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Corporate InformationASX CodeTLG/TLGOShares on issue124.59mOptions (unlisted)7.73mOptions (unlisted)7.85m

**Company Directors** Keith Coughlan Non-Executive Chairman

Mark Thompson Managing Director

Grant Mooney Non-Executive Director

#### TALGA PRESENTATION AT THE CANACCORD GENUITY NEW YORK GLOBAL RESOURCES CONFERENCE

Talga Resources Limited (ASX:TLG) ("Talga" or "the Company") is pleased to provide a copy of the presentation delivered by Managing Director Mr Mark Thompson at the *Canaccord Genuity Global Resources Conference in New York*.

The presentation will be made available on the Company's website <u>www.talgaresources.com</u>

The presentation details are as follows:

Date: Wednesday & Thursday, 15-16th October 2014

Venue: The Palace Hotel, 455 Madison Avenue, New York.

For further information, contact:

Mark Thompson Managing Director Talga Resources Ltd

Tel +61 (08) 9481 6667 Email admin@talgaresources.com

#### **ABOUT TALGA**

Talga Resources Limited (Talga) (ASX: "TLG") is a diversified mineral explorer and developer with a portfolio of 100% owned graphite, iron, copper/gold projects in Sweden and gold projects in Western Australia.

#### Graphite

Talga wholly owns multiple advanced and high grade graphite projects in northern Sweden. The immediate focus is to advance these projects towards development, utilising the advantages of established quality infrastructure including power, road, rail and ports. Initially this will entail economic studies on the Nunasvaara and Raitajärvi graphite deposits.

#### Iron

Talga owns multiple magnetite iron deposits located in the Kiruna mineral district of northern Sweden. The iron deposits are of significant scale and strategic importance, with considerable growth upside based on historic drilling. Talga's strategy is to commercialise these assets to provide funds for the graphite projects.

#### Gold

Talga owns multiple high grade gold projects located in the Yilgarn and Pilbara regions of Western Australia, which the Company is divesting to focus on the Swedish assets. Additionally the Company owns several copper-gold projects within its Sweden portfolio.





# Talga Resources Ltd Graphite-Graphene Projects Presentation

Canaccord Genuity Global Resources Conference New York October 2014



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### **Executive Summary**

- Talga Resources Ltd ("Talga") ASX:TLG is developing multiple graphite deposits in Sweden including the world's highest grade graphite mineral resource<sup>1</sup>.
- In recent tests Talga has demonstrated a world-first ability to produce high quality graphene direct from its raw graphite ore which provides Talga with unique economic advantages compared to global graphene peers.
- This new low cost and abundant supply potential is a paradigm shift in the production outlook for bulk graphene, a new material with huge growth potential.
- Talga has defined two JORC<sup>1</sup> resources to date and a Scoping Study completed on one, Vittangi, shows strong returns with low Capital cost of AUD\$29m and NPV AUD\$490m using conservative metrics.
- The Company is awaiting drill results from recent drilling along strike from the flagship Nunasvaara deposit, permitting a trial mining operation and onsite pilot plant to be constructed in 2015 and is moving towards further commercial/sales agreements in both graphite and graphene markets.





<sup>&</sup>lt;sup>1</sup> See appendices for details of JORC (2004) resources and www.techmetalsresearch.com for world graphite resources grade comparison.

### **Talga Resources Corporate Overview**

#### Listed on Australian Stock Exchange July 2010. Stock code: TLG

<b>Board of Directors</b>	
Keith Coughlan	Non-executive Chairman
Mark Thompson	Managing Director
Grant Mooney	Non-executive Director

#### Share Price last 12 months ASX:TLG







Capitalisation Summary at 30 Sept 2014	
ASX:TLG Ordinary Shares	124.6N
ASX:TLGO Options (exp 30 Nov 2015 at 35c)	7.74N
Unlisted Options <sup>1</sup>	7.85N
Cash \$AUD	~\$3.5N
Market Capitalisation (undiluted @ \$0.40)	\$49.8N

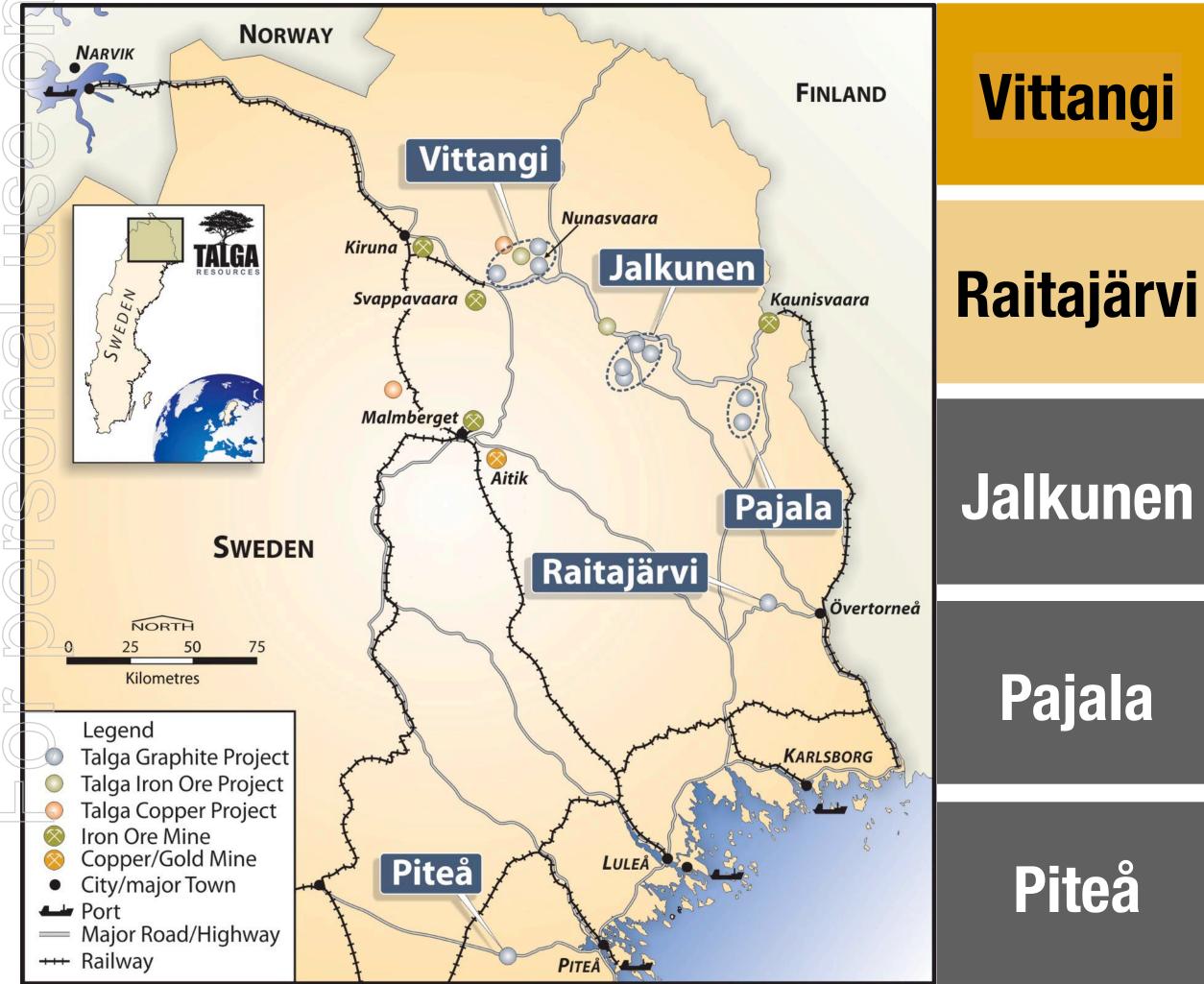
Top Shareholders (+3%) at 24 Sept 2014	
Lateral Minerals Pty Ltd (M.D - Mark Thompson)	11.4%
Gregorach Pty Ltd	7.3%
UBS Nominees Pty Ltd	3.2%
Yandal Investments Pty Ltd	3.1%
Two Tops Pty Ltd	3.0%





### **Talga's Graphite Project Pipeline**

100% ownership of five graphite projects in Sweden with multiple deposits offering the full range of market size specifications. Two advanced stage projects in the development pipeline. These are drilled to JORC<sup>1</sup> Indicated status and a preliminary economic study is complete on one of the deposits.



JORC<sup>1</sup> Total 7.6Mt @ 24.4% Cg containing 1.85Mt graphite, flake size <75µm suits1-step process to produce 46,000tpa graphite and 1,200tpa graphene in completed Scoping Study.

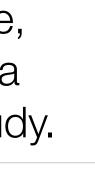
JORC<sup>1</sup> Indicated and Inferred 4.3Mt @ 7.1% Cg containing 0.35Mt graphite, 87% coarse flake size (49% >200µm), suit refractory and spherical market.

First pass drilling highlights include 45m @ 19.4% Cg, 9m @ 35.0% Cg, 51m @ 15.4% Cg and 26m @ 27.7% Cg. Flake size  $<75\mu m$  to  $>200\mu m$ . Graphene. Drilling planned.

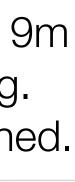
First pass drilling highlights include 8m @ 30.2% Cg, 20m @ 7.5% Cg, 5m @ 39.9% Cg. Flake size <75µm to >400µm Jumbo. Graphene and spherical market.

First pass drilling highlights grade 2.7-8.9% Cg. Flake size 80% >300µm Jumbo. Suit spherical market. New tenements pegged over extensions.















#### **Established mining district with established infrastructure**







# **Advantages of Sweden for Mining**

Ranked No.1 mining jurisdiction in world by Fraser Institute 2013-14 Corporate tax rate 22%, Mineral Production tax 0.2% • Established bulk commodity infrastructure with open access rail, road and ports Low cost power from hydroelectricity and nuclear grid foreign mineral ownership only allowed since 1992

The 'Aitik' Cu-Au mine, northern Sweden. Owner; Boliden. Milling 36Mt annum ore.

Well established mining province with highly skilled workforce and support industries. Hosts world-class mineral deposits but remains under-explored relative to peers as



### **Logistics Advantages for Graphite**

- EU consumes 20% of global natural graphite and imports 95% of its demand (the majority from China). The EU has classified graphite a "critical raw material".
- Talga's projects located **proximal** to high quality sealed roads and open-access heavy haulage railway with direct link to Europe markets. No shipping required.
- Major cost advantage on delivery compared to shipments from other jurisdictions.



Öresund Bridge road/rail tunnel linking Sweden to mainland Europe



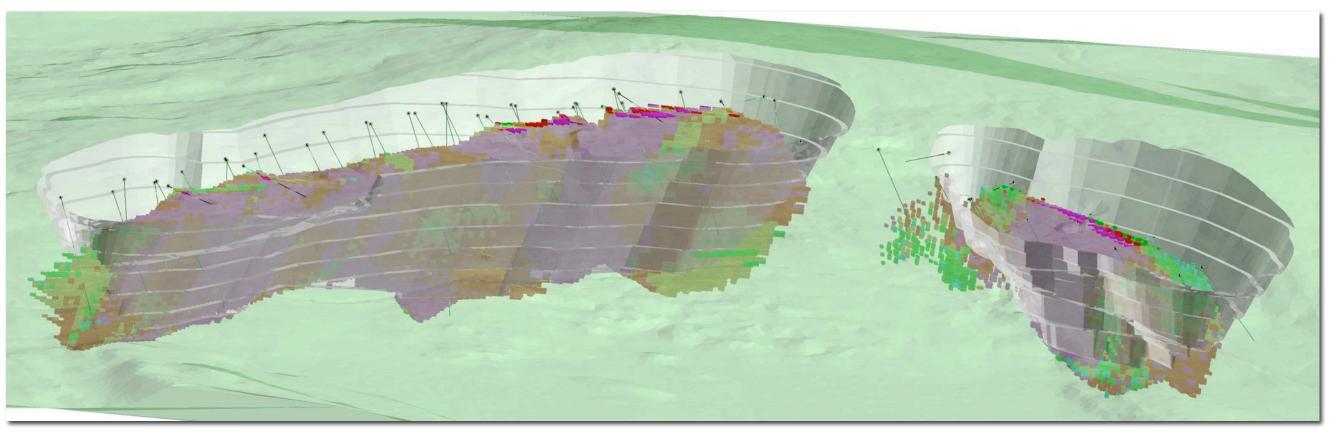




## Vittangi Project - Nunasvaara Graphite Deposit

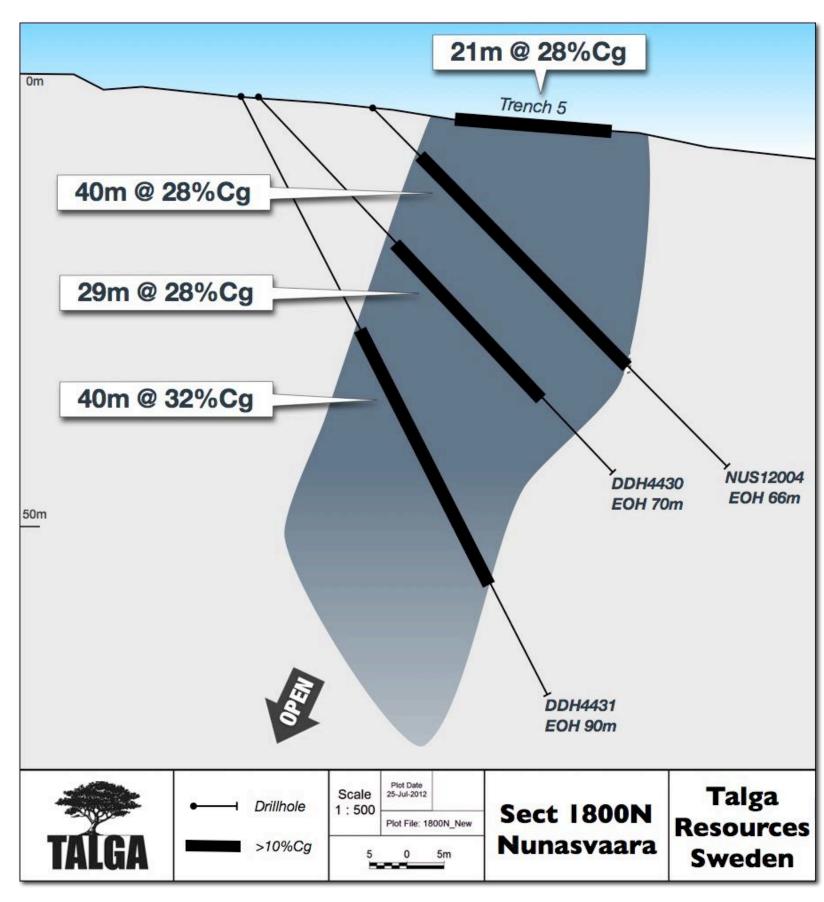
- The Vittangi graphite project (347km<sup>2</sup>) comprises multiple high grade graphite prospects defined by historic trenching, geophysics and drilling.
- Recent work by Talga has defined world's highest grade JORC/NI43-101 resource<sup>1</sup> of 7.6Mt @ 24.4% graphite ("Cg") (see Appendix) at the Nunasvaara deposit.
- Mineralisation from surface to 165m depth and remains open. Robust outcropping high grade resource makes low**cost** potential in both ultrafine to fine graphite and bulk graphene market.

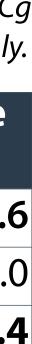
Unique ore type supports demonstrated one stage dual graphite / graphene processing method



Vittangi project's Nunasvaara Mineral Resource (2004) (@10% Cg *lower cut-off). Scoping Study limited to JORC Indicated portion only.* 

Deposit	JORC Status	Tonnes	Grade Cg %
Nunasvaara	Indicated	5,600,000	24.
Nunasvaara	Inferred	2,000,000	24.
	Total	7,600,000	24.







# **Strong Returns Indicated by Scoping Study**

- Vittangi project targeting dual production of ~46,000tpa graphite and ~1,000tpa graphene
  over approximately 20 years from just 250,000tpa operation.
  - Project low risk with Capex ~AUD\$29m and capex payback 1.4 years including construction
  - ~AUD\$84/t **feed** costs using **conservative** (low e 2% graphene and ~77% total graphite recovery
  - Indicative pre-tax NPV in excess of AUD\$490m and only on current JORC Indicated portion of resources of the second second
  - Without graphene sales project is still viable on graphite production alone graphene essentia byproduct
- Minimal environmental footprint with low impacts single-step comminution technology and metallurgical route tested at R&D and bench-top scales with permitting underway for pilot plant production



end)	Summary of Key Study		
	ltems		Base Cas
	Plant throughput	(tpa)	250,0
based	Diluted Feed Grade	(%)	23
urce	Graphite production	(tpa)	~46,0
	Graphene production	(tpa)	~1,0
	Life of Mine Strip Ratio	W:O	
ially a	Graphite price assumption	(USD\$/t)	
	Graphene price assumption	(USD\$/t)	55,0
act	Capital cost	(AUD\$m)	2
	Mine Life	(years)	1
n	Discount Rate	(%)	
р	Pre Tax Net Present Value (NPV)**	(AUD\$m)	~/
	Payback from construction start	(years)	
		5	

\*Feed grade after mining dilution factors. \*\* Pre-tax and other impositions but including state and private royalties.





### Vittangi Graphite-Graphene Mill Flythrough





#### Low Cost/Low Risk Development

Capital costs for proposed ~47,000tpa graphite and graphene operation estimated to be AUD\$29.2 milli at +/- **30%** accuracy.

Note capital cost is lower than conventional procession plants due in part to:

- the high grade/lower tonnage nature of the opera
- absence of primary crush/grind comminution.
- Operating costs including but not limited to contingencies such as;
  - resource dilution 3% and mining dilution 3%
  - high strip ratio for single pit style development
  - 90% mill availability
  - 5% sales logistics discount and 2% marketing penalty
  - 3.2% vendor and statutory royalties
  - transport and loading costs to be product FOB at port



#### Summary of Study capital expenditure estimates

	Category	Cost (AUD\$m)
lion	Process Plant	9.25
	(Equipment & Labour)	9.23
	Site & Plant Infrastructure	7.60
sing	Commissioning, Start-Up, Spares &	8.39
	Miscellaneous	0.59
ation	Total Direct Plant Costs	25.24
ation	Construction Facilities	0.25
	EPCM	3.79
	Total Indirect Plant Costs	4.04
	Total Plant Costs	29.28

#### Summary of Study operating expenditure estimates

Category	Cost (AUD\$/ tonne of feed)
Processing	61.9
Mining	16.3
Transport	5.6
Total	83.8

#### **Products/Pricing**

The Study assumes dual production of graphite and graphene with metallurgical results to date supporting three saleable product streams from Vittangi being:

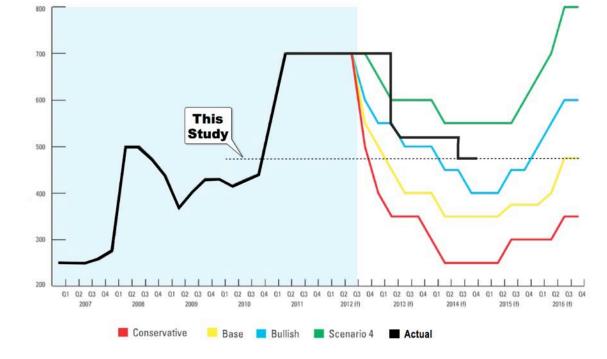
- •Standard ultrafine graphite concentrate (80-85%C purity) ("SUG"); and
- •Very few layer graphene (99.9%C purity)("vFLG"); and
- •Micronised high purity graphite (94-97%C purity)("Micronised").

Prices were sourced from independent reports, company sales, industry feedback and commissioned market reports and then discounted to be conservative going forward.

Product	Flake Size	~Length		Graphene Thickness (nM)		Price (US\$/t)
SUG	Ultrafine	<75 micron	n/a	n/a	+80%	\$480
vFLG	Ultrafine	<10 micron	1-5	2 (max)	99.9%	\$55,000
Micronised	Ultrafine	<10 micron	n/a	n/a	94-97%	\$1,600

Note: Testwork confirming graphite and graphene specifications above undertaken by IMO in Perth.





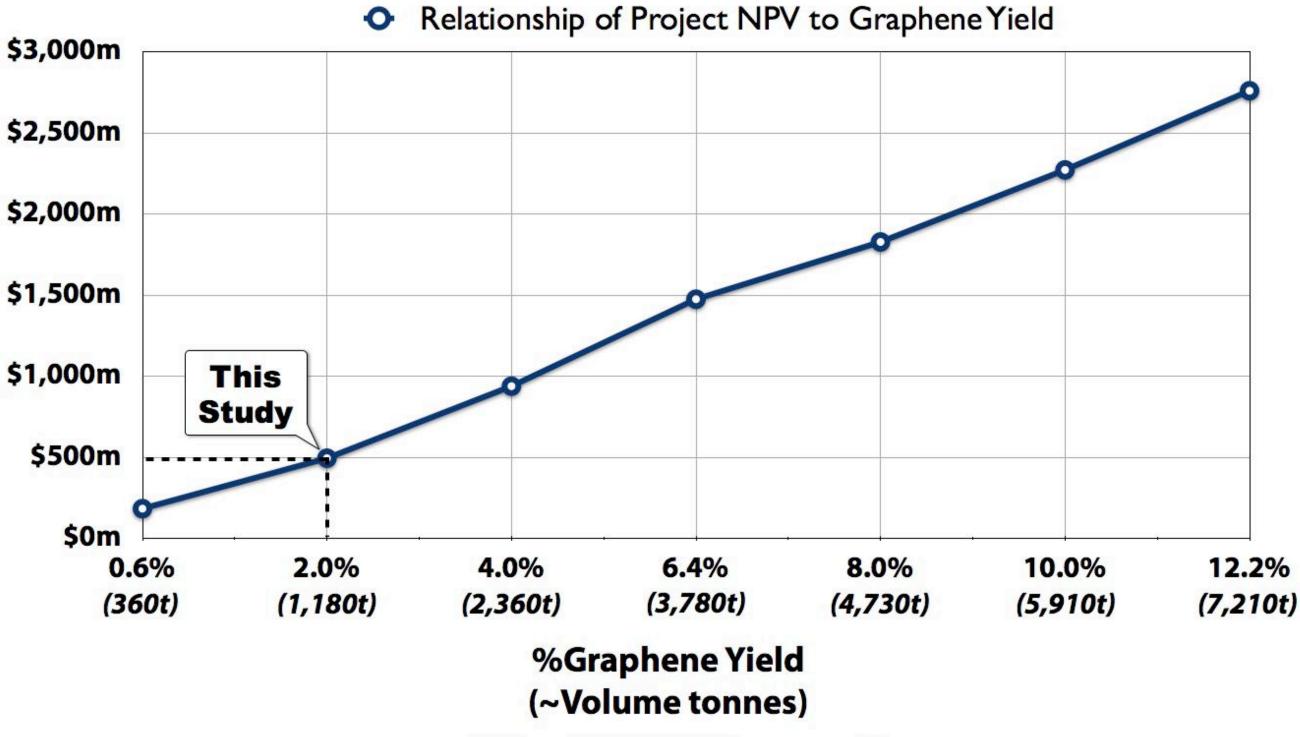
Graphite -75 micron 80-85%C, average, USD\$/tonne, CIF, FOB Europe

#### Immense Upside

- Conservative Study numbers used; graphene price severely discounted to current type minimum pricing and low-end metallurgical yields assumed
  - Study contemplates simple pits to depth with higher strip ratios. In reality further shallower resources would be targeted along strike.
  - Economic performance leveraged to graphene price and sales volume. NPV exceeds AUD\$1B at graphene yield/sales >4% Indicative project NPV (@ US\$55,000t graphene price) sensitivity to graphene yield/volume.
  - Scope for upside from increased;
  - Graphite and Graphene prices
  - Graphene sales volumes
  - Yields/metallurgical improvements
  - Optimised costs and mining methods
  - Resource growth/Jalkunen development
- Results provide confidence and a business case to advance the project towards trial mining, pilot plant design and construction

AUD\$m







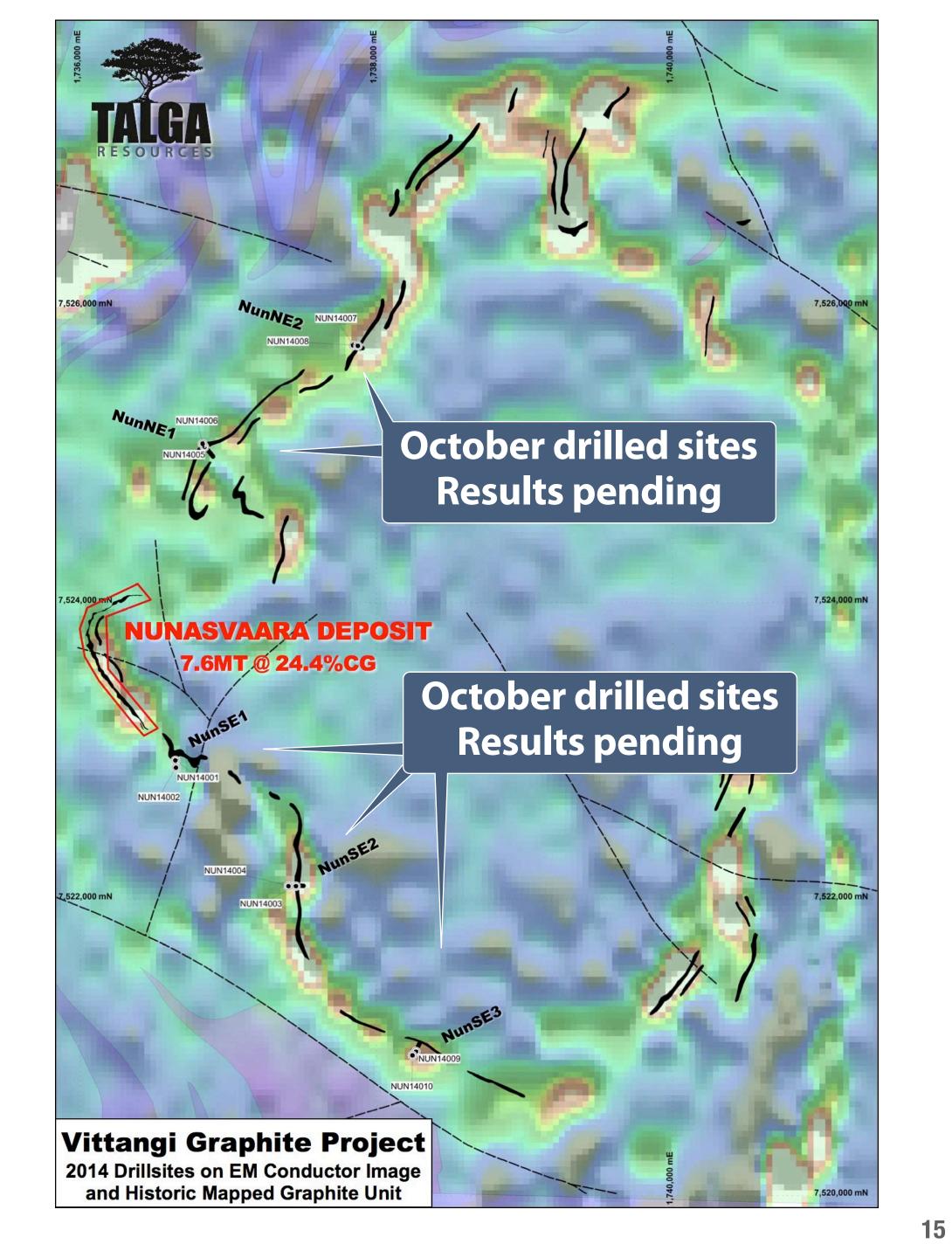


## Vittangi Project - Growth Potential

- Further 32km strike EM conductors (interpreted to be similar to Nunasvaara-type graphite) recently identified extending outside the resource area along strike.
  - Drilling of 5 sites over 7km strike extending from Nunasvaara resource completed in October.
  - Drill assay results pending and expected next 4 weeks.

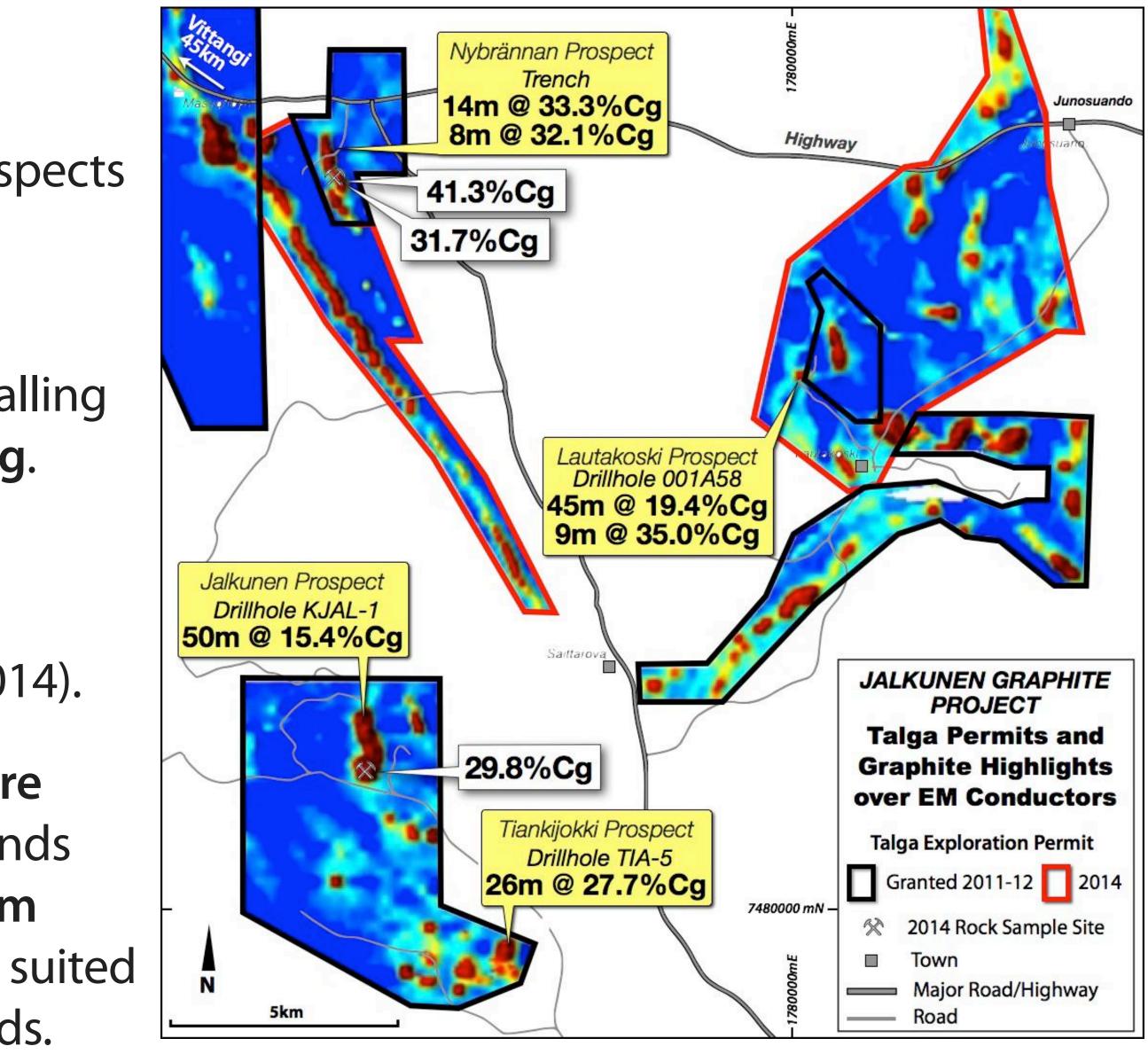






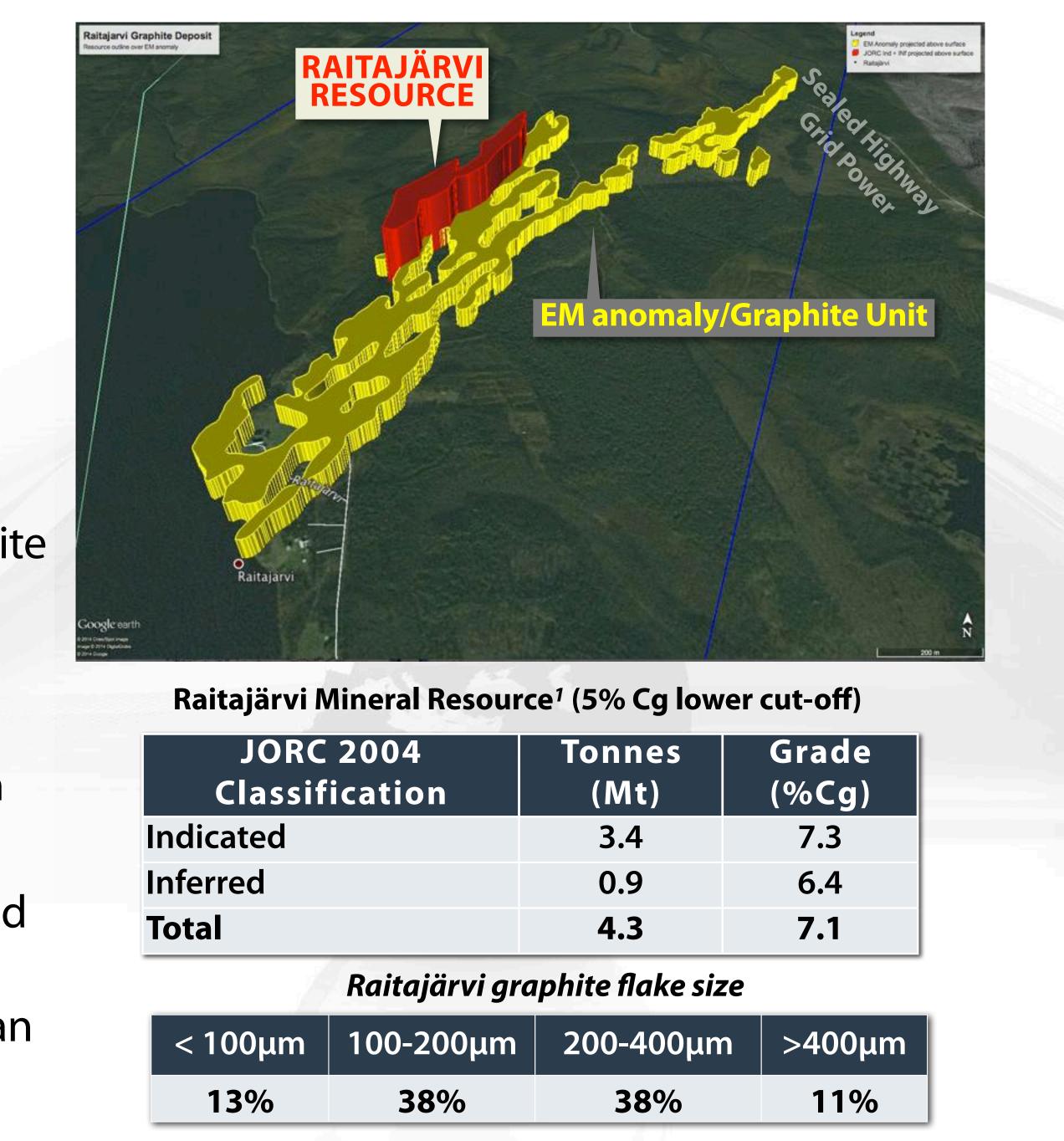
# Jalkunen Project - Emerging Graphene Potential

- The Jalkunen graphite project (93km<sup>2</sup>) located approximately 50km southeast from Vittangi comprises a cluster of high grade graphite prospects defined by historic trenching, geophysics and drilling.
- Recent work by Talga shows EM conductors totalling
  28km strike and surface grades up to 41.3% Cg.
- Metallurgical test confirms Graphene can be
  produced from Jalkunen using Talga's one-step
  process as per Vittangi (see ASX:TLG 16 Sept 2014).
  - Likelihood Jalkunen and Vittangi projects share same geological formation - significantly expands Talga's 100% owned graphene potential to 60km total strike across a graphite province uniquely suited for low cost bulk graphene production methods.



### **Other Graphite Projects -**Raitajärvi

- Indicated and Inferred 4.3 Million tonnes @ 7.1% Cg, JORC 2004 resource<sup>1</sup> open at depth and along strike.
- Near-surface deposit contains 87% coarse crystalline flake graphite with previous metallurgical work demonstrating up to 99.0%C purity concentrate.
- Significant portion 'large' and 'jumbo' size flake graphite in favor for production of lithium-ion battery electrodes.
- Advantageously located 2km from the Överkalix -Övertorneå Highway and grid power, 25km to town and railway.
- Capable of being 10-20,000t/annum output as second producer for Talga but excellent potential for size increase as remains open in all directions and less than 25% of the deposit's electromagnetic signature drill tested to date.



<b>JORC 2004</b>	Tonnes	Grade
Classification	(Mt)	(%Cg)
ndicated	3.4	7.3
nferred	0.9	6.4
<b>Fotal</b>	4.3	7.1

< 100µm	100-200µm	200-400µm	>400µm
13%	38%	38%	11%

# Piteå Project

Coarse flake graphite within a 4 x 1km EM anomaly intercepted to date by 3 historic drillholes.

# Very large average flake size; >80% reported as jumbo' 300 μm (+50 mesh).

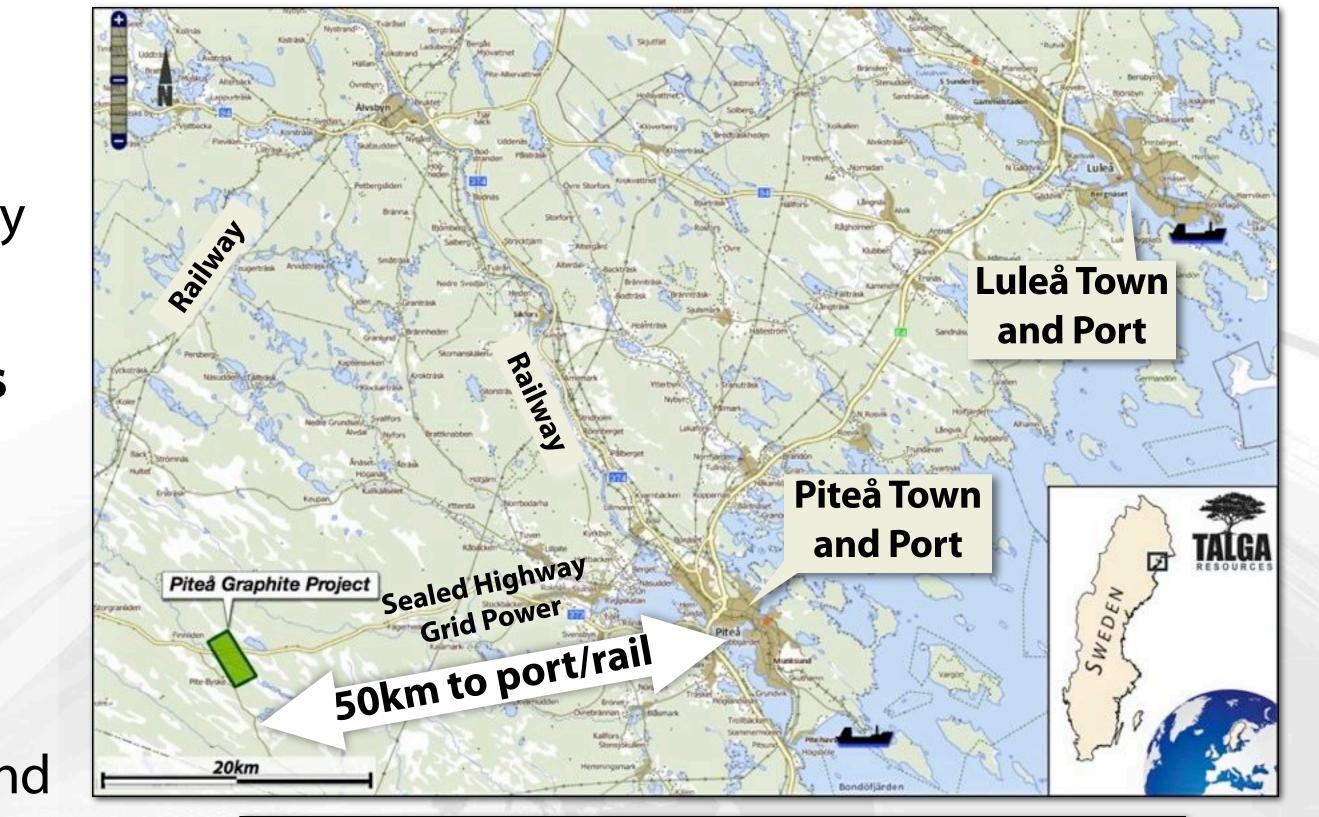
Such large flake graphite is premium product for spherical graphite production and commands higher prices.

Located on sealed road 50km from port of Piteå and adjacent to grid power.

 Adjacent EM anomalies pegged. Fieldwork to expand target zone and confirm drill targets after grant in 2015 for stage 2 drill testing.

Piteå average graphite flake size

< 100µm	100-300µm	300-600µm	>600µm
0%	45%	<b>64%</b>	18%

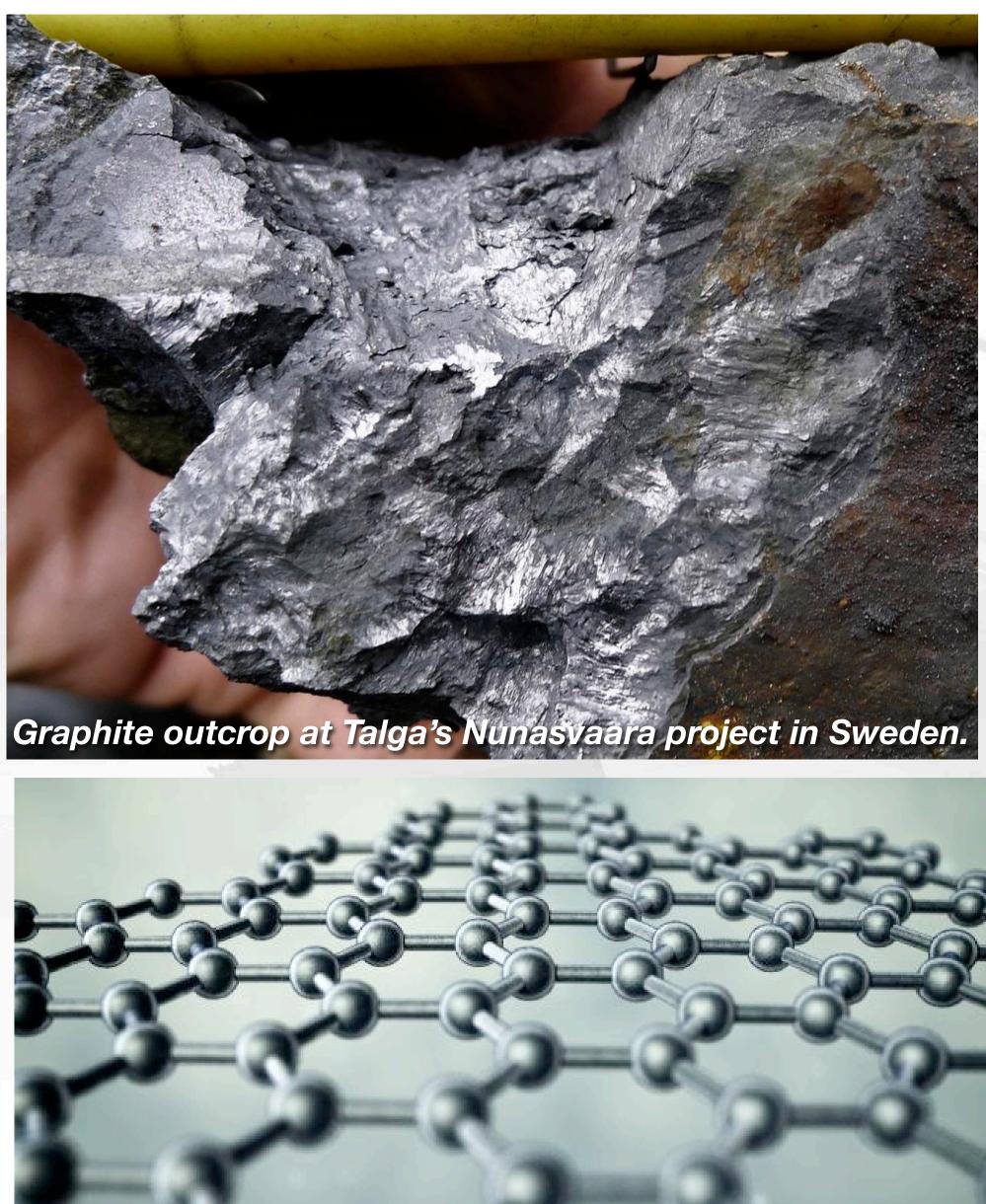


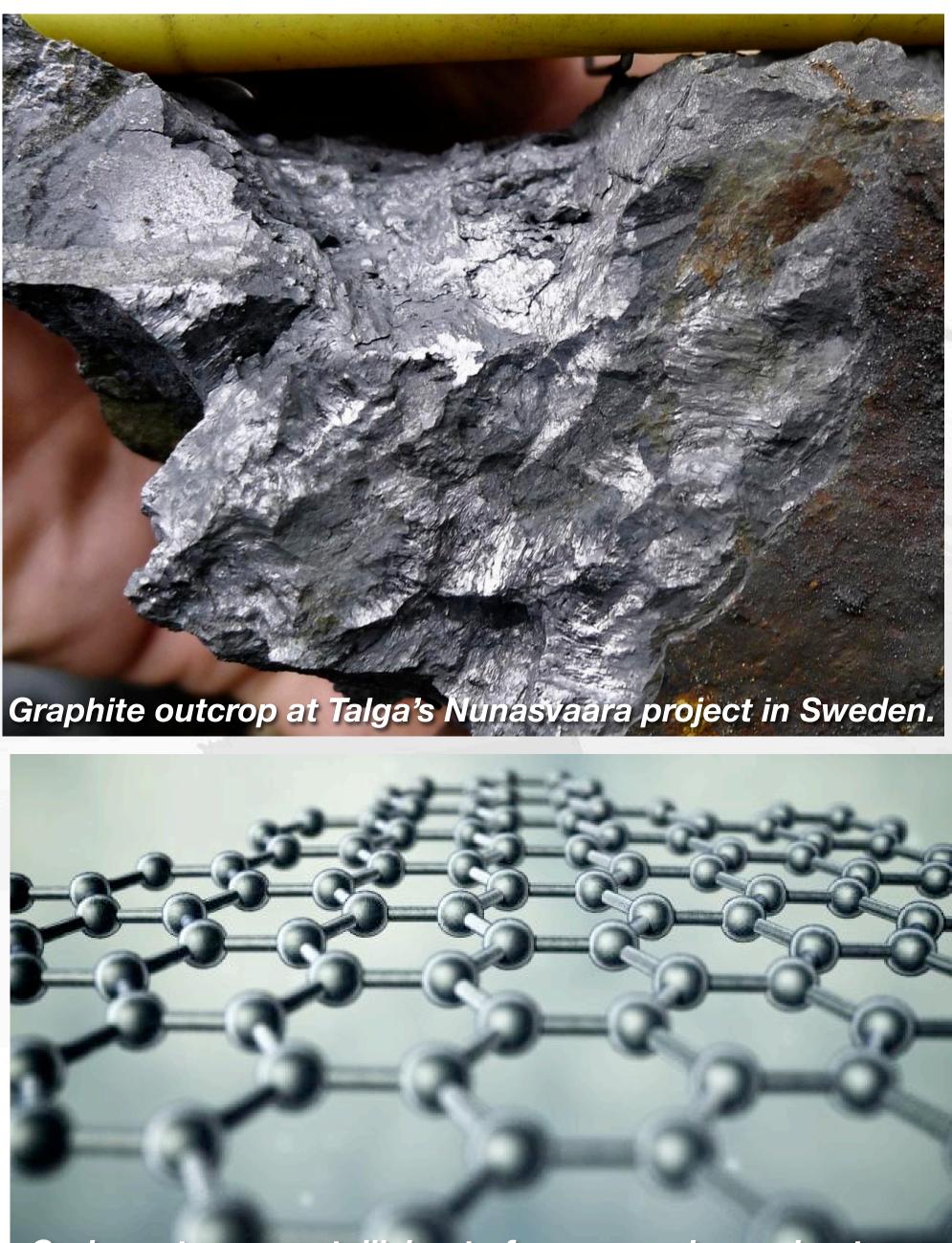
Coarse flake graphite present in historic drill core from the Piteå project stored at the SGU. Hole ÖNU89001, 44.2m depth.



## **Graphite versus Graphene?**

- Graphite (the mineral) consists of parallel sheets of carbon atoms in a hexagonal lattice, which when one or few atoms in thickness, are called graphene.
- Graphite therefore *IS* made from graphene sheets. There are about 3 million layers of graphene in 1mm of graphite.
- Graphene is everywhere you find graphite. But separating graphite to a few atoms thick is expensive and hard to scale up.
- Main factors delaying uptake include:
  - production methods are not scalable enough supply large quantities for commercial uptake
  - graphene production is prohibitively expensive
  - lower cost scalable production exists however quality • limits applications/markets.
- Oil is a good analogy to graphene omnipresent however fundamentals required for commercial success.





Carbon atoms crystallising to form a graphene sheet



### **Graphene - Disruptive Potential Across Multiple Markets**

"Graphene, which is composed of one-atom-thick sheets of carbon hexagons, is being produced today, but only in limited quantities and at high cost.

# When this material can be mass-produced cost-effectively, its impact could be quite disruptive."

**McKinsey Global Institute, May 2013** "Disruptive Technologies: Advances that will transform life, business and the global economy." Exhibit E1 Twelve potentially economically disruptive technologies



**Mobile Internet** 



Automation of Knowledge Work



**Internet of Things** 



**Cloud Technology** 



**Advanced Robotics** 

**Autonomous Vehicles** 

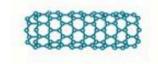
**Next Generation Genomics** 



**Energy Storage** 



**3D Printing** 



**Advanced Materials** 



**Oil/Gas Exploration & Recovery** 

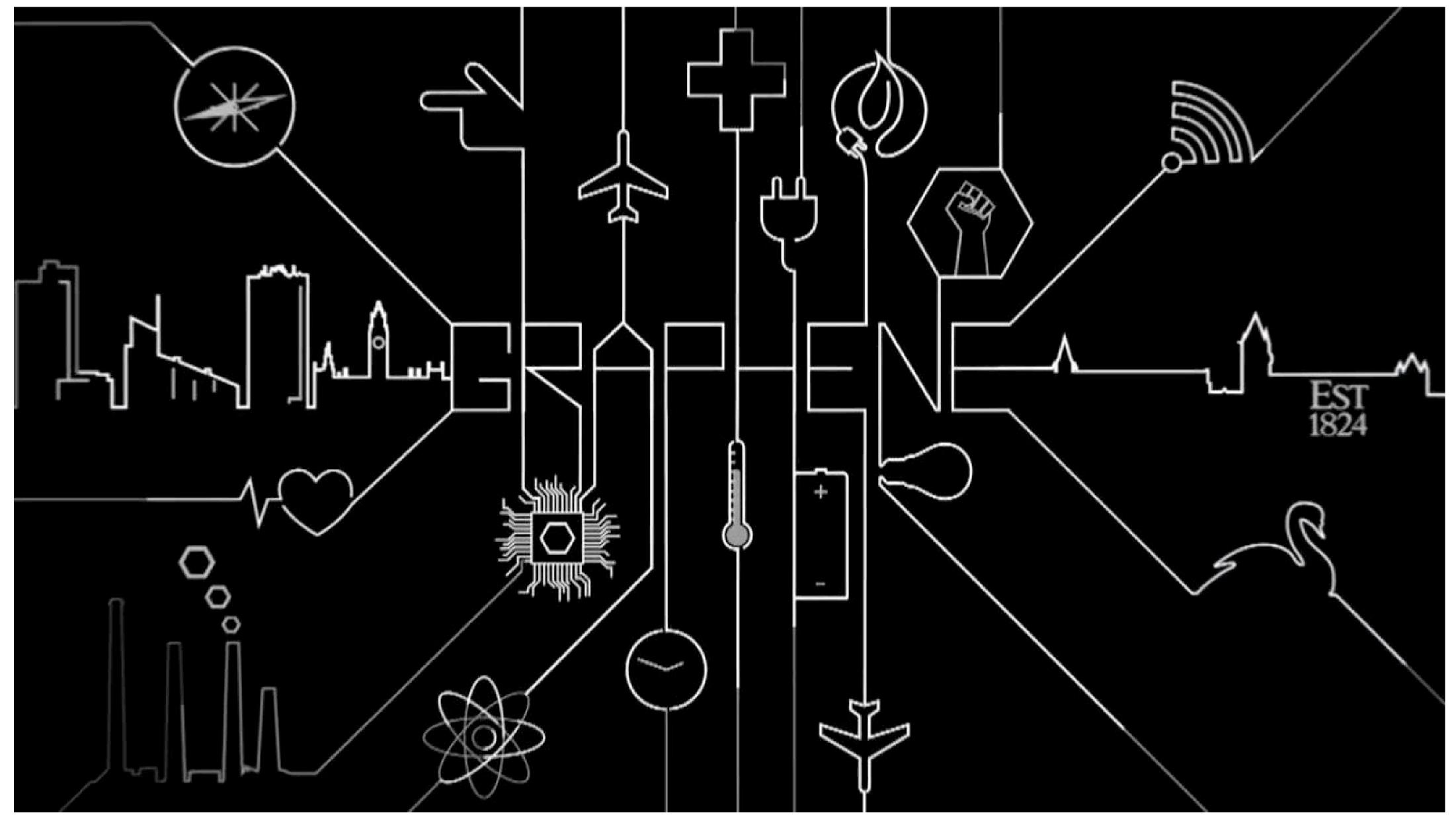


**Renewable Energy** 

SOURCE: McKinsey Global Institute analysis



#### Graphene; What is it & the buzz out of Manchester



Video: Courtesy The University of Manchester



#### **Graphene Market** Commercialisation is here

While the media is excited by future 'hi-tech' applications, and graphene-enhanced products are becoming available (tennis racquets, riding helmets) the main driver of near term graphene commoditisation is additives.

- Small amounts of graphene (0.05-2.00% vol) added to common bulk materials<sup>2</sup> can impart *exponential increases in strength* e.g. carbon fibre, cement (global consumption 3,300Mt/ann), and aluminium allowing less material/lighter builds with related lowering of CO<sub>2</sub> emissions. Similar additions to paints and steel coatings can impart anti-corrosion properties and conductive properties to plastics. Conductive and 3-D printing inks are commercialising rapidly.
- Talga can sell graphene it produces during development phases; metallurgical to pilot plant, from processing drillcores. First sale of graphene completed July 2014 to German group Microdrop Technologies.

#### **Global consumption of potential** graphene additive materials

#### Concrete 3,300 million tonnes annum

Steel 1,606

# Plastics 288

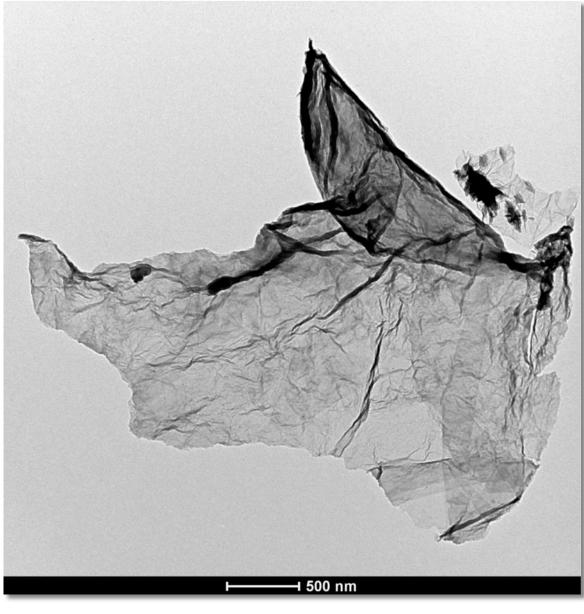






# **Talga's Graphene Status**

- The highly homogenous nature of the raw ore has enabled production of high quality 1-5 layer graphene with high potential for world-leading low cost and high volume.
- Talga and CSIRO are co-funding a research program on Vittangi graphite ore and graphene.
- An initial sale of Talga's graphene has been made to a German 3-D printer manufacturer.
- Process pathway has been demonstrated at benchtop scale and upscaling tests are underway to design a 5 tonne/hr pilot plant to be **operational** in north Sweden mid **2015**. The pilot plant will be designed to supply 100-200 tonnes graphene samples over few year test period.
- Scoping study shows production potential for 1-7,000tpa graphene production from Base case, flexible to suit market.







### Milestones on path to production

- Scoping study complete for dual graphene/graphite production.
- Permitting underway for 5,000 tonne test mining sample and pilot plant for mid-2015.
- Metallurgical testwork to be materially expanded and will produce graphene products for analyses and commercial purposes until pilot plant underway.
- Exploitation permit applications to commence, targeting full-scale construction circa 2016. Pilot plant and bulk sample program may be duplicated annually to continue producing test
- graphene and graphite products prior to full scale development.
- Potential for enduser/offtake commercialisation now volume and financial metrics known.









## **Investment Highlights**

- Highest grade JORC/NI43-101 global graphite resource.
- Demonstrated ability to produce high quality graphene direct from its raw ore provides robust margin potential compared to peers.
- Low cost capex and strong returns indicated from Scoping Study with conservative metrics.
- Advanced down the path to production.
- Massive resource growth profile; dominant land position on drilled EU graphite deposits.
- Exposure to high growth materials and energy markets in graphite and graphene.
- Located on road and rail routes to major markets, in highly ranked low-risk mining and corporate jurisdiction, Sweden.

#### To get further information or register interest contact:

Mark Thompson - Managing Director 1st Floor, 2 Richardson St West Perth WA 6005 Australia Tel +61 89481 6667 email admin@talgaresources.com





#### Appendices

#### **Graphite JORC (2004) Resources<sup>1</sup>**

**Nunasvaara** Graphite Mineral Resource @ 10% Cg lower cut-off Nov 2012

Classification	Tonnes	Graphite
Classification	(Mt)	(%Cg)
Indicated	5.6	24.6
Inferred	2.0	24.0
Total	7.6	24.4

Note 1: The Vittangi graphite project Mineral Resource (Nunasvaara deposit) estimate was first reported in February 2012 and has not been updated to comply with the 2012 JORC Code. The Company is not aware of any new information or data that materially affects the information included in the relevant market releases for this estimate. The Company confirms that all material assumptions and technical parameters underpinning the estimate in the relevant market releases continue to apply and have not materially changed. The Company confirms that the form and context in which the Competent Person's findings are presented here have not been materially modified.

In light of the positive results from the Study, Talga and its consultants have closely reviewed the parameters of the JORC 2004 estimate and are satisfied with its use in the context of this Study. A further revision of the estimate will be undertaken in order to move the resource to 2012 JORC compliant status in the near future as part of next stage feasibility studies.

#### **Cautionary Statement**

The scoping study referred to in this report is based on low level technical and economic assessments, and is insufficient to support estimation and economic assessments, and is insufficient to support estimation of Ore Reserves or to provide assurance of an economic development case at this stage, or to provide certainty that the conclusion of the scoping study will be realised. The use of the word "ore" in the context of this report does not support the definition of 'Ore Reserves' as defined by the 2012 Edition of the 'Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves". The word 'ore' is used in this report to give an indication of quality and quantity of mineralised material that would be fed to the processing plant and is not to assumed that 'ore' will provide assurance of an economic development case at this stage, or to provide certainty that the conclusion of the scoping study will be realised.



*Raitajärvi* Graphite Mineral Resource @ 5% Cg lower cut-off Aug 2013

Classification	Tonnes	Graphite
	(Mt)	(%Cg)
Indicated	3.4	7.3
Inferred	0.9	6.4
Total	4.3	7.1



#### **References & Qualified Persons**

#### 2 Research references

Graphene in concrete "Materials Genome for Graphene-Cement Nanocomposites for Infrastructure Applications"; Hunain Alkhateb et al Department of Civil Engineering, University of Mississippi USA plus see <u>http://www.monash.edu.au/assets/pdf/industry/graphene-oxide-reinforced-concrete.pdf</u> Graphene in aluminium "Reinforcement with graphene nanosheets in aluminum matrix composites". Wang, J et al (2012). Scripta Materialia, 66 (8).

Graphene in plastics "Graphene Nanoplatelets: A Multi-functional Nanomaterial Additive for Polymers and Composites" (2013) Lawrence T. Drzal, Chief Scientist XG Sciences, Inc. Professor, Chem Engin and Materials Science Michigan State University Graphene on iron/steel "Hybrid nanocomposite coatings for corrosion protection of low carbon steel: A substrate-integrated and scalable active-passive approach," (2011) G.K. Rout et al, J. Mater. Res., 26, 837–44 and see http://www.steeltimesint.com/news/view/tata-partners-with-epsrc-to-developgraphene-coated-steels.

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

The information in this report that relates to Exploration Results is based on information compiled and reviewed by Mr Mark Thompson, who is a member of the Australian Institute of Geoscientists. Mr Thompson, an employee of the Company, has sufficient experience which is relevant to the activity which is being 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"). Mr Thompson consents to the inclusion in the report of the matters based on this 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 of CoxsRocks Pty Ltd. 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.







