**ASX ANNOUNCEMENT**

4th April 2024

# Significant efficiency improvements achieved at Henderson graphene manufacturing facility

## Highlights

- **New German-made Retsch mill enables 60% improvement in downstream process efficiency and makes milling process 67% more cost effective**
- **A faster, more efficient drying facility with Micrea microwave due to be commissioned in mid-2024 to further improve the production process and save labour and energy costs**
- **Optimisation trials and equipment supported through Federal Government Manufacturing Modernisation Fund Grant**
- **Overall improvements in plant efficiency over the past 12 months include 32% improvement in the production rate, 25% reduction in power costs and greater ability to provide a wider range of graphene products to meet customer requirements**

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First Graphene Limited (ASX:FGR; "First Graphene" or "the Company") is pleased to provide an update on equipment upgrades and ongoing optimisation trials making its WA-based Henderson processing and production facility more efficient.

Phase 2 Electrochemical Cell (EC) optimisation activity commenced in May 2023 and follows the successful Phase 1 implementation, completed in 2022.

Phase 2 includes the addition of best-in-class equipment and machinery designed to improve production capacity and further reduce power consumption and associated costs, which were already reduced by circa 50% during Phase 1.

**Retsch mill trials enable superior product**

Introduction of a new German-made Retsch mill to Henderson in Q1 FY2024 and its subsequent commissioning has resulted in production of more uniform particle size distribution for PureGRAPH® powders along with a lower, more consistent density.

Improvements in particle size aids a more enhanced dispersion of PureGRAPH® into target materials, imparting greater benefits to overall material performance and characteristics. This advancement reinforces the Company's superior product offering to the industry and further strengthens our market position.

The mill's unique design has allowed an improved milling process that provides the capability to produce industrial-scale volumes of PureGRAPH® powders with higher surface area and consistent

morphology. In turn, this marks a 60% improvement to downstream process efficiency and a 67% more cost effective milling solution compared to previous methods.

The advanced and user-friendly mill design also reduces powder handling, and important OHS improvements that minimises labour associated with feeding graphene cake into the mill. As such, the unit cost of producing powdered PureGRAPH® products has reduced.

Figure 1: FGR Commercial Manager Neil Armstrong with commissioned Retsch grinding mill.

**UK-designed Micrea microwave procured to enable further product enhancements**

As part of the A$759,000 Round 2 Manufacturing Modernisation Fund (MMF) grant received by FGR from the Federal Government in 2021, the Company has ordered a Micrea microwave that will speed up drying times of wet graphene.

The microwave dryer module has been ordered and its build is already underway, with FGR expecting to take delivery of the unit mid-year from UK-based manufacturer Micrea.

Reducing wet graphene cake drying time will remove a major bottleneck in the processing of PureGRAPH® powders at the Henderson facility. This faster process also requires less energy and further reduces the labour involved, leading to additional reductions in unit product cost.

There is significant evidence from in-house and external work that use of microwave drying technology for graphene production will provide FGR options for new grades of graphene, enabling a pathway to scaling up pre-milling and catalyse improvements to functionalisation activity.

**Phase 2 Electrochemical Cell (EC) optimisation trials near completion**

Phase 2 EC optimisation trials commenced at the Henderson facility in May 2023 and have so far reached more than 400 hours of running time. Among key improvements achieved to date are:

- An increase in the overall PureGRAPH® production rate by approximately 32% per cell more than the rate achieved in Phase 1 trials.
- A reduction in specific power requirements by 25% from that achieved in Phase 1 trials.
- Better understanding of EC basket design and how it can influence production improvements.

First Graphene will continue to test and optimise a range of additional variables prior to making a final decision on implementing all production facility design changes at full scale.

Successful completion of Phase 2 optimisation trials will culminate in the production of a prototype basket incorporating all design changes, which, if deemed to materially improve production rates and product quality, will be rolled out across all 10 baskets in two ECs.

The Company's drive to reduce production cost and processing is focused on maximising margin and being able to increase capacity of smaller, more time-consuming products.

Increased interest and demand for PureGRAPH® 5 means the Company is taking commensurate steps to ensure capacity to supply what has been historically an expensive product to make and requires a long processing time.

First Graphene anticipates Phase 2 optimisation trials will be complete in Q2 2024.

**First Graphene Managing Director and CEO Michael Bell said:**

*"First Graphene is in the business of developing and producing PureGRAPH® products that play a vital role in decarbonising industrial scale manufacturing and help meet the push towards greener economies.*

*We are walking the talk when it comes to investing in state-of-the-art production processes and equipment at our Henderson facility in Western Australia.*

*Bringing down production costs, particularly through reducing power consumption and achieving improved throughput efficiencies, is quickly being realised at Henderson, where we continue to refine our approach to PureGRAPH® manufacturing.*

*We look forward to making ongoing refinements to our processes, ensuring PureGRAPH® is a long-term, sustainable solution to help achieve decarbonisation objectives for our customers."*

**This release has been approved for release by the Chairman.**

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## About First Graphene Ltd (ASX: FGR)

*First Graphene Limited is focused on the development of advanced materials to help industry improve. The Company is a leading supplier of graphitic materials and product formulations with a specific commercial focus on large, high-growth global markets including cement and concrete; composites and plastics; coatings, adhesives, silicones and elastomers (CASE); and energy storage applications.*

*One of the key benefits of these advanced materials is the reduction of carbon dioxide emissions, whether directly through a reduction in output of these harmful greenhouse gases or lower energy usage requirements in manufacturing, or indirectly due to enhanced performance characteristics and extending the usable life of products.*

*First Graphene has a robust manufacturing platform based on captive and abundant supply of high-purity raw materials, and readily scalable technologies to meet growing market demand. As well as being the world's leading supplier of its own high performance PureGRAPH® graphene product range, the Company works with multiple industry partners around the world as a supplier of graphitic materials and partner to research, develop, test and facilitate the commercial marketing of a wide range of sector-specific chemical solutions.*

*First Graphene Ltd is publicly listed in Australia (ASX:FGR) and has a primary manufacturing base in Henderson, near Perth, WA. The Company is incorporated in the UK as First Graphene (UK) Ltd and is a member of the Graphene Engineering Innovation Centre (GEIC), Manchester, UK, where it has a strong marketing and R&D capability.*