from April 2024 to March 2029. In January 2022 and April 2022, the Company received additional contributions of $155,735 and $137,207, respectively, which were discounted using the effective interest method using a rate of 8%.

[2] Maturing October 23, 2023 bearing interest at a rate of 6.95% per annum, payable in monthly instalments of $1,200 (including interest in capital) secured by automobile (carrying amount of $17,272 at June 30, 2022).

[3] Maturing in May 2023, payable in monthly instalments of $1,660, bearing interest at 7.45%.

[4] Loan bearing no interest and no minimum repayment, if repaid by December 2023.

15. Shareholders' equity

Common shares and warrants

Authorized:

The Company is authorized to issue an unlimited number of common shares without par value.

The following table sets out the activity in stock options:

	Number of options	Weighted average exercise price
		$
Balance – December 31, 2020	9,040,000	1.57
Granted	2,970,000	4.55
Exercised[1]	(3,482,000)	0.32
Forfeited	(125,000)	4.41
Balance, December 31, 2021	8,403,000	3.10
Granted	**2,350,000**	**3.62**
Exercised	**–**	**–**
Forfeited	**(220,000)**	**4.04**
Balance, June 30, 2022	**10,533,000**	**3.20**

(1) The weighted fair market value of the share price for options exercised in 2021 was $5.48.

As at June 30, 2022, the outstanding options, as issued under the stock option plan to directors, officers, employees and consultants for the purchases of one common share per option, are as follows:

Issuance date	Number of stock options 31-Dec-21	Granted	Exercised	Forfeitures	Number of stock options 30-Jun-22	Number of stock options vested -1	Exercise price per option	Expiry date
							$	
3-Nov-17	2,400,000	–	–	–	2,400,000	2,400,000	0.58	3-Nov-22
3-Jul-18	300,000	–	–	–	300,000	300,000	0.51	3-Jul-23
29-Oct-18	40,000	–	–	–	40,000	40,000	0.52	29-Oct-23
29-Sep-19	100,000	–	–	–	100,000	100,000	0.51	29-Sep-24
2-Jan-20	100,000	–	–	–	100,000	100,000	0.45	2-Jan-25
16-Jul-20	2,243,000	–	–	(20,000)	2,223,000	1,343,000	4.41	16-Jul-25
26-Oct-20	250,000	–	–	(200,000)	50,000	125,000	4.00	26-Oct-25
6-Apr-21	550,000	–	–	–	550,000	320,000	8.47	6-Apr-26
1-Jun-21	200,000	–	–	–	200,000	50,000	6.59	1-Jun-26
14-Jun-21	100,000	–	–	–	100,000	25,000	6.70	14-Jun-26
14-Oct-21	100,000	–	–	–	100,000	10,000	5.04	14-Oct-26
17-Dec-21	1,920,000	–	–	–	1,920,000	1,920,000	3.13	17-Dec-26
30-Dec-21	100,000	–	–	–	100,000	100,000	3.61	30-Dec-26
3-Jan-22	–	450,000	–	–	450,000	450,000	3.36	3-Jan-27
5-Apr-22	–	400,000	–	–	400,000	30,000	2.96	2-Apr-27
2-Jun-22	–	1,500,000	–	–	1,500,000	375,000	3.88	2-Jun-27
	8,403,000	**2,350,000**	**–**	**(220,000)**	**10,533,000**	**7,688,000**	**3.20**	

(1) At June 30, 2022, the weighted average exercise price for options outstanding which are exercisable was $3.62.

For the three-month and six-month periods ended June 30, 2022, a stock-based compensation expense of $1,621,040 and $3,290,670, respectively, was recorded in Selling, general and administrative expenses in the Condensed Consolidated Statements of Comprehensive income (loss), ($3,288,685 and $4,211,025 for the three-month and six-month periods ended June 30, 2021).

At June 30, 2022, an amount of $4,798,849 ($2,719,354 at December 31, 2021) remains to be amortized until June 2027 related to the grant of stock options.

16. Supplemental disclosure of cash flow information

	Three months ended June 30,		Six months ended June 30,	
	2022	2021	**2022**	2021
	$	$	**$**	$
Accounts receivable	**(2,028,735)**	(6,266,190)	**(1,566,146)**	(9,465,070)
Costs and profits in excess of billings on uncompleted contracts	**1,668,461**	(718,009)	**727,236**	(209,280)
Inventory	**(275,877)**	(356,455)	**(661,448)**	(356,455)
Investment tax credits receivable	**(60,936)**	384,745	**(15,051)**	358,095
Income taxes receivable	**117,195**	–	**117,195**	–
Deposits	**2,838,936**	565,714	**1,777,516**	(816,386)
Contract assets & other assets	**–**	–	**–**	–
Prepaid expenses	**796,997**	766,553	**(1,383,159)**	(2,045,341)
Accounts payable and accrued liabilities	**(82,365)**	(4,057,666)	**(664,635)**	(496,581)
Billings in excess of costs and profits on uncompleted contracts	**(2,536,512)**	1,136,858	**(2,860,122)**	(1,521,916)
	437,164	(8,544,450)	**(4,528,614)**	(14,552,934)

17. Supplemental disclosure on statements of comprehensive income

	Three months ended June 30,		Six months ended June 30,	
	2022	2021	**2022**	2021
	$	$	**$**	$
Inventories recognized in cost of sales	**201,547**	–	**414,142**	–
Amortization of intangible assets	**218,759**	6,779	**437,518**	13,559
Depreciation of property and equipment	**148,412**	84,061	**291,402**	160,378
Depreciation of ROU assets	**155,398**	149,217	**321,622**	251,011
Employee benefits	**2,991,223**	2,049,514	**5,702,092**	4,021,075
Share-based expenses	**1,621,040**	3,288,685	**3,290,670**	4,211,025
Awarded grants	**55,077**	87,565	**94,511**	146,744

18. Net finance costs

	Three months ended June 30,		Six months ended June 30,	
	2022	2021	**2022**	2021
	$	$	**$**	$
Financial expenses				
Interest on term loans	**752**	2,987	**1,603**	9,438
Interest on lease liabilities	**111,993**	90,947	**189,458**	136,928
Interest accretion on balance due on business combination	**44,115**	–	**127,088**	–
Penalties and other interest expenses	**36,802**	10,481	**60,777**	11,135
	193,662	104,415	**378,926**	157,501
Financial income				
Accretion interest on royalty receivable	**(37,549)**	(64,329)	**(38,913)**	(64,329)
Net finance costs	**156,113**	40,086	**340,013**	93,172

19. Earnings (loss) per share

The following table provides a reconciliation between the number of basic and fully diluted shares outstanding for the three-month and six-month periods ended June 30:

	Three months ended June 30,		Six months ended June 30,	
	2022	2021	**2022**	2021
	$	$	**$**	$
Weighted daily average of Common shares	**170,125,795**	166,289,320	**170,125,795**	163,769,415
Dilutive effect of stock options	**–**	–	**–**	–
Dilutive effect of warrants	–	–	–	–
Weighted average number of diluted shares	**170,125,795**	166,289,320	**170,125,795**	163,769,415
Number of anti-dilutive stock options and warrants excluded from fully diluted earnings per share calculation	**10,533,000**	9,405,500	**10,533,000**	9,405,500

20. Related party transactions

During the three month and six-month period ended June 30, 2022, the Company concluded the following transactions with related parties:

In January 2020, the Company entered into a lease agreement for the rental of a property with a trust whose beneficiary is the controlling shareholder and CEO of the Company. At June 30, 2022 the carrying amount of the ROU asset and lease liabilities are $898,977 and $976,874 ($1,107,131 and $Nil, respectively, at December 31, 2021).

Rent and property taxes charged by a trust whose beneficiary is the controlling shareholder and CEO of the Company, for the three and six-month periods ended June 30, 2022 amount to $70,226 and $139,280, respectively ($68,825 and $137,284 for the three and six-month periods ended June 30, 2021, respectively.

A balance due to the controlling shareholder and CEO of the Company amounted to $144,450 ($144,506 at December 31, 2021) and is included in accounts payable and accrued liabilities.

The Key Management Personnel of the Company, in accordance with IAS 24, are the members of the Board of Directors and certain officers. Total compensation to key management consisted of the following:

	Three months ended June 30,		Six months ended June 30,	
	2022	2021	**2022**	2021
	$	$	**$**	$
Salaries – key management	**257,871**	218,656	**573,842**	460,215
Pension contributions	**4,787**	3,971	**10,680**	8,407
Fees – Board of Directors	**69,000**	41,500	**89,000**	75,000
Share-based compensation – officers	**486,841**	1,312,708	**812,914**	1,792,325
Share-based compensation – Board of Directors	**1,106,066**	1,539,634	**1,758,213**	1,711,850
Other benefits – key management	**7,599**	43,363	**14,038**	53,352
Total compensation	**1,932,164**	3,159,832	**3,258,687**	4,101,149

21. Financial instruments

As part of its operations, the Company carries a number of financial instruments. It is management's opinion that the Company is not exposed to significant interest, currency or credit risks arising from these financial instruments except as otherwise disclosed. The Company's overall risk management program focuses on the unpredictability of the financial market and seeks to minimize potential adverse effects on the Company's financial performance. The Company does not use derivative financial instruments to hedge these risks.

Foreign currency risk

The Company enters into transactions denominated in US dollars for which the related revenues, expenses, accounts receivable and accounts payable and accrued liabilities balances are subject to exchange rate fluctuations.

As at June 30, 2022 and December 31, 2021 the Company's exposure to foreign exchange risk for amounts denominated in US dollars is as follows:

	June 30, 2022	December 31, 2021
	$	$
Cash	**795,502**	1,714,670
Accounts receivable	**15,399,014**	14,465,011
Accounts payable and accrued liabilities	**(1,367,570)**	(1,023,999)
Total	**14,826,946**	15,155,682

Foreign currency risk is the risk that the fair value or future cash flows of a financial instrument will fluctuate because of changes in foreign exchange rates.

Sensitivity analysis

At June 30, 2022, if the US Dollar changes by 10% against the Canadian dollar with all other variables held constant, the impact on pre-tax gain or loss and equity for the period ended June 30, 2022 would have been $1,482,695.

Credit risk and credit concentration

Credit risk is the risk that one party to a financial instrument will cause a financial loss for the other party by failing to discharge an obligation. The maximum credit risk to which the Company is exposed as at June 30, 2022 represents the carrying amount of cash and cash equivalents, accounts receivable (except sales tax receivable), deposits and royalties receivable. Cash and cash equivalents, which only comprise guaranteed investment certificates redeemable on relatively short notice by the Company, are held with major reputable financial institutions. The Company manages its credit risk by performing credit assessments of its customers. The Company does not generally require collateral or other security from customers on accounts receivable. The Company believes that there is no unusual exposure associated with the collection of these receivables. Two customers accounted for 91% (one customer for 73% at December 31, 2021) of trade accounts receivable with amounts owing to the Company of $13,609,854 ($12,063,636 at December 31, 2021), representing the Company's major credit risk exposure.

The following table summarizes the Company's concentration of credit risk as a percentage of revenue during the three-month and six-month periods ended June 30, 2022.

	Three months ended June 30, 2022		Six months ended June 30, 2022	
	Revenues	**% of total revenues**	Revenues	% of total revenues
	$	**%**	**$**	**%**
Customer 1	1,179,161	**20**	1,773,303	18
Customer 2	1,000,688	**17**	1,371,790	14
Customer 3	855,009	**15**	1,336,359	13
Customer 4	591,099	**10**	1,211,031	12
Customer 5	557,438	**10**	1,077,225	11
Total	**4,183,395**	**72**	6,769,708	68

Credit concentration is determined based on customers representing 10% or more of total revenues and/or total accounts receivable.

The royalties receivables are due from a company in which the Company has a strategic investments. The Company does not have collateral or other security associated with the collection of this receivable.

Fair value of financial instruments

The fair value represents the amount that would be received for the sale of an asset or paid for the transfer of a liability in an orderly transaction between market participants at the measurement date. The fair value estimates are calculated at a specific date taking into consideration assumptions regarding the amounts, the timing of estimated future cash flows and discount rates. Accordingly, due to its approximate and subjective nature, the fair value must not be interpreted as being realizable in an immediate settlement of the financial instruments.

There are three levels of fair value that reflect the significance of inputs used in determining fair values of financial instruments:

Level 1 — quoted prices (unadjusted) in active markets for identical assets or liabilities.

Level 2 — inputs other than quoted prices included within Level 1 that are observable for the asset or liability, either directly (i.e. as prices) or indirectly (i.e. derived from prices).

Level 3 — inputs for the asset or liability that are not based on observable market data. The fair values of cash and cash equivalents, trade accounts receivable, deposits, accounts payable and accrued liabilities and bank indebtedness approximate their carrying amounts due to their short-term maturities.

Royalties receivable are discounted according to their corresponding agreements and are classified as Level 2.

Investments in HPQ warrants are valued using the Black-Scholes pricing model and are classified as Level 3.

The fair value of the term loans and the balance due on business combination as at June 30, 2022 is determined using the discounted future cash flows method and management's estimates for market interest rates for similar issuances. Given their recent issuance, their fair market values correspond to their carrying amount.

Interest rate risk

Interest rate risk is the risk that the value of a financial instrument might be adversely affected by a change in interest rates. Changes in market interest rates may have an effect on the cash flows associated with some financial assets and liabilities, known as cash flow risk, and on the fair value of other financial assets or liabilities, known as price risk, and on the fair value of investments or liabilities, known as price risks. The Company is exposed to a risk of fair value on cash equivalents, and term loans as those financial instruments bear interest at fixed rates.

Price risk

Price risk is the risk that the fair value or future cash flows of a financial instrument will fluctuate because of changes in market price (other than those arising from foreign currency risk and interest risk), whether those changes are caused by factors specific to the individual financial instrument or its issuers or factors affecting all similar financial instruments traded in the market. The most significant exposure to the price risk for the Company arises from its investments in shares and warrants of public companies quoted on the TSXV Exchange. If equity prices had increased or decreased by 25% as at June 30, 2022, with all other variables held constant, the Company's investments would have increased or decreased respectively, by approximately $787,000 ($4,042,000 at December 31, 2021).

Liquidity risk

Liquidity risk is the risk that the Company will encounter difficulty in meeting obligations associated with financial liabilities that are settled by delivery of cash or another financial asset. The Company manages its liquidity risk by forecasting cash flows from operations and anticipating any investing and financing activities.

The following table summarizes the contractual amounts payable and maturities of financial liabilities and other liabilities at June 30, 2022:

	Carrying value	Total contractual amount	Less than one year	2-3 years	4-5 years	Over 5 years
	$	$	$	$	$	$
Bank indebtedness	941,180	941,180	941,180	–	–	–
Accounts payable and accrued liabilities	9,404,542	9,404,542	9,404,542	–	–	–
Term loans	390,755	538,123	81,805	142,377	180,000	133,941
Balance due on business combination	3,861,513	4,137,820	2,177,800	1,960,020	–	–
Lease liabilities	6,201,797	7,414,446	3,361,053	1,187,589	859,149	2,006,655
	20,799,787	**22,436,111**	**15,966,380**	**3,289,986**	**1,039,149**	**2,140,596**

The Company's Canadian subsidiary benefits from a line of credit of $500,000, and the Italian subsidiary benefits from a 400,000 Euro ($539,020) line of credit, and security against these credit lines is provided only by the subsidiaries, and not PyroGenesis Canada Inc. At June 30, 2022, $436,378 was drawn on the Canadian facility and 374,844 Euro ($504,801) was drawn on the Italian facility.

22. Contingent liabilities

The Company is currently a party to various legal proceedings. If management believes that a loss arising from these proceedings is probable and can reasonably be estimated, that amount of the loss is recorded. As additional information becomes available, any potential liability related to these proceedings is assessed and the estimates are revised, if necessary. Based on currently available information, management believes that the ultimate outcome of these proceedings, individually and in aggregate, will not have a material adverse effect on the Company's financial position or overall trends in results of operations.

The Company had received a government grant in prior years of approximately $800,000 to assist with the development of a new system of advanced waste treatment systems technology. The grant is potentially repayable at the rate of 3% of any consideration received as a result of the project, for which funding has been received, to a maximum of the actual grant received. This repayment provision will remain in effect until May 30, 2024. The Company abandoned the project in 2011 and accordingly, no amount is expected to be repaid.

23. Capital management

The Company's objectives in managing capital are:

a) To ensure sufficient liquidity to support its current operations and execute its business plan; and

b) To provide adequate return to the shareholders

The Company's primary objectives when managing capital is to ensure the Company continues as a going concern as well as to maintain optimal returns to shareholders and benefits for other stakeholders.

The Company currently funds these requirements from cash flows from operations and with financing arrangements with third parties and shareholders. The Company is not subject to any externally imposed capital requirements.

The Company monitors its working capital in order to meet its financial obligations. On June 30, 2022, the Company's working capital was $7,817,760 ($14,006,785 at December 31, 2021)

The management of capital includes shareholders' equity for a total amount of $26,950,773 and term loans of $390,755 ($40,768,754 and $190,905 respectively at December 31, 2021), as well as cash and cash equivalents amounting to $1,291,508 ($12,202,513 at December 31, 2021).

There were no significant changes in the Company's approach during the current six-month period and 2021 fiscal year, however, in order to maintain or adjust the capital structure, the Company may issue new shares, sell portions of its strategic investment and periodically purchase its own shares on the open market.

24. Segment information

The Company operates in one segment, based on financial information that is available and evaluated by the Company's Board of Directors. The Company's head office is located in Montreal, Quebec. The operations of the Company are located in three geographic areas: Canada, Italy and India.

The following is a summary of the Company's revenue from external customers, by geography:

	Three months ended June 30,		Six months ended June 30,	
	2022	2021	**2022**	2021
	$	$	**$**	$
Canada	**2,601,842**	3,937,462	**3,969,633**	4,736,895
United States	**601,587**	2,131,841	**1,346,874**	4,725,806
Europe	**896,854**	42,201	**1,279,142**	62,243
Mexico	**82,884**	137,856	**259,392**	137,856
Asia	**269,436**	41,489	**585,267**	49,107
Saudi Arabia	**353,654**	1,466,349	**1,077,225**	4,199,455
Africa	**–**	3,679	**–**	3,679
South America	**40,235**	519,695	**162,706**	630,034
India	**1,000,688**	–	**1,373,703**	–
	5,847,180	8,280,572	**10,053,942**	14,545,075

Revenue by product line and revenues recognized by revenue recognition method are presented in note 5.

PyroGenesis Canada Inc.
Management's Discussion and Analysis
For the three and six month periods ended June 30, 2022 and 2021
(Unaudited)

This management's discussion and analysis ("MD&A") is intended to assist readers in understanding the business environment, strategies, performance and risk factors of PyroGenesis Canada Inc. ("PyroGenesis", or the "Company"). The MD&A provides the reader with a view and analysis, from the perspective of management, of the Company's financial results for the three and six months ended June 30, 2022. The MD&A has been prepared in accordance with National Instrument 51-102, Continuous Disclosure Requirements, and should be read in conjunction with the audited consolidated financial statements and related notes thereto of the Company for the year ended December 31, 2021.

The condensed consolidated interim financial statements and MD&A have been reviewed by PyroGenesis' Audit Committee and were approved by its Board of Directors on August 15, 2022. The Board of Directors is responsible for ensuring that the Company fulfills its responsibilities for financial reporting and is ultimately responsible for reviewing and approving the MD&A. The Board of Directors carries out this responsibility principally through its Audit Committee. The Audit Committee is appointed by the Board of Directors and is comprised of independent directors. The Audit Committee reports its findings to the Board of Directors for its consideration when it approves the MD&A and financial statements for issuance to shareholders.

The following information takes into account all material events that took place up until August 15, 2022, the date on which the Company's Board of Directors approved this MD&A. Unless otherwise indicated, all amounts are presented in Canadian dollars. The Company's functional and reporting currency is the Canadian dollar.

Additional information regarding PyroGenesis is available on the System for Electronic Document Analysis and Retrieval ("SEDAR) at www.sedar.com, the Electronic Data Gathering, Analysis, and Retrieval system ("EDGAR") at www.sec.gov, and on the Company's website at www.pyrogenesis.com.

FORWARD-LOOKING STATEMENTS

This MD&A contains forward-looking statements and forward-looking information (collectively,"forward-looking statements") within the meaning of applicable securities legislation. All statements other than statements of historical fact contained in this MD&A are forward-looking statements, including, without limitation, the Company's statements regarding its products and services; relations with suppliers and clients; future financial position; business strategies; potential acquisitions; potential business partnering; litigation; and plans and objectives. In certain cases, forward-looking statements can be identified by the use of words such as "plans", "expects" or "does not expect", "is expected", "budget", "scheduled", "estimates", "forecasts", "intends", "anticipates" or "does not anticipate", or "believes", or variations of such words and phrases or state that certain actions, events or results "may", "could", "would", "might" or "will be taken", "occur" or "be achieved" and similar words or the negative thereof. Although management of the Company believes that the expectations represented in such forward-looking statements are reasonable, there can be no assurance that such expectations will prove to be correct.

In particular, this MD&A contains forward-looking statements that relate, but are not limited, to:

- the Company's business strategies, strategic objectives and growth strategy;
- the Company's current and future capital resources and the need for additional financing;
- the Company's ability to increase sales, including the results of the successful completion of the Company's current projects;
- management's expectation that the Company will achieve sustained annual growth and profitability, and that gross margins will increase resulting in a decrease in cost of sales as a percentage of revenue; and
- the Company's overall financial performance.

By their nature, forward-looking statements require assumptions and are subject to inherent risks and uncertainties including those discussed herein. In particular, forward-looking statements relating to future sales, growth and profitability are based on the assumption that current projects will be completed, and the Company will be awarded certain anticipated contracts pursuant to recent negotiations with, and statements made by, third parties. There is significant risk that predictions and other forward-looking statements will not prove to be accurate. Readers are cautioned to not place undue reliance on forward-looking statements made herein because a number of factors could cause actual future results, conditions, actions or events to differ materially from the targets, expectations, estimates or intentions expressed in the forward-looking statements.

Many factors could cause the Company's actual results, performance or achievements to be materially different from any future results, performance or achievements that may be expressed or implied by forward-looking statements, including, without limitation, risks and uncertainties relating to: the strength of the Canadian, US and Asian economies; operational, funding, and liquidity risks; unforeseen engineering and environmental problems; delays or inability to obtain required financing and/or anticipated contracts; risks associated with licenses, permits and regulatory approvals; supply interruptions or labour disputes; the impact of the Coronavirus (COVID-19) outbreak on our business and our operations; foreign exchange fluctuations and collection risk; competition from other suppliers, or alternative, less capital intensive, energy solutions; and risk factors described elsewhere under the heading "Risk Factors" in this MD&A and the Annual Information Form, and elsewhere in this MD&A and other filings that the Company has made and may make in the future with applicable securities regulatory authorities. We caution that the foregoing list of factors is not exhaustive, and that, when relying on forward-looking statements to make decisions with respect to the Company, investors and others should carefully consider these factors, as well as other uncertainties and potential events, and the inherent uncertainty of forward-looking statements.

Although the Company has attempted to identify significant factors that could cause actions, events or results to differ materially from those described in forward-looking statements, there may be other factors that cause actions, events or results not to be as anticipated, estimated or intended. There can be no assurance that forward-looking statements will prove to be accurate, as actual results and future events could differ materially from those anticipated in such statements. Accordingly, readers should not place undue reliance on forward-looking statements. Forward-looking statements are provided as of the date of this MD&A, and the Company assumes no obligation to update or revise such forward-looking statements to reflect new events or circumstances except as required under applicable securities laws.

The forward-looking statements contained herein are expressly qualified in their entirety by this cautionary statement. The forward-looking statements included in this MD&A are made as of the date of this MD&A or such other date specified herein.

BASIS OF PRESENTATION

For reporting purposes, we prepared the 2022 Q2 condensed consolidated interim Financial Statements in accordance with International Financial Reporting Standards ("IFRS") as issued by the International Accounting Standards Board. The financial information contained in this MD&A was derived from the 2021 Consolidated Financial Statements. Unless otherwise indicated, all references to "$" are to Canadian dollars. Unless otherwise indicated, all references to a specific "note" refer to the notes to the 2022 Q2 condensed consolidated interim Financial Statements. Certain totals, subtotals and percentages throughout this MD&A may not reconcile due to rounding.

NON-IFRS MEASURES

This MD&A makes reference to certain non-IFRS measures. These measures are not recognized measures under IFRS and do not have a standardized meaning prescribed by IFRS and are therefore unlikely to be comparable to similar measures presented by other companies. Rather, these measures are provided as additional information to complement those IFRS measures by providing further understanding of our results of operations from management's perspective. Accordingly, these measures should not be considered in isolation nor as a substitute for analysis of our financial information reported under IFRS.

We use non-IFRS measures, including EBITDA, Adjusted EBITDA and Modified EBITDA. EBITDA, Adjusted EBITDA and Modified EBITDA are not considered an alternative to income or loss from operations, or to net earnings or loss, in the context of measuring a company's performance. These non-IFRS measures are used to provide investors with supplemental measures of operating performance and thus highlight trends in our business that may not otherwise be apparent when relying solely on IFRS measures. We also believe that securities analysts, investors and other interested parties frequently use non-IFRS measures in the evaluation of issuers. Our management also uses non-IFRS measures in order to facilitate operating performance comparisons from period to period, to prepare annual operating budgets and forecasts and to determine components of management compensation. Management believes that EBITDA, Adjusted EBITDA and Modified EBITDA are important measures of operating performance because it allows management, investors and others to evaluate and compare the Company's operating results, including its return on capital and operating efficiencies, from period-to-period by removing the impact of the Company's capital structure consequences, and other non-operating items not requiring cash outlays including the adjustment to the fair value of investments and share-based compensation.

EBITDA

We define EBITDA as Net Earnings before Net Financing Charges, Taxes, Depreciation and Amortization. See "Results of Operations - Reconciliation of Non-IFRS measures (EBITDA, Adjusted EBITDA and Modified EBITDA)".

Adjusted EBITDA

We define Adjusted EBITDA as Net Earnings before Net Financing Charges, Taxes, Depreciation, Amortization and other non-cash items including share-based payment costs, inventory and equipment write-offs, and the tax assessment. See "Results of Operations - Reconciliation of Non-IFRS measures (EBITDA, Adjusted EBITDA and Modified EBITDA)".

Modified EBITDA

We defined Modified EBITDA as Adjusted EBITDA before the change in fair value of investments. See "Results of Operations - Reconciliation of Non-IFRS measures (EBITDA, Adjusted EBITDA and Modified EBITDA)".

OVERVIEW

PyroGenesis Canada Inc. is a leader in the design, development, manufacture and commercialization of advanced plasma processes. We provide engineering and manufacturing expertise, cutting-edge contract research, as well as turnkey process equipment packages to the defense, metallurgical, mining, additive manufacturing (including 3D printing), oil & gas, and environmental industries. With a team of experienced engineers, scientists and technicians working out of our Montreal office and our 40,902 sq. ft. (3,800 m²) and 31,632 sq. ft. (2,940 m²) manufacturing facilities, PyroGenesis maintains its competitive advantage by remaining at the forefront of technology development and commercialization. Our core competencies allow PyroGenesis to lead the way in providing innovative plasma torches, plasma waste processes, high-temperature metallurgical processes, and engineering services to the global marketplace. Our operations are ISO 9001:2015 and AS9100D certified, having been ISO certified since 1997. Since our acquisition of Pyro Green-Gas (formerly AirScience Technologies Inc), we now offer technologies, equipment, and expertise in the area of biogas upgrading, and air pollution control. As a result, we have extended our presence to Italy and India, and this acquisition provides potential synergies with our current land-based waste destruction offerings. Our common shares are listed on the Toronto Stock Exchange (TSX) (Ticker Symbol: PYR), NASDAQ (Ticker Symbol: PYR) and the Frankfurt Stock Exchange (FSX) (Ticker symbol: 8PY).

SELECTED FINANCIAL INFORMATION

	Three months ended June 30, **2022**	2021	% Change 2022 vs 2021	Six months ended June 30, **2022**	2021	% Change 2022 vs 2021
Revenues	**$ 5,847,180**	$ 8,280,572	-29%	**$ 10,053,942**	$ 14,545,075	-31%
Cost of sales and services	**3,347,907**	3,347,091	0.02%	**6,502,947**	7,468,584	-13%
Gross margin	**2,499,273**	4,933,481	-49%	**3,550,995**	7,076,491	-50%
Expenses						
Selling, general and administrative (not including share-based expenses)	**5,470,495**	3,371,888	62%	**9,413,233**	6,174,984	52%
Research and development, net	**804,564**	710,734	13%	**1,286,996**	997,041	29%
Total expenses (not including share-based expenses)	**6,275,059**	4,082,622	54%	**10,700,229**	7,172,025	49%
Net (loss) income from operations (not including share-based expenses)	**(3,775,786)**	850,859	-544%	**(7,149,234)**	(95,534)	7383%
Share-based expenses	**(1,621,040)**	(3,288,685)	-51%	**(3,290,670)**	(4,211,025)	-22%
Net (loss) income from operations	**(5,396,826)**	(2,437,826)	121%	**(10,439,904)**	(4,306,559)	142%
Changes in fair market value of strategic investments and financial expenses	**(7,633,978)**	(17,924,379)	57%	**(6,641,123)**	(12,342,743)	46%
Income taxes	**19,542**	–	100%	**76,095**	–	100%
Net earnings (loss)	**$ (13,050,346)**	$ (20,362,205)	-36%	**$ (17,157,122)**	$ (16,649,302)	3%
Foreign currency translation gain on investments in foreign operations	**10,815**	–	100%	**48,471**	–	100%
Comprehensive income (loss)	**$ (13,039,531)**	(20,362,205)	-36%	**$ (17,108,651)**	(16,649,302)	3%
Earnings (loss) per share						
Basic	**$ (0.08)**	$ (0.12)		**$ (0.10)**	$ (0.10)	
Diluted	**$ (0.08)**	$ (0.11)		**$ (0.10)**	$ (0.09)	
Modified EBITDA [(1)]	**$ (3,242,402)**	$ 1,090,915	-397%	**$ (6,050,221)**	$ 329,416	-1937%

[1].See "Non-IFRS Measures"

Extract from Statement of Financial Position at:

	June 30, 2022	Dec 31, 2021
Current assets	**30,206,728**	38,758,984
Non-current assets	**24,270,742**	31,011,693
Total assets	**$ 54,477,470**	$ 69,770,677
Current liabilities	**22,388,968**	24,752,199
Non-current liabilities	**5,137,729**	4,249,724
Total liabilities	**$ 27,526,697**	$ 29,001,923
Shareholders' equity	**$ 26,950,773**	$ 40,768,754

RESULTS OF OPERATIONS

Revenues

PyroGenesis recorded revenue of $5,847,180 in the second quarter of 2022 ("Q2, 2022"), representing a decrease of 29% compared with $8,280,572 (which includes 3.3M sale of intellectual properties) recorded in the second quarter of 2021 ("Q2, 2021"), Revenue for the six months of fiscal 2022 was $10,053,942 a decrease of 31% over revenue of $14,545,075 during the same period in 2021.

Revenues recorded in the three and six months ended June 30, 2022, were generated from:

(i) DROSRITE™ related sales of $436,538, $1,336,617 (2021 Q2 - $1,648,882, $4,389,606)
(ii) PUREVAP™ related sales of $727,378, $1,168,983 (2021 Q2 - $3,896,453, $4,521,539)
(iii) torch related sales of $1,550,201, $2,591,909 (2021 Q2 - $557,613, $752,835)
(iv) development and support related to systems supplied to the U.S. Navy of $591,099, $1,336,359 (2021 Q2 - $2,133,187, $4,719,208)
(v) biogas upgrading and pollution controls of $2,181,107, $3,171,152 (2021 Q2 - $Nil, $Nil)
(vi) other sales and services of $360,858, $448,922 (2021 Q2 - $44,437, $161,887)

As of August 15, 2022, revenue expected to be recognized in the future related to performance obligations that are unsatisfied (or partially satisfied) is $35,282,425. Revenue will be recognized as the Company satisfies its performance obligations under long-term contracts, which is expected to occur over a maximum period of approximately 3 years.

Cost of Sales and Services

	Three months ended June 30, 2022	2021	% Change 2022 vs 2021	Six months ended June 30, 2022	2021	% Change 2022 vs 2021
Employee compensation	**$ 901,826**	$ 544,725	66%	**$ 1,704,455**	$ 1,131,868	51%
Subcontracting	**360,140**	38,241	842%	**1,031,416**	600,498	72%
Direct materials	**1,612,969**	2,547,913	-37%	**2,695,752**	5,366,323	-50%
Manufacturing overhead & other	**725,145**	246,770	194%	**884,764**	455,207	94%
Foreign exchange charge on materials	**(447,968)**	(1,022)	43732%	**(226,165)**	(61,373)	269%
Investment tax credits	**(22,964)**	(36,315)	-37%	**(24,793)**	(37,498)	-34%
Cost of Sales and Services before Amortization of Intangible Assets	**$ 3,129,148**	$ 3,340,312	-6%	**$ 6,065,429**	$ 7,455,025	-19%
Amortization of intangible assets	**218,759**	6,779	3127%	**437,518**	13,559	3127%
Total Cost of Sales and Services	**$ 3,347,907**	$ 3,347,091	0.02%	**$ 6,502,947**	$ 7,468,584	-13%

Gross Margin

	Three months ended June 30, 2022	2021	Six months ended June 30, 2022	2021
Revenues	**$ 5,847,180**	$ 8,280,572	**$ 10,053,942**	$ 14,545,075
Cost of Sales and Services	**3,347,907**	3,347,091	**6,502,947**	7,468,584
Gross Margin	**$ 2,499,273**	$ 4,933,481	**$ 3,550,995**	$ 7,076,491
Gross Margin %	**43%**	60%	**35%**	49%

Cost of sales and services before amortization of intangible assets is not a performance measure defined under IFRS and it is not considered an alternative to gross margin in the context of measuring the Company's performance. Management believes that providing certain non-GAAP performance measures, in addition to IFRS measures, provides users of the Company's financial statements with an enhanced understanding of its results and related trends, and increases transparency and clarity. Gross margin before amortization of intangible assets is an important measure of operating performance because it allows management, investors and others to evaluate and compare the Company's core operating results, including its return on capital and operating efficiencies, from period to period, by removing the impact of non-operating items not requiring cash outlays. Securities regulations require that companies caution readers that earnings and other measures adjusted to a basis other than IFRS do not have standardized meanings and are unlikely to be comparable to similar measures used by other companies. Accordingly, they should not be considered in isolation or a substitute for financial measures prepared in accordance with IFRS.

Cost of sales and services before amortization of intangible assets was $3,129,148 in Q2 2022, representing a decrease of 6% compared with $3,340,312 in Q2 2021, primarily due to a decrease in direct materials of $1,612,969 (Q2 2022 - $2,547,913) and increases in employee compensation, subcontracting, manufacturing overhead & other of $1,987,111 (Q2 2022 - $829,736), offset by the increase in foreign exchange charge on materials of ($447,968) (Q2 2022 – ($1,022)).

The gross margin for the Q2 2022 three-month period was $2,499,273 or 43% of revenue compared to a gross margin of $4,933,481 or 60% of revenue for Q2 2021.

As a result of the type of contracts being executed, the nature of the project activity, as well as the composition of the cost of sales and services, as the mix between labour, materials and subcontracts may be significantly different. In addition, due to the nature of these long-term contracts, the Company has not necessarily passed on to the customer, the increased cost of sales which was attributable to inflation, if any.

Investment tax credits related to qualifying projects from the provincial government in Q2 2022 were $22,964 (Q2 2021 - $36,315). The Company also recorded for the six months ended June 30, 2022, $24,793 (2021 - $37,498) of the investment tax credits against cost of sales and services, $31,641 (2021 - $23,880) against research and development expenses and $15,000 (2021 - $15,979) against selling general and administrative expenses.

The amortization of intangible assets of $218,759 in Q2 2022 compared to $6,779 for Q2 2021 relates mainly to the intangible assets in connection with the Pyro Green-Gas acquisition, patents and deferred development costs. These expenses are non-cash items and will be amortized over the duration of their expected lives.

Selling, General and Administrative Expenses

	Three months ended June 30, 2022	2021	% Change 2022 vs 2021	Six months ended June 30, 2022	2021	% Change 2022 vs 2021
Employee compensation	**$ 1,870,165**	$ 1,291,580	45%	**$ 3,541,954**	$ 2,508,052	41%
Professional fees	**1,740,978**	918,964	89%	**2,402,957**	1,908,171	26%
Office and general	**223,629**	106,921	109%	**457,089**	265,674	72%
Travel	**80,453**	5,727	1305%	**107,662**	13,142	719%
Depreciation of property and equipment	**148,412**	84,061	77%	**291,402**	160,378	82%
Depreciation of ROU assets	**155,398**	149,217	4%	**321,622**	251,011	28%
Investment tax credits	**(7,500)**	(8,479)	-12%	**(15,000)**	(15,979)	-6%
Government grants	**(55,077)**	(17,234)	220%	**(94,511)**	(17,234)	448%
Other expenses	**1,314,037**	841,131	56%	**2,400,058**	1,101,769	118%
Sub-total not including share-based expenses	**$ 5,470,495**	$ 3,371,888	62%	**$ 9,413,233**	$ 6,174,984	52%
Share-based expenses	**1,621,040**	3,288,685	-51%	**3,290,670**	4,211,025	-22%
Total selling, general and administrative	**$ 7,091,535**	$ 6,660,573	6%	**$ 12,703,903**	$ 10,386,009	22%

Included within Selling, General and Administrative expenses ("SG&A") are costs associated with corporate administration, business development, project proposals, operations administration, investor relations and employee training.

SG&A expenses for Q2 2022 excluding the costs associated with share-based compensation (a non-cash item in which options vest principally over a four-year period), were $5,470,495 representing an increase of 62% compared with $3,371,888 reported for Q2 2021.

The increase in SG&A expenses in Q2 2022 over the same period in 2021 is mainly attributable to the Pyro Green-Gas acquisition and the net effect of:

(i) an increase of 45% in employee compensation due primarily to additional head count,
(ii) an increase of 89% for professional fees, primarily due to an increase in accounting fees and legal fees,
(iii) an increase of 109% in office and general expenses, is due to an increase in computer and internet expenses, security expenses and stationary and office related expenses,

(iv) travel costs increased by 1,305%, due to an increase in travel abroad,
(v) depreciation on property and equipment increased by 77% due to higher amounts of property and equipment being depreciated,
(vi) depreciation on right of use assets increased by 4% due to higher amounts of right of use assets being depreciated,
(vii) Investment tax credits decreased by 12%, due to a decrease in qualifying projects,
(viii) government grants increased by 220% due to higher levels of activities supported by such grants,
(ix) other expenses increased by 56%, primarily due to an increase in couriers & freight,

Separately, share based payments decreased by 51% in Q2 2022 over the same period in 2021.

Depreciation on Property and Equipment

	Three months ended June 30, 2022	2021	% Change 2022 vs 2021	Six months ended June 30, 2022	2021	% Change 2022 vs 2021
Depreciation of property and equipment	**$ 148,412**	$ 84,061	77%	**$ 291,402**	$ 160,378	82%

The depreciation on property and equipment increased to $148,412 in Q2 2022, compared with $84,061 in Q2 2021. The 77% increase is primarily due to higher amounts of property and equipment being depreciated.

Research and Development ("R&D") Costs

	Three months ended June 30, 2022	2021	% Change 2022 vs 2021	Six months ended June 30, 2022	2021	% Change 2022 vs 2021
Employee compensation	**$ 219,232**	$ 213,209	3%	**$ 455,683**	$ 381,156	20%
Investment tax credits	**(30,473)**	(5,913)	415%	**(31,641)**	(23,880)	33%
Subcontracting	**51,973**	43,701	19%	**84,027**	86,291	-3%
Materials and equipment	**470,574**	463,509	2%	**614,994**	581,640	6%
Other expenses	**93,258**	66,559	40%	**163,933**	101,344	62%
Sub-total before government grants	**$ 804,564**	$ 781,065	3%	**$ 1,286,996**	$ 1,126,551	14%
Government grants	–	(70,331)	-100%	–	(129,510)	-100%
Total net R&D expenses	**$ 804,564**	$ 710,734	13%	**$ 1,286,996**	$ 997,041	29%

The Company incurred $804,564 of R&D costs, net of government grants, on internal projects in Q2 2022, an increase of 13% as compared with $710,734 in Q2 2021. The increase in Q2 2022 is primarily related to an increase in employee compensation, investment tax credits, subcontracting, materials and equipment, and other expenses and a decrease in government grants recognized. During the first six months of fiscal 2022, net spending on internal R&D was $1,286,996 as compared to $997,041 in 2021, primarily due to an increase in R&D activities performed.

In addition to internally funded R&D projects, the Company also incurred R&D expenditures during the execution of client funded projects. These expenses are eligible for Scientific Research and experimental Development ("SR&ED") tax credits. SR&ED tax credits on client funded projects are applied against cost of sales and services (see "Cost of Sales" above).

Financial Expenses

	Three months ended June 30, 2022	2021	% Change 2022 vs 2021	Six months ended June 30, 2022	2021	% Change 2022 vs 2021
Financial expenses						
Interest on term loans	**12,226**	2,988	309%	**13,077**	9,438	39%
Interest on lease liabilities	**111,993**	90,947	23%	**189,458**	136,928	38%
Interest accretion on balance due on business combination	**44,115**	–	100%	**127,088**	–	100%
Penalties and other interest expenses	**25,328**	10,480	142%	**49,303**	11,135	343%
	193,662	104,415	85%	**378,926**	157,501	141%
Financial income						
Accretion interest on royality receivable	**(37,549)**	(64,329)	-42%	**(38,913)**	(64,329)	-40%
Financial expenses	**$ 156,113**	$ 40,086	289%	**$ 340,013**	$ 93,172	265%

Finance expenses for Q2 2022 totaled $156,113 as compared with $40,086 for Q2 2021, representing an increase of 289% year-over-year. The increase in finance expenses in Q2 2022, is primarily attributable to higher interest and accretion due on the business combination.

Strategic Investments

	Three months ended June 30, 2022	2021	% Change 2022 vs 2021	Six months ended June 30, 2022	2021	% Change 2022 vs 2021
Changes to fair value of strategic investments	**$ (7,477,865)**	$ (17,884,293)	58%	**$ (6,301,110)**	$ (12,249,571)	49%

The adjustment to fair market value of strategic investments for Q2 2022 resulted in a loss of $7,477,865 compared to a loss in the amount of $17,884,293 in Q2 2021. The loss is attributable to the decreased market share value of common shares and warrants owned by the Company of HPQ Silicon Resources Inc.

Comprehensive (loss) Income

	Three months ended June 30, 2022	2021	% Change 2022 vs 2021	Six months ended June 30, 2022	2021	% Change 2022 vs 2021
Comprehensive (loss) income	**$ (13,039,531)**	$ (20,362,205)	-36%	**$ (17,108,651)**	$ (16,649,302)	3%

The comprehensive loss for Q2 2022 of $13,039,531 compared to a loss of $20,362,205, in Q2 2021, represents a decrease of 36% year-over-year. The decrease of $7,322,674 in the comprehensive loss in Q2 2022 is primarily attributable to the factors described above, which have been summarized as follows:

(i) a decrease in product and service-related revenue of $2,433,392 arising in Q2 2022,
(ii) an increase in cost of sales and services of $816, primarily due to increase in foreign exchange charge on materials and the decrease in direct materials, offset by the increase in employee compensation, subcontracting, manufacturing overhead & other, investment tax credits, and amortization of intangible assets,
(iii) an increase in SG&A expenses of $430,962 arising in Q2 2022 primarily due to an increase in employee compensation, professional fees, office and general, travel, depreciation in property and equipment, depreciation ROU assets, government grants, and other expenses which is offset by a decrease in share-based expenses,
(iv) an increase in R&D expenses of $93,830 primarily due to an increase in subcontracting, material and equipment and other expenses and a decrease in government grants,
(v) an increase in financial expenses of $116,027 in Q2 2022 primarily due to interest on lease liabilities, interest accretion on balance due on business combination and other interest expenses,
(vi) an increase in fair value adjustment of strategic investments of $10,406,428 in Q2 2022,
(vii) an increase in income taxes of $19,542 in Q2 2022.

Reconciliation of Non-IFRS measures (EBITDA, Adjusted and Modified)

	Three months ended June 30, 2022	2021	**% Change 2022 vs 2021**	**Six months ended June 30, 2022**	2021	**% Change 2022 vs 2021**
Comprehensive income (loss)	**$ (13,039,531)**	$ (20,362,205)	-36%	**$ (17,108,651)**	$ (16,649,302)	3%
Depreciation of property and equipment	**148,412**	84,061	77%	**291,402**	160,378	82%
Depreciation of ROU assets	**155,398**	149,217	4%	**321,622**	251,011	28%
Amortization of intangible assets	**218,759**	6,779	3127%	**437,518**	13,559	3127%
Financial expenses	**156,113**	40,085	289%	**340,013**	93,172	265%
Income taxes	**19,542**	–	100%	**76,095**	–	100%
EBITDA	**$ (12,341,307)**	$ (20,082,063)	-39%	**$ (15,642,001)**	$ (16,131,182)	-3%
Other non-cash items:						
Share-based expenses	**1,621,040**	3,288,685	-51%	**3,290,670**	4,211,025	-22%
Adjusted EBITDA	**$ (10,720,267)**	$ (16,793,378)	-36%	**$ (12,351,331)**	$ (11,920,157)	4%
Change in fair value of strategic investments	**7,477,865**	17,884,293	58%	**6,301,110**	12,249,571	49%
Modified EBITDA (1)	**$ (3,242,402)**	$ 1,090,915	-397%	**$ (6,050,221)**	$ 329,416	-1937%

[1] See "Non-IFRS Measures"

The EBITDA in Q2 2022 was $12,341,307 loss compared with an EBITDA loss of $20,082,063 for Q2 2021, representing a decrease of 39% year-over-year. The $7,740,756 decrease in the EBITDA loss in Q2 2022 compared with Q2 2021 is due to the decrease in comprehensive loss of $7,322,673, an increase in depreciation on property and equipment of $64,351, an increase in depreciation ROU assets of $6,181, an increase in amortization of intangible assets of $211,980, an increase in financial expenses of $116,028, and an increase in income taxes of $19,542.

Adjusted EBITDA loss in Q2 2022 was $10,720,267 compared with an Adjusted EBITDA loss of $16,793,378 for Q2 2021. The decrease of $6,073,111 in the Adjusted EBITDA loss in Q2 2022 is attributable to a decrease in EBITDA loss of $7,740,756, and by a decrease of $1,667,646 in share-based payments.

The Modified EBITDA loss in Q2 2022 was $3,242,402 compared with a Modified EBITDA gain of $1,090,915 for Q2 2021, representing a decrease of 397%. The decrease of $4,333,318 in the Modified EBITDA loss in Q2 2022 is attributable to the decrease as mentioned above in the Adjusted EBITDA of $6,073,111 and a decrease in the change of fair value of strategic investments of $10,406,428.

SUMMARY OF QUARTERLY RESULTS

	2022		2021				2020	
	Q2	Q1	Q4	Q3	Q2	Q1	Q4	Q3
Revenues	**5,847,180**	4,206,762	7,205,349	9,317,926	8,280,572	6,264,503	6,778,240	8,149,427
Gross margin	**2,499,273**	1,051,723	1,302,789	4,052,531	4,933,481	2,143,010	3,236,136	5,532,526
Gross margin %	**42.7%**	25.0%	18%	44%	60%	34%	48%	68%
Net income (loss) and comprehensive income (loss)	**(13,039,531)**	(4,069,119)	(22,402,857)	623,664	(20,362,205)	3,712,903	22,971,415	15,325,996
Earnings (loss) per share								
Basic	**(0.08)**	(0.02)	(0.13)	–	(0.12)	0.02	0.15	0.1
Diluted	**(0.08)**	(0.02)	(0.13)	–	(0.11)	0.02	0.15	0.09

The majority of PyroGenesis' revenue is recognised over the time of the contract and is dependent on the timing of project initiation and execution, including project engineering, manufacturing, and testing.

LIQUIDITY AND CAPITAL RESOURCES

As at June 30, 2022, the Company has cash and cash equivalents of $1,291,508. In addition, the accounts payable and accrued liabilities of $9,404,542 are payable within 12 months.

	Carrying value	Total contractual amount	< 1 year	2-3 years	4-5 years	Over 5 years
	$	**$**	**$**	**$**	**$**	**$**
Bank indebtedness	941,180	941,180	941,180	–	–	
Accounts payable and accrued liabilities	9,404,542	9,404,542	9,404,542	–	–	–
Term loans	390,755	538,123	81,805	142,377	180,000	133,941
Balance due on business combination	3,861,513	4,137,820	2,177,800	1,960,020	–	–
Lease liabilities	6,201,797	7,414,446	3,361,053	1,187,589	859,149	2,006,655
	20,799,787	**22,436,111**	**15,966,380**	**3,289,986**	**1,039,149**	**2,140,596**

SUMMARY OF CASH FLOWS

	Three months ended June 30,		Six months ended June 30,	
	2022	2021	**2022**	2021
Cash provided by (used in) operating activities	**$ (2,752,116)**	$ (7,282,329)	**$ (10,489,744)**	$ (13,917,452)
Cash provided by (used in) investing activities	**(2,152,488)**	(5,000,280)	**(906,347)**	1,848,594
Cash provided by (used in) financing activities	**(419,500)**	4,084,805	**478,839**	12,040,498
Effect of exchange rate changes on cash denominated in foreign currency	**2,988**	–	**6,247**	–
Increase (decrease) in cash	**(5,321,116)**	(8,197,805)	**(10,911,005)**	(28,360)
Cash and cash equivalents - end of period	**1,291,508**	18,076,539	**1,291,508**	18,076,539

During the three months ended June 30, 2022, cash flows used by operating activities was $2,752,116 compared to cash flows used of $7,282,329 for the same period in the prior year. The use of cash by operating activities during Q2, 2022 consists of the net loss of $13,050,346 (2021 – net loss of $20,362,205) less adjustments for operating activities of $9,861,066 (2021 – decrease of $21,624,326), plus a net negative change in non-cash operating working capital items of $2,752,116 (2021 – negative change of $7,282,329).

Investing activities resulted in a use of cash of $2,152,488 in Q2 2022, compared to a use of cash of $5,000,280 for the same period in the prior year, mainly resulting from the purchase of strategic investments.

Financing activities in Q2, 2022 resulted in a use of funds of $419,500, compared with generated funds of $4,084,805 for the same period in 2021. In Q2, 2022 the cash used for such Financing activities included the increase in bank indebtedness of $2,295 and proceeds from the Economic Development Agency of Canada Loan of $96,157. In Q2, 2022, the Company also made payment of leases liabilities of $145,415, (compared to $25,965 in Q2, 2021) and a payment on the balance due on business combination of $217,778. Interest paid was $141,946 in Q2 2022 compared to $101,427 in Q2 2021.

The net cash position of the Company decreased by $5,321,116 for Q2, 2022 compared to a decrease of $8,197,805 for Q2, 2021.

CAPITAL STOCK INFORMATION

The authorized share capital of the Company consists of an unlimited number of Common shares (the "Common Shares"). On August 15, 2022, PyroGenesis had 170,125,795 Common shares, 10,653,000 outstanding stock options issued, and 8,100,500 exercisable options issued.

GOING CONCERN

The Company presumes it will be able to realize its assets and discharge its liabilities in the normal course of business for the foreseeable future. The Company's management has reviewed the Company's projected cash flow and backlog and is of the opinion that the Company has sufficient cash and cash equivalents and will generate cash flow inflow and profits from operations and strategic investments to meet current and future cash requirements. Management expects that the investments currently being made in accelerating projects under development for various clients, together with executing on its $35.3M backlog as of August 15, 2022, which is primarily related to the Company's successful diversification into niche markets of the additive manufacturing (including 3D printing), and metals & mining industries, and projects related to biogas upgrading, will continue to improve the Company's cash position.

The 2021 consolidated Financial Statements have been prepared using IFRS as issued by the IASB applicable to a going concern, which contemplates the realization of assets and settlement of liabilities in the normal course of business as they become due. If the going concern assumption were not appropriate for these consolidated financial statements, then adjustments would be necessary to the carrying value of assets and liabilities, the reported expenses and the statements of financial position classifications used. The impact on the consolidated financial statements could be material.

RELATED PARTY TRANSACTIONS

During the three-month and six-month period ended June 30, 2022, the Company concluded the following transactions with related parties:

In January 2020, the Company entered into a lease agreement for the rental of a property with a trust whose beneficiary is the controlling shareholder and CEO of the Company. At June 30, 2022 the carrying amount of the ROU asset and lease liabilities are $898,977 and $976,874 ($1,107,131 and $Nil, respectively, at December 31, 2021).

Rent and property taxes were charged by a trust whose beneficiary is the controlling shareholder and CEO of the Company, for the three and six month periods ended June 30, 2022, amount to $70,226 and $139,280 respectively, compared to $68,825 and $137,284 for the three and six month periods ended June 30, 2022 and 2021, respectively.

A balance due to the controlling shareholder and CEO of the Company amounted to $144,450 ($144,506 at December 31, 2021) and is included in accounts payable and accrued liabilities.

The Key Management Personnel of the Company, in accordance with IAS 24, are the members of the Board of Directors and certain officers. Total compensation to key management, for the three-month periods, consisted of the following:

	2022	2021	**2022**	2021
	$	$	**$**	$
Salaries – key management	**257,871**	218,656	**573,842**	460,215
Pension contributions	**4,787**	3,971	**10,680**	8,407
Fees – Board of Directors	**69,000**	41,500	**89,000**	75,000
Share - based compensation - officers	**486,841**	1,312,708	**812,914**	1,792,325
Share – based compensation – Board of Directors	**1,106,066**	1,539,634	**1,758,213**	1,711,850
Other benefits – key management	**7,599**	43,363	**14,038**	53,352
Total compensation	**1,932,164**	3,159,832	**3,258,687**	4,101,149

CRITICAL ACCOUNTING ESTIMATES, NEW AND FUTURE ACCOUNTING POLICIES AND FINANCIAL INSTRUMENTS

For a discussion of significant accounting policies, judgements, estimates assumptions and financial instruments, please refer to notes 3, 4 and 28 of the 2021 consolidated Financial Statements.

CONTROLS AND PROCEDURES

In the years prior to, and most of 2020, the Company's shares traded on the TSX Venture Exchange ("TSXV"), and all requirements of the TSXV were attainted by the Company. The Company graduated from the TSXV to the Toronto Stock Exchange ("TSX") on November 20, 2020, and subsequently became listed on the NASDAQ on March 11, 2021. It was recognized by the Company that being listed on the TSX, and NASDAQ would require more stringent disclosure controls, and started implementing such before the NASDAQ listing.

When listed on the TSXV, management was not required to assess disclosure controls and procedures ("DC&P") and internal control over financial reporting ("ICFR"). As a result of the graduation to the TSX and NASDAQ, the Company became subject to additional requirements under applicable securities laws relating to the establishment and maintenance of DC&P and ICFR, as defined in NI 52-109 and the applicable rules of the U.S. Securities and Exchange Commission. Such requirements also include the evaluation of both DC&P and ICFR. Consequently, the Company took and continues to take a number of actions to improve its DC&P and ICFR. The Company is currently implementing measures designed to improve its ICFR environment and remediate the control deficiencies that led to the material weaknesses identified below.

In accordance with the provisions of National Instrument 52-109 – Issuers' annual and interim filings ("NI 52-109") adopted by Canadian securities regulators and in Rule 13a-15(e) and 15d-15(e) under the U.S. Securities Exchange Act of 1934, as amended (the "Exchange Act"), the Company has filed certificates signed by the Chief Executive Officer ("CEO") and Chief Financial Officer ("CFO") that report on, among other items, i) their responsibility for establishing and maintaining DC&P and ICFR for the Company, ii) the design of DC&P and the design of ICFR.

Disclosure controls and procedures

The Company under the supervision of the CEO and CFO, have designed DC&P (as defined in NI-52-109 and Rule 13a-15(e) and 15d-15(e) under the Exchange Act), in order to provide reasonable assurance that:

- material information relating to the Company is made known to the CEO and CFO by others; and
- information required to be disclosed by the Company in its filings, under applicable securities legislation is recorded, processed, summarized and reported within the time periods specified in securities legislation.

As of June 30, 2022, an evaluation was carried out under the supervision of the CEO and CFO, of the design of the Company's disclosure controls and procedures. Based on this evaluation, the CEO and CFO concluded that due to the material weaknesses in our ICFR as described below, and in Management's Annual Report on Internal Controls over Financial Reporting, at December 31, 2021, the Company's DC&P were not effective as of June 30, 2022, as the controls have not yet been adequately remediated.

Management's Annual Report on Internal Controls over Financial Reporting

The Company under the supervision of the CEO and CFO, are responsible to design ICFR (as defined in NI-52-109 and Rules 13a-15(f) and 15d-15(f) under the Exchange Act) in order to provide reasonable assurance regarding the reliability of financial reporting and the preparation of consolidated financial statements for external purposes in accordance with IFRS as issued by the IASB.

As of December 31, 2021, an evaluation was carried out, under the supervision of the CEO and the CFO, of the effectiveness of the Company's ICFR. Based on this evaluation, the CEO and the CFO concluded that material weaknesses exist, as described below, and due to these material weaknesses, the Company's ICFR is not effective as of December 31, 2021. The control framework used to design and evaluate effectiveness of the Company's ICFR is established under the criteria set forth by the Committee of Sponsoring Organizations of the Treadway Commission (COSO) on Internal Control – Integrated Framework (2013 framework). A material weakness is a deficiency, or combination of deficiencies, in ICFR, such that there is a reasonable possibility that a material misstatement of the Company's annual or interim consolidated financial statements will not be prevented or detected on a timely basis.

In connection with the Company's evaluation of ICFR, the following control deficiencies were considered to be material weaknesses:

- **Control environment:** The Company did not maintain an effective control environment and has identified deficiencies relating to: (i) appropriate organizational structure, reporting lines, and authority and responsibilities, including our Board of Directors' and Audit Committee's oversight and governance of external financial reporting and related party transactions, (ii) lack of senior financial reporting resources for a portion of the year, to deal with complex accounting matters and perform management review controls over period-end consolidated financial statements. The Company did not have a sufficient number of trained resources with the appropriate skills and knowledge with assigned responsibilities and accountability for the design and operation of ICFR; and (iii) holding individuals accountable for their internal control related responsibilities.

- **Control activities:** The Company did not fully design and implement effective control activities and has identified deficiencies relating to: (i) selecting and developing control activities that contribute to the mitigation of risks to acceptable levels, and (ii) deploying control activities through policies that establish what is expected and procedures that put policies into action. For example, control activities related to documentation and consistency in accounting for intangible assets internally generated and revenue recognition were deficient.

- **Journal Entries:** The Company did not effectively design and maintain appropriate segregation of duties and controls over the effective preparation, review and approval, and associated documentation of journal entries, across its ERP platform. The Company did not have adequate review procedures for the recording of manual entries.

- **Complex Spreadsheet Controls:** The Company did not implement and maintain effective controls surrounding certain complex spreadsheets, including addressing all identified risks associated with manual data entry, completeness of data entry, and the accuracy of mathematical formulas, impacting complex spreadsheets used in fixed asset continuity schedules, production and revenue forecasting, and the calculation of the fair value of investments

- **User Access Controls:** The Company did not maintain effective user access controls to adequately restrict user access to financial applications and related data in accordance with job responsibilities. Management did not perform appropriate user access reviews, including superuser access.

As a consequence, the Company did not have effective control activities related to the design, implementation and operation of process-level and management review control activities related to order-to-cash (including revenue trade receivables, and billings in excess of cost/cost in excess of billings), procure-to-pay (including operating expenses, prepaid expenses, accounts payable, and accrued liabilities), hire-to-pay (including compensation expense and accrued liabilities), long-lived assets, significant unusual transactions, related party transactions and other financial reporting processes. The Company's subsidiaries from the Pyro Green-Gas Inc. acquisition were excluded from the evaluation of DC&P and ICFR given that the acquisition occurred less than 365 days prior to June 30, 2022 and their assets and revenues represent approximately 12% and 22% respectively, of the consolidated amounts included in this interim report.

Aside from these material weaknesses, management has concluded that the Company's audited consolidated financial statements for the year ended December 31, 2021, present fairly in all material respects, the Company's financial position, results of operations, changes in shareholders' equity and cash flows in accordance with IFRS as issued by the IASB. These material weaknesses did not have an impact on the Company's financial reporting and as a result, there were no material adjustments to the Company's audited consolidated financial statements for the year ended December 31, 2021. In addition, there were no changes to previously released financial results. However, because the deficiencies and material weaknesses create a reasonable possibility that a material misstatement to our consolidated financial statements would not be prevented or detected on a timely basis, the CEO and CFO concluded that as of December 31, 2021, the Company's design of ICFR were not effective.

Management's Remediation Measures

During the three-month and six-month periods ended June 30, 2022, management continued to implement remediation measures outlined in the 2021 MD&A. Management has performed an initial risk assessment using a top-down, risk-based approach with respect to the risks of material misstatement of the consolidated financial statements. In addition, compensating controls have been applied to the areas where the risks of material misstatement are considered moderate to high. The Company is using and plans to continue to use outside resources to strengthen the business process documentation and help with management's self-assessment and testing of internal controls.

Management, with oversight of the Audit Committee, continue to implement remediation plans for the aforementioned material weaknesses in ICFR and DC&P as follows:

- Continue to establish and improve an appropriate organizational structure and policies that the Board of Directors and Audit Committee will enforce to ensure proper oversight and governance of the external financial reporting process and related party transactions. Awareness by the Audit Committee and support over financial reporting matters has been improved

- Train, and retain individuals with appropriate skills and experience, assign responsibilities and hold individuals accountable for their roles related to ICFR. During the latter part of 2021, a new CFO was retained with the appropriate skills and knowledge to deal with complex accounting matters and perform management review controls over period-end consolidated financial statements as well as skills and knowledge of ICFR which has contributed to mitigating to a certain extent the severity of this control deficiency.

- Design and implement a risk assessment process to identify and assess risks of material misstatement and ensure that the impacted financial reporting processes and related internal controls are properly designed and in place to respond to those risks in our financial reporting; as a result, additional compensating internal controls were implemented in order to address and mitigate such risks, and

- Enhance the design of existing control activities and implement additional process-level control activities (including controls over the order-to-cash, procure-to-pay, hire-to-pay, long-lived assets, inventory, significant unusual transactions, related party transactions and other financial reporting processes) and ensure they are properly evidenced and operating effectively. A firm has been engaged to assist in the selection and testing of key internal controls and validate their effectiveness.

Although the Company can give no assurance that these actions will remediate these material weaknesses in internal controls or that additional material weaknesses in our ICFR will not be identified in the future, management believes the foregoing efforts will, when implemented, strengthen our ICFR and DC&P and effectively remediate the identified material weaknesses.

Management will take additional remedial actions as necessary as they continue to evaluate and work to improve the Company's ICFR environment.

Changes in internal controls over financial reporting

Other than the material weaknesses described above, and the remediation process described above, there were no changes to the Company's ICFR during the three-month and six-month periods ended June 30, 2022, that have materially affected, or are reasonably likely to materially affect, the Company's ICFR.

Limitations on Effectiveness of Disclosure Controls and Procedures and Internal Control over Financial Reporting

The Company's management recognizes that any disclosure controls and procedures and internal control over financial reporting, no matter how well designed and operated, can provide only reasonable assurance of achieving their objectives. Because of their inherent limitations, disclosure controls and procedures and internal control over financial reporting may not prevent or detect all errors or misstatements on a timely basis.

RISK FACTORS

The Company has identified below certain significant risks relating to the business of the Company and the industry in which it operates. The following information is only a summary of certain risk factors and is qualified in its entirety by reference to, and must be read in conjunction with, the detailed information appearing elsewhere in this MD&A. These risks and uncertainties are not the only ones facing the Company. Additional risks and uncertainties not currently known to the Company, or that the Company currently considers immaterial, may also impair the operations of the Company. If any such risks materialize into actual events or circumstances, the Company's assets, liabilities, financial condition, results of operations (including future results of operations), business and business prospects, are likely to be materially and adversely affected. There is no assurance that risk management steps taken will avoid future loss due to the uncertainties described below or other unforeseen risks. An investment in the Common Shares or other securities of the Company is highly speculative and involves a high degree of risk. Before making any investment decision, prospective investors should carefully consider all the information contained in this document including, in particular, the risk factors described below.

Certain factors may have a material adverse effect on the Company's business, financial condition and results of operations. Current and prospective investors should carefully consider the risks and uncertainties and other information contained in this MD&A, the 2021 Financial Statements and the Annual Information Form, particularly under the heading "Risk Factors" in the Annual Information Form, and in other filings that the Company has made and may make in the future with applicable securities authorities, Company's website at www.pyrogenesis.com. The risks and uncertainties described herein and therein are not the only ones the Company may face. Additional risks and uncertainties that the Company is unaware of, or that the Company currently believes are not material, may also become important factors that could adversely affect the Company's business. If any of such risks actually occur, the Company's business, financial condition, results of operations, and future prospects could be materially and adversely affected. In that event, the trading price of the Common Shares (or the value of any other securities of the Company) could decline, and the Company's securityholders could lose part or all of their investment.

Risks Related to the Company's Business and Industry

Operating Income (Loss) and Negative Operating Cash Flow

Prior to December 31, 2021, the Company had a history of losses and negative cash flows. For the year ended December 31, 2021, the Company has net losses of $38,431,939, cash flows used in operations of $18,113,432, and an accumulated deficit of $61,217,831. To the extent that the Company has net losses and negative operating cash flow in future periods, it may need to allocate a portion of its cash reserves to fund such negative cash flow. The Company may also be required to raise additional funds through the issuance of equity or debt securities. There can be no assurance that the Company will be able to generate a positive cash flow from its operations, that additional capital or other types of financing will be available when needed or that these financings will be on terms favourable to the Company.

The Company's ability to continue as a going concern is dependent upon its ability in the future to grow its revenue, achieve profitable operations, successfully developing and introducing new products and, in the meantime, to obtain the necessary financing to meet its obligations and repay its liabilities when they become due. While the Company has been successful in securing financing in the past, raising additional funds is dependent on a number of factors outside the Company's control, and as such there is no assurance that it will be able to do so in the future. External financing, predominantly by the issuance of equity and debt, might be, sought to finance the operations of the Company; however, there can be no certainty that such funds will be available at terms acceptable to the Company, or at all. If the Company is unable to obtain sufficient additional financing, it may have to curtail operations and development activities, any of which could harm the business, financial condition and results of operations.

Actual Financial Position and Results of Operations May Differ Materially from the Expectations of the Company's Management

The Company's actual financial position and results of operations may differ materially from management's expectations. The Company has experienced some changes in its operating plans and certain delays in the timing of its plans. As a result, the Company's revenue, net income and cash flow may differ materially from the Company's projected revenue, net income and cash flow. The process for estimating the Company's revenue, net income and cash flow requires the use of judgment in determining the appropriate assumptions and estimates. These estimates and assumptions may be revised as additional information becomes available and as additional analyses are performed. In addition, the assumptions used in planning may not prove to be accurate, and other factors may affect the Company's financial condition or results of operations.

Revenue Risks

PyroGenesis may experience delays in achieving revenues, particularly with plasma gasification projects which have a long sales cycle. Revenues may be delayed or negatively impacted by issues encountered by the Company or its clients including:

(i) unforeseen engineering and/or environmental problems;

(ii) delays or inability to obtain required financing, licenses, permits and/or regulatory approvals;

(iii) supply interruptions and/or labour disputes;

(iv) foreign exchange fluctuations and/or collection risk; and

(v) competition from other suppliers and/or alternative energy solutions that are less capital intensive.

There is no assurance that the business will perform as expected or that returns from the business will support the expenditures needed to develop it.

Concentration Risk and Credit Risk

To date, a small number of customers have accounted for a majority of PyroGenesis' revenues. As its business expands, the Company expects that revenue distribution will be over a larger number of different customers. For the three months ending June 30, 2022, sales of PyroGenesis to its two principal customers accounted for approximately 49% of its total revenue. For the three months ending June 30, 2021, sales to three principal customers accounted for approximately 91% of PyroGenesis' total revenue. The loss of, or a reduction in, purchase orders or anticipated purchase orders from PyroGenesis' principal customers could have a material adverse effect on its business, financial condition and results of operations. Additionally, if one of PyroGenesis' customers is unable to meet its commitments to PyroGenesis, the Company's business, financial condition and results of operations could be adversely affected.

As a result of the Drosrite International Exclusive Agreement and the Dross Processing Service Agreement, the Company generates significant revenues from payments made to Drosrite International under the Dross Processing Service Agreement. The Company will no longer receive payments under such arrangement if the Dross Processing Service Agreement, which involves a third party in a foreign jurisdiction, is terminated, which could have a material adverse effect on the business, financial condition and results of operations of the Company.

Credit risk is the risk that one party to a financial instrument will cause a financial loss for the other party by failing to discharge an obligation. The maximum credit risk to which the Company is exposed on June 30, 2022, represents the carrying amount of cash and cash equivalents, trade accounts receivable, deposits and royalties receivable. Cash and cash equivalents, which only comprise guaranteed investment certificates, are held with major reputable financial institutions. The Company manages its credit risk by performing credit assessments of its customers and does not generally require collateral or other security from customers on accounts receivable. The Company believes that there is no unusual exposure associated with the collection of these receivables and mitigates the risk by monitoring factors such as the current economic conditions, forward-looking macroeconomic data and historical information (collection history). On June 30, 2022, the Company's major credit risk exposure is a result or two customers which represent 91% of trade accounts receivable with amounts owing to the Company of $13.6 million.

Technology Development and Manufacturing Capability Risks

PyroGenesis recently expanded into new areas of business and, as a result, many of the Company's products are at various stages of the development cycle. The Company may be unable to commercialise such products, or it may be unable to manufacture such products in a commercially viable manner. Whilst management is confident in both its technology and in its team of experienced engineers, scientists and technicians, it cannot know with certainty, which of its products will be commercialised, when such products will be commercialised, or whether such products will be able to be manufactured and distributed profitably.

Product Revenues/History of Losses

PyroGenesis has incurred losses in the majority of years since its inception. In the past the Company's operations have not generated sufficient earnings and cash flows to date to result in consistent profitability or positive cash flow. For the three months ending June 30, 2022, the Company has net losses of $13,050,346, which includes a loss from the change in value of strategic investment of $7,477,865 and cash flows used in operations of $2,752,116. There can be no assurance that the Company will be able to continue to generate significant gains from the value of its strategic investments in the future.

Additional financing and dilution

PyroGenesis may require additional financing. There can be no assurance that additional financing will be available to the Company when needed, or on terms acceptable to the Company. PyroGenesis' inability to raise financing to support ongoing operations or to fund capital expenditures could limit the Company's growth and may have a material adverse effect upon the Company.

The Company does not exclude raising additional funds by equity financing. In addition, as of June 30, 2022, 10,533,000 stock options are currently issued and outstanding. The exercise of stock options and/or warrants, as well as any new equity financings, represents dilution factors for present and future shareholders.

Reliance on Third Party Suppliers, Service Providers, Distributors and Manufacturers

The Company's direct and indirect suppliers, service providers, distributors and manufacturers may elect, at any time, to breach or otherwise cease to participate in supply, service, distribution or manufacturing agreements, or other relationships, on which the Company's operations rely. Loss of its suppliers, service providers, distributors and manufacturers could have a material adverse effect on the Company's business and operational results. Further, any disruption in the manufacturing process done by third party manufacturers could have a material adverse effect on the business, financial condition and results of operations of the Company. The Company cannot ensure that alternative production capacity would be available in the event of a disruption, or if it would be available, it could be obtained on favorable terms.

Manufacturing Facility

The vast majority of the Company's products are manufactured in its manufacturing facility located in Montreal, Quebec. Accordingly, the Company is highly dependent on the uninterrupted and efficient operation of its manufacturing facility. If for any reason the Company is required to discontinue production at its facility, it could result in significant delays in production of the Company's products and interruption of the Company's sales as it seeks to resume production. The Company may be unable to resume production on a timely basis. If operations at the facility were to be disrupted as a result of equipment failures, natural disasters, fires, accidents, work stoppages, power outages or other reasons, the Company's business, financial condition and/or results of operations could be materially adversely affected.

Sales Cycle and Fixed Price Contracts

PyroGenesis sales cycle is long and the signing of new contracts is subject to delay, over which the Company has little control. The Company also enters into sales contracts with fixed pricing, which may be impacted by changes over the period of implementation. There is no assurance that delays or problems in fulfilling contracts with clients will not adversely affect the Company's activities, operating results or financial position.

Reliance on Technology

PyroGenesis will depend upon continuous improvements in technology to meet client demands in respect of performance and cost, and to explore additional business opportunities. There can be no assurance that the Company will be successful in its efforts in this regard or that it will have the resources available to meet this demand. Whilst management anticipates that the research and development will allow the Company to explore additional business opportunities, there is no guarantee that such business opportunities will be presented or realized. The commercial advantage of the Company will depend to a significant extent on the intellectual property and proprietary technology of PyroGenesis and the ability of the Company to prevent others from copying such proprietary technologies. PyroGenesis currently relies on intellectual property rights and other contractual or proprietary rights, including (without limitation) copyright, trade secrets, confidential procedures, contractual provisions, licenses and patents, to protect its proprietary technology. PyroGenesis may have to engage in litigation in order to protect its patents or other intellectual property rights, or to determine the validity or scope of the proprietary rights of others. This type of litigation can be expensive and time consuming, regardless of whether or not the Company is successful. PyroGenesis may seek patents or other similar protections in respect of particular technology; however, there can be no assurance that any future patent applications will actually result in issued patents, or that, even if patents are issued, they will be of sufficient scope or strength to provide meaningful protection or any commercial advantage to the Company. Moreover, the process of seeking patent protection can itself be long and expensive. In the meantime, competitors may develop technologies that are similar or superior to PyroGenesis' technology or design around the patents owned by the Company, thereby adversely affecting the Company's competitive advantage in one or more of its areas of business. Despite the efforts of the Company, its intellectual property rights may be invalidated, circumvented, challenged, infringed or required to be licensed to others. It cannot be assured that any steps the Company may take to protect its intellectual property rights and other rights to such proprietary technologies that are central to the Company's operations will prevent misappropriation or infringement of its technology.

Changes to Contracts

PyroGenesis is dependent upon its ability to establish and develop new relationships and to build on existing relationships with current clients. The Company cannot provide assurance that it will be successful in maintaining or advancing its relationships with current clients or procure additional clients. In addition, PyroGenesis cannot provide assurance that its customers and the end users of its products will continue to provide the Company with business, or that existing customers and end users will not seek to renegotiate or terminate existing contracts providing for the sale of the Company's products and technology based on circumstances on which the Company is not currently aware. Any termination or amendment of a contract under which the Company derives an important portion of its revenues, including the Drosrite International Exclusive Agreement and the Dross Processing Service Agreement, and any adverse change in the relationship of the Company with its customers and end users, will have an adverse effect on the Company's business, financial condition and results of operations.

Sales to governments and governmental entities are subject to specific additional risks, such as delays in funding, termination of contracts or sub-contracts at the convenience of the government, termination, reduction or modification of contracts or sub-contracts in the event of changes in the government's policies or as a result of budgetary constraints and increased or unexpected costs resulting in losses or reduced profits under fixed price contracts.

Foreign Exchange Exposure

PyroGenesis' products and services are increasingly being sold in markets outside of Canada, whilst most of its operating expenses and capital expenditures are denominated in Canadian dollars. As a result, the Company is exposed to fluctuations in the foreign exchange rates between Canadian dollar and the currency in which a particular sale is transacted, which may result in foreign exchange losses that could affect earnings. Foreign sales are predominantly denominated in U.S. dollars. The Company has not to date sought to hedge the risks associated with fluctuations in foreign exchange rates.

Competition

The industry is competitive and PyroGenesis competes with a substantial number of companies which have greater technical and financial resources. There can be no assurance that such competitors will not substantially increase the resources devoted to the development and marketing of products and services that compete with those of the Company or that new or existing competitors will not enter the various markets in which PyroGenesis is active. There can be no assurance that competitors will not develop new and unknown technologies with which the Company may have difficulty competing. Furthermore, failure to remain cost competitive may result in PyroGenesis losing business to its competitors.

The plasma technology of PyroGenesis competes against other plasma and conventional technologies. Without limitation, the demand for the plasma technology of PyroGenesis, particularly in waste destruction and waste-to-energy systems, can be impacted by the commodity prices of the energy source used for the process and the price at which waste is accepted by landfills and traditional waste processing plants. While the Company believes that demand for sustainable waste management practices that have lower environmental impacts than traditional solutions such as landfill or incineration is increasing, the high flows of electricity necessary to operate the waste destruction and waste-to-energy systems of PyroGenesis have an impact on the operational costs of the Company's systems, and traditional solutions may constitute lower-cost solutions, particularly if commodity prices (including of oil and natural gas) remain low or experience a decline.

Management and Key Personnel

PyroGenesis depends on the skills and experience of its management team and other key employees. The Company relies heavily on its ability to attract and retain highly skilled personnel in a competitive environment. PyroGenesis may be unable to recruit, retain, and motivate highly skilled employees in order to assist the Company's business, especially activities that are essential to the success of the Company. Failure to recruit and retain highly-skilled employees may adversely affect PyroGenesis' business, financial condition and results of operations.

Implementation of a strategic plan

PyroGenesis' commercial strategy aims to leverage its products, consumables, and services whilst focusing on the resolution of problems within niche markets within the industries served by the Company. There can be no assurances as to the success of the Company's strategic plan, which should be considered under the risks perspective and difficulties frequently encountered by a developing business.

Adverse Decisions of Sovereign Governments

PyroGenesis conducts an increasing portion of its business internationally. There is no assurance that any sovereign government, including Canada's, will not establish laws or regulations that will not be detrimental to the Company's interests or that, as a foreign corporation, it will continue to have access to the regulatory agencies in other countries. Governments have, from time to time, established foreign exchange controls, which could have a material adverse effect on the Company's business, financial condition and results of operations.

Risks Related to International Operations

A substantial portion of the Company's sales are made to customers and end users outside Canada. The Company conducts its international operations directly or through distributors or other agents or intermediaries, including Drosrite International. The Company plans to continue to expand its international sales and marketing efforts. International operations are subject to a number of inherent risks, and the Company's future results could be adversely affected by a number of factors, including:

- unfavorable political or economic environments; requirements or preferences for domestic products or solutions, which could reduce demand for the Company's products;
- differing existing or future regulatory and certification requirements;
- unexpected legal or regulatory changes;
- greater difficulty in collecting accounts receivable and longer collection periods;
- difficulties in enforcing contracts; an inability to effectively protect intellectual property;
- tariffs and trade barriers, export regulations and other regulatory and contractual limitations on the Company's ability to sell its products; and
- potentially adverse tax consequences, including multiple and possibly overlapping tax structures.

Fluctuations in currency exchange rates could materially adversely affect sales denominated in currencies other than the Canadian dollar and cause a reduction in revenues derived from sales in a particular country. Financial instability in foreign markets could also affect the sale of the Company's products in international jurisdictions. In addition, the Company may be denied access to its end customers as a result of a closing of the borders of the countries in which it its products are sold due to economic, legislative, political and military conditions in such countries.

There can be no assurance that such factors will not materially adversely affect the operations, growth prospects and sales of the Company and, consequently, its results of operations. In addition, revenues the Company earns in other jurisdictions may be subject to taxation by more than one jurisdiction, which could materially adversely affect the Company's earnings. Each of these factors could have an adverse effect on the Company's business, financial condition and results of operations.

Governmental Regulation

PyroGenesis is subject to a variety of federal, provincial, state, local and international laws and regulations relating namely to the environment, health and safety, export controls, currency exchange, labour and employment and taxation. These laws and regulations are complex, change frequently and have tended to become more stringent over time. Failure to comply with these laws and regulations may result in a variety of administrative, civil and criminal enforcement measures, including assessment of monetary penalties, imposition of remedial requirements and issuance of injunctions as to future compliance. The Company may be subject to compliance audits by regulatory authorities in the various countries in which it operates.

Government-funded Defense and Security Programs

Like most companies that supply products and services to governments, government agencies routinely audit and investigate government contractors. These agencies may review the Company's performance under its contracts, business processes, cost structure, and compliance with applicable laws, regulations and standards. The Company's incurred costs for each year are subject to audit by government agencies, which can result in payment demands related to costs they believe should be disallowed. The Company works with governments to assess the merits of claims and where appropriate reserve for amounts disputed. The Company could be required to provide repayments to governments and may have a negative effect on its results of operations. Contrary to cost-reimbursable contracts, some costs may not be reimbursed or allowed under fixed-price contracts, which may have a negative effect on the Company's results of operations if it experiences costs overruns.

Environmental Liability

PyroGenesis is subject to various environmental laws and regulations enacted in the jurisdictions in which it operates, which govern the manufacturing, processing, importation, transportation, handling and disposal of certain materials used in the Company's operations. Management believes that it has adequate procedures in place to address compliance with current environmental laws and regulations. Furthermore, management monitors the Company's practices concerning the handling of environmentally hazardous materials. However, there can be no assurance that the Company's procedures will prevent environmental damage occurring from spills of materials handled by the Company or that such damage has not already occurred. On occasion, substantial liabilities to third parties may be incurred. The Company may have the benefit of insurance maintained by it or the operator, however, the Company may become liable for damages against which it cannot adequately insure or against which it may elect not to insure because of high costs or other reasons. The Company's clients are subject to similar environmental laws and regulations, as well as limits on emissions to the air and discharges into surface and sub-surface waters. While regulatory developments that may follow in subsequent years could have the effect of reducing industry activity, the Company cannot predict the nature of the restrictions that may be imposed. The Company may be required to increase operating expenses or capital expenditures in order to comply with any new restrictions or regulations.

Product Liability and Other Lawsuits

PyroGenesis is subject to a variety of potential product liabilities claims and other lawsuits related with its operations, including liabilities and expenses associated with product defects. The Company maintains product liability and other insurance coverage that management believes is generally in accordance with the market practice in its industry, but there can be no assurance that the Company will always be adequately insured against all such potential liabilities.

A malfunction or the inadequate design of the Company's products could result in product liability or other tort claims. Accidents involving the Company's products could lead to personal injury or physical damage. Any liability for damages resulting from malfunctions could be substantial and could materially adversely affect the Company's business and results of operations. In addition, a well-publicized actual or perceived problem could adversely affect the market's perception of the Company's products. This could result in a decline in demand for the Company's products, which would materially adversely affect the Company's financial condition and results of operations.

The sale and use of products and processes developed by the Company may entail potential liability and possible warranty claims. The Company may be subject to personal injury claims for injuries resulting from use of its products. Although the Company maintains product liability insurance, there can be no assurance that such insurance will continue to be available on commercially reasonable terms or that the risks covered, or coverage amounts will be sufficient to cover all claims.

Information systems disruptions

The Company relies on various information technology systems to manage its operations. Over the last several years, the Company has implemented, and it continues to implement, modifications and upgrades to such systems, including changes to legacy systems, replacing legacy systems with successor systems with new functionality, and acquiring new systems with new functionality. These types of activities subject the Company to inherent costs and risks associated with replacing and changing these systems, including impairment of the Company's ability to fulfill customer orders, potential disruption of its internal control structure, substantial capital expenditures, additional administration and operating expenses, retention of sufficiently skilled personnel to implement and operate the new systems, demands on management time and other risks and costs of delays or difficulties in transitioning to or integrating new systems into the Company's current systems. These implementations, modifications, and upgrades may not result in productivity improvements at a level that outweighs the costs of implementation, or at all. In addition, the difficulties with implementing new technology systems may cause disruptions in the Company's business operations and have a material adverse effect on its business, financial condition, or results of operations.

Security Breaches

As part of its day-to-day business, the Company stores its data and certain data about its customers in its global information technology system. Unauthorized access to the Company's data, including any regarding its customers, could expose the Company to a risk of loss of this information, loss of business, litigation and possible liability. These security measures may be breached by intentional misconduct by computer hackers, as a result of third-party action, employee error, malfeasance or otherwise. Additionally, third parties may attempt to fraudulently induce employees or customers into disclosing sensitive information such as usernames, passwords or other information in order to gain access to the data of the Company's customers or the Company's data, including the Company's intellectual property and other confidential business information, or the Company's information technology systems. Because the techniques used to obtain unauthorized access, or to sabotage systems, change frequently and generally are not recognized until launched against a target, the Company may be unable to anticipate these techniques or to implement adequate preventative measures. Any security breach could result in a loss of confidence by the Company's customers, damage its reputation, disrupt its business, lead to legal liability and negatively impact its future sales.

Public Health Crises

Public health crises, including local, regional, national or international outbreak of a contagious disease, could have an adverse effect on local economies, the global economy, and the markets in which the Company operates and markets its products, and may adversely impact the price and demand for the Company's products and the ability of the Company to operate and market its products. Any such alterations or modifications could cause substantial interruption to the Company's business, any of which could have a material adverse effect on the Company's operations or financial results, and could include temporary closures of one or more of the Company's or its partner's offices or facilities; temporary or long-term labor shortages; temporary or long-term adverse impacts on the Company's supply chain and distribution channels; the potential of increased network vulnerability and risk of data loss resulting from increased use of remote access and removal of data from the Company's facilities.

Subsequent to December 31, 2019, the global emergence of coronavirus (COVID-19) occurred. The global outbreak of COVID-19 has resulted in governments worldwide enacting emergency measures to protect against the spread of the virus. These measures, which include, among other things, limitations on travel, self-imposed quarantine periods and social distancing measures, have caused material disruption to businesses globally resulting in an economic slowdown. Global equity markets have experienced significant volatility and weakness. Governments and central banks have reacted with significant monetary and fiscal interventions designed to stabilize economic conditions. The duration and impact of the COVID-19 outbreak is unknown at this time, as is the efficacy of any government and/or central bank interventions. It is not possible to reliably estimate the length and severity of these developments and the impact on the financial results and condition of the Company in future periods.

As of the date of this MD&A, the Company has successfully continued operations under COVID-19 protocols. COVID-19 has not resulted in any material delays in the development or testing of the Company's products or any other material development projects. The Company is not currently experiencing any material delays or interruptions in service or product delivery. At the outset of the COVID-19 pandemic, certain of the Company's operations were negatively impacted, but have since normalized. The Company has not experienced any material disruption in its supply chain, and the pandemic has not materially impacted the Company's business.

The Company's production schedule has continued throughout COVID-19 on a modified employee schedule, with certain non-production employees working remotely. The Company has been able to operate largely unaffected by the COVID-19 pandemic. Notwithstanding the foregoing, if the Company or its vendors and suppliers are unable to continue operations or keep up with increasing demands as a result of COVID-19, customers may experience delays or interruptions in service or the delivery of products, which may be detrimental to the Company's reputation, business, results of operations and financial position. The Company cautions that it is impossible to fully anticipate or quantify the effect and ultimate impact of the COVID-19 pandemic as the situation is rapidly evolving. The extent to which COVID-19 impacts the Company's results will depend on future developments, which are highly uncertain and cannot be predicted, including new information that may emerge concerning the severity of COVID-19 and the actions taken by governments to contain it or treat its impact, including shelter in place directives, which, if extended, may impact the economies in which the Company now operates, or may in the future operate, key markets into which the Company sells products and delivers services, and markets through which the Company's key suppliers source their products.

Litigation

The Company may from time to time become party to litigation in the ordinary course of business which could adversely affect its business. Should any litigation in which the Company becomes involved be determined against the Company, such a decision could adversely affect the Company's ability to continue operating and the market price for the Common Shares and could use significant resources. Even if the Company is involved in litigation and wins, litigation can redirect significant Company resources. Litigation may also create a negative perception of the Company's brand.

Trade Secrets May Be Difficult to Protect

The Company's success depends upon the skills, knowledge and experience of its scientific and technical personnel, consultants and advisors, as well as contractors. Because the Company operates in a highly competitive industry, it relies in part on trade secrets to protect its proprietary products and processes. However, trade secrets are difficult to protect. The Company generally enters into confidentiality or non-disclosure agreements with its corporate partners, employees, consultants, outside scientific collaborators, developers and other advisors. These agreements generally require that the receiving party keep confidential, and not disclose to third parties, confidential information developed by the receiving party or made known to the receiving party by the Company during the course of the receiving party's relationship with the Company. These agreements also generally provide that inventions conceived by the receiving party in the course of rendering services to the Company will be its exclusive property, and the Company enters into assignment agreements to perfect its rights.

These confidentiality, inventions, and assignment agreements, where in place, may be breached and may not effectively assign intellectual property rights to the Company. The Company's trade secrets also could be independently discovered by competitors, in which case the Company would not be able to prevent the use of such trade secrets by its competitors. The enforcement of a claim alleging that a party illegally obtained and was using the Company's trade secrets could be difficult, expensive and time consuming and the outcome could be unpredictable. The failure to obtain or maintain meaningful trade secret protection could adversely affect the Company's competitive position.

Risks Related to Acquiring Companies

The Company may acquire other companies in the future and there are risks inherent in any such acquisition. Specifically, there could be unknown or undisclosed risks or liabilities of such companies for which the Company is not sufficiently indemnified. Any such unknown or undisclosed risks or liabilities could materially and adversely affect the Company's financial performance and results of operations. The Company could encounter additional transaction and integration related costs or other factors such as the failure to realize all of the benefits from such acquisitions. All of these factors could cause dilution to the Company's earnings per share or decrease or delay the anticipated accretive effect of the acquisition and cause a decrease in the market price of the Company's securities. The Company may not be able to successfully integrate and combine the operations, personnel and technology infrastructure of any such acquired company with its existing operations. If integration is not managed successfully by the Company's management, the Company may experience interruptions in its business activities, deterioration in its employee and customer relationships, increased costs of integration and harm to its reputation, all of which could have a material adverse effect on the Company's business, financial condition and results of operations. The Company may experience difficulties in combining corporate cultures, maintaining employee morale and retaining key employees. The integration of any such acquired companies may also impose substantial demands on the management. There is no assurance that these acquisitions will be successfully integrated in a timely manner.

Global Economic Uncertainty

Demand for the Company's products and services are influenced by general economic and consumer trends beyond the Company's control. There can be no assurance that the Company's business and corresponding financial performance will not be adversely affected by general economic or consumer trends. In particular, global economic conditions are still tight, and if such conditions continue, recur or worsen, there can be no assurance that they will not have a material adverse effect on the Company's business, financial condition and results of operations.

Furthermore, such economic conditions have produced downward pressure on stock prices and on the availability of credit for financial institutions and corporations. If these levels of market disruption and volatility continue, the Company might experience reductions in business activity, increased funding costs and funding pressures, as applicable, a decrease in the market price of the Common Shares, a decrease in asset values, additional write-downs and impairment charges and lower profitability.

Inability to Renew Leases

The Company may be unable to renew or maintain its leases (commercial or real property) on commercially acceptable terms or at all. An inability to renew its leases, or a renewal of its leases with a rental rate higher than the prevailing rate under the applicable lease prior to expiration, may have an adverse impact on the Company's operations, including disruption of its operations or an increase in its cost of operations. In addition, in the event of non-renewal of any of the Company's leases, the Company may be unable to locate suitable replacement properties for its facilities or it may experience delays in relocation that could lead to a disruption in its operations. Any disruption in the Company's operations could have an adverse effect on its financial condition and results of operations.

Financial Reporting and Other Public Issuer Requirements

As a public company, the Company is subject to the reporting requirements of the Canadian Securities Administrators, or the CSA, and the U.S. Securities Exchange Act of 1934, as amended, and the rules and regulations of the listing standards of the TSX and NASDAQ and the U.S. Sarbanes-Oxley Act. The requirements of these laws, rules and regulations have increased and will continue to increase the Company's legal, accounting, and financial compliance costs, make some activities more difficult, time-consuming, and costly, and place significant strain on the Company's personnel, systems, and resources. The Company is continuing to develop and refine its disclosure controls and other procedures that are designed to ensure that information required to be disclosed by the Company in the reports that it will file with the CSA is recorded, processed, summarized, and reported within the time periods specified in CSA rules and forms and that information required to be disclosed in reports under applicable securities laws is accumulated and communicated to the Company's principal executive and financial officers. The Company is also continuing to improve its internal control over financial reporting. In order to improve the effectiveness of its disclosure controls and procedures and internal control over financial reporting, the Company has expended, and anticipate that it will continue to expend, significant resources, including accounting-related costs and significant management oversight.

The Company has identified certain material weaknesses in its internal controls, as more fully explained in its management's discussion and analysis for the year ended December 31, 2021 under "Disclosure Controls and Procedures". Additional weaknesses in the Company's disclosure controls and internal control over financial reporting may also be discovered in the future. Any failure to develop or maintain effective controls or any difficulties encountered in their implementation or improvement could harm the Company's results of operations or cause the Company to fail to meet its reporting obligations and may result in a restatement of the Company's financial statements for prior periods. Any failure to improve and maintain effective internal control over financial reporting also could adversely affect the results of periodic management evaluations and annual independent registered public accounting firm attestation reports regarding the effectiveness of the Company's internal control over financial reporting that the Company will eventually be required to include in its periodic reports that will be filed with the CSA. Ineffective disclosure controls and procedures and internal control over financial reporting could also cause investors to lose confidence in the Company's reported financial and other information, which could have a negative effect on the trading price of the Common Shares. In addition, if the Company is unable to continue to meet these requirements, it may not be able to remain listed on the TSX and/or NASDAQ.

Influence of the Significant Shareholders

To the Company's knowledge, no shareholder beneficially owns, or controls or directs, directly or indirectly, more than 10% of the voting rights attached to the Company's outstanding voting securities, except for Mr. Photis Peter Pascali, President and Chief Executive Officer of the Company, who holds or controls, directly or indirectly, 78,370,198 Common Shares, representing in aggregate 46.07% of the total voting rights attached to the outstanding Common Shares, and options to acquire an additional 6,520,000 Common Shares (increasing the total number of Common Shares held or controlled, directly or indirectly, by him to 84,890,198 Common Shares, or 48.06% or the Common Shares, on a fully diluted basis). In addition, from time to time, the Company may have other shareholders who have the ability to exercise significant influence over matters submitted to the shareholders of the Company for approval, whether subject to approval by a majority of the shareholders of the Company or subject to a class vote or special resolution.

Limited Control Over the Company's Operations

Holders of the Common Shares have limited control over changes in the Company's policies and operations, which increases the uncertainty and risks of an investment in the Company. The Board determines major policies, including policies regarding financing, growth, debt capitalization and any future dividends to shareholders of the Company. Generally, the Board may amend or revise these and other policies without a vote of the holders of the Common Shares. The Board's broad discretion in setting policies and the limited ability of holders of the Common Shares to exert control over those policies increases the uncertainty and risks of an investment in the Company.

Change in Tax Laws

New income, sales, use or other tax laws, statutes, rules, regulations or ordinances could be enacted at any time. Further, existing tax laws, statutes, rules, regulations or ordinances could be interpreted, changed, modified or applied adversely to the Company. These enactments and events could require the Company to pay additional tax amounts on a prospective or retroactive basis, thereby substantially increasing the amount of taxes the Company is liable to pay in the relevant tax jurisdictions. Accordingly, these events could decrease the capital that the Company has available to operate its business. Any or all of these events could harm the business and financial performance of the Company.

Forward-Looking Information

The forward-looking information included in this MD&A relating to, among other things, the Company's future results, performance, achievements, prospects, targets, intentions or opportunities or the markets in which it operates and the other statements listed is based on opinions, assumptions and estimates made by the Company's management in light of its experience and perception of historical trends, current conditions and expected future developments, as well as other factors that the Company believes are appropriate and reasonable in the circumstances. However, there can be no assurance that such estimates and assumptions will prove to be correct. The Company's actual results in the future may vary significantly from the historical and estimated results and those variations may be material. The Company makes no representation that its actual results in the future will be the same, in whole or in part, as those included in this MD&A.

Credit Facilities

The Company's credit facilities and financing agreements mature on various dates. There can be no assurance that such credit facilities or financing agreements will be renewed or refinanced, or if renewed or refinanced, that the renewal or refinancing will occur on equally favourable terms to the Company. The Company's ability to continue operating may be adversely affected if the Company is not able to renew its credit facilities or arrange refinancing, or if such renewal or refinancing, as the case may be, occurs on terms materially less favorable to the Company than at present. The Company's current credit facilities and financing agreements impose covenants and obligations on the Company. There is a risk that such loans may go into default if there is a breach in complying with such covenants and obligations, which could result in the lenders realizing on their security and causing our shareholders to lose some or all of their investment.

Risks Related to the Company's Securities

Potential Volatility of Common Share Price

The market price of the Common Shares could be subject to significant fluctuations. Some of the factors that may cause the market price of the Common Shares to fluctuate include:

(i) the public's reaction to the Company's press releases, announcements and filings with regulatory authorities and those of its competitors;

(ii) fluctuations in broader stock market prices and volumes;

(iii) changes in market valuations of similar companies;

(iv) investor perception of the Company, its prospects or the industry in general;

(v) additions or departures of key personnel;

(vi) commencement of or involvement in litigation;

(vii) announcements by the Company or its competitors of strategic alliances, significant contracts, new technologies, acquisitions, commercial relationships, joint ventures or capital commitments;

(viii) variations in the Company's quarterly results of operations or cash flows or those of other comparable companies;

(ix) revenues and operating results failing to meet the expectations of securities analysts or investors in particular quarter;

(x) changes in the Company's pricing policies or the pricing policies of its competitors;

(xi) future issuances and sales of Common Shares;

(xii) sales of Common Shares by insiders of the Company;

(xiii) third party disclosure of significant short positions;

(xiv) demand for and trading volume of Common Shares;

(xv) changes in securities analysts' recommendations and their estimates of the Company's financial performance;

(xvi) short-term fluctuation in stock price caused by changes in general conditions in the domestic and worldwide economies or financial markets; and

(xvii) the other risk factors described under this heading of the MD&A.

The realization of any of these risks and other factors beyond the Company's control could cause the market price of the Common Shares to decline significantly.

In addition, broad market and industry factors may harm the market price of the Common Shares. Hence, the price of the Common Shares could fluctuate based upon factors that have little or nothing to do with the Company, and these fluctuations could materially reduce the price of the Common Shares regardless of the Company's operating performance. In the past, following a significant decline in the market price of a company's securities, there have been instances of securities class action litigation having been instituted against that company. If the Company were involved in any similar litigation, it could incur substantial costs, management's attention and resources could be diverted and it could harm the Company's business, operating results and financial condition.

Market Liquidity

The market price for the Common Shares could be subject to wide fluctuations. Factors such as the announcement of significant contracts, technological innovations, new commercial products, patents, a change in regulations, quarterly financial results, future sales of Common Shares by the Company or current shareholders, and many other factors could have considerable repercussions on the price of the Common Shares. In addition, the financial markets may experience significant price and value fluctuations that affect the market prices of equity securities of companies that sometimes are unrelated to the operating performance of these companies. Broad market fluctuations, as well as economic conditions generally may adversely affect the market price of the Common Shares.

Dividends to Shareholders

The Company does not anticipate paying cash dividends on the Common Shares in the foreseeable future. The Company currently intends to retain all future earnings to fund the development and growth of its business. Any payment of future dividends will be at the discretion of the directors and will depend on, among other things, the Company's earnings, financial condition, capital requirements, level of indebtedness, statutory and contractual restrictions applying to the payment of dividends, and other considerations that the directors deem relevant.

Impact of Future Sales by Existing Shareholders

If the Company's shareholders sell substantial amounts of the Common Shares in the public market, the market price of the Common Shares could decrease. The perception among investors that these sales will occur could also produce this effect. All currently outstanding Common Shares other than those subject to lock-up agreements executed by certain existing shareholders will, subject to applicable securities laws, generally be immediately available for resale in the public markets.

Subject to compliance with applicable securities laws, the Company's officers, directors and their affiliates may sell some or all of their Common Shares in the future. No prediction can be made as to the effect, if any, such future sales of Common Shares will have on the market price of the Common Shares prevailing from time to time. However, the future sale of a substantial number of Common Shares by the Company's officers, directors and their affiliates, or the perception that such sales could occur, could materially adversely affect prevailing market prices for the Common Shares.

Additional Common Shares issuable upon the exercise of stock options may also be available for sale in the public market, which may also cause the market price of the Common Shares to fall. Accordingly, if substantial amounts of Common Shares are sold in the public market, the market price could fall.

Working Capital and Future Issuances

The Company may issue additional Common Shares in the future which may dilute a shareholder's holdings in the Company. The Articles permit the issuance of an unlimited number of Common Shares, and shareholders of the Company will have no pre-emptive rights in connection with any further issuances The directors of the Company have the discretion to determine the provisions attaching to the Common Shares and the price and the terms of issue of further Common Shares.

Additional equity financing may be dilutive to holders of Common Shares. Debt financing may involve restrictions on the Company's financing and operating activities. Debt financing may be convertible into other securities of the Company which may result in immediate or resulting dilution. In either case, additional financing may not be available to the Company on acceptable terms or at all. If the Company is unable to raise additional funds as needed, the scope of its operations or growth may be reduced and, as a result, the Company may be unable to fulfil its long-term goals. In this case, investors may lose all or part of their investment. Any default under such debt instruments could have a material adverse effect on the Company, its business or the results of operations.

Securities or Industry Analysts

The trading market for Common Shares could be influenced by the research and reports that industry and/or securities analysts may publish about the Company, its business, the market or competitors. If any of the analysts who may cover the Company's business change their recommendation regarding the Common Shares adversely, or provide more favourable relative recommendations about its competitors, the share price would likely decline. If any analyst who may cover the Company's business were to cease coverage or fail to regularly publish reports on the Company, it could lose visibility in the financial markets, which in turn could cause the share price or trading volume to decline.

Risks Related to the Company's Status as a Foreign Private Issuer

Information Publicly Available to the Company's U.S. shareholders

The Company is a foreign private issuer under applicable U.S. federal securities laws. As a result, the Company does not file the same reports that a U.S. domestic issuer would file with the U.S. Securities and Exchange Commission (the "SEC"), although the Company is required to file with or furnish to the SEC the continuous disclosure documents that the Company is required to file in Canada under Canadian Securities Laws, in certain respects the reporting obligations are less detailed and less frequent than those of U.S. domestic reporting companies. In addition, the Company's officers, directors and principal shareholders are exempt from the reporting and short-swing profit recovery provisions of Section 16 of the U.S. Exchange Act. Therefore, the Company's shareholders may not know on as timely a basis when the Company's officers, directors and principal shareholders purchase or sell Common Shares as the reporting periods under the corresponding Canadian insider reporting requirements are longer.

As a foreign private issuer, the Company is exempt from the rules and regulations under the Exchange Act related to the furnishing and content of proxy statements. The Company is also exempt from Regulation FD, which prohibits issuers from making selective disclosures of material non-public information. While the Company complies with the corresponding requirements relating to proxy statements and disclosure of material non-public information under Canadian securities laws, these requirements differ from those under the Exchange Act and Regulation FD and shareholders should not expect to receive the same information at the same time as such information is provided by U.S. domestic companies. In addition, the Company may not be required under the Exchange Act to file annual and quarterly reports with the SEC as promptly as U.S. domestic companies whose securities are registered under the Exchange Act.

In addition, as a foreign private issuer, the Company has the option to follow certain Canadian corporate governance practices, except to the extent that such laws would be contrary to U.S. securities laws, and provided that the Company discloses the requirements it is not following and describe the Canadian practices it follows instead. The Company plans to rely on this exemption. As a result, the Company's shareholders may not have the same protections afforded to shareholders of U.S. domestic companies that are subject to all U.S. corporate governance requirements.

Loss of Foreign Private Issuer Status in the Future

In order to maintain its status as a foreign private issuer, a majority of the Company's Common Shares must be either directly or indirectly owned by non-residents of the U.S. unless the Company also satisfies one of the additional requirements necessary to preserve this status. The Company may in the future lose its foreign private issuer status if a majority of the Common Shares are held in the United States and the Company fails to meet the additional requirements necessary to avoid loss of foreign private issuer status. The regulatory and compliance costs to the Company under U.S. federal securities laws as a U.S. domestic issuer may be significantly more than the costs the Company incurs as a Canadian foreign private issuer eligible to use the multi-jurisdictional disclosure system ("MJDS"). If the Company is not a foreign private issuer, it would not be eligible to use the MJDS or other foreign issuer forms and would be required to file periodic and current reports and registration statements on U.S. domestic issuer forms with the SEC, which are more detailed and extensive than the forms available to a foreign private issuer. In addition, the Company may lose the ability to rely upon exemptions from Nasdaq corporate governance requirements that are available to foreign private issuers.

Inability for U.S. Investors to Enforce Certain Judgments

The Company is a corporation existing under the Canada Business Corporations Act. A number of the Company's directors and officers are residents of Canada, and substantially all of the Company's assets are located outside the United States. As a result, it may be difficult to effect service within the United States upon the Company or upon its directors and officers. Execution by United States courts of any judgment obtained against the Company or any of the Company's directors or officers in United States courts may be limited to the assets of such companies or such persons, as the case may be, located in the United States. It may also be difficult for holders of securities who reside in the United States to realize in the United States upon judgments of courts of the United States predicated upon civil liability and the civil liability of the Company's directors and executive officers under the United States federal securities laws. The Company has been advised that a judgment of a U.S. court predicated solely upon civil liability under U.S. federal securities laws or the securities or "blue sky" laws of any state within the United States, would likely be enforceable in Canada if the United States court in which the judgment was obtained has a basis for jurisdiction in the matter that would be recognized by a Canadian court for the same purposes. However, there may be doubt as to the enforceability in Canada against these non-U.S. entities or their controlling persons, directors and officers who are not residents of the United States, in original actions or in actions for enforcement of judgments of courts of the United States, of liabilities predicated solely upon U.S. federal or state securities laws.

Risks Relating to the Company's Status as an "Emerging Growth Company" Under U.S. Securities Laws

The Company is an "emerging growth company" as defined in section 3(a) of the Exchange Act (as amended by the JOBS Act, enacted on April 5, 2012), and the Company will continue to qualify as an emerging growth company until the earliest to occur of: (a) the last day of the fiscal year during which the Company has total annual gross revenues of US$1,070,000,000 (as such amount is indexed for inflation every five years by the SEC) or more; (b) the last day of the fiscal year of the Company following the fifth anniversary of the date of the first sale of common equity securities of the Company pursuant to an effective registration statement under the United States Securities Act of 1933, as amended; (c) the date on which the Company has, during the previous three year period, issued more than US$1,000,000,000 in non-convertible debt; and (d) the date on which the Company is deemed to be a "large accelerated filer", as defined in Rule 12b-2 under the Exchange Act. The Company will qualify as a large accelerated filer (and would cease to be an emerging growth company) at such time when on the last business day of its second fiscal quarter of such year the aggregate worldwide market value of its common equity held by non-affiliates will be US$700,000,000 or more.

For so long as the Company remains an emerging growth company, it is permitted to and intends to rely upon exemptions from certain disclosure requirements that are applicable to other public companies that are not emerging growth companies. These exemptions include not being required to comply with the auditor attestation requirements of Section 404 of the JOBS Act. The Company takes advantage of some, but not all, of the available exemptions available to emerging growth companies. The Company cannot predict whether investors will find the Common Shares less attractive because the Company relies upon certain of these exemptions. If some investors find the Common Shares less attractive as a result, there may be a less active trading market for the Common Shares and the Common Share price may be more volatile. On the other hand, if the Company no longer qualifies as an emerging growth company, the Company would be required to divert additional management time and attention from the Company's development and other business activities and incur increased legal and financial costs to comply with the additional associated reporting requirements, which could negatively impact the Company's business, financial condition and results of operations.

OUTLOOK

The first half of 2022 has proffered an unusual combination of events and results.

The Company – as with much of the industrial technology and manufacturing sectors – has felt the repercussions of macro-economic headwinds that have affected the planning, logistics, and spending of its customers and of its sales pipeline targets.

These conditions have weighed, at times heavily, on both the Company's top and bottom lines, with potential or planned sales being impacted by customer resourcing, staffing, and purchasing delays, and with continued governmental and logistical issues preventing other customers from finalizing contract negotiations or taking delivery of their fully completed orders – orders that represent significant revenue and income to the Company once they can be moved out of our warehouse.

What was anticipated to be a major growth first half, has adjusted to be more of a modest stage-setting for the second half of the year and into 2023, as existing and prospective customers moved back their planning and decision-making in the quarter to accommodate their own interruptions.

However, in parallel, and in contrast, during the last quarter the Company achieved some of its greatest corporate milestones – achievements that are considered major advancements for both PyroGenesis and its customers' industries, and which are anticipated to provide potentially large sales bursts through to and beyond 2023.

These achievements include producing and delivering plasma torches for the first-ever in-factory use within an iron ore pelletization furnace – a major upstream step in the steelmaking process – and the movement from sample size to commercial-scale batch production of titanium metal powder production for 3D printing and additive manufacturing, from the Company's plasma atomization system.

These milestones continue to set the company up for the accelerated business growth that the previous three decades of research and development have made possible.

Importantly, as the global economy transitions out of the disruption stage it has found itself in for several quarters, we see a return to logistical and resourcing stability for our heavy industry and government customers throughout the rest of 2022 and 2023, but with a renewed sense of urgency.

Our value proposition remains the same, yet with the events of 2020-2022 revealing the precariousness of the world's supply chain, fossil-fuel energy availability, workforce, and material cost certainty, the Company's technology offering looks even better positioned.

Our ability to help impact and remake several of the major priorities facing heavy industry – priorities that have fallen further behind during these past two years – such as greenhouse gas emissions reduction, fuel switching to combustion-free electric sources, improved value recovery of metal waste-streams, enhanced metal production output from the same input, safe destruction of pervasive chemicals, and more rapid and higher quality metal powder production for component weight reduction – leaves us excited about our recent critical milestones and our long-term positioning.

All of these factors, bolstered by the quickening global push towards fossil fuel reduction at both industry and government levels that further showcases the PyroGenesis advantage, allows Management to state with continued conviction that despite the challenges seen in the year's first half, the company believes opportunities for PyroGenesis continue to expand.

To note, until such time as the Company produces consistent recurring revenue or continuous large scale orders and can offer forward-looking guidance, we will continue to provide an Outlook that is more descriptive, with a combination of actual achievements combined with working opportunities, and less focused on financial numbers.

Overall Strategy

The Company continues to build on its strategy to offer technology solutions that produce benefits through greenhouse gas ("GHG") emissions reduction, clean electric fuel sources, safe waste destruction, and improved production output and quality, that take advantage of the Company's expertise in patented ultra-high temperature processes for heavy industry.

We have acknowledged our strategy to be timely, as many governments in jurisdictions around the world promote and fund environmental technologies and infrastructure projects. After 2021 proved an even greater affirmation of this approach as major industries targeted by the Company not only recommitted to their targets, but in some cases raised them significantly, 2022 has brought about more circumstances that highlight how technology solutions like those from PyroGenesis will be in even greater demand.

In particular, the conflict in Ukraine has exhibited how geopolitical influences will continue to impact the supply of metals that are already under extraordinary market demand. As supply chain issues, worries about supply reductions, and additional sanctions on Russia (a major producer of the world's aluminum supply) caused massive fluctuations to aluminum spot-prices, the conflict also more fully exposed the vulnerability of aluminum producers to power availability and energy price uncertainty, as energy supply challenges that were already being experienced by European and Asian metal producers were exacerbated during the war.

All of these factors show that with global metal demand growing (anticipated to grow by 80% by 2050)[1], and industry carbon-reduction targets not yet on track to meet their goals, aluminum producers must find ways to improve their efficiency, and increase their yield of high-quality metal from current production – all while lowering their carbon footprint. PyroGenesis' range of technology solutions provide just such an opportunity, with the Company's DROSRITE™ systems providing industry-leading dross recovery rates of high-quality aluminum, inline and on-site, with a lower operating expense and lower carbon footprint than all competing technologies; meanwhile, the Company's mainstay plasma torch offering provides another technology-driven solution for metal producers looking to reduce their reliance on a volatile natural gas and diesel supply chain within any aspect of their operations that require metal melting or heating, while again eliminating fossil fuel emissions.

These same or similar pressures are affecting the global steelmaking industry, into which the Company has already sold and now delivered initial clean electric, non-combustion plasma torches for final pre-order test runs. Macroeconomic pressures may in fact serve to expedite the need for faster implementation over the next year or more.

For clarity, as stated often, PyroGenesis' product lines do not depend on environmental incentives (tax credits, GHG certificates, environmental subsidies, etc.) to be economically viable; with the increased industry carbon reduction commitments, it is anticipated that the Company's growth drivers will expand, and shareholders will see increased value.

While the Company is not immune to how COVID-19 and other external factors negatively impacted businesses over the past two years, specifically related to the work force and, more importantly, the supply chain, Management believes that – while it can do little about the strain on its customers' and prospects' – the Company itself is well structured, and through various mitigation measures these challenges continue to be dealt with in an effective manner. The Company expects even greater improvements as the impact of COVID-19 and other external factors continues to recede during the remainder of 2022.

Organic Growth

Organic growth will be spurred on by (i) the natural growth of our existing offerings; (ii) leveraging off the insider "golden ticket" advantage we have with several industrial customers due to how some of our industrial systems are installed inside a customer's facility (vs. the legacy systems that are installed off-site) – enabling us to see first-hand some of the additional daily challenges faced by our customers, and then upsell to them accordingly; (iii) exploring new ways scientifically (and to corresponding markets laterally) to provide unique solutions and value that helps industries deal with some of the most pressing environmental, engineering, and energy problems; and (iv) building new manufacturing and chemical recovery facilities in overseas markets, as per our recent announcement to pursue the construction of a European production facility for metal powder production.

Over the past several years, PyroGenesis has successfully positioned each of its business lines for rapid growth by strategically partnering with multi-billion-dollar entities. These entities have identified PyroGenesis' offerings to be unique, in demand, and of such a commercial nature as to warrant the unique, long-term, supportive relationships that the Company has experienced while it ramps up various technologies to commercialization. We expect that these relationships have us well positioned to transition into significant revenue streams once full commercialization is achieved.

Aluminum Industry Process Improvement

As mentioned in previous reports, momentum with PyroGenesis' aluminum Industry strategy and offering continues to expand.

During the quarter, the company announced that its DROSRITE™ waste metal recovery technology had been successfully commissioned for Ma'aden Aluminum in Saudi Arabia, one of the world's largest primary aluminum producers with 2021 revenue in excess of US $7 billion. There, the DROSRITE™ technology is helping to service the Ma'aden plant in Ras Al-Khair, a joint venture corporation with Alcoa that is the largest and most efficient vertically integrated aluminum complex in the world and includes one of the world's largest smelters. At Ma'aden, the first three DROSRITE™ systems passed site acceptance testing and were fully commissioned, with the remaining four already manufactured and awaiting final shipment at the end-user's request.

[1] **https://international-aluminium.org/iai-releases-aluminium-sectors-decarbonisation-dataset-in-line-with-the-international-energy-agencys-beyond-2-degrees-findings**

In addition to the DROSRITE™ waste metal recovery system – one of the largest and fastest growing dross recovery solutions in the world, with 11 large DROSRITE™ systems in use or slated for delivery to markets around the world, and three more LOI's in play – during the quarter the Company provided a comprehensive update on the aluminum business line as a whole, outlining how increasing demand, global supply shortages, and fluctuating prices and energy availability were impacting aluminum producers, allowing PyroGenesis to announce new-use markets after numerous inquiries for many different aspects of the aluminum production process. As the aluminum industry eyes greater technological innovation to improve production and reduce fossil fuel reliance, few technologies are as ready as PyroGenesis.

Subsequent announcements in the quarter outlined even more areas where the Company's technology is being considered. Combined, the various announcements revealed that PyroGenesis' technology is being used, studied, or actively evaluated for use in the upstream carbon anode baking process, as a fuel replacement in scrap re-melting furnaces, in molten holding furnaces, in new furnace production, in downstream cast-house furnaces, and in retrofitting of existing aluminum recycling furnaces.

With the relationships the Company has been developing throughout the industry, and as a result of the success seen by its technologies in the primary aluminum sector, interest has now expanded into secondary scrap-based producers, as well as downstream parts manufacturers. This represents a significant change and advancement from just 18 months ago.

Finally, the various joint ventures announced in prior quarters continue to evolve.

For the joint venture technology geared to handle the leftover residues resulting from the processing of waste stream metal dross, the pre-launch requirements and considerations have entered the final stage. Chemical residue samples from dross produced at one of the Company's clients' facilities are being tested in two different countries, and the results of those tests will inform final steps.

As stated previously, we believe that valorizing the residues and producing high end products will further define us as the go-to company for all dross-related processing.

For the partnership with Aluminerie Alouette (the largest primary aluminum smelter in the Americas and co-owned by Rio Tinto and Norsk Hydro), for the development of a solution to safely recover various metals and compounds from the heavily contaminated carbon lining of aluminum smelters (known as "spent pot linings"), work continues, with lab-scale tests concluded and initial pilot phase in development.

Steel Industry Process Improvement

With steelmaking being one of the most carbon-emission intensive industries in the world, estimated to be responsible for between 7 to 12 per cent of all global fossil fuel and greenhouse gas emissions, that industry continues to be under intense pressure, including huge financial penalties, to find emission reductions.

This pressure on the steelmaking industry allows PyroGenesis to expect demand for its upstream, iron ore pelletization solution to increase significantly, as steelmakers look to all aspects of the production lifecycle for carbon reduction opportunities.

As outlined in previous reports, serious consideration is being given to replacing large numbers of the fossil fuel burners in iron ore pelletization with PyroGenesis' proprietary and patented plasma torches.

During the quarter, the Company achieved a major milestone when, after extensive modeling, simulations, business case development, production, and live factory tests – during a period that was engulfed by a global pandemic – our plasma torch system for iron ore pelletization was produced, assembled, and shipped (as per the February 8 news release designating a Q2 quarter end shipping timeline) to the clients – in preparation for first-ever live factory usage and factory acceptance testing toward that carbon reduction goal.

As previously disclosed, that client is a multi-billion-dollar international producer of iron ore pellets and one of the largest in the industry, whose name will remain confidential for competitive reasons. The Client, which has committed to reduce its GHG emissions, has over ten (10) iron ore pelletization plants, each possibly requiring up to 50 plasma torches, or more than 500 torches in total. The Company has also previously disclosed, that we have provided a cost estimate for 36 plasma torches to that same Client A, at a value of $95-115 million. The range is an estimate due to usage and customization uncertainties which will be more clearly defined in due course.

Other previously announced clients – Client B, one of the largest iron ore processes in the world who has signed a $6M contract with the Company for 4 plasma torches for their pelletization system, and Client C, who is not only a significant player in the iron ore pelletization industry but is also a major player in the steel industry – continue to progress at their own pace.

For Client B, production of the four torches is underway. As previously announced, Client B has advised PyroGenesis that, upon the successful implementation of the torches, subsequent orders are expected to be for approximately 130 plasma torches.

PyroGenesis expects that the previously mentioned government initiatives, geared to stimulating their respective economies by promoting and funding environmental technologies and infrastructure projects, will only serve to increase interest in PyroGenesis' plasma torch offerings to other companies in this space. While potential clients seeking government support for large initiatives may draw out the onset of large contracts, the sheer number of potential customers, and the fact that the Company will engage with many of them in different stages at different times, will help to ensure a long, overlapping pipeline of potential projects.

In addition, PyroGenesis continues to target other industries which are experiencing significant pressure to reduce GHGs, and which utilize fossil fuel burners as well, such as the cement, aluminum, and automotive industries.

Plasma Torches for Emerging / Niche Markets

Separately, the Company also offers plasma torches to emerging / niche markets where there is a high probability of on-going sales from successful implementation.

One such example is when, in Q1 on February 7, the Company announced that it had signed a $273,000 contract with a European research centre, to manufacture and deliver a 50Kw methane plasma torch, which will be used by the client to develop a process to convert hydrocarbons, including methane (a greenhouse gas), into useful chemicals such as olefins (e.g. ethylene, propylene, etc.), thereby significantly reducing GHGs.

That torch and system is currently in production.

For each new market, the Company will also benefit from providing proprietary spare parts and service, which generates significant recurring revenue, thus complementing the Company's long-term strategy to build a recurring revenue model.

Additive Manufacturing (Metal Powders for 3D Printing)

Our metal powders business line also saw a major milestone in Q2.

The Company's NexGen™ facility, which incorporates all the previously disclosed benefits (increased production rates and lower capital & operating expenditures), was announced as having produced and delivered two separate 100kg orders for titanium powders – the first two commercial batch orders for the system, after months of testing and sample size production.

These orders were both an important commercial milestone, as well as further validation of the Company's process and ability to supply some of the highest quality powder produced to the AM industry using our NexGen™ plasma atomization process. This process is a significant departure and upgrade from conventional plasma atomization – a technology the Company also invented and coined the term for, and which is still considered the gold standard for the production of metal powder.

The two orders came via our European business partner Aubert & Duval, who is a world leader in industrializing high-performance steel, super alloy, aluminum and titanium alloys for over a century. More specifically, they are a recognized supplier of metal powders for additive manufacturing, serving the Aerospace, Energy, Transport, Medical, Defense, Automotive and other large scale, demanding markets.

Of note, a major tier-one global aerospace company has already entered into an agreement with the Company to formally qualify its metal powder, at considerable expense to the global aerospace company, with a view towards having the Company become a supplier.

Under this agreement, the Client has been performing an in-depth qualification process with PyroGenesis – a procedure typically required before a company can become an approved supplier. The process was established to, amongst other things, evaluate the Company's manufacturing methods, test samples of powder for batch-to-batch consistency, and determine various mechanical and chemical properties. Subsequently, larger volumes of powder will be used to print test coupons to further evaluate mechanical and chemical properties.

Upon passing all steps, including acceptance tests, the Company's process will be locked down specifically for each client, with no additional modifications permitted. Upon successful completion of the testing, PyroGenesis would expect to receive formal acceptance as an approved supplier. The formal and methodical process with this top tier aerospace company is on track and is nearing conclusion, with additional updates to investors expected throughout Q3.

There are additional major top tier aerospace companies and OEMs, in both Europe and North America, eagerly awaiting powders from this new state-of-the-art production line, and we are currently in the process of supplying sample powders to them for analysis.

The Company expects that such developments will continue and will translate into significant improvements in contributions to revenue by this segment in the mid-long term.

HPQ/PUREVAP™

With respect to HPQ, a PyroGenesis client and a company whom PyroGenesis owns significant shares and options, the goal is to continue to expand our role as HPQ's technology provider for the game changing family of silicon processes which we are developing exclusively for HPQ and its wholly owned subsidiaries HPQ Nano Silicon Powders Inc. and HPQ Silica Polvere Inc., namely:

The PUREVAP™ "Quartz Reduction Reactors" (QRR), an innovative process (patent pending), which should permit the one step transformation of lower purity quartz (SiO_2) than any traditional processes can handle into a silicon (Si) of a higher purity level (2N-4N) that can be produced by any traditional smelter, at reduced costs, energy input, and carbon footprint. The unique capabilities of this process could position HPQ as a leading provider of the specialised silicon material needed to propagate its considerable renewable energy potential; and

The PUREVAP™ Nano Silicon Reactor (NSiR), which, if successful, could position itself as a new proprietary low-cost process that can transform the silicon (Si) made by the PUREVAP™ QRR into the nano-silicon materials (spherical silicon powders and silicon nanowires) sought after by energy storage, batteries, electric vehicle manufactures and clean hydrogen sectors participants. The aim of the ongoing work is to position HPQ NANO as the first to market with a commercial scale low-cost nanoparticle production system.

A new plasma-based process that could convert Silica (Quartz, SiO_2) into fumed silica (Pyrogenic Silica) in one step. This new process could be a low-cost and environmentally friendly option that combines HPQ Silicon High Purity Quartz initiatives with PyroGenesis' industry leading know-how in the development of commercial plasma processes. It is envisioned that the process will eliminate harmful chemicals presently generated by traditional methods. This new process could revolutionize the manufacturing of fumed silica, while repatriating production back to North America.

Government participation in a $5.3M funding of the fumed silica project confirms our expectation that 2022 should be a year in which significant developments occur on all these fronts.

Land Based Units/Environmental

The Company did not previously aggressively target the Company's land-based/environmental solutions during the period where the Company's other offerings, such as in steelmaking and aluminum industry process improvement, were accelerating.

However, during 2021, interest in the Company's capabilities in this arena was renewed, and PyroGenesis' plasma-based solutions have generated interest in processing a waste stream that has recently been classified as hazardous.

In October of 2021, PyroGenesis was selected by a US municipal water utility to provide a C$9.2 million system to destroy perfluoroalkyl and polyfluoroalkyl substances (PFAs), a group of hazardous chemicals that have become pervasive in product manufacturing, and which are now understood to be harmful as they leech out of products and into farmland, soil, and the water system.

Planning and negotiations for this project have drawn out considerably, for various client-side reasons related to logistics, resourcing, competing municipal and state project priorities and funding, as well as extensive legal ramifications related to hazardous chemical processing and the newness of operating in this realm, for all parties. As a result, great care has been taken to ensure a proper project and contract framework. The effort involved and the framework created will be very useful for future projects of this nature, as well as in this area of PFAS and hazardous chemical processing that is so new to governments, but expanding rapidly.

Growth through Synergistic Mergers and Acquisitions

As previously disclosed, the Company is conservatively considering synergistic merger and acquisition strategies to augment its growth, and the Company has been very actively involved in pursuing several opportunities to support this strategy. In so doing, the focus has been on private companies exclusively which (i) primarily leverage the Company's Golden Ticket advantage, or (ii) could uniquely benefit from the Company's engineering advantage and/or international relationships.

Additional Opportunities for Plasma Torches

Within the general plasma torch line of business, the Company continues to consider options to leverage its plasma expertise. We continue to review torch technologies, pursue grant applications and government research involvement, and client participation partnerships, that could complement our existing torch offerings, leverage off our unique relationships, or explore new opportunities. We are in early stage discussion across many sectors and many potential customers; no additional details are available at this time.

CONCLUSION

In conclusion, while headwinds have interrupted the intentions of many clients and prospects during the first half of the year, PyroGenesis continues to see 2022 as a platform from which decades of growth will stem.

The Company plans to take advantage of its unique position in its main business offerings to accelerate growth, with a particular emphasis on offerings geared to aggressively reducing GHG emissions and the world's carbon footprint, while finding and offering solutions to pressing environmental, engineering, and energy challenges.

FURTHER INFORMATION

Additional information relating to Company and its business, including the 2021 consolidated Financial Statements, the Annual Information Form and other filings that the Company has made and may make in the future with applicable securities authorities, may be found on or through SEDAR at www.sedar.com, EDGAR at www.sec.gov or the Company's website at www.pyrogenesis.com.

Additional information, including directors' and officers' remuneration and indebtedness, principal holders of the Company's securities and securities authorized for issuance under equity compensation plans, is also contained in the Company's most recent management information circular for the most recent annual meeting of shareholders of the Company.

Form 52-109F2
Certification of Interim Filings Full Certificate

I, P. Peter Pascali, Chief Executive Officer of PyroGenesis Canada Inc., certify the following:

1. ***Review:*** I have reviewed the interim financial report and interim MD&A (together, the "interim filings") of PyroGenesis Canada Inc. (the "issuer") for the interim period ended June 30, 2022.

2. ***No misrepresentations:*** Based on my knowledge, having exercised reasonable diligence, the interim filings do not contain any untrue statement of a material fact or omit to state a material fact required to be stated or that is necessary to make a statement not misleading in light of the circumstances under which it was made, with respect to the period covered by the interim filings.

3. ***Fair presentation:*** Based on my knowledge, having exercised reasonable diligence, the interim financial report together with the other financial information included in the interim filings fairly present in all material respects the financial condition, financial performance and cash flows of the issuer, as of the date of and for the periods presented in the interim filings.

4. ***Responsibility:*** The issuer's other certifying officer(s) and I are responsible for establishing and maintaining disclosure controls and procedures (DC&P) and internal control over financial reporting (ICFR), as those terms are defined in National Instrument 52-109 *Certification of Disclosure in Issuers' Annual and Interim Filings*, for the issuer.

5. ***Design:*** Subject to the limitations, if any, described in paragraphs 5.2 and 5.3, the issuer's other certifying officer(s) and I have, as at the end of the period covered by the interim filings

(a) designed DC&P, or caused it to be designed under our supervision, to provide reasonable assurance that

(i) material information relating to the issuer is made known to us by others, particularly during the period in which the interim filings are being prepared; and

(ii) information required to be disclosed by the issuer in its annual filings, interim filings or other reports filed or submitted by it under securities legislation is recorded, processed, summarized and reported within the time periods specified in securities legislation; and

(b) designed ICFR, or caused it to be designed under our supervision, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with the issuer's GAAP.

5.1. ***Control framework:*** The control framework the issuer's other certifying officer(s) and I used to design the issuer's ICFR is the Internal Control – Integrated Framework (2013 COSO Framework) published by The Committee of Sponsoring Organizations of the Treadway Commission.

5.2. ***ICFR – material weakness relating to design:*** The issuer has disclosed in its interim MD&A for each material weakness relating to design existing at the end of the interim period

(a) a description of the material weakness;

(b) the impact of the material weakness on the issuer's financial reporting and its ICFR; and

(c) the issuer's current plans, if any, or any actions already undertaken, for remediating the material weakness.

5.3. ***Limitation on scope of design:*** The issuer has disclosed in its interim MD&A

(a) the fact that the issuer's other certifying officer(s) and I have limited the scope of our design of DC&P and ICFR to exclude controls, policies and procedures of

(i) N/A;

(ii) N/A; or

(iii) a business that the issuer acquired not more than 365 days before the last day of the period covered by the interim filings; and

(b) summary financial information about the business that the issuer acquired that has been consolidated in the issuer's financial statements.

6. ***Reporting changes in ICFR:*** The issuer has disclosed in its interim MD&A any change in the issuer's ICFR that occurred during the period beginning on April 1, 2022 and ended on June 30, 2022 that has materially affected, or is reasonably likely to materially affect, the issuer's ICFR.

Date: August 15th, 2022

/s/ P.Peter Pascali
P. Peter Pascali
Chief Executive Officer

Exhibit 99.5

Form 52-109F2
Certification of Interim Filings Full Certificate

I, Andre Mainella, Chief Financial Officer of PyroGenesis Canada Inc., certify the following:

1. ***Review:*** I have reviewed the interim financial report and interim MD&A (together, the "interim filings") of PyroGenesis Canada Inc. (the "issuer") for the interim period ended June 30, 2022.

2. ***No misrepresentations:*** Based on my knowledge, having exercised reasonable diligence, the interim filings do not contain any untrue statement of a material fact or omit to state a material fact required to be stated or that is necessary to make a statement not misleading in light of the circumstances under which it was made, with respect to the period covered by the interim filings.

3. ***Fair presentation:*** Based on my knowledge, having exercised reasonable diligence, the interim financial report together with the other financial information included in the interim filings fairly present in all material respects the financial condition, financial performance and cash flows of the issuer, as of the date of and for the periods presented in the interim filings.

4. ***Responsibility:*** The issuer's other certifying officer(s) and I are responsible for establishing and maintaining disclosure controls and procedures (DC&P) and internal control over financial reporting (ICFR), as those terms are defined in National Instrument 52-109 *Certification of Disclosure in Issuers' Annual and Interim Filings*, for the issuer.

5. ***Design:*** Subject to the limitations, if any, described in paragraphs 5.2 and 5.3, the issuer's other certifying officer(s) and I have, as at the end of the period covered by the interim filings

   (a) designed DC&P, or caused it to be designed under our supervision, to provide reasonable assurance that

      (i) material information relating to the issuer is made known to us by others, particularly during the period in which the interim filings are being prepared; and

      (ii) information required to be disclosed by the issuer in its annual filings, interim filings or other reports filed or submitted by it under securities legislation is recorded, processed, summarized and reported within the time periods specified in securities legislation; and

   (b) designed ICFR, or caused it to be designed under our supervision, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with the issuer's GAAP.

5.1. ***Control framework:*** The control framework the issuer's other certifying officer(s) and I used to design the issuer's ICFR is the Internal Control – Integrated Framework (2013 COSO Framework) published by The Committee of Sponsoring Organizations of the Treadway Commission.

5.2. ***ICFR – material weakness relating to design:*** The issuer has disclosed in its interim MD&A for each material weakness relating to design existing at the end of the interim period

(a) a description of the material weakness;

(b) the impact of the material weakness on the issuer's financial reporting and its ICFR; and

(c) the issuer's current plans, if any, or any actions already undertaken, for remediating the material weakness.

5.3. ***Limitation on scope of design:*** The issuer has disclosed in its interim MD&A

(a) the fact that the issuer's other certifying officer(s) and I have limited the scope of our design of DC&P and ICFR to exclude controls, policies and procedures of

(i) N/A;

(ii) N/A; or

(iii) a business that the issuer acquired not more than 365 days before the last day of the period covered by the interim filings; and

(b) summary financial information about the business that the issuer acquired that has been consolidated in the issuer's financial statements.

6. ***Reporting changes in ICFR:*** The issuer has disclosed in its interim MD&A any change in the issuer's ICFR that occurred during the period beginning on April 1, 2022 and ended on June 30, 2022 that has materially affected, or is reasonably likely to materially affect, the issuer's ICFR.

Date: August 15th, 2022

/s/ ANDRE Mainella
Andre Mainella
Chief Financial Officer