HYDROGRAPH

CSE: HG | OTCQB: HGCPF | FRA: M98

IGNITING MATERIAL CHANGE **Investor Presentation** November 2024

Forward-Looking Statement

This deck contains certain "forward looking statements" and certain "forward-looking information" as defined under applicable Canadian securities laws. Forward-looking statements and information can generally be identified by the use of forward-looking terminology such as "may", "will", "expect", "intend", "estimate", "upon" "anticipate", "believe", "continue", "plans" or similar terminology. Forward-looking statements and information include, but are not limited to: the use of the net proceeds from the previously announced private placement, anticipated benefits resulting from the Marketing Services Agreement, the future exercise of the Options, ability to successfully increase commercial scale production at its manufacturing facility, and the timing thereof, the potential valuation of Company, any EBITDA predictions, the commercialization of HydroGraph's products that lead to customer contracts resulting in our potential valuation and EBITDA predictions, and strategies.

Forward-looking statements and information are based on forecasts of future results, estimates of amounts not yet determinable and assumptions that, while believed by management to be reasonable, are inherently subject to significant business, economic and competitive uncertainties and contingencies. Forward-looking statements and information are subject to various known and unknown risks and uncertainties, many of which are beyond the ability of HydroGraph to control or predict, that may cause HydroGraph's actual results, performance or achievements to be materially different from those expressed or implied thereby, and are developed based on assumptions about such risks, uncertainties and other factors set out herein, including but not limited to: HydroGraph's ability to implement its business strategies; risks associated with general economic conditions; adverse industry events; stakeholder engagement; marketing and transportation costs; loss of markets; volatility of commodity prices; inability to access sufficient capital from internal and external sources, and/or inability to access sufficient capital on favorable terms; industry and government regulation; changes in legislation, income tax and regulatory matters; competition; currency and interest rate fluctuations; and other risks. HydroGraph does not undertake any obligation to update forward-looking information except as required by applicable law. Such forward-looking information represents management's best judgment based on information currently available. No forward-looking statement can be guaranteed, and actual future results may vary materially. Accordingly, readers are advised not to place undue reliance on forward-looking statements.



Proceeded by stone, copper, bronze, iron, steel, plastic and silicon, we are now entering the graphene age.

Graphene, a nano material, is made up of pure carbon atoms and is the strongest material known to man; it will help usher in an age of nanotechnology, which will touch virtually every known industry.



What We Do

We produce the **highest quality graphene** in the industry at the greatest cost efficiency

HydroGraph uses a patented "explosion synthesis process", which yields the highest purity, most powerful graphene in the industry.

- Our production process is the most environmentally friendly process in the world, and *commercialization has begun*
- Hydrograph graphene is being tested in over 20 different applications
- Our current scalable production capacity is **10 tons per year**
- New production units can be built in 2-3 months
- Low capital intensity US\$10M to US\$12M of capex to generate US\$100M of sales
- Next phase fully funded completed financing raising CAD\$3.6M 55% of existing shareholders participated; proceeds to support commercialization activities, R&D and production scale up







16 Employees



3 Patents Granted 8 Pending









Global Quality Problem: Not All Graphene Is The Same

While many companies are developing graphene production methods, the truth is that not all graphene is the same quality

OTHER PRODUCERS

300 companies worldwide claim to produce graphene

An analysis of 60 companies by **Advanced Materials** journal found:



in the market as defined by ISO

There is **almost no**

high-quality graphene

No company produces over 50% graphene content, with a majority producing less than 10%

Compared to HydroGraph



Most companies are producing fine graphite, not graphene



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https://www.thegraphenecouncil.org/page/Registry

A Sustainable Solution for a Sustainable World

HydroGraph produces pristine graphene with the smallest environmental footprint





References

- 1. Juong et.al., Nature | Vol577 | 30January 2020 | 647
- 2. Wyss et al., Communications Engineering, (2022)

3. US patent application US2017/0113935A1

Graphene: The "Wonder" Material Of The Future Made Available Today



STRENGTH 200x stronger than steel



FLEXIBILITY Can bend & stretch to 120% of original size



THERMAL CONDUCTIVITY 10x the conductivity of copper



ELECTRICAL CONDUCTIVITY 1,000x current capacity of copper



ELECTRONIC BEHAVIOUR Electrons can move at near light speed through it





IMPERMEABILITY Hydrogen atoms cannot penetrate its structure



OPTICAL PROPERTIES Highly transparent

On Track to Commercial Production

Product testing completed, ready for commercialization





Commercial scale production capacity of graphene. Business development team engaging with customers and partners.

PRODUCT EXTENSION

HydroGraph upscales UK focus to leverage customer access in Manchester, the home of graphene

Q1 2023

Q2/Q3 2023

2024

SCALE-UP

Completed construction of commercial-scale graphene unit for wide range of applications

Initiated UK application development capabilities to meet growing customer demand

CONTRACTED REVENUE

Best-in-Class Executive Team



Kjirstin Breure President and CEO

A 15-year background in emerging technologies and portfolio management, with experience in investor relations; on HydroGraph board since lab scale; Director of Operations for Frontline Crossings, and Chief Operating Officer with Omada Technologies.



More than 25 years as a physicist; invented 3M's graphene-like carbon coatings and contributed to 190 invention submissions and 20 granted US patents. Authored more than 33 peer-reviewed papers and teaches at Western University, Canada.

Ranjith Divigalpitiya

Chief Science Officer



As former VP of Engineering, Stephen developed Hydrograph's current production equipment and is building a working prototype for our hydrogen production as well. In his role as VP of Operations, he has evolved into commercial design and developing trade secrets for the business.



Matt Anderson CFO

Over 15 years of accounting and CFO experience with private and public companies. He is the Managing Director of Malaspina Consultants Inc., where he has worked since 2009. Matt holds a Bachelor of Commerce from McGill University and earned his CPA, CA accreditation in 2008, providing CFO services to junior public companies across various sectors.



Chris Sorensen VP R&D





Stefan Bossman Lead Chemist

Stefan a Distinguished Professor emeritus at K State. He received his B.S. and PhD in chemistry from the University of Saarland, Germany. Previous posts include postdoctoral research associate at Columbia University, an assistant professor and subsequently an associate professor-ship in chemical and process engineering at the University of Karlsruhe, Germany. Stefan holds a PhD, has authored more than 200 publications and holds 14 patents.



CHAMPIONX KANSAS STATE Linde des fluence PRODUCTS









- \checkmark Multiple start-up experiences
- \checkmark 100+ years of combined industry experience
- ✓ Proven track record & success in scaling tech
- ✓ CAD ~\$2.0M personal funds committed to date

Board of Directors

David Williams

Kjirstin Breure

Chairman

Paul Cox

Director, **President** and **CEO David Morris**

Director (Independent)

Director (Independent)



James Baker Advisory Board Member

More than 25 years' experience in the defense, aerospace and security market leading and managing high technology businesses, and currently Professor of Practice at the University of Manchester and CEO of Graphene@Manchester, encompassing the Graphene Engineering Innovation Center (GEIC) and the National Graphene Institute (NGI). Responsible for business strategy development and delivery, including commercialization opportunities.









Our Strategy

Become the leading global producer of high-quality graphene

Produce identical batches of pristine graphene at industrial scale

Employ centralized production model

HydroGraph has the capacity to produce the highest quality graphene at industrial scale in identical batches.

This is an industry first.

To secure IP and boost margins, HydroGraph will build a centralized facility near an acetylene supply.

Gas costs mainly arise from compression and transport, while graphene is inexpensive to ship. Establish production in key geographical regions

As customer demand grows through HydroGraph's application development activities, the Company will build additional centralized facilities to guarantee supply.



Expand capabilities to include formation and masterbatch

To increase market penetration HydroGraph will include formulation and masterbatch offerings so customers can easily integrate graphene into their products without going through a testing process with the Company.

Our Target Markets





COMPOSITES



COATINGS

\$160B Global Market

LUBRICANTS

\$90B Global Market

\$200B Global Market

- 80% reduction of wear
- 24X improvement of lifetime
- 70% increase of lubricity
- Environmental benefit: longer life means less oil extracted and less spent oil to be disposed of
- 8 orders of magnitude increase in conductivity
- Low (< 1-wt%) loading for mechanical improvement
- 14% improvement of thermal conductivity
- 25 30% improvement in strength in PET and epoxy

- Enhanced durability
- Light-weighting
- Enhanced electrical conductivity (static dissipative)
- Anti-corrosion







ENERGY STORAGE

\$860B Global Market

\$250B Global Market

24% increase strength with 0.04 wt-%

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- 15% reduction in energy demand and Global Warming Potential as LCA benefits
 - Reduced porosity leading to reduced water permeability, lowering freeze/thaw damage and rebar corrosion
- 47% increased Charge Acceptance Rate in lead acid batteries resulting faster charging
- Extends battery life by reduced sulfation
- Outperforms leading cathode catalyst in lithium-air batteries
- 4X capacity improvement in supercapacitors compared to high surface carbon black

HydroGraph's Path to Market

Graphene demand is ready for commercial scale



MANCHESTER 1824

The University of Manchester Graphene Engineering Innovation Centre

Pursue partnerships and advance R&D to unlock business development opportunities in secondary target markets

Strategic Partnership

HydroGraph partnered with the GEIC in 2023

HydroGraph Graphene Production Facility Manhattan, Kansas, US Graphene Engineering Innovation Centre (GEIC) Manchester, UK – Birthplace of graphene

> Manchester, where graphene was discovered in 2004, remains a hub for graphene activity and talent.

The GEIC serves as a key hub for customers to interact with graphene experts.

- The GEIC, containing all relevant industrial prototyping machines and characterization devices needed to commercialize graphene materials, is expediting the path to market
- As a university-affiliated institution, GEIC staff must maintain impartiality when selecting graphene for customer projects
- HG's graphene has demonstrated exceptional performance across various applications
- This cost-effective gateway facilitates customer engagement for the Company
- HG plans to further expand efforts to explore new application areas and attract new customers
- HG's business development team utilizes data obtained from new materials
- We collaborate on application development with both the GEIC and our own HydroGraph team onsite, gaining access to customers through the GEIC network.

James Baker CEO, GEIC HydroGraph Advisory Board

The University of Manchester Graphene Engineering Innovation Centre

Our Technology: The Hyperion System

Disruptive, patented and scalable

Readily Available Local Feedstock

EXTENSIVE APPLICATIONS

HydroGraph's Hyperion System will change the landscape of nanotechnology.

The Hyperion System

PATENTED EXPLOSION SYNTHESIS PROCESS

Uses minimal energy and produces no waste. Ideal for commercial deployment: modular, scalable, and eco-friendly.

Units can be produced in three months

Building additional units to increase capacity

Source a larger US facility as demand grow. Not reliant on China for source of graphite.

99.8% Pure Graphene

HIGHEST QUALITY MATERIALS

We produce the highest-purity, most crystalline graphene in the market.

Units are located near cost-effective gas sources or at customer locations if needed for supply chain security^{*}

*In co-located scenarios, HydroGraph will maintain, own, and operate all units.

What is Graphene

Thermal Conductivity Highest ever measured at ~4000 Wm⁻¹ K⁻¹

Strength Graphene has a strength of 130 GPa, higher than steel

Electron Mobility As high as 200,000 cm²/V·s, much higher than silicon

Electrical Resistance Graphene electrical resistivity of just 0.2x10⁻⁶Ω·cm

High Surface Area As much as 2,630 m²/g, very high surface area

Flexibility

Graphene can stretch up to 25% of its original length

Impermeability Blocks all other elements, even hydrogen

Thinness A single layer of graphene is just 0.345Nm

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HYDROGRAPH

UV Resistance Blocks harmful UV rays by up to 70%

Flame Resistant Graphene significantly

reduces flammability if added to polymers

Transparent Single layer graphene transmits approximately 97.2% of light

Stiffness

Young's modulus 0.95 to 1.1 TPa, some of the highest ever measured

Patented Technology

Fractal Graphene Patented No: 9,440, 857 B2

The 2016 patent for the high-yield production of fractal graphene via detonation is the founding technology for HydroGraph. The detonation closed system produces the highest quality products, while conserving energy, preventing emissions and is modular and scalable for clients. Additionally, the HydroGraph portfolio now contains patents relating to the production of nanomaterials, applications involving nanomaterials and clean energy.

REACTIVE GRAPHENE

Disc. No.: 2019-064; Attorney Docket No.: 52468

Title: "Graphene/Graphene Oxide Core/Shell Particulates and M

PCT Application No.: PCT/US2020/038055

Filing Date: June 17, 2020

GRAPHENE INK

RE: Disc. No. 2019-066

Title: "Nano-inks of Carbon Nanomaterials for Printing and Coati

PCT Patent Application No.: PCT/US2020/039547

Filing Date: June 25, 2020

GRAPHENE ENHANCED CARBON FIBER

Disc. No.: 2017-008; Docket No.: 49240-US

Title: "Additive Manufacturing of Continuous Fiber Thermoplasti

U.S. Application No.: 16/487,622 (PCT/US2018/018800)

HYDROGEN PRODUCTION

Disc. No.: 2021-027; Attorney Docket No.: 54713-PCT

Title: "Process for Synthesis of Syngas Component"

U.S. Provisional Patent Application No.: 63/161,625

Filing Date: March 16, 2021

PATENTED TECHNOLOGY

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c Composites"	

Composites

PROBLEM

Plastic use contributes to multiple environmental issues such as pollution and CO₂ production.

Address challenge by improving the mechanical properties of plastics using graphene as composites. Plastic users can reduce usage without compromising performance.

PET improvements: modulus - 18%, strength - 25%; breaking load - 115% **Epoxy improvements**: modulus - 23%, strength - 30%; RESULTS elongation - 11% Save energy in processing plastics. Improve properties of recycled plastics to match that of virgin plastics.

COMPOSITE CASE STUDY

- Work with plastic compounders and major users to commercialize HG graphene.
- **Obtain FDA approval for** food contact applications (in process)

"In the 12 years we've been experimenting with graphene, carbon nanotubes and nano materials in general, we've never seen anything like the results we've gotten with HydroGraph's FGA-1 graphene. We're excited about the potential to marry cost savings with sustainability as we move forward."

> Chris Surbrook, **Head of New Business Development** Midland Compounding & Consulting

Additive for Cells

Electrical conductivity of most electrodes need to be improved for more efficient performance of batteries because any internal resistance is an energy loss.

Use our FGA-1 as a conductive additive in electrode materials to boost performance

Lead acid battery electrode additive Dynamic charge acceptance by $47\% \uparrow vs$. carbon black Super capacitor additive RESULTS Capacitance by $300\% \uparrow vs.$ activated carbon Lithium – O2 Battery cathode catalyst Discharge capacity by 14 X \uparrow vs. carbon black

ENERGY STORAGE CASE STUDY

"HydroGraph's fractal graphene has shown significantly higher results while the team at HydroGraph has been incredibly supportive."

> Maithri Dissanayake, Head of Product Volfpack

Cement / Mortar

PROBLEM

Cement industry contribute to 8% of global emissions by humans.¹

1. Nature 597,593-594 (2021), https://www.nature.com/articles/d41586-021-02612-5

SOLUTION

RESULTS

Use HG graphene in cement to improve mechanical strength, reduce volume used and improve durability.

- Multiple testing at various sites have shown double digit compressive strength improvements
 - Lifecycle analysis: Global warming potential and energy demand reduced by 10 - 15% normalized by compressive strength. i.e., for a given strength 10 – 15 % less env. impact.
- At 400 ppm loading of HG graphene, compressive strength increases by 15%
- Pore size decreases enhanced durability of concrete

CONSTRUCTION CASE STUDY

"This study shows that Hydrograph's graphene, which is manufactured through scalable and cost-, energy- and CO₂-efficient detonation synthesis, can be of a huge benefit to the engineering and environmental performance of concrete and cement."

> Prof. Narayanan Neithalath **Arizona State University**

BIO-SENSOR CASE STUDY

Next Steps

Supplying quantities of FGA-1 to Hawkeye Bio Extending technology platform to detect at least 14 other cancers + demographically significant diseases

"Hawkeye Bio leverages HydroGraph's pristine graphene to manufacture pharmaceutical grade biosensors for the detection of lung cancer from a standard blood draw. HydroGraph's manufacturing process reproducibly yields the 99.8% high purity and consistent geometry required for Hawkeye's ultra-sensitive diagnostic tests."

> Andre de Fusco **Co-founder and CEO** Hawkeye Bio

HydroGraph's Commercialization Process

Large automotive company: Three successful trials completed for graphene integration into various automobile components.

Next: Pilot industrial scale-up order expected in 1-2 months, followed by commercial scale-up negotiations targeting 2025. Tonnage volumes anticipated.

Discussions with 3 major PET producers: Initial results replicated by multiple parties. Next: FDA related testing ongoing, w/ commercial scale-up upon FDA approval (expected within 6-12+ mos). Potential exceeds hundreds of tons of graphene.

Large energy storage company: Pilot industrial scale-up slated for 2024 based on reproduced results.

Next: Supply agreement negotiations to commence within 2025. Tonnage volumes expected.

FDA Approval Process

Data Gap Analysis Review and Strategy - complete

In-Polymer Analysis Analytical Testing -in progress

Reg and Tox Review of Phase 2 Results -in progress

Fully Validated Migration Study

Submit Food Contact Notification. FDA completeness check. FDA review.

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HydroGraph's Commercialization Process

Aerospace machining fluid: Initial trial proved successful. Novel, precision engineered material tested currently.

Next: Material optimization ongoing with formulation and scale up anticipated Q3 2025. Potential exceeds hundreds of tons.

Defense contractor tactical fibers: Initial trial successful. Second phase to initiate Q4. **Next:** Second phase underway with an anticipated 6 months of optimization before scale up order. Hundreds of tons expected.

Composite construction material: Initial trial generated triple digit performance improvements. Second phase underway.

Next: Phase 2 testing in progress. Pilot scale trial expected to commence Q2 2025.

Generate application development data via the GEIC

Collaborate w/ customers through the GEIC and through internal BD activity

Engage in product development; if successful move to industrial trial

Sign customer contracts

Scale up production

Why Invest?

1 | HIGHEST PERFORMING

HydroGraph produces the highest performing graphene in the industry at industrial scale

4 | GLOBAL REACH

HydroGraph's high-performance graphene can improve virtually every industry and has near unlimited potential impact

2 | CONSISTENT RESULTS

Unlike other graphene producers, HydroGraph produces identical batches

5 | STRONG ECONOMICS

HydroGraph unlocks value for the customer by strengthening competitive advantage

3 | GREEN FOOTPRINT

The Hyperion System, the Company's production unit, uses the lowest energy in the industry and produces no waste

6 | SIGNIFICANT VALUATION UPSIDE

Low CAPEX process, large end markets, rapid market growth and differentiated products all lead to significant upside

Key Catalysts

- Expanded application development capabilities
- Close first major multiyear contract in 2024
- Increased product line

Capital Structure

Basic Shares Outstanding	231M
Options Outstanding	16M
Warrants Outstanding	60M
Fully Diluted	307M
Market Cap (as of October 14, 2024)	CAD\$33.5M

THANK YOU

APPENDIX

HYDROGRAPH

Website: hydrograph.com IR Contact: ir@hydrograph.com

Partnerships and Industry Certification

The University of Manchester Graphene Engineering Innovation Centre

The GEIC, at the University of Manchester, helps companies develop and launch new technologies, products and processes that exploit the remarkable properties of graphene and other 2D materials.

RIC2D, at Khalifa University, is part of a strategic investment by the Government of Abu Dhabi, to advance the scientific development and commercial deployment of technologies derived from graphene and other 2D materials.

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The Verified Graphene Producer ® Certification

• The highest standard in the industry!

• The only credential with independent, third party, inperson inspections of graphene production facilities

• Verification of production methods and volumes, and quality control processes

• Based on the Graphene Classification Framework (GCF).

HydroGraph is currently one of only five companies to be certified globally and the first company in the Americas to be certified.

FRACTAL GRAPHENE

Patent for the high-yield production of graphene via detonation

Market Problem

Graphene has been recognized as the first "super material" of the 21st century. However, commercialization of graphene was not feasible before now.

Conventional methods for producing graphene were:

- Producing inferior and inconsistent graphene, sometimes graphite
- Very expensive
- Not scalable
- Inconvenient
- Involving toxic chemicals
- Using vast amounts of electricity
- Addressable markets include:
 - Lubricants
 - Energy storage
 - Resins
 - Specialty chemicals
 - Coatings

HydroGraph Patented Solution

Now: HydroGraph's proprietary detonation technology – Hyperion System– produces turbostratic graphene that is:

- 99.8% pure
- 2 to 7 layers thick
- Identical from batch to batch
- High value
- Uses very little energy
- Green: using acetylene & oxygen as feedstock with net-zero emissions
- Scalable
- Modular design that can be deployed virtually anywhere

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PATENTED TECHNOLOGY

"The Hyperion method to create graphene is an example of an elegant synthesis. Fill a chamber with acetylene and oxygen, ignite the mixture with a small spark, and voila, high-purity graphene is formed."

> Dr. Chris Sorensen, the creator of the Hyperion process

Patent Filed

REACTIVE GRAPHENE

Graphene/Graphene Oxide Core/Shell Particulates and Methods of Making and Using the Same

Market Problem

Certain high-valued applications require additional functionalization to:

- Enhance bonding and integrating graphene with other materials
- Bring attractive properties, such as tensile strength, elasticity and conductivity, to more complex materials
- Address applications in a vast number of areas, including:
 - Medicine and biology
 - Resins and composites
 - Dispersions
 - Functional coatings
 - Plastics

HydroGraph Patented Solution

HydroGraph has responded by producing Reactive Graphene, which can bond more easily to other materials thanks to its reactive shell that is functionalized with carboxylic acid groups.

- HydgroGraph leaves the graphene inner core intact, a huge advantage compared to standard graphene oxide which is only 70% carbon content vs. HydroGraph's 96%.
- HydroGraph's reactive graphene is a "pristine functionalized graphene"
- Due to the success of the material, HydroGraph has extended the product line to include a host of other functionalizations

PATENTED TECHNOLOGY

"We can tailor this graphene to virtually any application; just name it. We can perform the entire palette of organic chemistry reactions on the graphene's surface and keep it intact. The future is extremely bright with regards to us integrating graphene into just about any material you can imagine"

> - Dr. Stefan Bossman, HydroGraph's lead chemist