PyroGenesis Announces the Launch of a New ZCE Hydrogen Production Process Following the Filing of International Patent Applications

MONTREAL, QUEBEC (GlobeNewswire – December 08, 2021) - PyroGenesis Canada Inc. (http://pyrogenesis.com) (NASDAQ: PYR) (TSX: 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 to reduce greenhouse gases (GHGs), announced today the launch of a new zero-carbon emission ("ZCE") hydrogen production technology which is expected to compete with conventional technologies to produce an environmentally-friendly hydrogen. PyroGenesis' new hydrogen production technology is now entering a testing phase and is expected to convert methane (a GHG with a high global warming potential) to hydrogen, thereby creating a ZCE hydrogen. The conventional ZCE process, water electrolysis, is extremely expensive, requires a lot of energy and uses rare earth materials. The accumulation of GHGs in the atmosphere contributes to global warming. Under the Paris Agreement, 191 countries have committed to limit GHGs, while many territories, including the European Union, have committed to be carbon neutral by 2050.

"The conventional method to produce hydrogen is called "Steam Methane Reforming", which produces GHGs as a result", said P. Peter pascali, CEO and Chair of PyroGenesis. "Another technology used to produce hydrogen is called "Water Electrolysis". It has been around for many years and is considered to be a ZCE technology. The hydrogen generated from this process is generally referred to as "Green Hydrogen", however it is recognized to (i) be relatively expensive, (ii) require a lot of energy, and (iii) use rare earth materials. PyroGenesis' new technology is expected to combine the best of both worlds; it is expected to be cheaper than any existing hydrogen process while at the same time producing ZCE hydrogen. The hydrogen generated by this process is referred to as "Turquoise Hydrogen". The Company does not expect that this new process would compete with its iron ore pelletization offering where fossil fuel burners are replaced with plasma torches but, in fact, would complement theses plasma torch offerings by providing a hydrogen alternative elsewhere in the manufacturing process."

PyroGenesis has filed an international application No. PCT/CA2021/000099 with WIPO (World Intellectual Property Organization) entitled, "Hydrogen production from hydrocarbons by plasma pyrolysis." This PCT application covers the Company's process for producing hydrogen from methane and other light hydrocarbons using thermal plasma without generating GHGs.

PyroGenesis' technology boasts a theoretical electricity cost 3 times lower than that of water electrolysis to produce the same amount of hydrogen making it one of the most energy-efficient

technologies to produce ZCE hydrogen. The technology would be easily scalable, and its capital cost per hydrogen production unit is comparable to that of steam methane reforming technology, the most established commercial technology to produce hydrogen.

The combustion of ZCE hydrogen for heating in industrial processes and in transportation generates water vapor as a combustion byproduct, instead of carbon dioxide, thus reducing GHG emissions worldwide. As a result, many industrial processes are looking to replace fossil fuels and reactants such as coal, oil, and natural gas with ZCE hydrogen. In the iron and steel manufacturing industries alone, the consumption of ZCE is projected to increase from 0.5 million tons per year in 2020 to 12.5 million tons in 2030.[1] Once again, the Company does not expect that this new process would compete with its iron ore pelletization offering where fossil fuel burners are replaced with plasma torches but, in fact, would complement these plasma torch offerings by providing a hydrogen alternative elsewhere in the manufacturing process.

"Filing our U.S. provisional patent application, along with the international PCT application is an important milestone as we move forward with launching a new method for producing ZCE hydrogen through an energy-efficient and reliable plasma process", said Mr. Pierre Carabin, Chief Technology Officer and Chief Strategist of PyroGenesis. "There is a high demand for technologies that use clean renewable electricity. Currently, the only commercially available process to produce clean hydrogen is water electrolysis. In this process, electrical energy is used to convert water to hydrogen and oxygen. However, the water electrolysis process suffers from several drawbacks, including high energy consumption and the need for a high quantity of rare materials, which is not sustainable. We believe our new proprietary hydrogen production process will be much more energy efficient, cost-effective and scalable than other forms of hydrogen production."

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.

[1] IEA, "Hydrogen", IEA, Paris, 2021. https://www.iea.org/reports/hydrogen

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