

# QUARTERLY ACTIVITIES REVIEW FOR THE PERIOD ENDING 31 MARCH 2019

## Talga Resources Ltd

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## Corporate Information

ASX Codes **TLG**

Shares on issue **218.7m**

Options (unlisted) **19.4m**

## Company Directors

### Terry Stinson

Non-Executive Chairman

### Mark Thompson

Managing Director

### Grant Mooney

Non-Executive Director

### Stephen Lowe

Non-Executive Director

### Ola Mørkved Rinnan

Non-Executive Director

Australian advanced materials technology company, Talga Resources Ltd (**ASX:TLG**) (“**Talga**” or “**the Company**”) is pleased to report its activities for the quarter ending 31 March 2019.

Talga is building a vertically integrated business with wholly-owned, world-class graphite mineral resources, processing innovations and technologies, to produce advanced energy and smart materials at the forefront of the global sustainability shift.

Highlights of the March 2019 quarter activities included:

## COMMERCIAL & PRODUCT DEVELOPMENT

- Exceptional low-temperature performance results from Talnode®-C Li-ion battery anode graphite product
- Positive commercial qualification of Talnode®-C in fast charge/high battery power tests with premium electric motorcycle manufacturer
- Successful update of Talga’s silicon anode product Talnode®-Si to ~70% more energy density than graphite-only Li-ion battery anodes
- Agreement with Germany’s Schunk Carbon Technology GmbH for joint co-operation exploring incorporation of Talphene® into automotive applications

## MINERAL PROJECT DEVELOPMENT & EXPLORATION

- New survey success at Kiskama cobalt deposit in north Sweden identifies new, larger geophysical conductor
- Successful maiden drilling program at Niska North graphite prospect generates the widest mineralised intercepts to date from the Vittangi project. Initial assay results expected in May
- Subsequent breakthrough pilot metallurgical tests of Vittangi graphite confirms production of Talnode®-C using ‘off the shelf’ equipment, opening up development options
- Incorporation of enhancements to cause short delay in delivery of pre-feasibility study

## CORPORATE & INVESTOR RELATIONS

- Sweden operation expanded with second office and key appointment
- Presentations at globally significant industry events
- Cash balance of A\$10.9 million as at 31 March 2019
- Market capitalisation of A\$132 million as at 31 March 2019



**Managing Director, Mr Mark Thompson:** *“This has been another highly successful quarter of activity across all four divisions. Talga graphite and graphene products have continued to outperform in independent tests and market qualification by global corporates active in the battery, electronics and automotive sectors. In addition, exploration of our Swedish graphite and cobalt holdings has increased our mineral asset value and generated additional development opportunities. These commercial options can be optimised without compromising our primary focus - the development of products and technologies for global battery and advanced material markets.”*

## **COMMERCIAL AND PRODUCT DEVELOPMENT**

During the quarter, Talga continued strong progress in the development of its high-performance Talnode® Li-ion battery anode graphite products and Talphene® graphene products.

### ***Low Temperature Performance Breakthrough***

During the period under review performance results from tests of Talnode-C, Talga’s fully surface engineered anode product, at a leading Japanese battery institute under a range of real world temperatures (see ASX:TLG 21 Mar 2019). Some of the key outcomes included retention of 100% capacity and 100% cycle efficiency at freezing temperature (0°C), outperforming current market leading anode products.

These are important results as in freezing conditions, Li-ion batteries usually suffer lower capacity retention and cycling efficiency, causing shorter runtime of devices such as laptop computers and mobile phones, or shorter driving ranges for electric vehicles.

The breakthrough positions Talga as a solution provider to solving the long-challenged Li-ion batteries problem of under-performance in cold weather applications. Robust industry interest in the product has been received since the results were published, reinforcing Talga’s potential in the fast-growing international Li-ion battery market.

### ***Commercial Qualification of Talnode-C***

The market suitability of Talnode-C was further underpinned during the quarter when batteries using Talnode-C anodes outperformed commercial cells by up to 36% in fast charge/ endurance tests by premium electric motor cycle manufacturer, IV Electrics (formerly Italian Volt) known for its high performance Lacama electric motorcycle (see ASX:TLG 26 Mar 2019).

In the key “Stelvio” performance test, Talnode-C anode batteries out-performed several market leading cells in collecting fast charge regenerative current (from braking) after a high-power discharge (acceleration) in low temperature conditions.

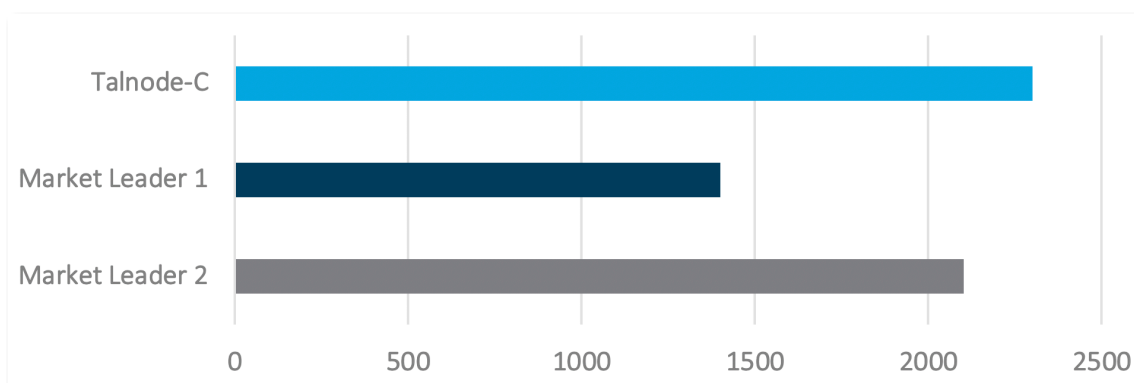
As the Lacama is a fully electric roadster motorbike with an acceleration from 0 to 100 km/h in under 4 seconds and a top speed approaching 200km/h, delivering performance gains is an important milestone for Talga’s anode development.

Following a range of scale-up and independent performance tests across multiple battery institutes and potential end users, Talga now expects that Talnode-C, a fully engineered coated anode graphite, will be marketed directly to Li-ion battery manufacturers and form the foundation of a near-term commercialisation opportunity for the Company’s Vittangi graphite project. See project development below.

**Figure 1.** *Electric vehicle range is negatively impacted by low temperature.*



**Figure 2.** *Stelvio Test: time (s) for cell voltage to fall below 3.2V, at 14°C. Details of test cycle: discharge 3 seconds at 3C, charge 1 second at 1C, rest for 4 seconds and repeat until voltage or thermal limit.*



### **Battery Silicon Anode Gains**

During the period under review Talga's ongoing optimisation of Talnode-Si, a graphene silicon-anode for higher energy density, delivered further performance gains. These included up to ~70% more energy density than commercial graphite-only anodes (see ASX:TLG 19 Feb 2019).

There is strong industry interest in using higher amounts of silicon in anodes for performance boosting Li-ion batteries, particularly to increase range or usage time. This is illustrated by the recent investment by Daimler AG (Mercedes Benz) in Sila Nanotechnologies, a US-based silicon anode developer, in a funding round at US\$1 billion valuation (see Sila press release 16 Apr, 2019) and following partnerships announced with BMW, ATL and Siemens.

Compared to other manufacturers of silicon-anodes, Talga's key advantages include;

- Low cost production profile compared to synthetic and other routes
- Highly scalable process suitable for existing manufacturing lines
- Integrated control of both silicon and carbon materials

Based on the encouraging test results to date, Talga has opted to progress to larger scale testing and optimisation of Talnode-Si. Numerous confidentiality and material transfer agreements have been completed for samples, with recipients including some of the world's largest electronics and battery manufacturers.

**Managing Director, Mr Mark Thompson:** *"The market price of silicon-anodes offers a substantial premium above standard graphite anodes, and represents a commercially attractive large volume market for our graphene and graphite. We're excited about developing this opportunity, and will look to review scale up options for this high value material and explore the market in further detail."*

### **Agreement with Schunk on Talphene**

A key commercial development was achieved during the quarter when Talga signed a Letter of Intent ("LOI") with Schunk Carbon Technology GmbH ("Schunk"), a subsidiary of the German-based Schunk Group. Under the LOI, Talga and Schunk will co-operate on the exploration and incorporation of our trademarked graphene product (Talphene) into Schunk products with applications in the large volume automotive sector (see ASX:TLG 15 Jan 2019).

Much of the initial detail of the LOI and application is at this stage, commercial-in-confidence. Schunk is a globally active and innovative carbon product manufacturer, with more than 8,200 employees across 29 countries. As the company offers a broad spectrum of products and services in the fields of carbon technology and ceramics, its market footprint provides considerable leverage in getting Talga product and technologies into these key international markets.

## Other Commercial News

Work progressed on a wide range of existing and new commercial agreements over the period. Unfortunately, specifics related to these projects cannot be publicly disclosed as they are protected by non-disclosure and confidentiality agreements.

The commercial endeavours over the period were focused on new applications of Talga's unique graphite for various battery anode applications and further work to commercialise Talphene for emerging advanced battery/energy applications, composites, conductive inks, polymers, coatings and more. During the period, the Chemetall Joint Development Agreement expired, however project discussions continue with Chemetall's parent company, BASF.

The projected market growth of electric vehicles as part of the global shift to sustainability is driving a higher level of interest in all of Talga's advanced materials utilising Talphite®, Talnode® and Talphene® products.

## MINERAL PROJECT DEVELOPMENT AND EXPLORATION

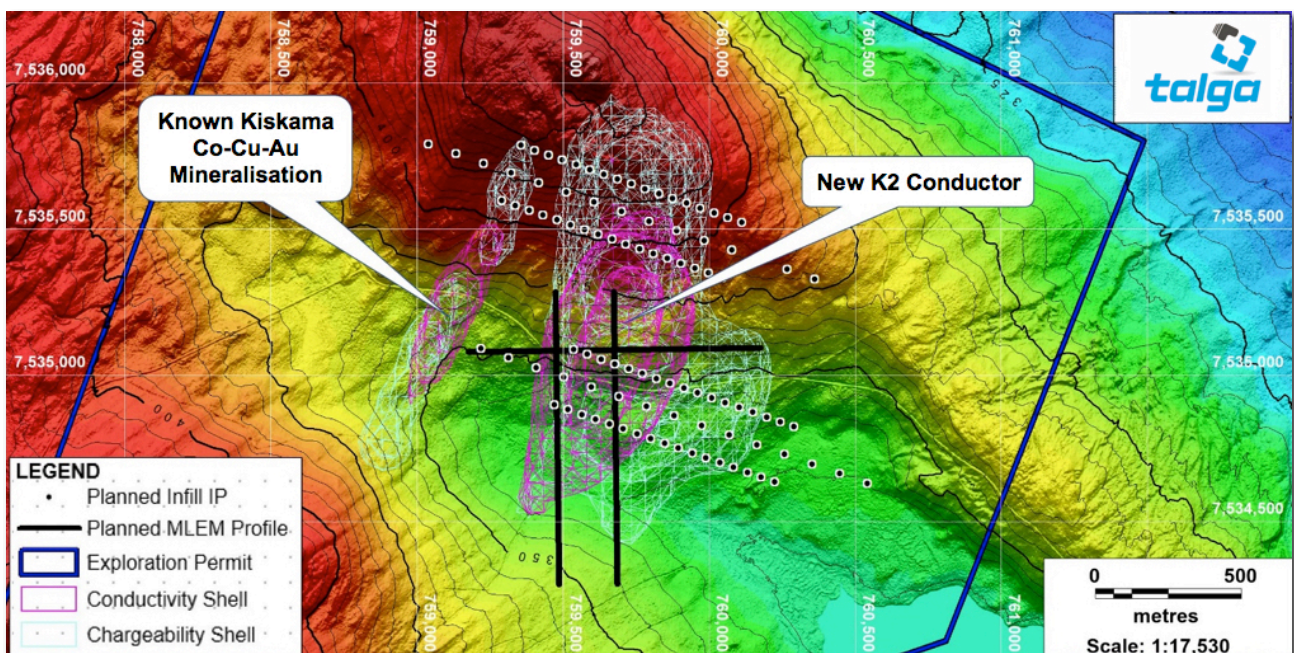
### Larger Cobalt Project Target Discovered

During the period under review Talga completed geophysical surveys (Induced Polarisation (IP) and Moving Loop Electromagnetic (MLEM) survey) at the Company's 100%-owned Kiskama cobalt-copper-gold project, Sweden's largest cobalt deposit. This yielded a new, large geophysical conductor, K2, which is double the size and strength of the current known Kiskama deposit signature, and is located about 500-1000m to its east (see ASX:TLG 28 Feb 2019). Historic drilling failed to test the K2 conductor.

A program of infill IP and MLEM is subsequently underway with further processing, modelling and interpretation to be undertaken to better define the K2 conductor. Results will be analysed prior to making a decision on drilling K2 and further drilling towards a maiden JORC Co-Cu-Au mineral resource at Kiskama.

Talga's development focus remains on its high-grade Swedish graphite projects. However, Talga considers the new broader Kiskama cobalt opportunity will further add value to these strategically well-placed European cobalt-copper-gold assets. Battery metals like cobalt are and will continue to be very much in demand, and the Company is constantly reviewing the best opportunities for advancing the commercialisation of these assets under various market conditions.

**Figure 3.** Map of new Kiskama conductors and planned geophysical infill surveys.



### ***Drilling Expands Vittangi Graphite***

A program of diamond core drilling was undertaken during the quarter on Talga's 100%-owned Vittangi Graphite Project in north Sweden. This program was designed to target extensions to the Nunasvaara North resource for future development potential, permits and planning. Drill targets were based on new geophysical interpretations of the Niska prospect, located 1-2km northeast along strike of the Nunasvaara JORC (2012) resource of 12.3Mt @ 25.5% Cg.

Subsequent to the period, the first holes at Niska North intercepted up to 60-75m true width Nunasvaara-type graphite from near surface (see ASX:TLG 4 Apr 2019). These are the widest graphite intercepts at the Vittangi project to date and exceed the average width of the Nunasvaara resource.

As a result, the exploration program was re-focussed on resource definition and drilling is now complete with ~3,050m core transported to Scott Geological in Malå for logging and analysis. First assay results are expected to be received in May with the final assays in June, following which maiden mineral resource estimates for Niska North and Niska South are expected to be complete.

Additional core material will be sent to Talga's processing and product technology teams to confirm its metallurgical properties and suitability for the production of Talnode and Talphene products.

### ***Metallurgical Results Boost Vittangi Development Options***

Reinforcing the Talnode developments reported above, Talga was pleased to report post the end of the March quarter, that pilot metallurgical testing of Vittangi's graphite ore produced high concentrate recoveries and purities for use in anode products, using 'off the shelf' and industry standard crush-grind-flotation processing equipment (see ASX:TLG 10 Apr 2019).

This opens up lower cost development options for Vittangi, including third party toll processing at nearby concentrator facilities in the project's early development stages. The results will contribute to new and economically improved process pathways for the current Vittangi Pre-feasibility study ("PFS"), which will now focus on an open cut mine and concentrator at the Nunasvaara deposit, with concentrates trucked to an anode refinery at Luleå to produce purified and coated Talnode-C for sale. Talphene products are not included in the PFS at present, however scale up and development will continue towards incorporation into future project studies.

Incorporating the new processing pathways has delayed completion of the Vittangi PFS which was scheduled for the end of this month. The Company has however decided to convert a portion of the Vittangi mineral resource to ore reserves in conjunction with the PFS to form a more robust investment case and this will add several weeks to the process, with completion now expected in mid-May.

In addition, processing of ore samples from Talga's Jalkunen and Raitajärvi graphite resources, employing the same industry standard method, resulted in similar high recovery and purity graphite concentrates later successfully refined into high capacity Li-ion battery anode material. This opens up potential future growth options for Talga, in addition to the Vittangi project.

**Figure 4.** *Vittangi project graphite undergoing pilot scale metallurgical testing.*



## Tenement Interests

As required by ASX listing rule 5.3.3, refer to Appendix 1 for details of Talga's interests in mining tenements held by the Company. No new joint ventures or farm-in/farm-out activity occurred during the quarter.

## CORPORATE

Talga staff and management presented during the quarter at global leading events for the graphene and graphite products industry including the AMA European Battery Metals Event in London, the International Battery Seminar in Florida, MWC19 in Barcelona, the European Coatings Show in Nuremberg and the Future Mine and Minerals conference in Stockholm.

Subsequent to the period under review, the Company opened a second Swedish office in Kiruna, strategically positioned near Vittangi, Talga's flagship graphite project. This is designed to support the Company's local stakeholders and project development in addition to the office in the Norrbotten county administration capital of Luleå.

The expansion is supported by the appointment of a Community Relations Manager, Ms Dharma Johansson. She is a former Business Development Manager (Sustainability and Destination Strategy) for the local investment and tourism organisation, Kiruna Lapland, and has held community-related positions with the Swedish Public Employment Service and the Swedish Migration Agency.

## Financial

Talga closed out the 2019 March quarter with A\$10.9 million cash-in-bank and at the close of the ASX on 31 March 2019 was capitalised at ~A\$132 million.

For further information, visit [www.talgaresources.com](http://www.talgaresources.com) or contact:

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**Figure 5.** Talga's 'From Atom to Tons' industrial scale graphene exhibit at MWC19 in Barcelona.



**Figure 6.** Dharma Johansson, Talga's newly appointed Community Relations Manager.

### About Talga

Talga Resources Ltd (“Talga”) (ASX: TLG) is an advanced material technology company enabling stronger, lighter and more functional graphene- and graphite-enhanced products for the multi-billion dollar global coatings, battery, construction and carbon composites markets. Talga has significant advantages owing to its 100%-owned unique high grade conductive graphite deposits in north Sweden, a Research and Development test processing facility in Germany and in-house product development and technology. Joint development agreements are underway with a range of international corporations.

### No New Information

To the extent that announcement contains references to prior technical information, exploration results and mineral resources; these have been cross referenced to previous market announcements made by the Company. These had been disclosed to JORC 2012 standard. Unless explicitly stated, no new information is contained. The Company confirms that it is not aware of any new information or data that materially affects the information included in the relevant market announcements that assumptions and technical parameters underpinning the relevant market announcement continue to apply and have not materially changed.

## APPENDIX 1

### Tenement Holdings

Project/Location	Tenements	Interest at end of quarter	Acquired during quarter	Disposed during quarter
<b>Ahmavuoma Project</b> Norrbotten County, Sweden	Ahmavuoma nr 3 Ahmavuoma nr 4 Ahmavuoma nr 5	100% 100% 100%		
<b>Aitik East Project</b> Norrbotten County, Sweden	Suorravaara 2 Suorravaara 3 Suorravaara 4	100% 100% 100%		
<b>Jalkunen Project</b> Norrbotten County, Sweden	Jalkunen nr 1 Kursuvaara Nybrännan nr 2	100% 100% 100%		
<b>Kiskama Project</b> Norrbotten County, Sweden	Kiskama nr 1 Airivaara nr 100	100% 100%		
<b>Lautakoski Project</b> Norrbotten County, Sweden	Jukkasvaara nr 2 Lautakoski nr 2 Lautakoski nr 4 Piipiönjoki nr 1 Suinavaara nr 2 Suinavaara nr 3 Suinavaara nr 4	100% 100% 100% 100% 100% 100% 100%		
<b>Masugnsbyn Project</b> Norrbotten County, Sweden	Masugnsbyn nr 101	100%		
<b>Piteå Project</b> Norrbotten County, Sweden	Gräliden nr 2 Önusträsket nr 2	100% 0%		100%
<b>Raitajärvi Project</b> Norrbotten County, Sweden	Raitajärvi nr 5	100%		
<b>Vittangi Project</b> Norrbotten County, Sweden	Maltosrova nr 3 Nunasvaara nr 2 Vathanvaara nr 101 Vittangi nr 2 Vittangi nr 3 Vittangi nr 4	100% 100% 100% 100% 100% 100%		