



ASX Announcement
2 July 2014

SER SEEKS LOW COST GRAPHENE BREAKTHROUGH WITH NEW UNIVERSITY GRANT

- **Graphene based Australian Research Council Linkage Grant awarded to SER and Monash University.**
- **Since its first production only a decade ago, the pure carbon allotrope graphene has been the focus of considerable research and speculation.**

Strategic Energy Resources Limited (ASX: SER) is pleased to announce that with our partners Monash University we have been awarded our second Australian Research Council Linkage Grant. To date SER and Monash have been the only successful applicants for graphene based research.

The title of the research grant is “Green Manufacturing of Graphene from Indigenous Natural Graphite and Graphene-based Nanofiltration Membranes”.

The research team will establish a green chemical route for transforming an industrial by-product into high-value material. Through using graphite fines, which is a low cost product, to create graphene, which is currently has a high cost, the intention is to value-add but also to reduce the cost of graphene.

The team will develop scalable coating methods for producing asymmetric, inert, robust, and highly permeable graphene membranes. These will allow the safe and economical treatment of corrosive mining effluents and the recovery of precious metals.

This research is already underway by our team and has led to very encouraging results for water purification.

The team involved is Dr. Mainak Majumder (Nanoscale Science and Engineering Laboratory (NSEL), Mechanical and Aerospace Engineering, Monash University, Clayton, Victoria), Prof. Huanting Wang (Chemical Engineering, Monash University, Clayton, Victoria), Dr. Zhe Liu (Mechanical and Aerospace Engineering, Monash University, Clayton, Victoria), Prof. Dibakar Bhattacharyya (Chemical Engineering, University of Kentucky, USA), Dr. Anita Hill (CSIRO, Clayton, Australia), and Mr Mark Muzzin and Mr Anthony Rechner from SER.

Monash plans to hire a postdoctoral researcher and a PhD student to help with the proposed research.

The contributions for the successful application are as follows:

ARC has approved \$255,000 over three years, while SER/Graphitech Pty Ltd (a wholly owned subsidiary of SER) will contribute \$120,000 over three years. The total budget is \$375k.

The goal of the research is to investigate radical new approaches to reduce chemical and energy requirements for transformation of indigenous natural graphite to a high-value material - graphene.

Graphite used here is the by-product of the Uley mine located near Port Lincoln, South Australia.

Graphene is atomically a thin arrangement of carbon atoms with combinations of remarkable chemical inertness, strength, and massive surface area.

Utilizing fluid phase dispersed graphene, we will develop scalable and industrially-adaptable methods to manufacture thin yet mechanically robust, inert, fouling-resistant, highly-permeable graphene-based asymmetric membranes.

These advanced membranes will find wide application in reducing discharge of mining effluents and recovery of precious metals.

To date the researchers with SER have already developed 'super-sand' - a novel core-shell granule structure composed of sand grains coated with graphene layers. In this study, we will continue to develop advanced filtration membranes that will have widespread use in water purification and separation processes.

About Linkage Projects

Linkage Projects supports research and development projects which are collaborative between higher education researchers and other parts of the national innovation system, which are undertaken to acquire new knowledge, and which involve risk or innovation.

Proposals for funding under *Linkage Projects* must involve a Partner Organisation from outside the higher education sector. The Partner Organisation must make a significant contribution in cash and/or in kind, to the project that is equal to, or greater than, the ARC funding.

Under the *Linkage Projects* scheme, the ARC provides opportunities for postgraduate and postdoctoral researchers to engage in industry-oriented research training and enables postdoctoral researchers to pursue internationally competitive research opportunities in collaboration with industry.

The objectives of *Linkage Projects* are to:

- encourage and develop long-term strategic research alliances between higher education organisations and other organisations, including with industry and other end-users, in order to apply advanced knowledge to problems and/or to provide opportunities to obtain national economic, social or cultural benefits;
- enhance the scale and focus of research in National Research Priorities;

- foster opportunities for postdoctoral researchers to pursue internationally competitive research in collaboration with organisations outside the higher education sector, targeting those who have demonstrated a clear commitment to high-quality research;
- provide outcome-oriented research training to prepare high-calibre postgraduate research students; and
- produce a national pool of world-class researchers to meet the needs of the broader Australian innovation system.

For more about SER see:
www.strategicenergy.com.au

Further Information:
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