

Talga Resources Ltd
ABN 32 138 405 419
1st Floor, 2 Richardson St,
West Perth, WA 6005
T: +61 8 9481 6667
F: +61 8 9322 1935
www.talgaresources.com

Corporate Information
ASX Code **TLG**
Shares on issue **181.9m**
Options (unlisted) **24.8m**
Options (listed) **44.9m**

Company Directors
Keith Coughlan
Non-Executive Chairman

Mark Thompson
Managing Director

Grant Mooney
Non-Executive Director

Stephen Lowe
Non-Executive Director

TALGA LAUNCHES GRAPHENE PRODUCTS BUSINESS STRATEGY

Highlights

- **Plan to manufacture targeted ‘fit for purpose’ graphene products to complement supply of raw graphene and graphite materials**
- **Additional commercial opportunities being targeted through licensing arrangements with third parties using Talga products and processes**
- **Strategy to pursue revenue opportunities during pilot processing stage, prior to full-scale production**

Advanced materials company, Talga Resources Ltd (“Talga” or “the Company”)(ASX: TLG) is pleased to outline its updated commercialisation strategy.

Talga is seeking to unlock early commercialisation opportunities based on the production of four specific graphene products for use within targeted industrial markets. The development of these product lines is in addition to the supply of raw graphene and graphite materials which has been the Company’s focus to date.

The new strategy is a progression made possible by the growth of Talga’s pilot plant facility in Germany. Recent equipment scale up and a significant boost to the Company’s technical team enables this new ‘applied products’ capability and expedited path to associated sources of revenue.

Talga has previously identified four prime industry sectors as potential markets for its graphene materials, namely coatings (including inks for printed electronics), polymer composites, building products and energy storage/harvesting. Within these sectors Talga will now direct its pilot plant output and future revenue focus to four targeted products:

- A metal pre-treatment coating
- An electrically conductive ink
- A conductive cement product
- A high performance membrane for energy storage/harvesting

Talga believes its strategy to produce tailored (dispersed, functionalised and formulated) products and the continued expansion of production capabilities will provide the most effective, near-term



opportunities for commercialisation. In-house and industry partner testing programs, as well as field and benchmarking product trials will continue and be expanded to confirm performance results and support commercialisation progress.

Talga's updated strategy will be supported by a number of recent initiatives including:

- the scale-up of Talga's pilot test facility to Phase 2;
- positive results from internal and industry partner testwork;
- the appointment of a Chief Technology Officer; and
- the recent successful capital raising to fund next stage expansion.

Talga Managing Director, Mark Thompson commented:

"Talga's pilot scale graphene processing accomplishments in Rudolstadt and growing commercial relationships have provided us with a clear picture of new emerging opportunities and how best to capitalise on these in the shorter term.

We have assessed dozens of market opportunities that have led us to focus on specific targeted large volume applications, enabling us to move faster to products, hand in hand with the raw materials. This approach is intended to create a platform from which Talga can secure validation and commitments from customers before full scale production".

Products

Talga's four initial commercial products will be developed contemporaneously with existing raw material initiatives (which includes lithium ion battery anode products). Summaries of the value-add products are provided below:

1. Metal Pre-Treatment Coating

Graphene added to coatings such as paint and metal pre-treatments has been demonstrated in research to significantly improve corrosion resistance. Graphene's anti-corrosion attributes relate to its chemical inertness, conductivity and its impermeability to fluids and gases.

According to the Global Corrosion Association (NACE), the international cost of corrosion is two trillion USD per annum. Control of steel corrosion often requires coating systems using galvanisation (zinc coating) or chromatising (hexavalent chromium ("chrome VI")). Due to the adverse effects of chrome VI on human health and the environment, its use is heavily restricted and legislation in the United States and Europe demands its replacement in coatings. Similarly the fluctuating cost of zinc, high weight and high loadings required for effectiveness (~+90% loading in metal corrosion coatings) have become a concern for industry. Graphene is earmarked by many to replace chrome VI and reduce zinc in some applications, particularly where highly aggressive corrosion conditions exist (i.e. where metals are exposed to chemicals, high humidity and salt) or where weight is a significant factor (electric vehicles).

Talga has been working with its collaboration partner Tata Steel UK Limited on corrosion coatings, amongst other products, and recently Talga has sponsored a PhD qualified Prime Minister's Fellowship researcher at the Indian Institute of Technology Bombay, who is focused on graphene's application in protective coatings. Results of these programs will provide a platform for product development.

2. Conductive Ink

The global conductive ink and paste market includes demand for large area electronics such as solar panel photovoltaics, flexible electronics such as RFID tags and high performance polymer (plastic) additives. Today's conductive inks often rely on nano-silver and carbon black which are high cost additives. Graphene could present a lower cost alternative with similar performance and functionality.

Graphene inks are highly tolerant to bending stresses and can be produced with inkjet, 3D printing and industrial roll to roll processes. They may also be incorporated directly into textiles and fabrics for the emerging 'wearable' electronics sector.

Talga is developing a conductive ink to replace or reduce the amount of silver used in photovoltaics and be useful for printed battery applications. This product will also be used to develop a graphene enhanced polymer offering lower weight and higher thermal and electrical performance in automotive applications. By hybridising or replacing copper and aluminium heating elements and wires significant weight reductions can be made, assisting electric vehicles in particular where there is high demand for increased battery life and vehicle range.

3. Cement Additive for Conductive Concrete

Different types of graphene used in published cement mix trials has been shown to improve strength, impermeability, resistance to surface abrasion and most importantly for Talga, to make concrete electrically and thermally conductive.

A conductive concrete can be warmed cheaply using low voltage electrical current applied directly to the concrete, compared to the currently expensive methods of underlaying hot water pipes and electrical wires. Large domestic markets exist for underfloor heating and snow-free driveways while large industrial markets include ice-free roads/rail crossings, bridges, footpaths, outdoor stairs and airport aprons.

Talga has been collaborating with a European cement company to produce a graphene cement additive that suits current market formulations, distribution and handling procedures. Talga will look to undertake a joint research program with a European university that provides product trial data to support industry adoption and partnerships. Work to date has shown the Talga product can also incorporate the 'solid waste' of graphene processing as an additive to some products.

4. High Performance Membranes

Membrane technology for liquid filtration is undergoing significant development due to global challenges related to water supply and sanitation, stricter environmental regulations for manufacturing and increasing demand in developing regions.

Graphene membranes show great promise to address these applications due to the ultra-thin film's capacity for more efficient and selective separation of minerals or molecules from water and other liquids. Together this can enable filtration using much less energy resulting in lower costs.

Talga has undertaken preliminary development work on a polymer electrolyte membrane product which utilises the thinner (few layered) graphene from its proprietary (patent pending) production process. This product targets commercial membrane and separator applications in water filtration, fuel cells, mineral processing, medical/pharmaceuticals and energy storage (batteries). Market researcher Freedonia estimate current global membrane demand to be worth US\$17.5 billion and current major membrane manufacturers include General Electric, 3M, Toray and EMD Millipore (Merck).

Background

Talga set up its German pilot testwork facility to:

- Scale up and optimise the novel Talga graphene production process with future full scale engineering outcomes in mind; and
- Provide materials for industry testing and customer development for future full scale production and financing.

Testwork began in late 2014 with a small team to move from bench-scale to commercial equipment, and gain insights that are not possible from an academic laboratory.

The initial aim was to produce graphene additive materials for all large-volume market sectors. With the benefit of several design and equipment modifications, along with extensive industry dialogue, it is now possible to focus the landscape of broad opportunities to a targeted range of sectors, and now products.

Work to date includes collaborations with universities and major corporations, as well as sample/product analysis and feedback.

Talga now has sufficient development momentum and scale to concentrate on intermediate (value-added) products and formulations, protecting intellectual property around those and evolving to a supplier-customer level relationship with industry.

For further information, visit www.talgaresources.com or contact:

Mark Thompson
Managing Director
Talga Resources Ltd
T: + 61 (08) 9481 6667

Jeremy McManus
Commercial Manager
Talga Resources Ltd
T: + 61 (08) 9481 6667