TALGA RESOURCES LIMITED



Research Note

NOT JUST GRAPHITE

Investment Highlights

- Talga Resources Limited (TLG) has ownership of five graphite projects in northern Sweden, and represents a unique play on the anticipated commercialisation of large scale graphene and ultra-thin graphite applications. The Company continues to test the scalability of its liberation process at its pilot test work facility in Germany, with the Phase 2 expansion recently completed. We consider TLG as well placed to provide a low-cost bulk graphene and ultra-thin graphite supply into existing and new growth markets. Meanwhile, the Company has a significant opportunity to transform its advanced iron ore (2004 JORC Resources) and cobalt-copper deposits within its tenements package and close to infrastructure. We maintain a Speculative Buy recommendation.
- **Graphite exploration update:** The Nunasvaara deposit currently holds a JORC 2012 Indicated and Inferred Mineral Resource of 9.8Mt grading 25.3% Total Graphite Content (TGC). The Company has also completed infill resource drilling at Northern Nunasvaara, where results have shown a high grade correlation from drilling encountered further south. Northern Nunasvaara currently contributes an Inferred Mineral Resource of 1.5Mt grading 31.0% TGC. A new resource update is expected on Q1 CY2017.
- Exploration bonus track: In October 2016, drill results returned encouraging results with 85.8m at 0.18% copper and 153ppm cobalt from 14.2m. To add to TLG's strategy, Iron Oxide Copper Gold (IOCG) deposits are found elsewhere in northern Sweden. The potential to confirm further mineralisation remains open, TLG has indicated that stronger targets will be drilled in the future.
- Graphite, Iron Ore, Co-Cu-Au, all in one: TLG has 100% controlled projects located in the vicinity of the graphite projects. The area is located in a well-established mining province with skilled workforce and open access to rail, road and ports and low cost hydro power. The iron-ore project has 235Mt at 30.7%Fe (2004 JORC Resource). The Company has quoted the Kiskana project has a Ernest Henry mineralisation style and considered the largest cobalt project in Sweden.
- Vittangi trial mining: TLG has completed its second trial mining campaign at Nunasvarra (part of the Vittangi project area). The trial mining campaign extracted c.2,500t of material (as blocks of ore), in order to feed the enlarged processing capacity at the Company's pilot plant test work facility in Germany.
- **Pilot test plant update:** The expansion at the pilot plant has been successfully commissioned and is achieving expected performance. TLG is considering options for a cash flow positive Phase 3 expansion.
- Product Development and Marketing update: TLG has been actively advancing its product development and marketing initiatives, targeting early commercialisation opportunities. TLG is focused on four target sectors being: a metal pre-treatment coating, an electrically conductive ink, a conductive cement product, and a high performance membrane for energy storage/harvesting. This product strategy is in addition to the supply of raw graphene and graphite materials.
- **Catalysts**: (1) Signing key contract(s) with industry operators to sell its graphite and graphene products will be considered as confirmation of TLG's high end specs combined the successful demonstration of large scale, low cost production at its pilot test work facility. (2) The confirmation of a significant copper-cobalt-gold deposit and/or studies on its iron ore deposits. (3) Longer term, the decision to proceed with a full scale plant development is expected to be a key milestone.

19 December 2016				
12mth Rating	Speculative Buy			
Price	A\$	0.30		
RIC: TLG.AX		BBG: TLG AU		
Shares o/s Free Float Market Cap. Net Debt (Cash)	m % A\$m A\$m	181.9 80.9 52.7 (10.3)		
3m Av. D. T'over 52wk High/Low	A\$m A\$	0.10 0.395/0.156		

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Disclosure: The Chairman of Talga Resources, Keith Coughlan, is also an employee of Patersons Securities Ltd. Mr Coughlan has had no input into this report.

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.



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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 25.3%), with high rock competence and highly conductive particle morphology. 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 addition, TLG has recently completed Phase 2 commissioning and processing at its pilot test work facility in Germany. Importantly, the plant is currently achieving a 76% recovery of graphitic carbon to graphene products (Few Layer Graphene (FLG) and Graphene Nanoplatelets (GNP)). The Company has a JORC (2012) Total Mineral Resource (Indicated and Inferred) at Vittangi of 9.8Mt grading 25.3% TGC for 2.4Mt of contained graphite (using a 10% TGC low cut-off). In addition, TLG has JORC Mineral Resources at two other graphite projects in Sweden, Jalkunen and Raitajarvi. Jalkunen has a Total Inferred Mineral Resource of 31.5Mt grading 14.9% TGC, for 4.69Mt of contained graphite, while Raitajarvi has a Total Indicated and Inferred Mineral Resource of 4.3Mt grading 7.1% TGC, for 305kt of contained graphite.

The Company's product development and marketing strategy is to provide early commercial sample volumes of graphitic products in order to develop strong customer relationships and bridge the gap in availability of supply as Research and Development (R&D) is conducted into new commercial applications. The Company has a focus on four key markets for its graphene products: Coatings, Energy, Construction, and Composites. The four products are: a metal pre-treatment coating, an electrically conductive ink, a conductive cement product, and a high performance membrane for energy storage/harvesting. This product strategy is in addition to the supply of raw graphene and graphite materials, and offers the potential to provide early commercialisation opportunities during the current pilot processing stage.

Furthermore, the Company has advanced iron ore projects that host Resources of 236Mt at 30.7%Fe (magnetite, JORC 2004) at the Masugnsbyn and Vittangi projects, located in Norrbotten County in north Sweden. The projects have well understood and encouraging metallurgical (un-optimised) concentration results reflecting >68%Fe. Lastly, and within Vittangi's tenements, TLG has the Kiskama Cobalt-Copper-Gold Project quoted to have similar geological mineralisation style to Ernest Henry and described by the Company as the largest cobalt deposit in Sweden. More significantly, all three projects are adjacent to each other and close to existing infrastructure for bulk commodities. The projects are located within 30km from an existing magnetite operation.

We consider TLG as a well-placed company to provide low-cost bulk graphene and ultra-thin graphite supply into existing and new growth markets. Meanwhile, and since our last publication, we want to add a new angle to TLG's other projects in Sweden as illustrated on Figure 1. We believe that the Company has further ways to add value by exploring/optimising in parallel to its graphite aspirations. Importantly, all projects are within the same tenements, we believe that this combination presents potential synergies and cost savings whilst developing the projects. The new value change to TLG comes from the new revived iron ore market and its advanced magnetite projects, as well as review of its cobalt-copper deposit given the recent buoyant expectations for these metals.

We retain our **Speculative Buy** recommendation as we believe that the Company has more than one way to generate significant value to its shareholders from its diversified portfolio in a mining friendly jurisdiction.





Source: Talga Resources Limited

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COMPANY UPDATE

Operations

TLG has completed its second trial mining campaign at Vittangi (21 November 2016 announcement) with approximately 2,000m³ of material extracted (as blocks of ore) from the two trial mining areas. The trial mining permit forms part of a larger permit issued by the Swedish Environmental Review Commission over a part of TLG's exploration license area. The permit allows for the extraction of a total of 5,000t of graphite ore for pilot test processing, and expires on 30 September 2018. TLG has made a number of modifications to its trial mining process since the 2015 campaign: notably, tailor-made automated block cutting equipment is being used (as illustrated on Figure 2 and 3), and the extracted blocks will be stored in Sweden, ready for transport to the pilot plant in Germany when required. The last trial mining provided important data for larger scale mining in the future; the Vittangi open pit is now backfilled and rehabilitated.



Source: Talga Resources Limited

Source: Talga Resources Limited

The Company has also commenced infill resource drilling at Vittangi. The 10 hole diamond drill program, for 1,000m, was aimed to infill the high grade Northern Nunasvaara JORC Inferred Mineral Resource of 1.5Mt grading 31.0% TGC (which forms part of the total Nunasvaara JORC Resource of 9.8Mt grading 25.3% TGC). On 6 December 2016, the Company announced outstanding high grade graphite results and rated them among the highest grade graphite results globally (grades >30%) as illustrated on Figure 4. The Company expects to have a resource update from Vittangi, during Q1 CY2017.

The drilling campaign also targeted the Jalkunen project (40km south of Vittangi) testing for graphite with encouraging results. Results gave TLG a bit more than expected as one of the anomalies gave an intercept of 85.8m @ 0.18% Cu, 153ppm Co from 14.2m(LAU16001)including 15m @ 0.41% Cu, 232ppm Co from 85.0m, the highest grade was LAU16001 which included 0.7m @ 1.5% Cu, and 0.27g/t Au from 89.3m and 1.15m @ 565ppmCo from 95.5m. LAU 16001 was designed initially to test a graphite target. The potential to have a second cobalt-copper deposit remains open due to LAU 16001 not targeting the strongest electromagnetic (EM) anomaly as illustrated on Figure 5.

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Figure 5: LAU16001 and Untested EM Anomalies



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Source: Talga Resources Limited

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Since our last update, TLG has also commissioned the Phase 2 (total feed load of 365kg of ore) at its pilot processing facility in Rudolstadt, Germany. Given the good results of Phase 2, the Company is studying Phase 3 with a view of a potential commercial production. Results from Phase 2 indicate that the balance of the graphite is being recovered as micrographite (potentially for use in the construction sector). A recovery of 76% as graphene products represents a substantial increase on the level expected in the Scoping Study, and comes as a result of significant advances made in the recovery process.

Sample products from Phase 2 have been sent to different facilities to test a wide array of potential costumers and/or graphene or micrographite products. The increased capacity allows the Company to consistently produce graphene and micrographite products. Feedback from these samples will help to tailor the outcome of Phase 3 layout and product definition.

Product Development and Marketing

TLG continues to advance its product development and marketing initiatives, in tandem with its pilot plant expansion and optimisation. The Company had previously indicated its focus on four key markets for its graphene products: Coatings, Energy, Construction, and Composites (Figure 6). On 19 July 2016, TLG announced an updated commercialisation strategy, which involved the focus on four products to cater for each of these target sectors. The four products are: a metal pre-treatment coating, an electrically conductive ink, a conductive cement product, and a high performance membrane for energy storage/harvesting. This product strategy is in addition to the supply of raw graphene and graphite materials, and offers the potential to provide early commercialisation opportunities during the current pilot processing stage.



Source: Talga Resources Limited

RESEARCH NOTE – PATERSONS SECURITIES LIMITED



On 10 October 2016, TLG announced it received positive results from its lithium-ion battery program (at least 1,000 hours of testing) at the Warwick Manufacturing Group's Energy Innovation Centre, University of Warwick UK. The Company's graphite performed in line with battery grade expectations proving the possibility to use TLG's graphite as a commercial ingredient in the battery production including roll-to-roll fabrication of lithium-ion anodes and large pouch cells (cells used in electrical vehicles) without energy intensive milling or shaping due to TLG's simple and low cost graphite production. As a next step the Company will test its graphene materials which are known to enhance high rate battery performance and may enable eco-friendly water-based anode formulations to replace toxic solvents currently used in the manufacture of Li-ion batteries.

On 26 October 2016, TLG announced that TLG's materials are found to improve graphene-based sensor. Talga graphite used to make higher performing graphene-based sensors suitable for widespread environmental, healthcare and automotive applications. Sensors showed a 10 fold increase in sensitivity over other materials outcome of one of these peer reviews.

CORPORATE

TLG currently has 181.9m ordinary shares on issue. In addition, the Company has 44.9m quoted options (exercisable at A\$0.45/share, expiry 31 December 2018), and 36.2m unlisted options (various expiry dates and strike prices).

As at 30 September 2016, TLG had A\$10.3m in cash and has listed investments of \$1.3m in TSX-listed Novo Resources Corp (received as part of the payment from the sale of its Pilbara Gold Projects). The Company estimated that cash outflows for the December 2016 Quarter would amount to A\$2.74m. The Company has no debt.

CATALYSTS

In our view, given the current climate change in commodities, several catalysts could ignite TLG's value. The most 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. In parallel, an additional short-term catalyst would be the outcomes of the Prefeasibility Study.

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.

Meanwhile, the iron ore and cobalt-copper-gold deposits could present a new revised value front for the Company. The iron ore deposits have JORC (2004) Resources and well understood metallurgical properties with open mineralisation. The cobalt-copper project has its own story to tell given the recent demand spike for lithium batteries in the car sector. The Project had 105 diamond drilling dating back to 1970s (approximately 90 of them still available) and are under sampled as <70% of the core was tested for cobalt-copper and gold.

We highlight that all of the above projects are located within the same tenements which could provide important synergies for future development. Furthermore, the projects are located in a mining region, close to existing bulk infrastructure, available power and have local trained workforce. The full extent of the geological potential of TLG's ground is yet to be understood giving the high conductivity of iron ore (magnetite), sulphides and graphites. Exploration to date has demonstrated that targeting graphite and intercepted breccia-hosting sulphides that host cobalt-copper has merits.

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 the Company as it proceeds with the Company's dual graphene/graphite project development at its world-class deposits in Sweden. Mr Mooney serves as Director to several ASX listed companies, and 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 currently 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. Given that TLG had A\$10.3m in cash as at 30 September 2016, we see this as a low probability risk in the near-term.





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