# **TALGA RESOURCES**



# PATERSONS

#### TICKING THE BOXES

#### **Investment Highlights**

- Talga Resources (TLG) is a graphite company that represents a unique play on the anticipated commercialisation of large scale graphene and ultra-thin graphite applications. In addition to the ongoing product evaluation, feedback, and product optimisation being performed by a range of companies around the globe, the Company continues to test the scalability of its liberation process at its pilot test work facility in Germany. Installation and commissioning of Phase 2 equipment and testing is underway. We maintain our Speculative Buy recommendation on the stock.
- Operations and Marketing Update TLG has developed a pilot test work facility in Germany to optimise the processing technique, test its scalability and provide early commercial sample volumes of graphitic products in order to develop strong customer relationships and bridge the gap in availability of supply as R&D is conducted into new commercial applications. The Company has completed Phase 1 of the scaled pilot test work and the assembly and commissioning of Phase 2 of the operations is imminent. Phase 2 exfoliation, entails the use of 50kg ore samples (Phase 1 used 10kg samples). Phase 3 is expected to commence by the end of 2016. On the marketing front, while the majority of TLG's efforts have been focussed on the potential for graphene, the Company has continued to develop its direct relationships with potential customers and this work has highlighted the opportunity to supply into an existing market for ultra-thin nanographite and micrographite.
- Test work on graphite processing for Li-ion batteries In February 2016, TLG announced the results of independent test work performed on its Vittangi graphite ore, in processing into refined natural graphite, for use in producing the anode used in lithium-ion batteries. The findings indicate that commercial grade energy capacity in Li-ion battery anodes can be delivered, without the need for milling, purification, spheronisation, or coating. The Company intends to undertake more comprehensive follow-up test work.
- Update on sale of Pilbara Gold Project TLG recently confirmed that it had received the balance of the \$200k option payment from Beatons Creek Gold Pty Ltd (Beatons). Beatons has now paid A\$250k as part of the transaction to purchase TLG's Pilbara Gold Projects for up to A\$1m in cash. Beatons now has the right to exercise the Option and pay the balance of the proceeds of up to A\$750k (A\$250k per option exercised over each of the three assets) to be received within two years of the date of the agreement (due by 11 August 2017). TLG retains a 2.25% gross royalty payable on the net smelter return (NSR) of minerals extracted from any of the Projects prior to the exercise of the Option, and 1.5% in perpetuity thereafter. The Company's other remaining gold asset (Bullfinch), located in the Yilgarn region of Western Australia, remains the subject of ongoing discussions with a number of parties.
- Catalysts The clear short term catalyst for TLG is the successful demonstration of large scale, low cost graphene and graphite production at its pilot test work facility through the various phases, combined with the relationships developed with end-users developing near term commercial scale applications of graphene and ultra-thin nanographite and micrographite. While the Company is currently providing samples free of charge, a further catalyst will be the transition to a revenue model coupled with the successful conclusion of pricing point/s for the graphene products produced. Longer term, the decision to proceed with a full scale plant development is expected to be a key milestone, as we expect this will be timed with a ramp-up in demand from identified end-users requiring bulk volumes of product for commercial applications.

| 4 April 2016   |   |
|--|---|
| 12mth Rating   | Speculative Buy   |
| Price  | A\$ 0.285   |
| RIC: TLG.AX  | BBG: TLG AU   |
| Shares o/s<br>Free Float<br>Market Cap.<br>Net Debt (Cash) | m 146.3<br>% 89.8<br>A\$m 41.7<br>A\$m (5.03)               |
| 3m Av. D. T'over<br>52wk High/Low                          | A\$m 0.07<br>A\$ 0.48/0.235                                 |
| Analyst:<br>Phone:<br>Email:                               | Jason Chesters, CFA<br>08 9263 1144<br>jchesters@psl.com.au |

An investment in this company should be considered speculative and note assumptions employed are contingent on broader market conditions being supportive. These can change at short notice. Recommendations are current at the time of publication.

#### 12 Month Share Price Performance \$0.50 1.6 \$0.45 1.4 \$0.40 12 \$0.35 Share Price (\$) \$0.30 \$0.25 \$0.20 \$0.15 \$0.10 \$0.05 \$0.00 12 Months



#### **EXECUTIVE SUMMARY**

TLG is a graphite and graphene focussed Company, with five wholly owned graphite mineral projects located in Sweden (Figure 1). Two of the projects (Vittangi and Jalkunen) have particular attributes, being high grade (according to TLG Vittangi is the world's highest grade JORC or Canadian equivalent graphite resource at 24.4%), with high rock competence and highly conductive particle morphology (Figure 2). This allows for the unique outcome of liberating graphitic carbon products (graphene and ultra-thin graphite) directly from the graphite ore using a one-step electrochemical exfoliation processing route (no crushing or grinding required).

In October 2014, TLG completed a Scoping Study over the Vittangi Graphite and Graphene Project indicating a pre-tax NPV of A\$490m, with indicated production of 46kt of graphite product and 1kt of graphene. The Company has subsequently trebled its global resource with the announcement (27 August 2015) of the Maiden JORC Mineral Resource at Jalkunen of 31.5Mt @14.9% graphite. This took its global JORC Mineral Resource across three projects (including both 2004 and 2012 based JORC requirements) to 43.4Mt for 6.85Mt of contained graphite.

TLG has developed a pilot test work facility in Germany to optimise the processing technique, test its scalability and provide early commercial sample volumes of graphitic products in order to develop strong customer relationships and bridge the gap in availability of supply as R&D is conducted into new commercial applications. The Company has completed Phase 1 of the scaled pilot test work and the assembly and commissioning of Phase 2 of the operations is imminent. Phase 2 exfoliation entails the use of 50kg ore samples (Phase 1 used 10kg samples).

In a validation of the work TLG has conducted to-date, it has been recently inducted as an Associate Member of the European Union founded 'Graphene Flagship' program, joining the likes of Bosch and LEGO. In addition, the Company recently signed a Collaboration Agreement with Tata Steel UK Limited to jointly explore opportunities across graphene supply, processing and development of graphene applications. In a more recent independent study, TLG's Vittangi graphite ore was processed and proved that commercial grade energy capacity in Li-ion battery anodes can be delivered without the need for milling, purification, spheronisation, or coating.

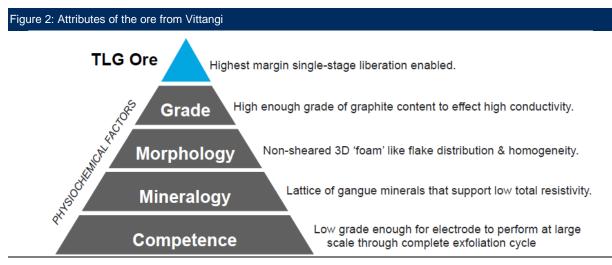
We consider TLG as well placed to provide a low-cost bulk graphene and ultra thin graphite supply into existing and new growth markets. We initiate coverage on TLG with a Speculative Buy recommendation.

NORWAY **FINLAND** Vittangi TALGA Jalkunen Pajala SWEDEN Raitajärvi Legend Talga Graphite Project Talga Iron Ore Project Talga Copper Project Iron Ore Mine Copper/Gold Mine Piteå City/major Town Port Major Road/Highway Railway

Figure 1: Location of graphite projects in Sweden

Source: Talga Resources





Source: Talga Resources

#### **COMPANY UPDATE**

#### **Operations**

From an operational perspective, TLG is currently focussed on the assembly and commissioning of Phase 2 operations at its Rudolstadt pilot test work facility, in Germany. Phase 2 exfoliation entails the use of 50kg ore samples (Phase 1 used 10kg samples), and is the next step in optimising the process, proving the scalability, and also provides for larger samples to be provided to potential customers for product testing. Phase 3 is expected to commence by the end of 2016.

TLG remains subject to its 5,000 tonne trial mining permit in Sweden. The Company extracted a portion of the permitted tonnes in 2015 and is permitted to extract the balance of the tonnes each year up to 30 September 2018. As the Company has sufficient stored material for all planned testing during 2016, the next campaign of trial mining may be delayed until 2017. TLG continues with the required environmental surveys for full scale exploitation permitting of the Vittangi graphite project.

#### Marketing

While the majority of TLG's marketing efforts have been focussed on the potential for graphene, the Company has continued to develop its direct relationships with potential customers and this work has highlighted the opportunity to supply into an existing market for ultra-thin nanographite and micrographite. The extent and opportunity in this market was not included in the 2014 Scoping Study, and represents substantial potential economic upside. A further development for TLG is the decision to focus its graphene marketing efforts on the four key target markets of; Coatings, Energy, Construction and Composites (Figure 3).

#### Figure 3: Talga graphene target markets

#### Coatings

- Replace chrome and zinc in anticorrosion & antifouling
- Electric and thermal conductive
- Current market 40Mt/a worth over \$150 billion/annum

#### Construction

- insulation foam
- lighter, stronger cement (current cement additives market alone \$13.6 billion)
- functional glass



# Energy

- Li ion batteries
- Flow batteries
- Fuel cells
- Solar panels
- printable circuits



#### Composites

- stronger, lighter plastics
- 3D printing inks
- flexible conductive materials



Source: Talga Resources



### **Battery test work**

In February 2016, TLG announced the results of independent test work performed on its Vittangi graphite ore, in processing into refined natural graphite, for use in producing the anode used in lithium-ion batteries. The findings indicate that commercial grade energy capacity in Li-ion battery anodes can be delivered, without the need for milling, purification, spheronisation, or coating (Figure 4). The Company reports that this demonstrates the advantage of Vittangi graphite ore, in making multiple high value products (alongside graphene) as part of its advanced technology materials strategy. The Company intends to undertake more comprehensive follow-up test work.

Figure 4: Processing steps required compared to peers

| Talga Graphite   | Spheronised Graphite                |  |  |
|--|-------------------------------------|--|--|
| Talga Processing Steps   | Peer Processing Steps               |  |  |
| Exfoliate  | Crush                               |  |  |
| <b>\</b>   | Grind Stages                        |  |  |
| Concentrator single stage  | Flotation stages                    |  |  |
|  | Micronisation                       |  |  |
|  | Purification (chemical/thermal)     |  |  |
|  | Shaping (spheronisation)            |  |  |
| <b>\</b>   | Coating                             |  |  |
| Mix binder and dispersant  | Mix binder and dispersant           |  |  |
| Both was a series of the serie | Pattern average and its 260 mAb/s   |  |  |
| Battery average capacity ~360 mAh/g  | Battery average capacity ~360 mAh/g |  |  |

Source: Talga Resources

## **Update on Pilbara Gold Project**

TLG recently confirmed that it had received the balance of the \$200k option payment from Beatons Creek Gold Pty Ltd (Beatons). Beatons has now paid \$250k as part of the transaction to purchase TLG's Pilbara Gold Projects for up to A\$1m in cash.

Beatons now has the right to exercise the Option and pay the balance of the proceeds of up to \$750k (\$250k per option exercised over each of the three assets) to be received within two years of the date of the agreement (due by 11 August 2017). TLG retains a 2.25% gross royalty payable on the net smelter return (NSR) of minerals extracted from any of the Projects prior to the exercise of the Option, and 1.5% in perpetuity thereafter.

The Company's other remaining gold asset, Bullfinch, located in the Yilgarn region of Western Australia remains the subject of ongoing discussions with a number of parties.

## **CATALYSTS**

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#### **BOARD OF DIRECTORS**

#### Keith Coughlan - Non-Executive Chairman

Mr Coughlan has almost 30 years of experience in stockbroking and funds management where he has been largely involved in the funding and promoting of resource companies listed on the ASX, AIM and TSX. He has advised various companies on the identification and acquisition of resource projects and was previously employed by one of Australia's then largest funds management organisations.

Mr Coughlan is a current executive director of ASX listed European Metals Holdings Limited.

#### Mark Thompson - Managing Director

Mr Thompson has more than 20 years industry experience in mineral exploration and mining management, working extensively on major resource projects throughout Australia, Africa and South America. He is a member of the Australian Institute of Geoscientists and the Society of Economic Geologists, and holds the position of Guest Professor in Mineral Exploration Technology at both the Chengdu University of Technology and the Southwest University of Science and Technology in China.

Mr Thompson founded and served on the Board of ASX listed Catalyst Metals Ltd and is a Non-Executive Director of Phosphate Australia Ltd.

## **Grant Mooney - Non-Executive Director**

Mr Mooney has a wealth of experience in resources and technology markets that should assist Talga as it proceeds with the Company's dual graphene/graphite project development at its world-class deposits in Sweden. Mr Mooney serves as Director and Company Secretary to several ASX listed companies including Chair of renewable energy developer, Carnegie Wave Energy Ltd and Director of ASX-listed resource companies, Barra Resources Ltd, Carbine Resources Ltd, Phosphate Australia Ltd and Wild Acre Metals Limited. Mr Mooney is a member of the Institute of Chartered Accountants in Australia.

#### **Stephen Lowe - Non-Executive Director**

Mr Lowe is an experienced public company director. He was actively involved in managing the recapitalisation and re-listing of the former Croesus Mining NL shell into Sirius Resources NL and then served for four years as Non-Executive Chairman and Non-Executive Director through the discovery, and partially through the development phase, of the Nova/Bollinger nickel-copper deposits. He also serves as a Non-Executive Director (ex-Chairman) of ASX listed base metal explorer Windward Resources Limited and iron ore exploration and project developer, Corizon Resources Limited. He has spent the last eight years as Business Manager to the Creasy Group.

Mt Lowe holds a Bachelor of Business (Accounting), a Post Graduate Diploma in Advanced Taxation, and a Masters of Taxation from the UNSW. He is a Fellow of the Taxation Institute of Australia and a Member of the Australian Institute of Company Directors.



#### INVESTMENT RISKS

TLG is subject to a number of investment risks. The key investment risks include, but are not limited to, the following:

**Fledgling Graphene Market -** The market for graphene products is in its infancy and commercial scale applications requiring bulk volumes of product may not eventuate in a reasonable investment timeframe.

**Commodity price risk** - The market for graphite exhibits price volatility as with every other commodity and therefore holds commodity price risk. The market price for graphene is potentially inflated at current levels and would likely decline to a level that better reflects the economic reality of bulk commercial applications. This level may be dramatically lower than currently estimated.

**Geological risk** - The actual production characteristics of an ore body may be significantly different from initial interpretations and expectations, particularly in TLG's case given the unique processing route intended.

**Capital Expenditure and operating risk -** The risk that the capital and operating costs exceed budget and/or exhaust the available funding due to unforeseen circumstances before project completion, and reduce the profitability and free cash generation of the project.

**Exchange rate risk -** TLG's product sales are likely to be in US\$, its costs may be in multiple currencies and it reports in A\$, leading to exchange rate risk.

Liquidity risk - The ability of TLG to pay its creditors from its cash balances or cash generation when the payment is due.



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