

4th September 2023

FGR and partners awarded A\$2 million for graphene enhanced solar cell research

Highlights

- **Ultra-low-cost perovskite solar cell project awarded A\$2 million from Cooperative Research Centre Project (CRC-P)**
- **First Graphene participating in R&D activity to scale up cost effective manufacturing of emerging photovoltaic (PV) technology**
- **Collaboration includes Halocell Energy (Lead Partner), First Graphene Limited and Queensland University of Technology**

First Graphene Limited ("ASX: FGR"; "First Graphene" or "the Company") is pleased to announce a R&D collaboration with Greatcell Energy Limited, trading as "Halocell Energy" (Halocell), and Queensland University of Technology (QUT) has received a Cooperative Research Centres Project (CRC-P) grant of A\$2,028,773.

The grant was awarded under Round 14 of the Australian Government's CRC-P collaborative research funding stream and will support the project over three years.

The project aims to commercialise ultra-low-cost, flexible perovskite solar cell fabrication using Halocell's roll-to-roll (R2R) production process at its Wagga Wagga plant.

Scalable fabrication would help meet an anticipated 31% compound annual growth rate in the perovskite solar cell market, estimated to be valued at US\$7.38 billion by 2030¹.

Among key project outcomes will be FGR's development of cost-effective graphene-based electrode replacements for high-cost conductor materials, such as gold and silver, used in cell production.

Cells made with alternative carbon-based materials have been found to outperform conventional silicon cells in low and artificial light conditions, including indoor environments, in relation to generating and supplying power for niche applications.

Halocell Energy has already had success utilising carbon electrode materials such as graphene in its perovskite cells, increasing efficiency by up to 38% and reducing production cost by over 83%.

First Graphene's focus in this project will be on the research, development and provision of

¹ <https://www.verifiedmarketresearch.com/product/perovskite-solar-cell-market/>

graphene formulations to produce the material ink used in perovskite solar cell manufacturing with suitable dispersion, low toxicity and high conductivity characteristics.

FGR will provide R&D resources including labour, equipment, laboratory space, formulation and testing expertise to produce optimum graphene systems, with a view to scale up and supply graphene products in the latter phases.

QUT will provide expertise in material development, facilities for advanced material characterisation and testing, and assistance in developing the R2R process for perovskite cells and module production.

First Graphene Managing Director and CEO Michael Bell said:

“Graphene’s unique properties as a carbon-based replacement in conductive environments means it is increasingly considered for use in energy storage and transfer applications.

Our collaboration with Halocell Energy and QUT will help develop new materials and processing technology for high performance perovskite solar cells, opening the door for high-tech commercial materials and manufacturing of cell components in Australia.

Validation of these graphene-based materials will help build a strong business case for full-scale commercial production of both perovskite cells and the materials needed to make them in large volumes.

Our team is looking forward to this exciting opportunity presented by research partners in Australia, with very strong applications for Australians as we continue to move through the energy transition.”

Halocell Energy CEO Paul Moonie said:

“Thin Film Solar technology is the future of ultra low-cost manufacturing in Australia, as recognised by Federal Government’s critical technologies list.

Halocell Energy has an established tradition of getting the science right with research institutions and materials science companies, and we always start with the end in mind: being able to reliably manufacture commercial-ready modules at low cost with enhanced performance.

Working with QUT and First Graphene for this Project is an exemplar of our real-world approach. QUT as the university for the real world and First Graphene as the reliable producer of graphene-based materials with high end performance characteristics.”

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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 outcomes these advanced materials offer 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 Tier 1 partner at the Graphene Engineering and Innovation Centre (GEIC), Manchester, UK, where it has a strong marketing and R&D capability.

With authority of the board, this announcement has been authorised for release by Aditya Asthana, Chief Financial Officer and Company Secretary.