

The logo for ZEN, featuring the letters Z, E, and N in a stylized, white, sans-serif font. The letter 'E' is composed of three horizontal bars, with the middle bar being a bright yellow color, while the other two are white. The background of the slide is a dark blue, textured surface with a grid of interconnected nodes and lines, resembling a molecular or atomic structure.

ZEN

ZEN Graphene Solutions

Investor Presentation
February 2021

TSXV: ZEN
OTCQB: ZENYF

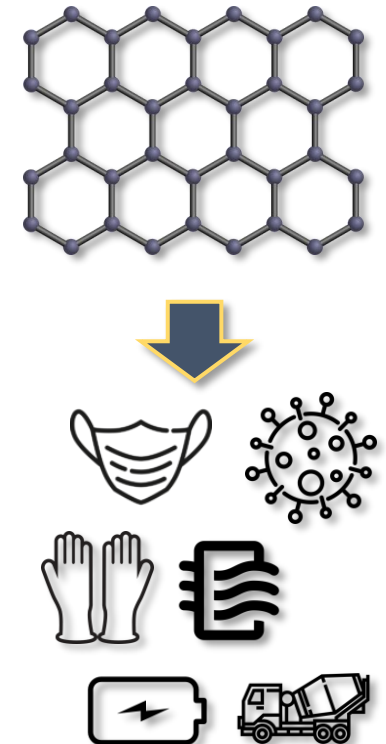
- ⌘ Creators of next-gen graphene-enhanced technology
- ⌘ Developers of IP for practical applications
- ⌘ Pursuers of better products for people and the environment

What is Graphene?

- A nanomaterial consisting of a single layer of carbon atoms arranged in a honeycomb lattice that has extraordinary properties

Why is it Unique?

Attribute	How it Can Be Used
200x stronger than steel	Composite materials & alloys; additive to rubber, plastics, concrete
Stretches to 120% of its original size	Coatings, additives & wearable technologies
10x thermal conductivity of copper	Composite materials, polymers, coatings, concrete, heat sinks/spreaders
Impermeable to hydrogen	Filters, H ₂ O purification, desalination, gas storage, hydrogen generators
1000x capacity of copper	Longer battery life, faster charge times, semiconductors
Electrons can move at near speed of light	Improved speed / efficiency of computer chips
Extremely high surface area-to-mass ratio	Transport antimicrobial agents to target viruses, bacteria and fungi





- Potential medical breakthrough treatment for human-contracted pathogens with far-reaching and extremely positive impacts for society
- Biocidal coating on PPE helps protect people against pathogens, like COVID-19



- Graphene has shown significant promise for water filtration given its permeability properties



- Potential for graphene to be used in solar cells and next generation batteries for energy storage



- Pure graphene is 200 times stronger than steel. Graphene-enhanced aluminum and concrete can lead to stronger and more sustainable form of building materials and infrastructure development



- Graphene-based coating on air filtration media has the potential to reduce human contact with pathogens
- Graphene has shown significant promise for water filtration – and potentially waste management – given its permeability properties



- Graphene-enhanced applications can allow countries to strengthen infrastructure and resilience against climate-related hazards
- Potential for enhanced and cleaner energy solutions and more sustainable infrastructure development can allow countries to implement and meet more aggressive emission and climate polices and targets

Graphene is a next gen nanomaterial with enormous potential to help protect people, the environment and help us make meaningful progress toward the UN's sustainable development goals¹.

We are just scratching the surface on graphene's potential to make the world safer, cleaner and more efficient

What We Focus On

Why It Matters

1

Monetizing Our Current Opportunities

Commercializing our existing graphene-based product intellectual property (IP)

Cash Generation

- There is significant need and demand for our existing proprietary solutions
- Generates cash flow to support future growth and creates shareholder value

2

Optimizing Our Supply Chain

Long-term vertical integration strategy focused on development graphene production capacity, supply agreements and our 100% owned Albany Pure™ Graphite deposit

Production Execution

- Ensures competitive, consistent and stable input for our proprietary graphene-based solutions (*i.e., graphite and GO for coating/compound production*)
- A well-established supply chain, production processes and marketing presence in the graphene space gives us an extremely strong footing ahead of potentially tremendous market growth

3

Building Our IP Portfolio

Positioning ourselves to thrive by developing partnerships and securing new IP in high-growth areas like advanced materials, clean tech, green energy and alternative therapeutics




Future Growth Engine

- There are numerous applications for graphene. We need to understand the most attractive and practical opportunities to ensure we allocate resources and establish partnerships to functionalize graphene and develop IP in the right areas
- Protects our ability to serve high-growth markets with proprietary solutions

Biocidal Coating Development

- We have developed a non-toxic, biocidal coating that is proven to be 99+% effective against the SARS-CoV-2 virus. Testing was completed at Western University's BSL-3 ImPaKT facility
- The viricidal coating can be utilized on PPE, filtration media (HVAC filters) and other materials such as paper, cardboard etc.
- Global provisional patent filed for this biocidal coating
- The coating has been successfully tested against bacteria and fungi as well, with results demonstrating greater than 99.9% efficacy based on ISO standards. Provides for significant opportunity beyond COVID-19
- Precursor to the development of our potential medical breakthrough: a proprietary, graphene-based compound with antibiotic, antiviral and antifungal properties for potential therapeutic use for humans

Commercializing our existing graphene-based product IP is a top priority

Target Market	Estimated Size	Where We Can Create Value	Timing
 Personal Protective Equipment (PPE)	> US \$52.0B ¹ (global)	<ul style="list-style-type: none"> Biocidal coating on masks, gloves and other PPE to protect front-line workers, the public and reduce spread of pathogens (including COVID-19) 	Q2 2021 First sales under Trebor RX mask agreement expected (Masks) (Gloves)
 Air Filtration	> US \$66B ²	<ul style="list-style-type: none"> Biocidal coating on air filters to kill airborne pathogens in homes, schools, hospitals and commercial and industrial spaces 	Imminent No additional approvals required; supply chain dependent
 Therapeutics	> US \$100B ³ (Represents total global market estimate for antibiotics, antiviral drugs and antifungal drugs annually)	<ul style="list-style-type: none"> Antiviral, antifungal and antibacterial treatment of respiratory tract infections, sinusitis and topical wounds 	TBD Longer timeline, but potential to be expedited if eligible for WHO Solidarity Trials ⁴

¹ Source: 2019 estimate per fortunebusinessinsights.com; over \$90B in 2027 (Accessed Jan 2021)

² Source: 2020 global HVAC filter estimate of US \$12.9B per fortunebusinessinsights.com; 2020 US furnace filter market estimated at US \$21.3B per researchandmarkets.com (Accessed Jan 2021). Management estimates US represents 40% of global furnace filter demand for illustrative purposes only

³ Source: 2020 antibiotic technologies market per researchandmarkets.com (US\$44M); 2019 antiviral market estimate per statista.com (US\$52M); 2019 antifungal market estimate per bccresearch.com of US\$14B (Accessed Jan 2021)

⁴ Solidarity is an international clinical trial to help find an effective treatment for COVID-19, launched by the World Health Organization and partners. [Link](#) (Accessed Feb 2021)

Assumptions:

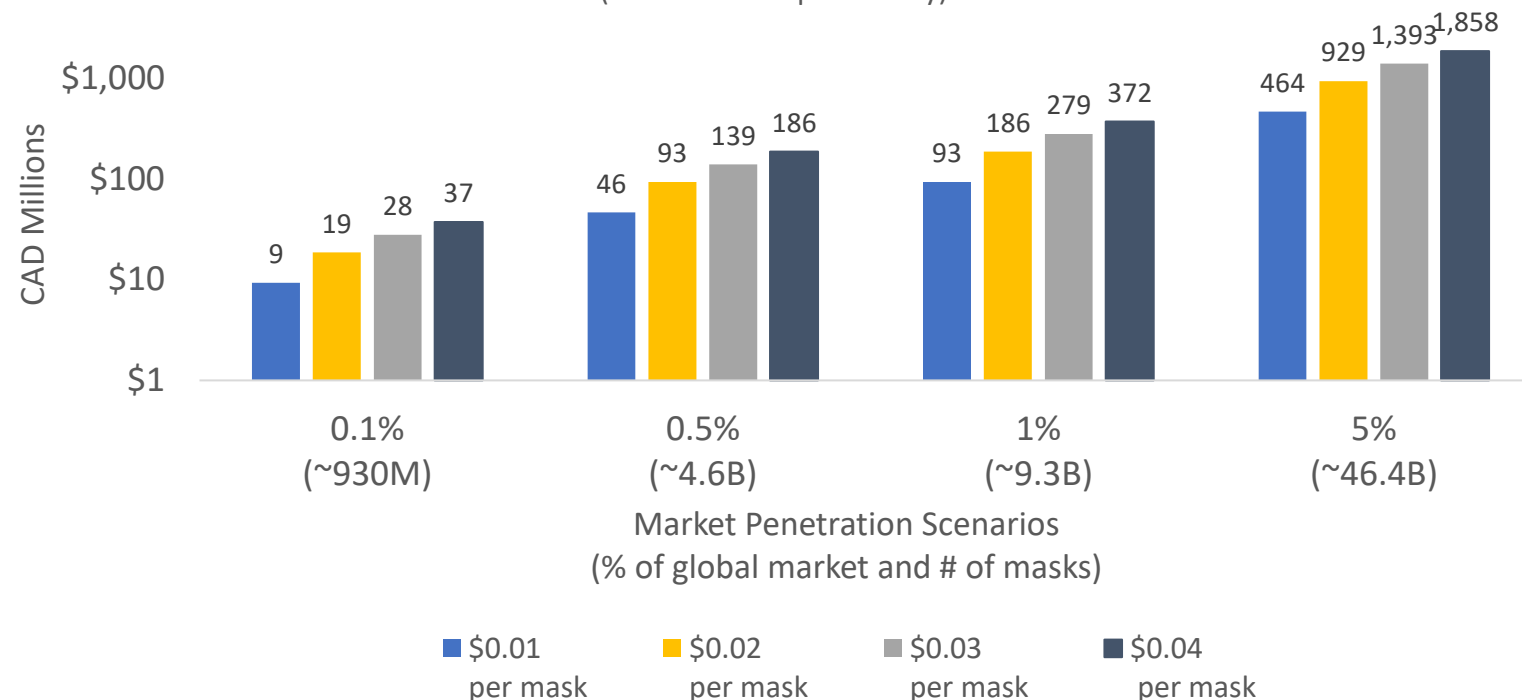
- 1.5 trillion masks being used globally per year ¹
- We believe steady state demand could be ~60% of current need or ~930 billion
- We assume gross margin per mask could range from \$0.01 to \$0.04

Other Considerations:

- Secular shift in societal approach to PPE expected to support global demand above pre-pandemic levels (hospitality, food, janitorial etc.)
- Governments seeking to build PPE reserves
- Increase in aging population globally means a higher number of higher-risk patients in the healthcare system and in public
- Emerging market usage represents significant growth opportunity

Market Penetration and Gross Margin Scenario Analysis

(Illustrative Purposes Only)



¹ Source: Estimate per ASC Publications "COVID-19 Pandemic Repercussions on the Use and Management of Plastics" (accessed Jan 2021)

Assumptions:

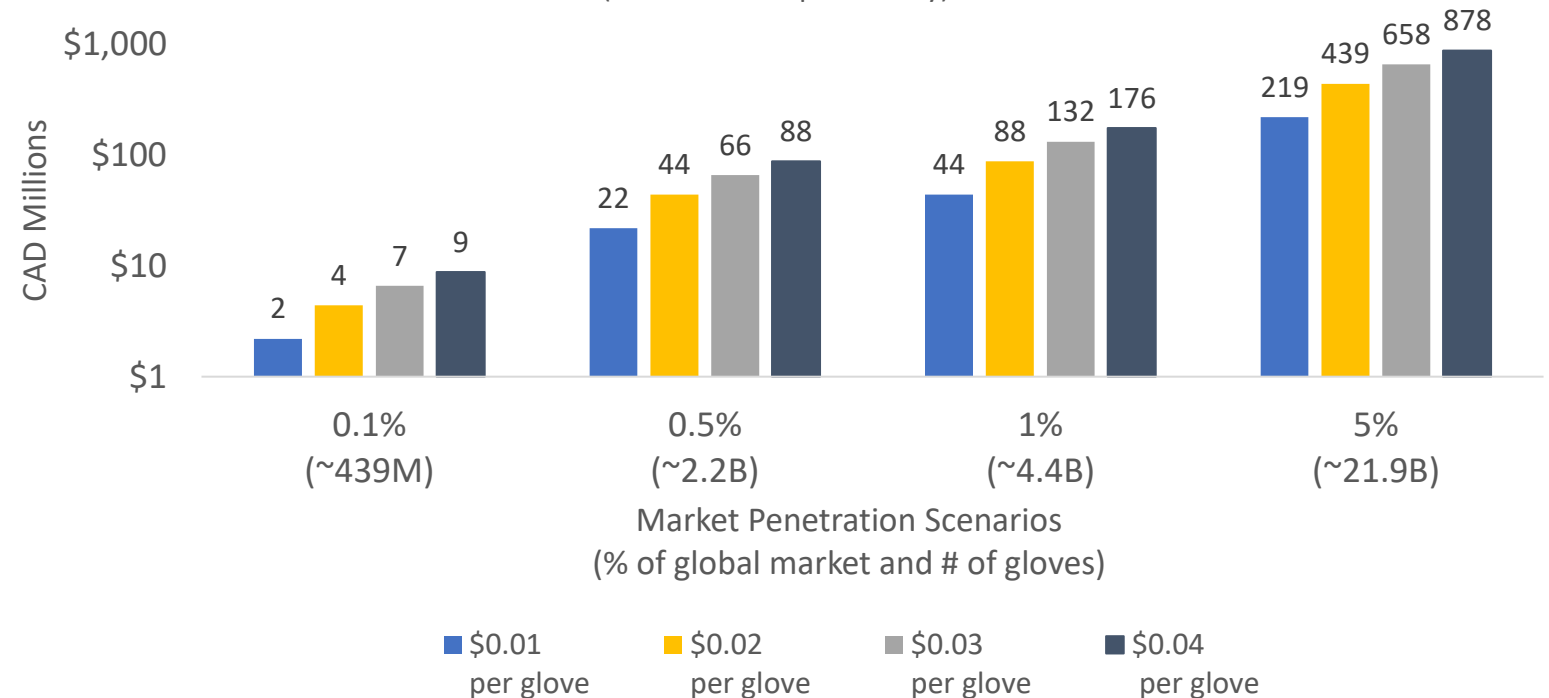
- 585 billion gloves are needed globally per year ¹
- We believe steady state demand could be ~75% of current need or ~439 billion
- We assume gross margin per glove ranging from \$0.01 to \$0.04

Other Considerations:

- Secular shift in societal approach to PPE expected to support global demand above pre-pandemic levels (hospitality, food, janitorial etc.)
- Governments seeking to build strategic PPE reserves
- Increase in aging population globally (higher number of higher-risk patients in healthcare system & in public)
- Emerging market usage represents huge growth opportunity (Asia is ~80% lower than North America today ¹)

Market Penetration and Gross Margin Scenario Analysis

(Illustrative Purposes Only)



¹ Source: Ansell Oct 27, 2020 Capital Markets Day presentation (accessed Jan 2021)

Achieved To-Date

Intellectual Property

- ✓ Patent pending secured on graphene-based biocidal coating with 99.9% effectiveness against viral, fungal and bacterial activity; 98% effective after 108 days

Testing & Approvals

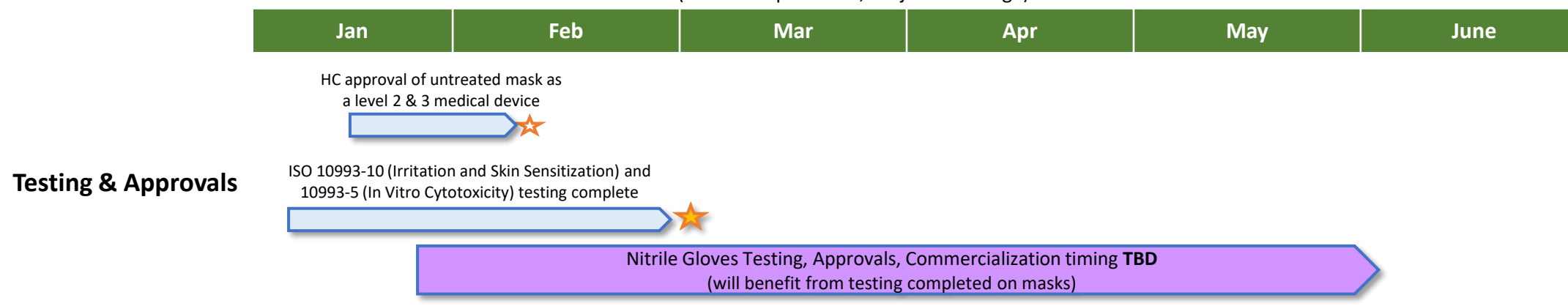
- ✓ Confirmation from two third-party testing organizations that our biocidal coating does not inhibit flow rates in mask material
- ✓ Masks without coating received Health Canada (HC) approval as a level 1 medical device

Commercialization

- ✓ Binding letter of intent with Trebor Rx for a first-year minimum of 100M masks/filters with biocidal coating
- ✓ Agreement with Trebor Rx for application of coating on a minimum of 100M nitrile gloves for the first year
- ✓ Hired an engineering company (Bantrel) to design and source the equipment for the production of our proprietary formula at industrial scale

Upcoming Milestones

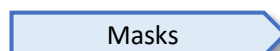
(Current expectation; subject to change)



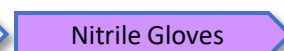
Legend:



Milestone
Achieved



Masks



Nitrile Gloves

1 Air Filtration Market Opportunity

Assumptions:

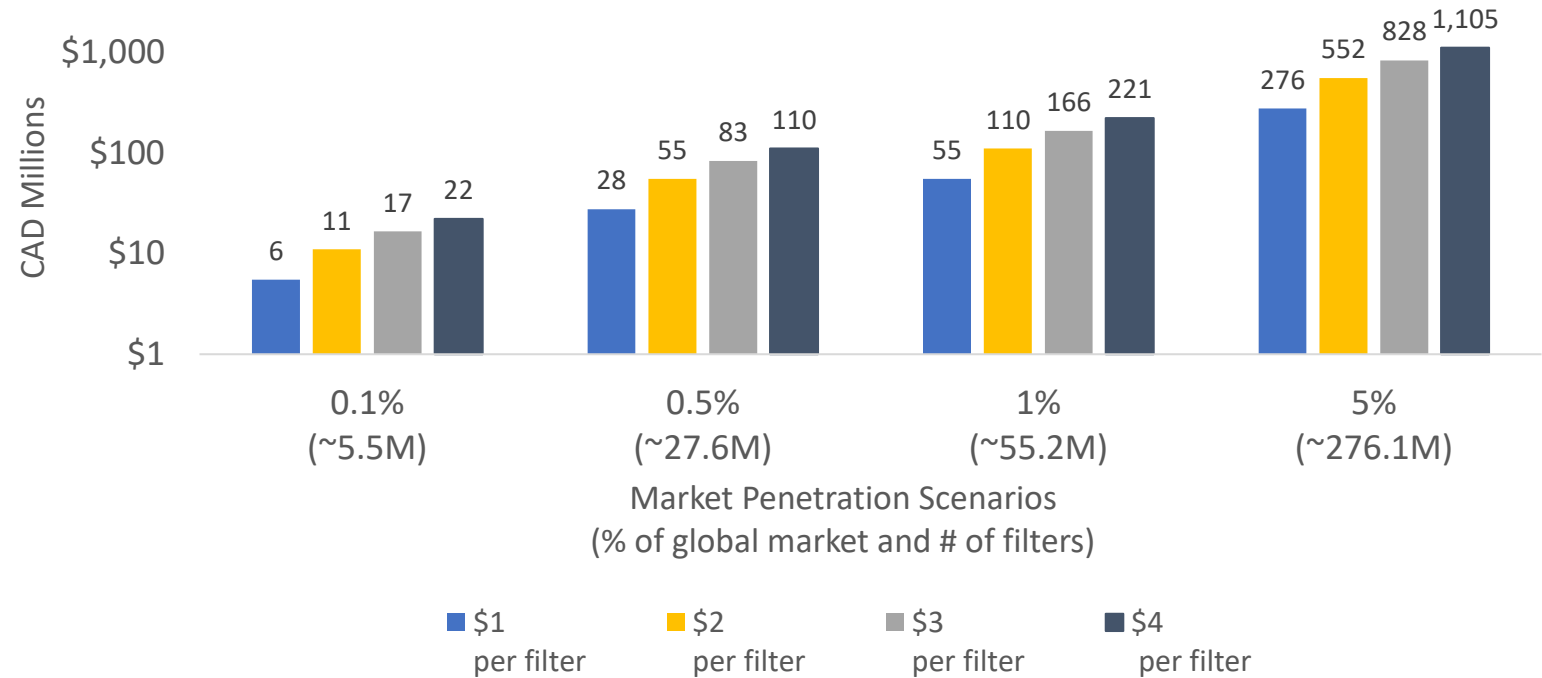
- Estimated 2020 air filtration market of US\$66.3B¹
- Volume assumes average cost per filter of ~US\$12

Other Considerations:

- Secular shift in approach to air quality and safety – especially for airborne viruses like COVID-19 – expected to support global demand above pre-pandemic levels (hospitals, schools, commercial, industrial, residential, air travel)

Market Penetration and Gross Margin Scenario Analysis

(Illustrative Purposes Only)



Actively exploring opportunities and partnerships to begin commercializing our coating on air filtration media

¹ Source: 2020 global HVAC filter estimate of US \$12.9B per fortunebusinessinsights.com; 2020 US furnace filter market estimated at US \$21.3B per researchandmarkets.com (Accessed Jan 2021). Management estimates a global furnace filter market of ~\$53.3B assuming the US represents 40% of global furnace filter demand for illustrative purposes. **10**

1 Therapeutic Market Opportunity



Tony Mazzulli, MD, FRCPC, FACP

Microbiologist-in-Chief & Infectious Diseases Specialist

Professor, Depts. of Lab. Medicine & Pathobiology and Medicine, University of Toronto

- World-class research at Mount Sinai Hospital by Chief Microbiologist Dr. Tony Mazzulli
- ZEN has developed a broad-spectrum compound 99.9% effective against viruses, bacteria and fungi
- Testing exhibited very low MIC to achieve 99.9% effectiveness
- Initial cytotoxicity indicates our graphene-based compound is very safe. All animals dosed at 2,000 mg/kg (~32,000 times the MIC) survived and appeared normal during the post observation period; no gross findings at necropsy for these animals
- Potential for upper and lower respiratory tract infections as well as topical for eyes and ears
- Phase 2 cytotoxicity testing on lab animals at Nucro Labs underway with results expected soon

1 Therapeutic Market Opportunity



We spend over US \$100B on treating viruses, bacteria and fungi in humans each year globally

> US \$44B¹

Estimated amount spent globally on antibiotics to fight bacteria

> US \$52B²

Estimated amount spent globally on antiviral drugs

> US \$14B³

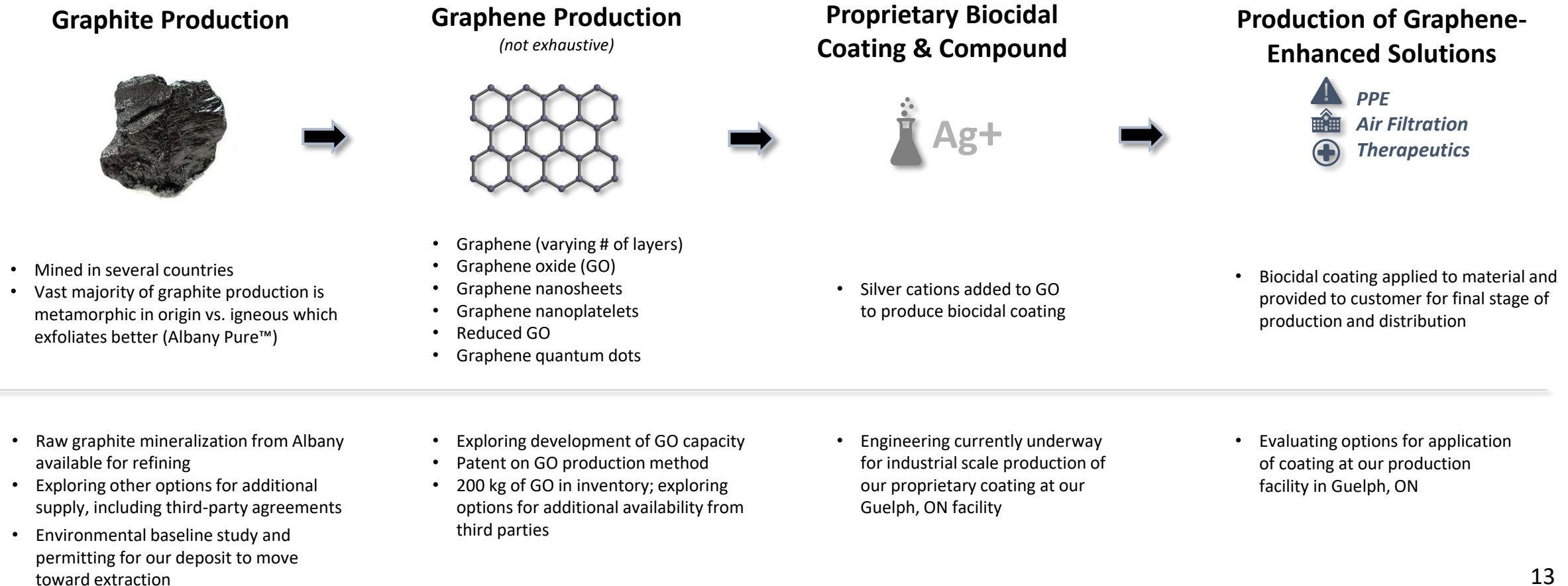
Estimated amount spent globally on antifungal drugs

If proven to be safe, our broad-spectrum compound that is 99.9% effective against viruses, bacteria and fungi could be a potential medical breakthrough treatment for human-contracted pathogens with far-reaching and extremely positive impacts for society



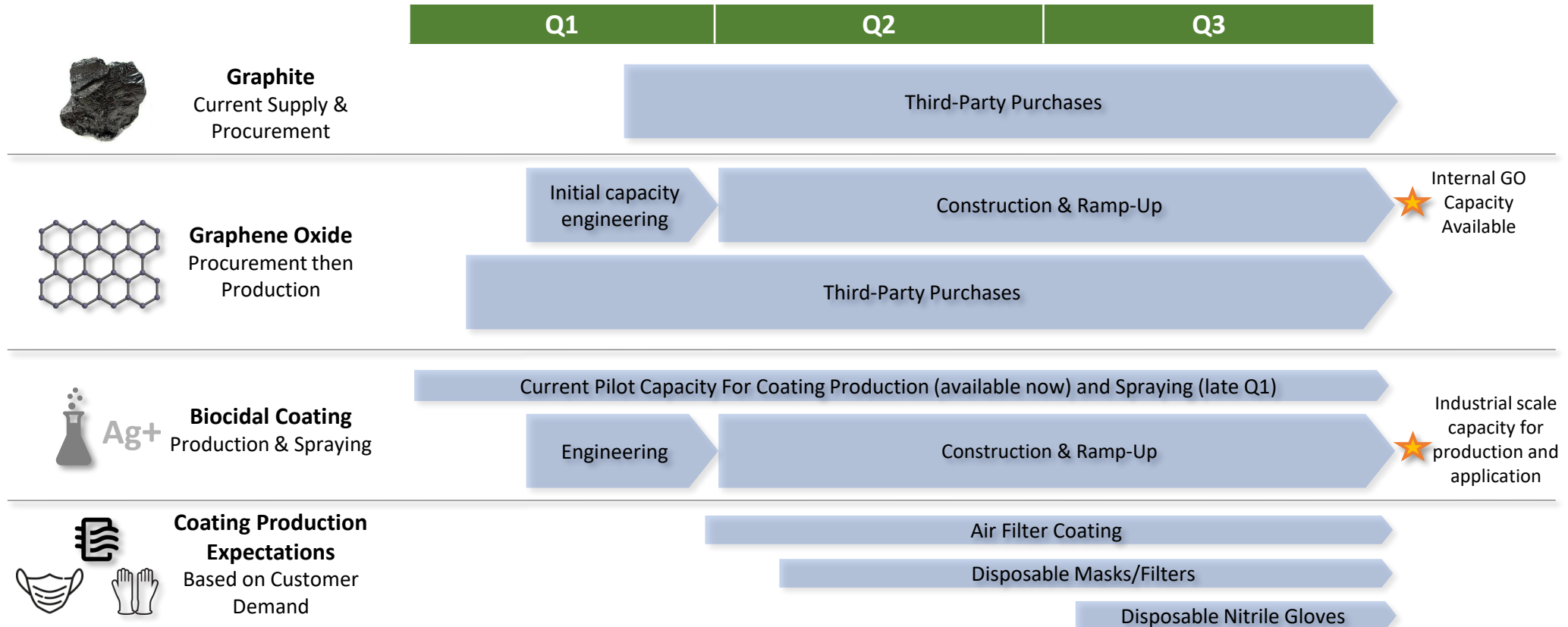
According to Dr. Mazzulli: 'In the clinical setting, if GO-Ag+ can be shown to be safe and effective, it could provide a breakthrough alternative therapy with potentially significant impact on the practice of family medicine'

Long-term vertical integration strategy focused on development of graphene production capacity, supply agreements and our 100% owned Albany Pure™ Graphite deposit



Upcoming Milestones

Current expectation; subject to change



We will leverage currently available capabilities – supplemented by third-party purchases – to meet near-term demand for our coating while we invest in our own internal capacity and integrate our supply chain.

Longer term, our graphene oxide capacity gives us optionality to supply other end-use markets we don't serve directly.

Positioning ourselves to thrive by developing partnerships and securing new IP in high-growth areas

Growth Market	Graphene Enhancement Opportunity	Potential Benefits & Applications
Healthcare & PPE	<ul style="list-style-type: none"> • Biocidal coating/compound • Aptamer virus detection 	<ul style="list-style-type: none"> • External protection from viruses, bacteria and fungi (PPE, air filtration, surfaces) • Potential for a targeted internal application to eliminate human pathogens and infections • Rapid, ultra-sensitive, low-cost biosensor to detect antigens/antibodies
Advanced Materials	<ul style="list-style-type: none"> • Graphene synthesis & quantum dots • Aluminum • Cement-based composites • Polymers 	<ul style="list-style-type: none"> • Graphene production at scale to help de-risk supply chain • Enhanced strength and electrical conductivity for automotive industry • Enhanced strength and longevity for construction industry • Enhanced strength, longevity and conductivity; versatile replacements for metallic electromagnetic shields
Green Energy	<ul style="list-style-type: none"> • Aerogel and Li-ion batteries; graphene-wrapped silicon anode 	<ul style="list-style-type: none"> • Lower-cost, reduced weight, higher performance and capacity energy storage applications
Clean Technology	<ul style="list-style-type: none"> • Membrane for dehumidification • Corrosion protective coating 	<ul style="list-style-type: none"> • Remove humidity with significant reduction in energy (air conditioning) • Reduce corrosion and enhanced longevity for steel

Academia



Government



Corporate



- ✓ Commercialization of our proprietary graphene-based biocidal coating for the PPE and filtration markets
- ✓ Pursuing commercialization of our potential medical breakthrough: a proprietary, graphene-based compound with antibiotic, antiviral and antifungal properties for potential therapeutic use for humans
- ✓ De-risking supply chain by vertically integrating graphite and GO production for our biocidal compound, including permitting and environmental baseline study at our Albany graphite deposit
- ✓ Continuing to develop high-impact graphene applications and building our IP portfolio

TSXV: ZEN
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Shared Issued	86,024,597		As of: December 31, 2020
Warrants	604,688	@ \$0.80	Expiry: June 22, 2021
Warrants	1,413,571	@ \$0.50	Expiry: December 9, 2021
Warrants	1,565,753	@ \$0.80	Expiry: July 6, 2022
Options	7,031,667	Avg. Weighted price: \$1.13	
Fully Diluted	96,640,276		

This presentation contains "forward-looking information" within the meaning of applicable Canadian securities legislation and United States federal securities laws. Forward-looking statements include, but are not limited to, estimates and statements with respect to ZEN Graphene Solutions Inc. future exploration and development plans, objectives or goals, to the effect that ZEN Graphene Solutions Inc. or management expects a stated condition or result to occur, including the PEA, expected timing for release of sample analyses and a resource estimate, the expected uses for graphite or graphene in the future, and the future uses of the graphite from ZEN Graphene Solutions Inc. Albany deposit, the adequacy of ZEN Graphene Solutions Inc. financial resources, business plans and strategy, and other events or conditions that may occur in the future. Generally, forward-looking information can be identified by the use of forward- looking terminology such as "potential", "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". These forward-looking statements are subject to a number of assumptions, risks and uncertainties, many of which are beyond our control, which could cause actual results to differ materially from such forward-looking statements. As such, undue reliance should not be placed on these forward-looking statements. The forward-looking statements in this presentation are made as of the date hereof and ZEN Graphene Solutions Inc. disclaims any intention or obligation to update or revise any forward-looking statements in this presentation as a result of new information or future events, except as may be required under applicable Canadian securities legislation or applicable US federal securities laws.

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Appendix

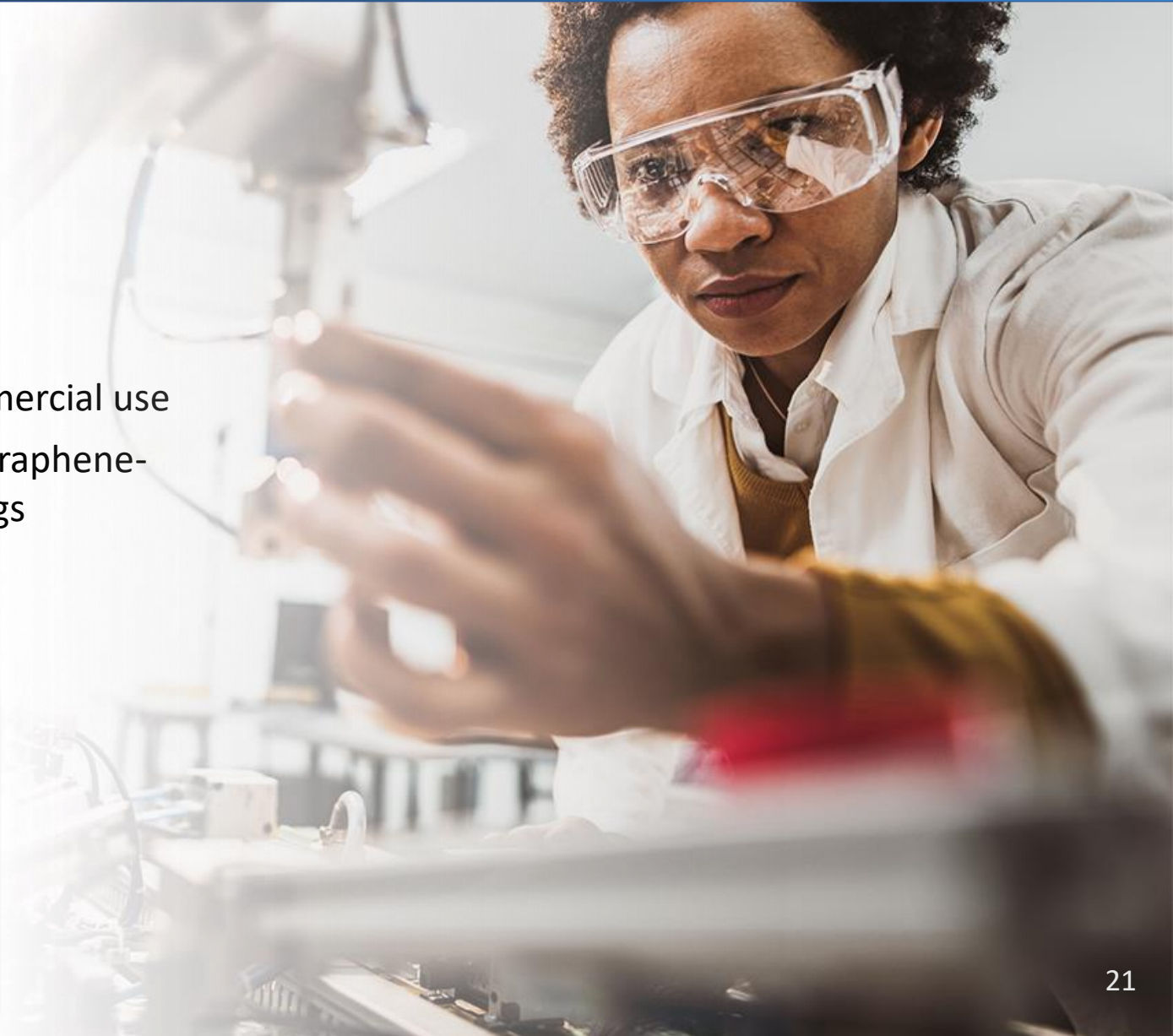


New Manufacturing Facility – Guelph, Ontario

- 1 Newly constructed ~25,000 sq ft of B1 industrial zoning in Guelph, Ontario
- 2 3-year lease with 3-year option beginning February 1st, 2021



- Graphite purification and graphene production
- Scaling up production capacity
- Graphene products available for R&D and commercial use
- Working on a variety of applications including graphene-enhanced composite materials, inks and coatings



- Graphene is a nanomaterial that requires unique knowledge and processing in order to functionalize in an application. This unique knowledge and process is intellectual property that can be protected through a patent or trade secret
- ZEN currently owns or has an exclusive license on four provisional patents and continues to develop and license additional patents for graphene applications. Additional patent filings are expected in the coming months
- An internally developed, provisional patent for a biocidal coating has led to the execution of the company's first commercial supply agreement

PROTECTION

- Graphene ink as a coating for personal protective equipment and surfaces
- Silver-doped graphene oxide has virucidal properties
- Applied to the outer layer of PPE (masks), killing significant amount of virus
- Could be utilized as a coating in medical operating rooms, paints, etc.

RAPID DETECTION

- Aptamer-assisted graphene oxide-based technology
- For a rapid virus & antibody/antigen detection test
- Ultrafast technology, 5 – 10 minutes
- Low cost, less than \$5.00 per test
- Ultra-sensitive detection (<200 pM IgG/IgM)

- Energy-efficient graphene-based membrane cooling systems
- ZEN and Evercloak partnership received NGen award-July 2020
- Evercloak's advanced manufacturing process makes large area ultra-thin nanomaterial membranes that can easily separate water vapor from air
- Evercloak's membrane system reduces the energy use of air conditioners by efficiently removing humidity prior to the traditional vapor compression cooling system

In Partnership with:

evercloak.

NGen
Next Generation
Manufacturing Canada

NRCan Breakthrough
Energy Solutions Canada

- Graphene-based corrosion protection coatings are being developed to protect against corrosion in ships' hulls as well as equipment used in the construction, petrochemical and transport sectors. Testing shows improved wear resistance, extend engine life, increase fuel efficiency, and increased engine power in vehicles.
- Preliminary results on the use of ZEN's Graphene in an epoxy corrosion-inhibiting coating for steel showed minimal corrosion (3% of surface) after 10 days when exposed to highly corrosive saline solution vs other samples.
- ZEN has received a Mitacs Elevate grant to fund a two-year project studying graphene as a corrosion protective coating for steel.



Work at University of Toronto

- Increased Compressive Strength by 39% with a low loading of 0.02% Graphene
- Increased Flexural Strength by 81% with a low loading of 0.02% Graphene Oxide



Work at Ben Gurion

- Faster curing time - from 28 to 8 days
- Use 25% less cement therefore reduce CO₂ by same amount
- Increased compressive strength by 34% and tensile strength by 62%



- Applications work on Albany tailings as a partial cement replacement and filler material for the concrete industry
- Currently seeking industrial partnerships focusing initially on large volume markets for graphene

- Waterloo University - Dr. Pope's team worked with ZEN's material to develop a graphene-wrapped silicon anode material. The current battery technology uses graphite as an anode which has roughly 370 mAh/g of capacity. Dr. Pope's team demonstrate 1600-1800mAh/g. The weight includes both the silicon and carbon and has > 90% capacity retention over 300 cycles
- DLR and UBCO - Collaboration has created a Graphene Aerogel composite anode material using ZEN's material. Preliminary results were achieved with a 2 wt.% loading of Graphene dispersed in aerogel and resulted in an initial specific discharge capacity of 2800 mAh/g and a discharge capacity of 1300 mAh/g after 50 cycles at a current capacity of 186 mA/g.
- UBCO - The addition of 5% rGO from ZEN to the Carbon Black anode material increased the capacity from 115 mAh/g to 488 mAh/g while a battery consisting of 100% rGO had a capacity of 840 mAh/g.

ZEN's graphene precursor material is from a unique graphite resource located in Ontario

Unique Geology & Near Infrastructure

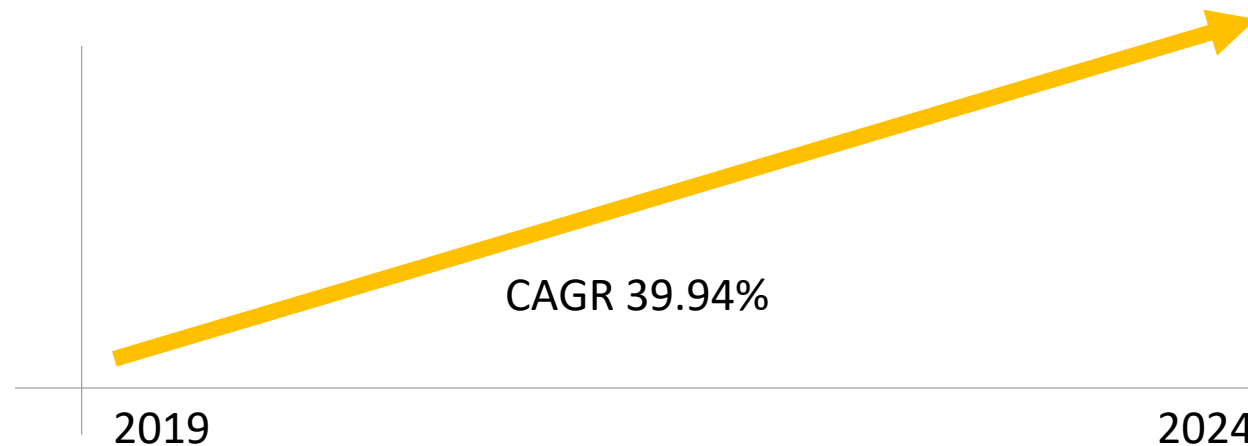
- Albany Graphite yields a significant advantage in the production of graphene products
- A very rare, large resource of igneous-hosted, fluid-derived microcrystalline graphite
- Easily accessible and located near infrastructure (railway, road, and ports)
- Albany Deposit is located on Constance Lake First Nation traditional lands. MOU signed in 2018 towards creating a Project Partnership Structure (PPS) to guide the deposit development. The PPS ensures shared governance, decision-making and support for community engagement.

Large Graphite Resource

- Total Indicated Cg Resource: 968k tonnes
- Total Inferred Cg Resource: 445k tonnes



A BURGEONING INDUSTRY – MASSIVE GROWTH POTENTIAL



The 2019 Canaccord UK research report estimates worldwide graphene sales are likely to take off over the next few years reaching US\$4.8B by 2030

Graphene's commercial potential lies in its ability to enhance and improve existing materials at a very low load factor making it a viable solution in the cost/benefit calculation for commercial applications

Markets in which graphene is already competing with other additives amount to more than US\$150B in value

Canaccord's central case implies a Compound Annual Growth Rate (CAGR) of 45% in revenue over a decade 2030E from current levels

Approximate offer prices for various product types (listed in USD per ton)

TYPE OF GRAPHENE	PRICE PER TON*
GNP	\$30,000
MLG	\$40,000
FLG	\$90,000
vFLG	\$750,000

*These are base prices for these products. Parameters that could affect prices include flake size (lateral dimensions), degree of functionalization purity and structural (intrinsic) defects - it is not yet clear how the market values these qualities

Source – The Graphene Council, April 2019