



# QUARTERLY ACTIVITIES REVIEW FOR THE PERIOD ENDING 30 SEPTEMBER 2016

#### Talga Resources Ltd ABN 32 138 405 419

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#### **Corporate Information**

ASX Codes **TLG**, **TLGOA**Shares on issue 181.9m
Options (listed) 44.9m
Options (unlisted) 36.2m

### Company Directors Keith Coughlan

Non-Executive Chairman

## Mark Thompson

Managing Director

#### **Grant Mooney**

Non-Executive Director

#### **Stephen Lowe**

Non-Executive Director

#### **OVERVIEW**

Australian advanced materials company, Talga Resources Ltd (ASX: TLG) ("Talga" or "the Company") is pleased to report its activities for the quarter ending 30 September 2016 - a substantial period of activity that delivered a number of project and business milestones. Highlights included:

#### **COMMERCIAL DEVELOPMENT**

#### Graphene products business strategy

- Manufacturing 'fit for purpose' graphene products to complement supply of raw graphene and graphite materials
- Strategic decision made to pursue revenue opportunities during pilot processing stage, prior to full-scale production

#### First Functionalised Graphene Products Developed and Delivered

- Functionalised graphene coating produced and delivered to global leading customer following patent and trademarking of first value-added product
- Results of scientific study demonstrate Talga's graphene increases corrosion protection of steel by up to 74% - validating opportunities in the coatings sector

#### Phase 2 graphene plant commissioning completed in Germany

- Phase 2 graphene pilot test plant in Germany successfully commissioned
- High quality graphene output confirmed with the capability to convert approximately 76% of graphite to graphene
- Capacity scale-up continues and grows product inventory for business strategy

#### Graphene partnership with German battery group

 Graphene collaboration agreement signed with JenaBatteries GmbH targeting commercial scale grid energy battery applications

#### MINING AND EXPLORATION

### 2016 Graphite Trial Mining Commenced in Sweden

- Commenced 2nd trial graphite ore mining campaign at Vittangi Project
- Graphite resource infill and exploration drilling commenced across three Swedish graphite projects

#### **CORPORATE**

- Appointed Project Manager Europe, to drive operations in Germany and Sweden
- Completed the \$0.9m options entitlement offer component of a combined \$10.9m capital raising
- Completed sale of Pilbara based gold projects in Western Australia



#### **COMMERCIAL DEVELOPMENT**

#### Graphene business launched

Talga's graphene business strategy was announced during the quarter with a focus on manufacturing 'fit for purpose' graphene products designed and produced by Talga to suit targeted market sectors. This strategy is in addition to Talga's proposed supply of raw graphene and graphite materials sourced from its 100% owned deposits in north Sweden.

The strategy opens up broader commercial opportunities from the production and supply of higher value 'products' and potential revenue from licensing and royalty arrangements with third parties using these products.

The business opportunity stems from Talga's investment in the Company's German pilot test facility in Rudolstadt which supports the optimisation, scale-up and design of full-scale commercial graphene production in Europe.

Talga's initial industrial market focus for its graphene is targeted towards the global coatings industry, energy/battery products and components, polymer composites and building products. Talga believes these sectors offer significant commercial opportunities in both volume sales, margins and speed to market through agreements with sector leaders, who require both value added products and graphitic carbon raw materials.

Talga's business plan has identified the following four key products for priority development and marketing to leading end users:

**Figure 1.** Talga employees and staff at commissioning of Phase 2 pilot test facility, Rudolstadt Germany.



- A metal pre-treatment coating graphene significantly improves resistance to metals corrosion which costs global industry US\$2 trillion a year and can replace environmentally and health damaging metals;
- An electrically conductive ink for use in battery anodes and components, printed electronics and high performance polymers;
- A conductive cement product trials show graphene improves the electrical and thermal conductivity of concrete making it suitable for under floor heating or snow and ice free pavements and roads; and
- A high performance membrane for energy and environmental applications Membrane technology for liquid filtration is undergoing significant development due to global challenges related to water quality, battery and fuel cell cost/performance.

The current December quarter and the opening months to calendar 2017 will now see a ramped up schedule of in-house and industry partner testing programs as well as field and benchmarking product trials to confirm performance, validate products and support the step-up to full-scale commercialisation in future.

#### First Functionalised Graphene Products Delivered

The September quarter saw Talga produce and deliver its first value-added graphene based product, a metal pre-treatment coating, to a leading international coatings business. This company will be undertaking its own application and performance trials on the coating over coming months. Further tests on the coating product are also underway at research institutions in India and the UK. Talga has filed a patent application over the product's composition and synthesis (ASX:TLG 16 Aug 2016).

It is the first of a range of targeted, functionalised graphene and graphite products Talga is developing and looking to commercialise.

#### **Product Development**

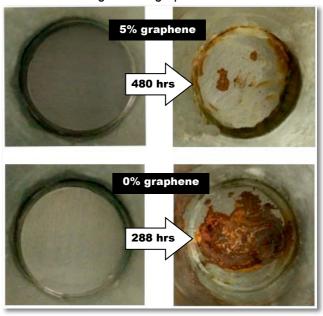
New scientific studies released during the period showed that adding Talga's graphene in a coating increased corrosion protection of steel by up to 74% (Fig 2).

The peer review study - "Functionalised Graphene as a Barrier Against Corrosion" - was published in the scientific journal, *FlatChem* and used Talga's graphene nanoplatelets produced at the Company's pilot test facility in Germany to manufacture a coating for corrosion resistance tests on mild steel (ASX:TLG 21 Sep 2016).

The successful test underpins emerging evidence that graphene's high impermeability, high electrical conductivity and ultra-thin shape may prove a new and effective additive to improve coatings of many types.

The global coatings industry consumes more than 40 million tonnes per annum of materials and the sector is a priority commercialisation target for Talga.

**Figure 2.** The steel coated with Talga graphene shows less corrosion over more time than a reference coating with no graphene.



#### Phase 2 graphene plant commissioning completed in Germany

During the September quarter, all stages of the Company's Phase 2 graphene pilot test plant in Germany were successfully commissioned, including new recovery circuits which produce high quality few layer graphene. Approximately 76% of graphite introduced to the circuits is converted to graphene.

Capacity of the plant will continue to be scaled up over coming months as Talga grows its inventory for use in customer product testing and its business strategy focus.

The Rudolstadt facility is expanding rapidly and now employs 13 technicians, scientists and staff. The pilot test work facility allows Talga to initiate industrial scale commercially focused collaborations with major corporations around the world. Completion of Phase 2 commissioning means that Talga now has the ability to consistently manufacture graphene and micrographite for a range of targeted products.

#### Graphene partnership with German battery group

A collaboration agreement ("Agreement") was signed during the quarter with Germany's JenaBatteries GmbH to jointly explore the use of Talga's graphene products in JenaBatteries' patented polymer flow battery for commercial scale and grid applications.

Talga will formulate and supply graphene for testing in components with the aim of reducing manufacturing costs and increasing the performance and longevity of the battery components by utilising graphene's superior properties conductivity, chemical inertness and impermeability. This provides a platform for Talga's graphene to be introduced to the large stationary energy storage sector.

Grid connected energy storage is seen as a multi-hundred billion dollar market opportunity, with flow batteries expected to make up almost 20% of global energy storage markets by 2025 (ASX:TLG 13 Sep 2016). JenaBatteries is supported by Wirthwein AG, a leading international plastic components manufacturer with a strong focus on the energy business segment.

#### **MINING AND EXPLORATION**

#### 2016 Graphite Trial Mining and Exploration Commenced in Sweden

Talga's 2nd trial graphite ore mining campaign commenced at its wholly-owned Vittangi graphite project during the period (ASX:TLG 25 Jul 2016). The program aimed to extract ~2,500 tonnes of raw graphite ore in blocks to be used as feed for pilot test work at Talga's German pilot plant facility.

This latest trial mining campaign extended and deepened last year's open pit site, cutting whole blocks of graphite ore from within the total JORC (2012) resource of 9.8 million tonnes @ 25.3% graphite. Improved, larger scale mining equipment was used during the 2016 campaign compared to the 2015 campaign and it performed very well, extracting blocks of ~7 tonne average weight (Fig 3).

The Company also launched a 20-hole, 1,950m diamond core drill program to test resource and exploration targets across three graphite projects.

Drilling at the Vittangi project was designed to infill and upgrade Talga's high grade Northern Nunasvaara JORC Inferred mineral resource of 1.5 million tonnes @ 31.0% graphite, which is part of the total Nunasvaara JORC (2012) resource of 9.8 million tonnes @ 25.3% graphite.

Results are planned to be used in a new resource estimate for permitting and development planning of the Vittangi project. Exploratory drilling was also planned for several targets in the Jalkunen and Piteå graphite projects. The drill program was successfully completed subsequent to the September quarter period (ASX:TLG 20 Oct 2016).

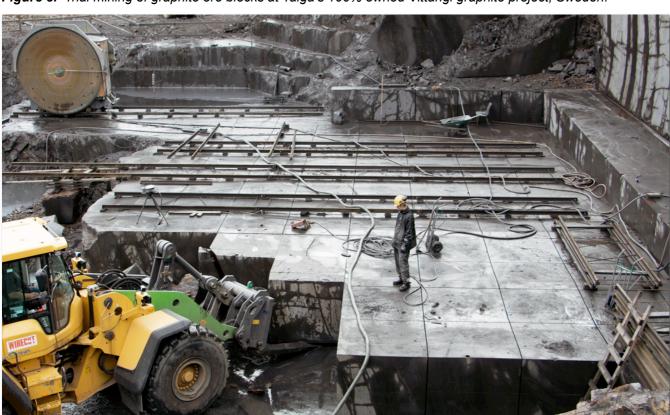


Figure 3. Trial mining of graphite ore blocks at Talga's 100% owned Vittangi graphite project, Sweden.

#### **CORPORATE**

# Appointed European Project Manager to drive graphene business

During the period, Talga appointed Mr Martin Phillips as the Company's Project Manager - Europe to drive European operations (Fig 4). Mr Phillips is an experienced project manager, commercial manager and company director with more than 25 years of global minerals and processing experience. He will be based in Europe and oversee Talga's operations in Germany and Sweden.

# Completed \$10.9m capital raising which included fully underwritten entitlements offer

Following the Company's successful A\$10 million placement in June 2016 to sophisticated investors, Talga offered shareholders the opportunity to participate in an underwritten non-renounceable rights option issue. More than 62% of the 44.9 million options offered were taken up by shareholders, with the remaining 17 million options placed with underwriters. The rights option issue raised \$900,000 in funds, which is to be used to advance graphite-graphene technical and commercial activities over the next 12 months. The options were listed on the ASX during the period and trade under the ASX code TLGOA.



**Figure 4.** Mr Martin Phillips, Talga's Project Manager- Europe at the Vittangi graphite project.

#### Completed sale of gold projects in Pilbara- WA

During the quarter, Talga completed the sale of its Pilbara gold projects (Mosquito Creek, Talga Talga and Warrawoona) in Western Australia to Beatons Creek Gold Pty Ltd, an Australian subsidiary of the TSX Venture-listed Novo Resources Corp. Beatons paid an initial \$250,000 cash option fee under the Sale Agreement, which was completed with the issue to Talga of 765,115 common shares of Novo (valued at 16 September 2016 at approximately A\$1.28m). The share based consideration was in lieu of cash payments for the A\$750,000 transaction balance remaining. Talga retains an ongoing 1.5% net smelter royalty on gold and any other mineral production from the three projects.

### **TENEMENT INTERESTS**

As required by ASX listing rule 5.3.3, refer to Table 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.

For further information, visit <u>www.talgaresources.com</u> or contact:

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TABLE 1
Tenement Holdings

Project/Location	Tenements	Interest at end of quarter	Acquired during quarter	Disposed during quarter
<b>Jalkunen Project</b> Norrbotten County, Sweden	Jalkunen nr 1 Jalkunen nr 2 Jalkunen nr 3 Kursuvaara Lautakoski nr 1 Lautakoski nr 2 Lautakoski nr 3 Nybrännan nr 1 Nybrännan nr 2 Suinavaara nr 1 Suinavaara nr 2 Tiankijoki nr 1	100% 100% 100% 100% 100% 100% 100% 100%		
Kiskama Project Norrbotten County, Sweden	Kiskama nr 1	100%		
Masugnsbyn Project Norrbotten County, Sweden	Masugnsbyn nr 1 Masugnsbyn nr 2	100% 100%		
Pajala Project Norrbotten County, Sweden	Lehtosölkä nr 3 Liviövaara nr 2	100% 100%		
Piteå Project Norrbotten County, Sweden	Gråliden nr 2 Önusträsket nr 2	100% 100%		
Raitajärvi Project Norrbotten County, Sweden	Raitajärvi nr 5	100%		
Vittangi Project Norrbotten County, Sweden	Maltosrova nr 2 Maltosrova nr 3 Mörttjärn nr 1 Nunasvaara nr 2 Vathanvaara nr 1 Vittangi nr 2 Vittangi nr 3 Vittangi nr 4	100% 100% 100% 100% 100% 100% 100%		
<b>Bullfinch Project</b> Western Australia	E77/2139 E77/2221 E77/2222 E77/2251 P77/4106	100% 100% 100% 100% 100%		
Mosquito Creek Project Western Australia	P46/1634 P46/1636 P46/1638 P46/1666 P46/1667 P46/1668 P46/1800 E46/1035	0% 0% 0% 0% 0% 0% 0%		100% 100% 100% 100% 100% 100% 100%
<b>Talga Talga Project</b> Western Australia	M45/618 P45/2689 P45/2690 P45/2691 P45/2746 P45/2747 P45/2774	0% 0% 0% 0% 0% 0%		100% 100% 100% 100% 100% 100%
<b>Warrawoona Project</b> Western Australia	E45/3381 P45/2661 P45/2662 P45/2781	0% 0% 0% 0%		100% 100% 100% 100%

#### **APPENDIX 1**

#### Mineral Resources - Graphite

VITTANGI GRAPHITE PROJECT, NORTHER SWEDEN (Talga 100%)
Nunasvaara Graphite Deposit - JORC (2012) Resource at 10% Cg cut-off

DEPOSIT	JORC RESOURCE CATEGORY	TONNES	GRADE CG (%)
Nunasvaara	Indicated	6,900,000	24.2
Nunasvaara	Inferred	2,900,000	28.1
Total		9,800,000	25.3

Note: Ore tonnes rounded to nearest hundred thousand tonnes. The Vittangi project graphite mineral resource was disclosed in May 2016 in accordance with the 2012 JORC Code (ASX:TLG 30 May 2016).

# JALKUNEN GRAPHITE PROJECT, NORTHER SWEDEN (Talga 100%) Jalkunen Graphite Deposit - JORC (2012) Resource at 10% Cg cut-off

DEPOSIT	JORC RESOURCE CATEGORY	TONNES	GRADE CG (%)
Jalkunen	Inferred	31,500,000	14.9

Note: Ore tonnes rounded to nearest hundred thousand tonnes. The Jalkunen project graphite mineral resource was disclosed in August 2015 in accordance with the 2012 JORC Code (ASX:TLG 27 August 2015).

#### RAITAJÄRVI GRAPHITE PROJECT, NORTHER SWEDEN (Talga 100%) Raitajärvi Graphite Deposit - JORC (2004) Resource at 5% Cg cut-off

DEPOSIT	JORC RESOURCE CATEGORY	TONNES	GRADE CG (%)
Raitajärvi	Indicated	3,400,000	7.3
Raitajärvi	Inferred	900,000	6.4
Total		4,300,000	7.1

Note: Ore tonnes rounded to nearest hundred thousand tonnes. The Raitajärvi project graphite mineral resource was disclosed in August 2013 in accordance with the 2004 JORC code (ASX:TLG 26 August 2013). It has not been updated since to comply with the JORC code 2012 on the basis that the information has not materially changed since it was last reported. The Company is not aware of any new information or data that materially affects the information included in the previous announcement and that all of the previous assumptions and technical parameters underpinning the estimates in the previous announcement have not materially changed.

#### **Competent Person's Statement**

The information in this document that relates to exploration results is based on information compiled by Amanda Scott, a Competent Person who is a Member of the Australian Institute of Mining and Metallurgy (Membership No.990895). Amanda Scott is a full-time employee of Scott Geological AB. Amanda Scott has sufficient experience, which is relevant to the style of mineralisation and types of deposits under consideration and to the activity which has been undertaken to qualify as a Competent Person as defined in the 2012 edition of the Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves (JORC Code). Amanda Scott consents to the inclusion in the report of the matters based on her information in the form and context in which it appears.

The information in this report that relates to Resource Estimation is based on information compiled and reviewed by Mr Simon Coxhell. Mr Coxhell is a consultant to the Company and a member of the Australian Institute of Mining and Metallurgy. Mr Coxhell has sufficient experience relevant to the styles of mineralisation and types of deposits which are covered in this document and to the activity which he is undertaking to qualify as a Competent Person as defined in the 2012 edition of the "Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves" ("JORC Code"). Mr Coxhell consents to the inclusion in this report of the Matters based on this information in the form and context in which it appears