



ASX: TLG



Talga Resources Ltd AGM Presentation

Perth 27 November 2014

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Executive Summary



- ▶ Talga Resources Ltd (“Talga”) ASX:TLG is an integrated technology materials development company with multiple graphite projects in Sweden including the **world’s highest grade graphite mineral resource***.
- ▶ Talga’s testwork 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 JORC¹** resources to date and completed a Scoping Study on one (Vittangi) that shows strong returns with low Capital cost of AUD\$29m and NPV AUD \$490m using conservative metrics.
- ▶ The Company is **expanding** it’s deposits, permitting a **trial mining** operation to feed a **demonstration/pilot plant** to be constructed in **2015** and developing further **commercial/sales agreements** in both **graphite** and **graphene** markets.

* See www.techmetalsresearch.com for world graphite NI43-101/JORC resources grade table.

Talga Resources Corporate Overview

Listed on ASX July 2010: Stock code TLG. Snapshot 24 November 2014

Board of Directors

Keith Coughlan	Non-executive Chairman
Mark Thompson	Managing Director
Grant Mooney	Non-executive Director

Capitalisation Summary

ASX:TLG Ordinary Shares	124.6M
ASX:TLGO Options (exp 30 Nov 2015 at 35c)	7.72M
Unlisted Options ¹	10.85M
Cash \$AUD	~A\$3.1M
Market Capitalisation (undiluted @ \$0.28)	A\$34.8M

12 month Share Price and Volume (weekly) TLG



Top Shareholders (+3%)

Lateral Minerals Pty Ltd (Mark Thompson)	11.4%
Gregorach Pty Ltd	7.3%
HSBC Custody Nominees Australia Pty Ltd	3.6%
UBS Nominees Pty Ltd	3.2%
Yandal Investments Pty Ltd	3.1%
Two Tops Pty Ltd	3.0%

¹ As at 24 November 2014

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 JORC¹ Indicated status and a preliminary economic study is complete on one of the deposits.



Vittangi

JORC¹ Total 7.6Mt @ 24.4% Cg containing 1.85Mt graphite, flake size <75µm suits 1-step process to potentially produce 46,000tpa graphite and 1,200tpa graphene.

Raitajärvi

JORC¹ Indicated and Inferred 4.3Mt @ 7.1% Cg containing 0.35Mt graphite, 87% coarse flake size (49% >200µm), Purity of 99%Cg in testwork. Suit refractory to spherical/battery market.

Jalkunen

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

Pajala

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.

Piteå

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



Kiruna magnetite mine-mill/LKAB.



Svappavaara magnetite mine-mill/LKAB



Aitik Cu-Au mine-mill/Boliden



Kaunisvaara magnetite mine -mill / Northlands AB. Photo©Northlands AB



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
- ▶ Well established **mining province** with **highly skilled** workforce and **support industries**
- ▶ Hosts **world-class mineral deposits** but remains under-explored relative to peers as foreign mineral ownership only allowed since 1992

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.



Road through Vittangi project



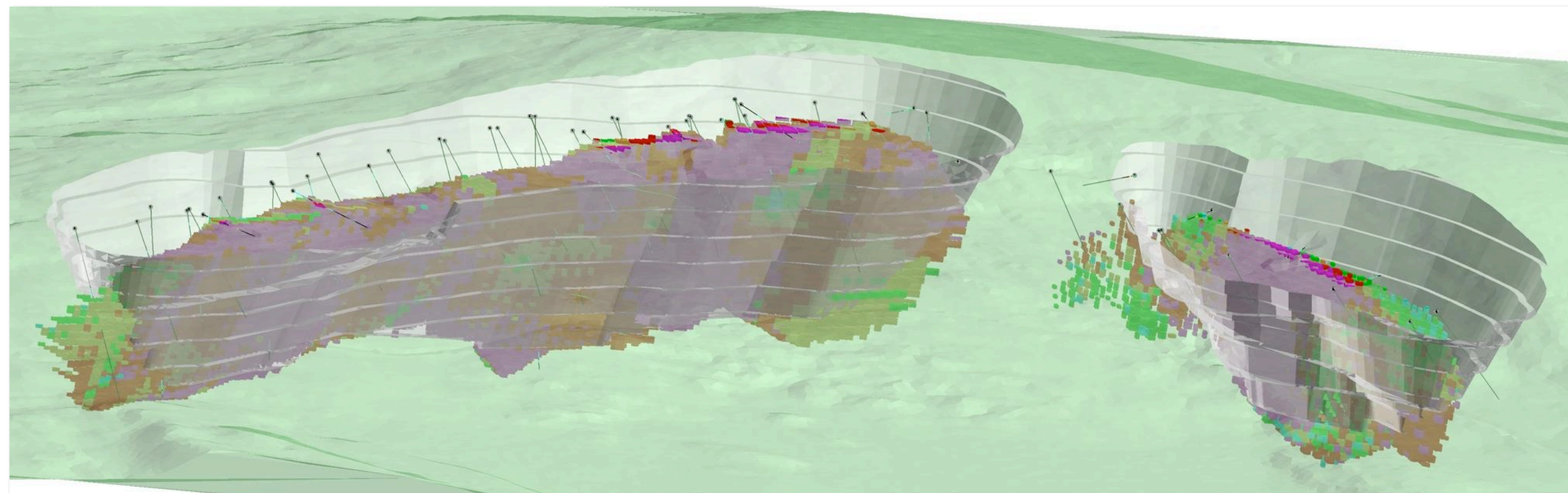
Rail routes direct to major markets



Öresund Bridge road/rail tunnel linking Sweden to mainland Europe

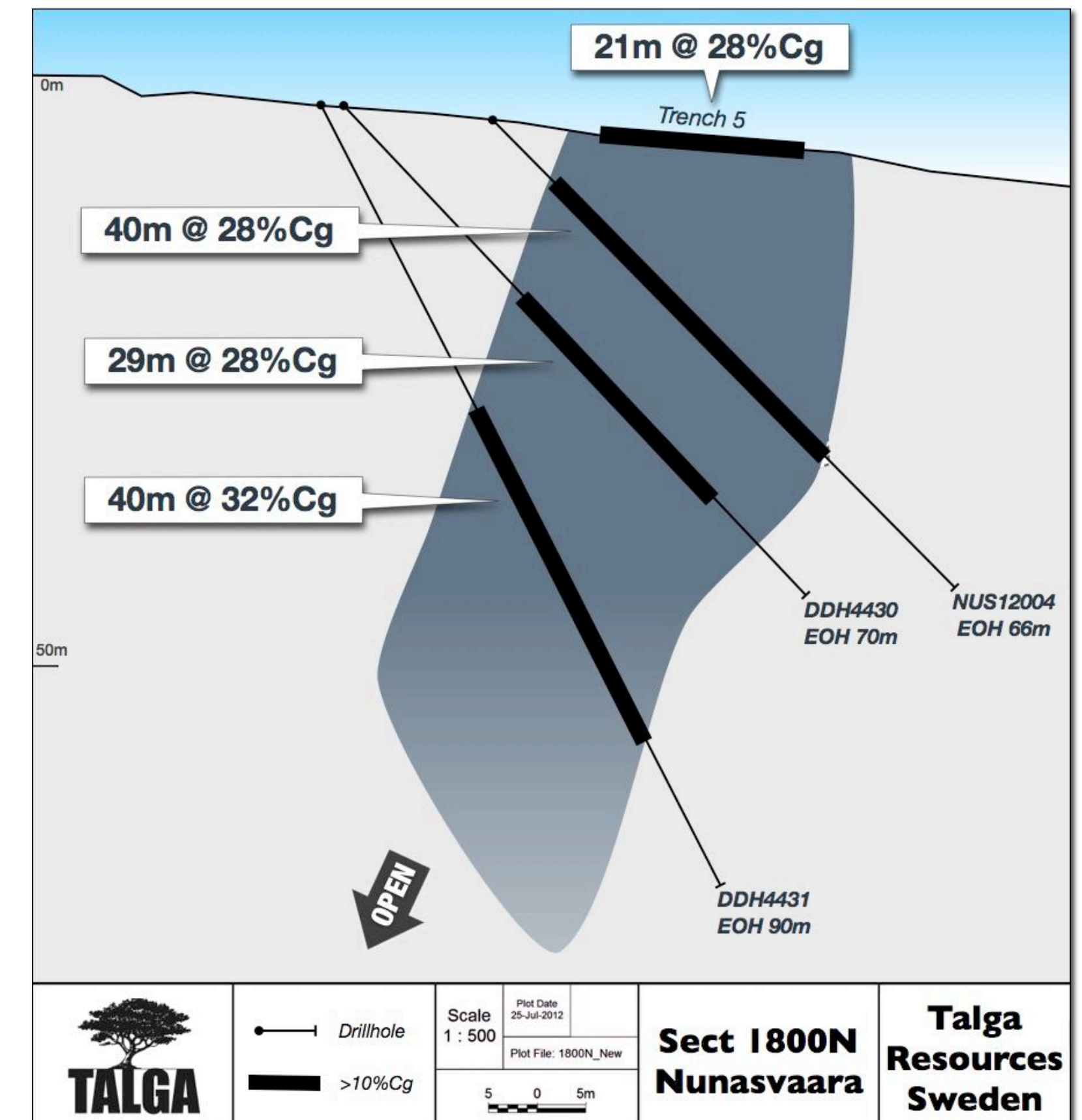
Vittangi Project - Nunasvaara Graphite Deposit

- ▶ The Vittangi graphite project (347km²) 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 resource¹ of 7.6Mt @ 24.4% graphite ("Cg") 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	24.6
Nunasvaara	Inferred	2,000,000	24.0
Total		7,600,000	24.4



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 end) 2% graphene and ~77% total graphite recovery
- ▶ Indicative **pre-tax NPV** in excess of **AUD\$490m** based only on **current JORC Indicated portion** of resource
- ▶ Without graphene sales project is still **viable on graphite production alone – graphene essentially a byproduct**
- ▶ Minimal environmental footprint with **low impact single-step comminution technology** and metallurgical route tested at R&D and bench-top scales with permitting underway for pilot plant production

Summary of Key Study Outcomes

Items		Base Case
Plant throughput	(tpa)	250,000
Diluted Feed Grade	(%)	23.6*
Graphite production	(tpa)	~46,000
Graphene production	(tpa)	~1,000
Life of Mine Strip Ratio	W:O	4:1
Graphite price assumption	(USD\$/t)	480
Graphene price assumption	(USD\$/t)	55,000
Capital cost	(AUD\$m)	29.3
Mine Life	(years)	19.7
Discount Rate	(%)	12
Pre Tax Net Present Value (NPV)**	(AUD\$m)	~490
Payback from construction start	(years)	1.4

**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 million** at +/- **30%** accuracy.
- ▶ Note capital cost is lower than conventional processing plants due in part to:
 - the **high grade/lower tonnage** nature of the operation
 - **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)
Process Plant (Equipment & Labour)	9.25
Site & Plant Infrastructure	7.60
Commissioning, Start-Up, Spares & Miscellaneous	8.39
Total Direct Plant Costs	25.24
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:

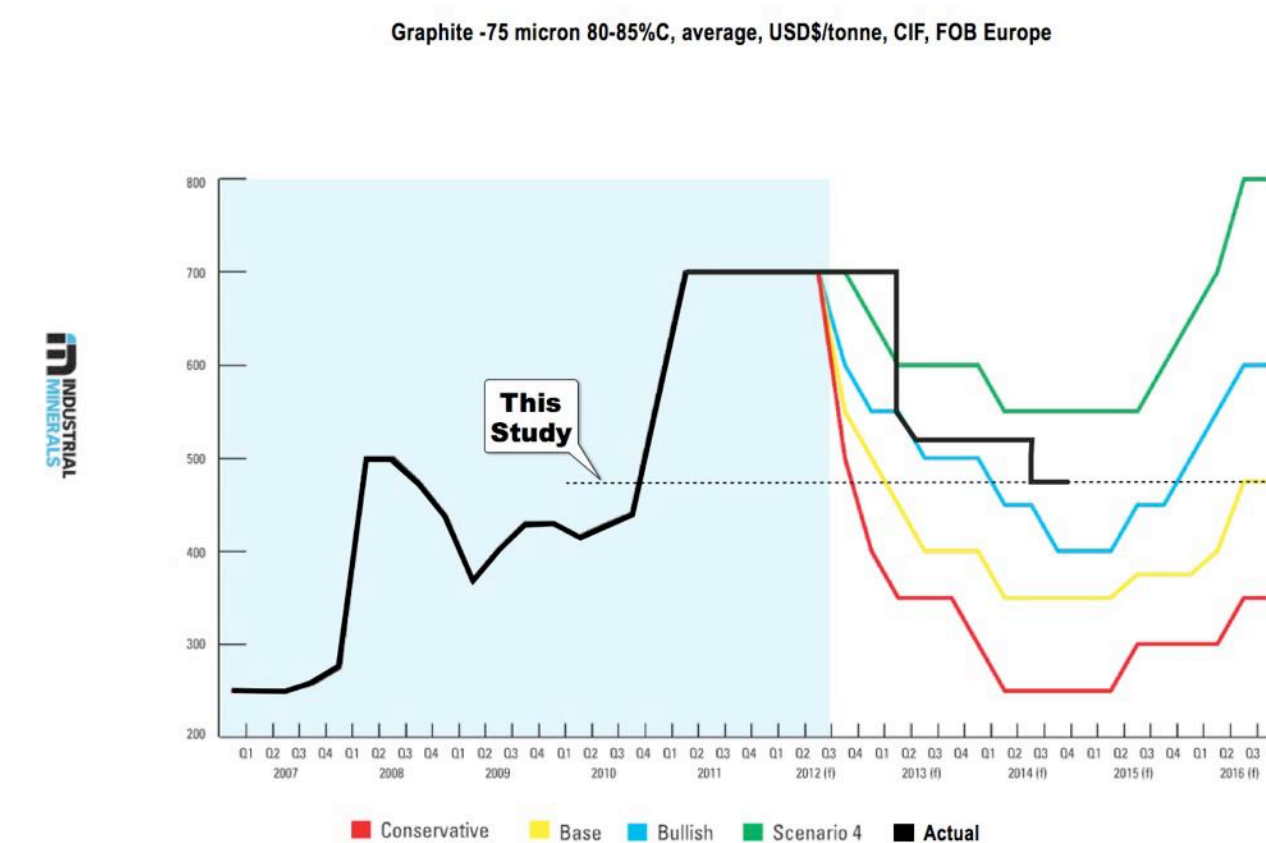
- Standard ultrafine graphite concentrate (80-85%C purity) ("**SUG**"); and
- Very few layer graphene (99.9%C purity) ("**vFLG**"); and
- Micronised high purity graphite (94-97%C purity) ("**Micronised**").

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

Scoping Study Product and pricing summary

Product	Flake Size	~Length	Graphene Layers	Graphene Thickness (nM)	Purity (%C)	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.



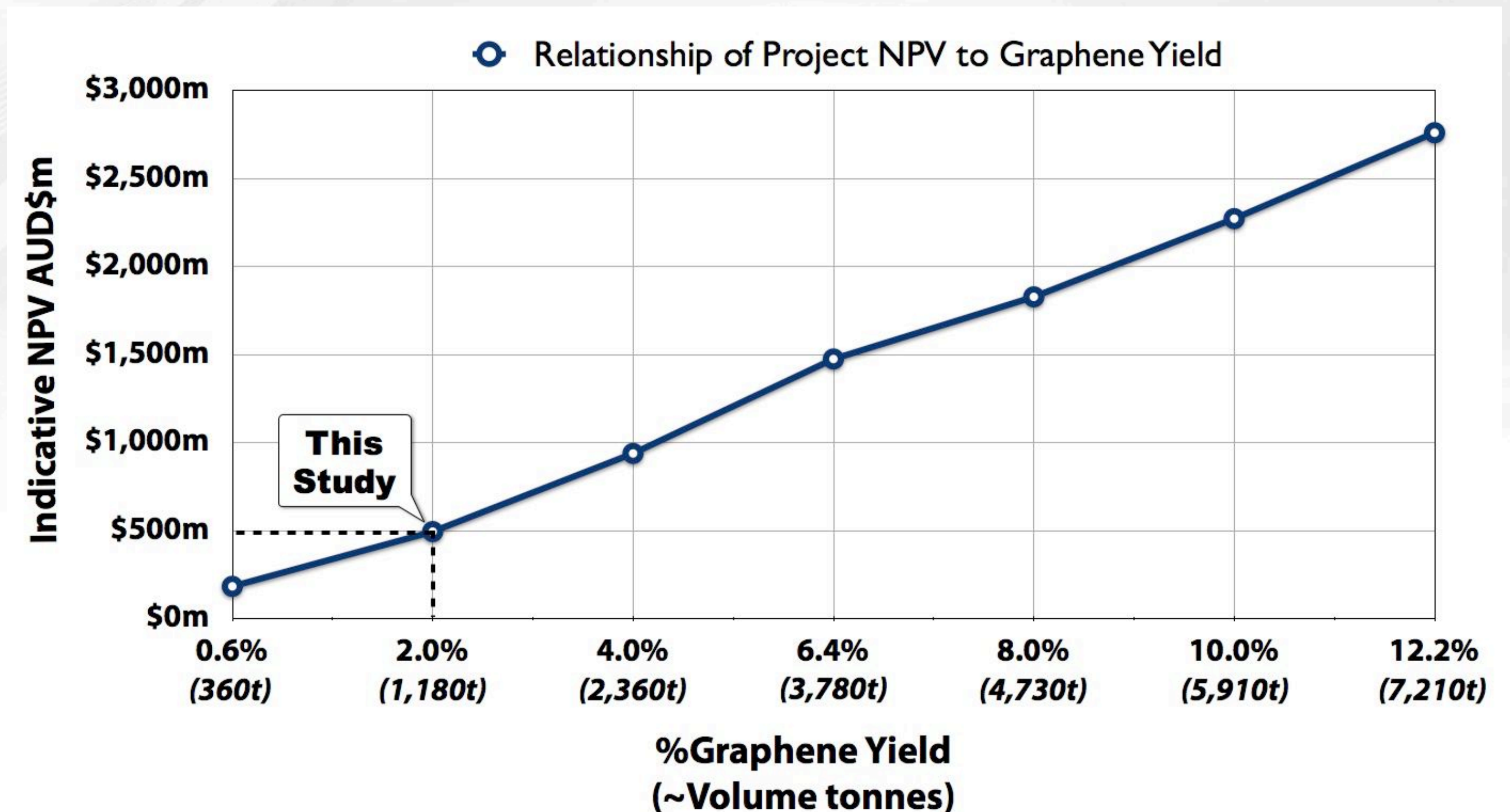
Natural Graphite Report 2012

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%

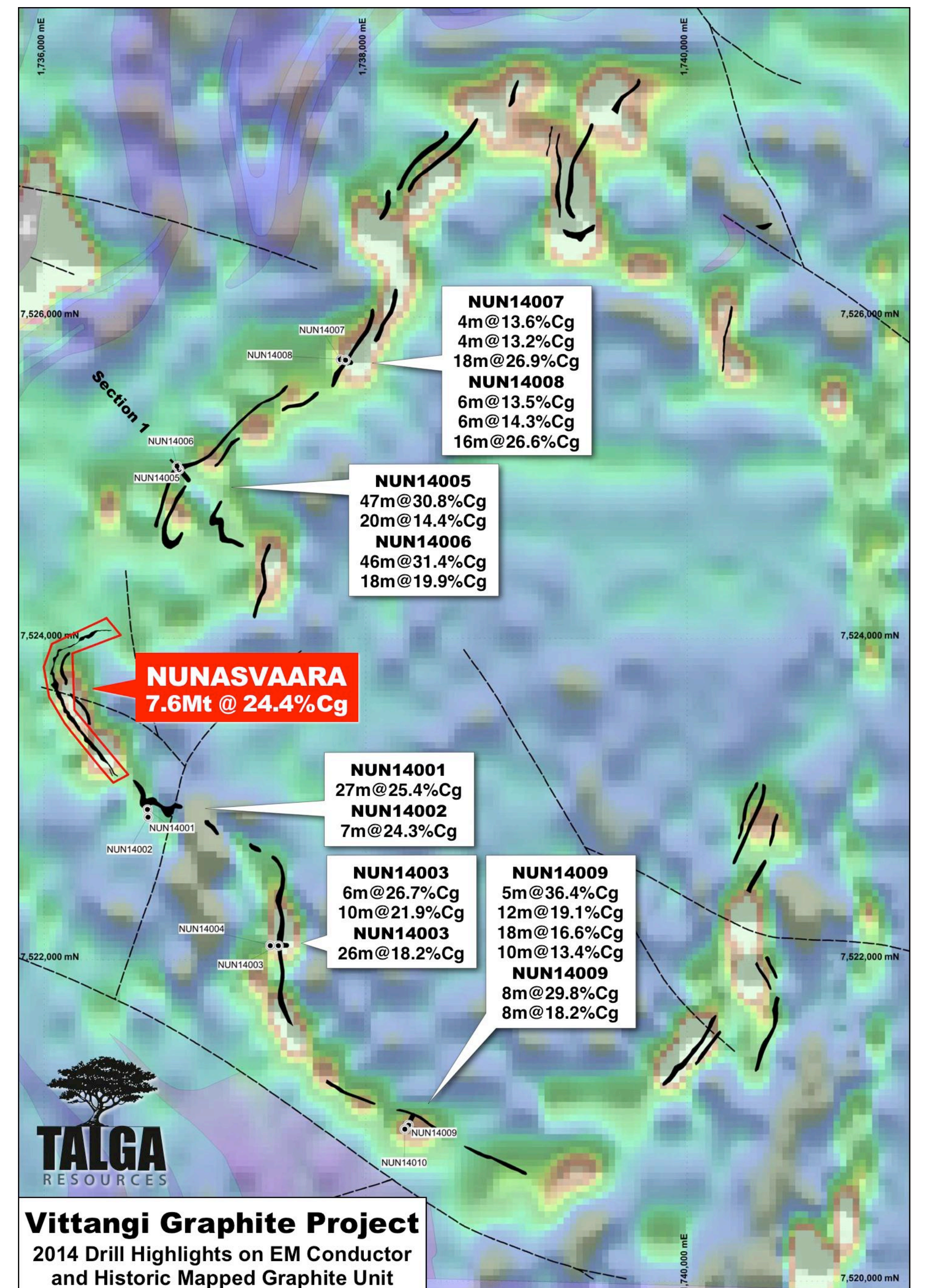
- ▶ **Scope for upside from increased;**
 - Graphite and Graphene **prices**
 - Graphene sales **volumes**
 - **Yields**/metallurgical **improvements**
 - **Optimised** costs and mining methods
 - Resource **growth**/Jalkunen development
- ▶ **Results provide confidence and a business case to advance the project towards trial mining, pilot plant design and construction**

Indicative project NPV (@ US\$55,000t graphene price) sensitivity to graphene yield/volume.



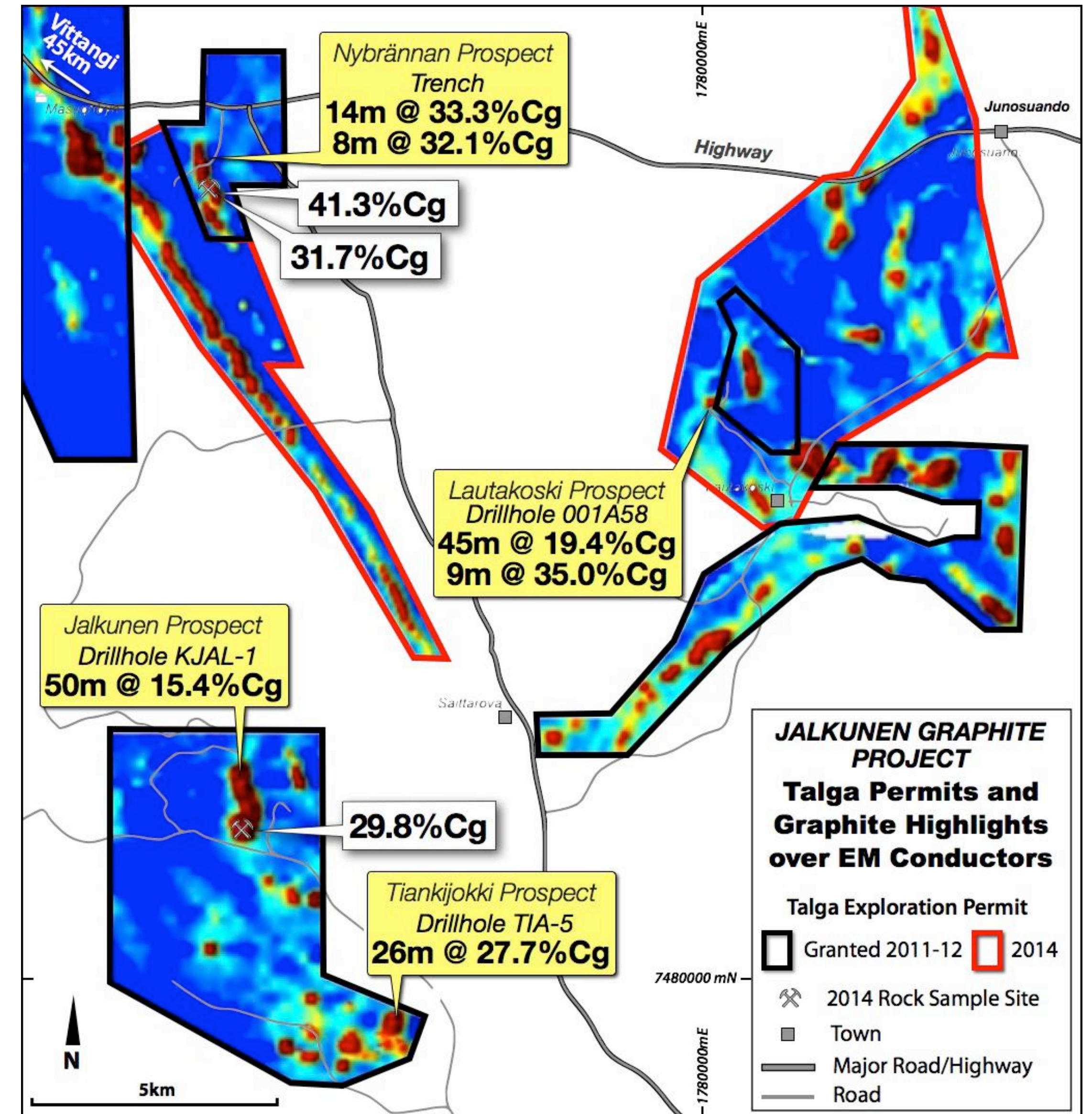
Vittangi Project - Growth Potential

- ▶ Further **32km strike** EM conductors (Nunasvaara-type graphite) recently identified extending **outside the resource area** along strike to north and south.
- ▶ Drilling of 5 sites over **6km strike** intercepted best results in the project's history. Key intercepts include:
 - NUN14005: from 1m depth **47m @ 30.8% Cg** including **10m @ 40.6% Cg** and new footwall zone of 20m @ 14.4% Cg from 102m
 - NUN14006: from 52m depth **46m @ 31.4% Cg** including **10m @ 44.9% Cg** and new footwall zone of 18m @ 19.9% Cg from 168m
 - NUN14001: from 15m depth **27m @ 25.4% Cg** located **350m southeast** from current resource
- ▶ New layer of footwall mineralisation underlying main layer drilled to date is significant new development for size.



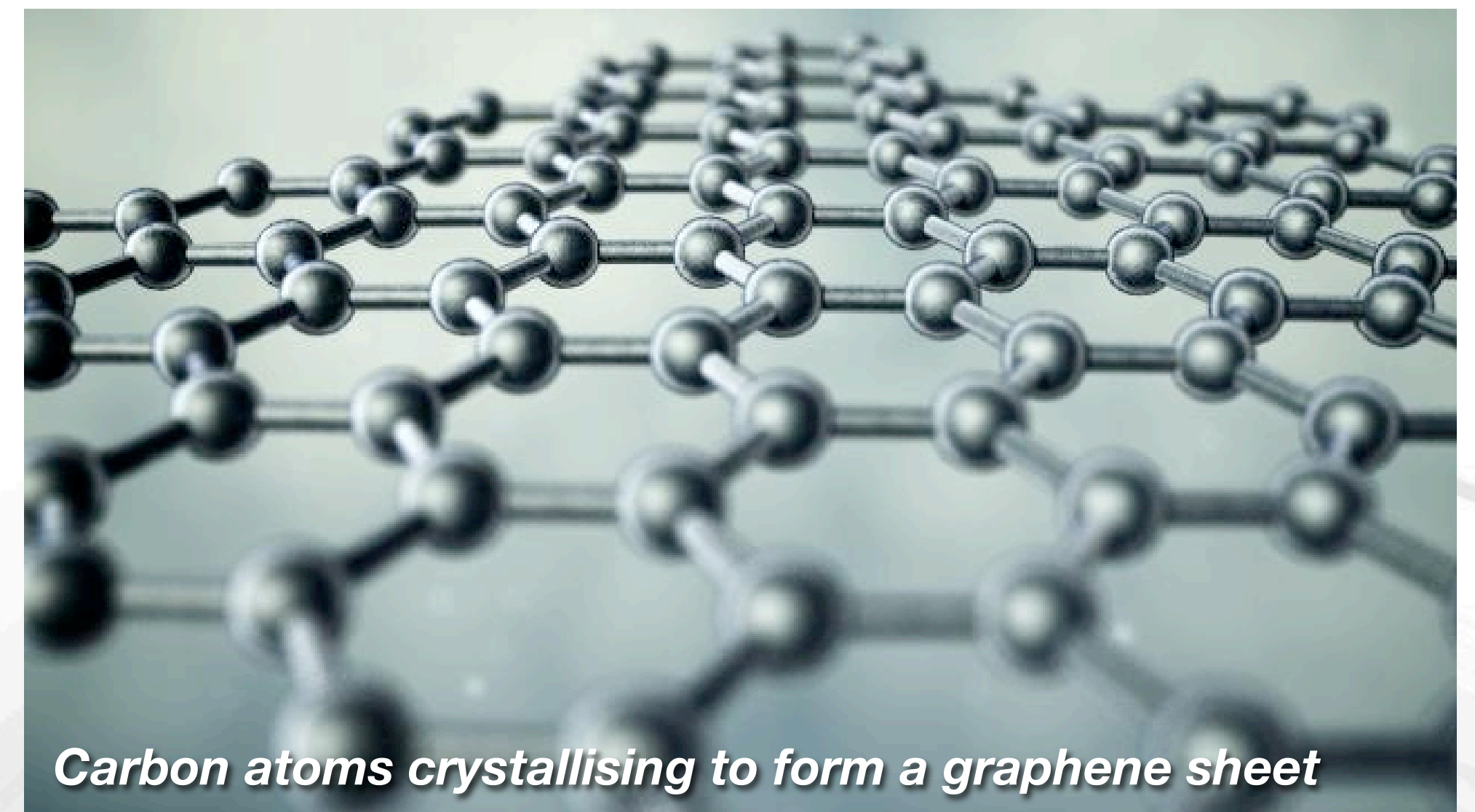
Jalkunen Project - Emerging Graphene Potential

- ▶ The Jalkunen graphite project (93km²) 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.



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 - is present worldwide however fundamentals required for commercial success.



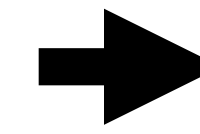
Graphene - Disruptive Potential Across Multiple Markets

“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.”



Mobile Internet



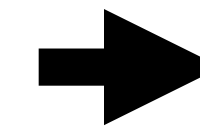
Automation of Knowledge Work



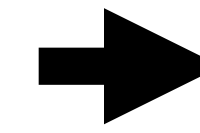
Internet of Things



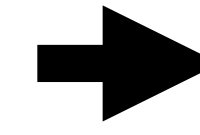
Cloud Technology



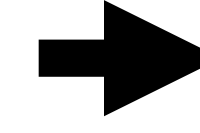
Advanced Robotics



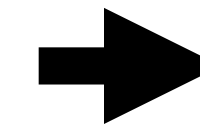
Autonomous Vehicles



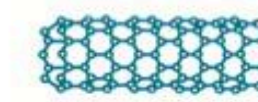
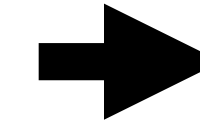
Next Generation Genomics



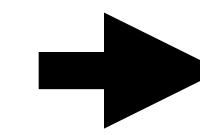
Energy Storage



3D Printing



Advanced Materials



Oil/Gas Exploration & Recovery



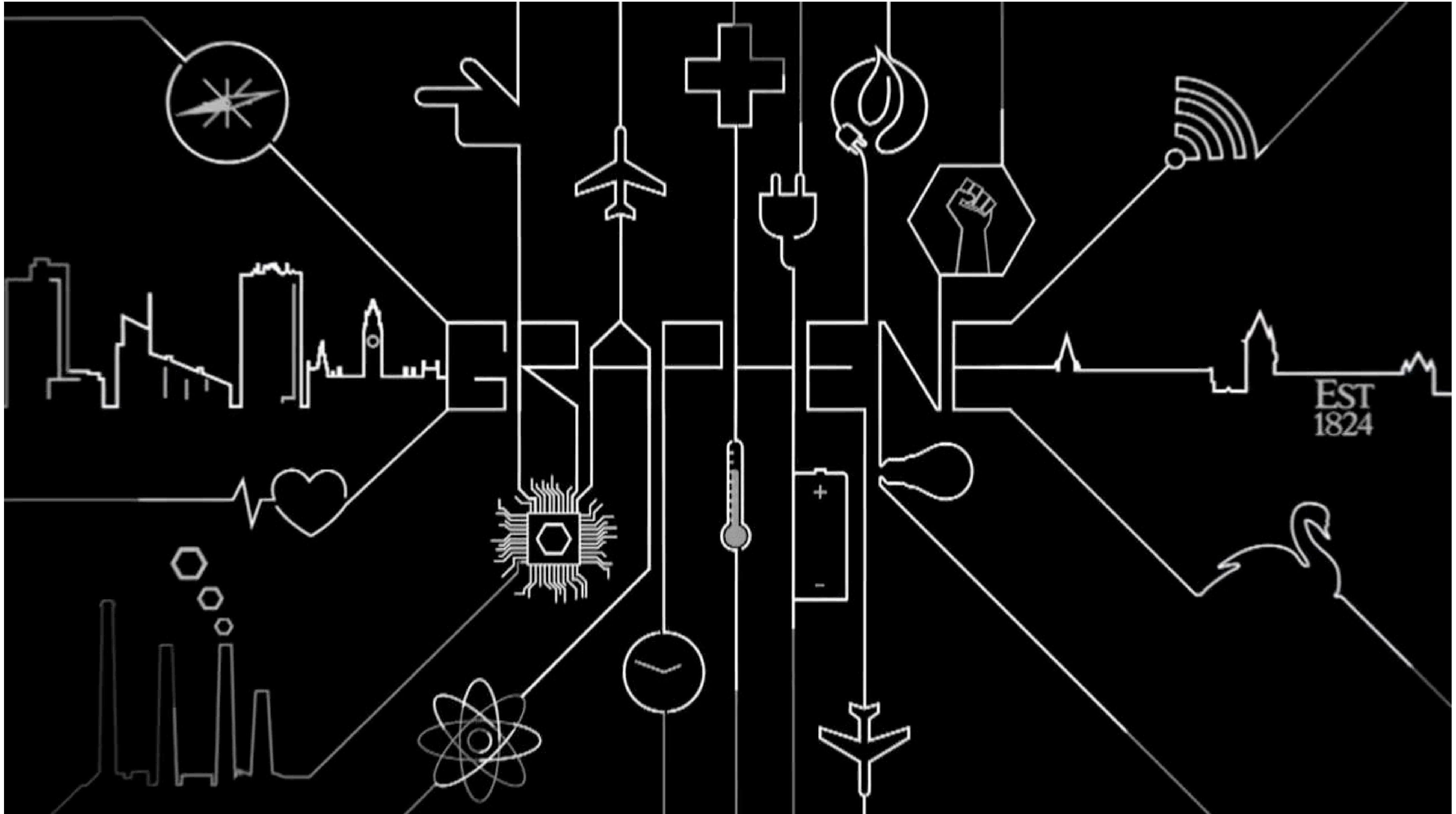
Renewable Energy

Exhibit E1

Twelve potentially economically disruptive technologies

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

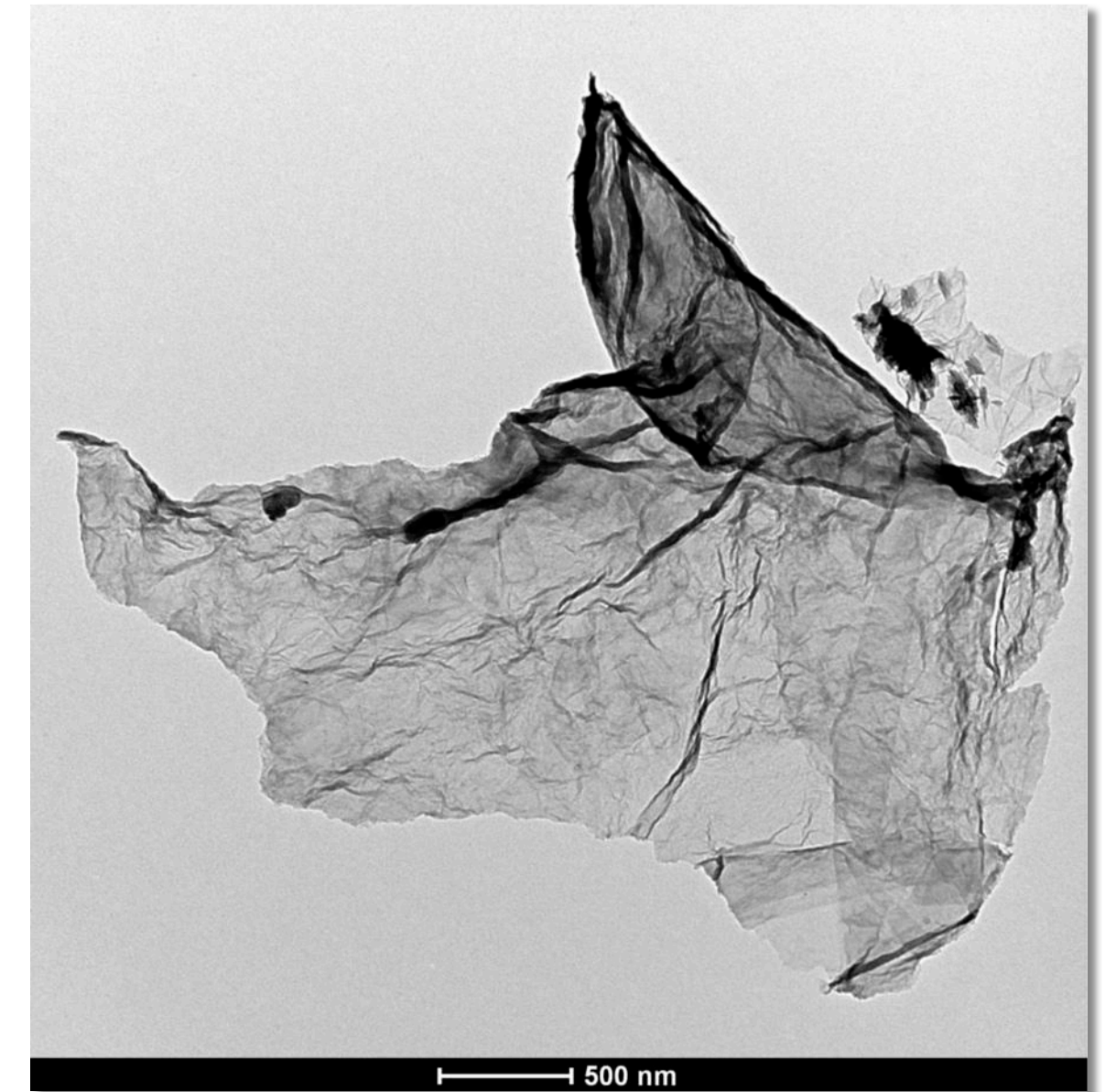
- ▶ While the media is excited by future 'hi-tech' applications, and graphene-enhanced products are becoming available (tennis racquets, riding helmets) the main driver of near term graphene commoditisation is **additives**.
- ▶ Small amounts of graphene (**0.05-2.0% vol**) added to common bulk materials 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 CO₂ 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



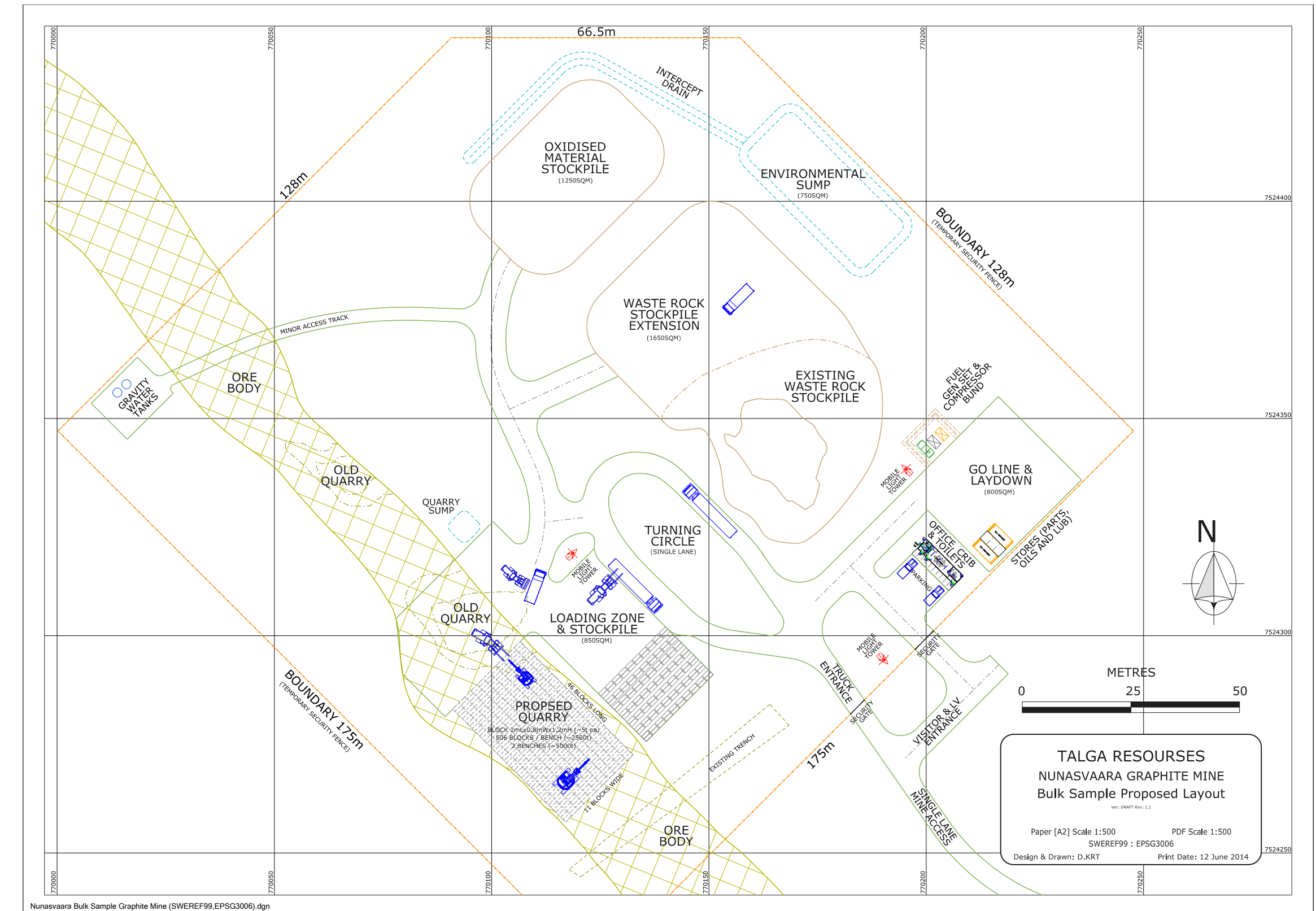
Talga's Graphene Status

- ▶ 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 **demonstration/pilot plant** to be **operational** in Europe mid **2015**. The pilot plant will be designed to supply commercially significant scale 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 to feed **demonstration/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 late 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.

For further information contact:

Mark Thompson - Managing Director

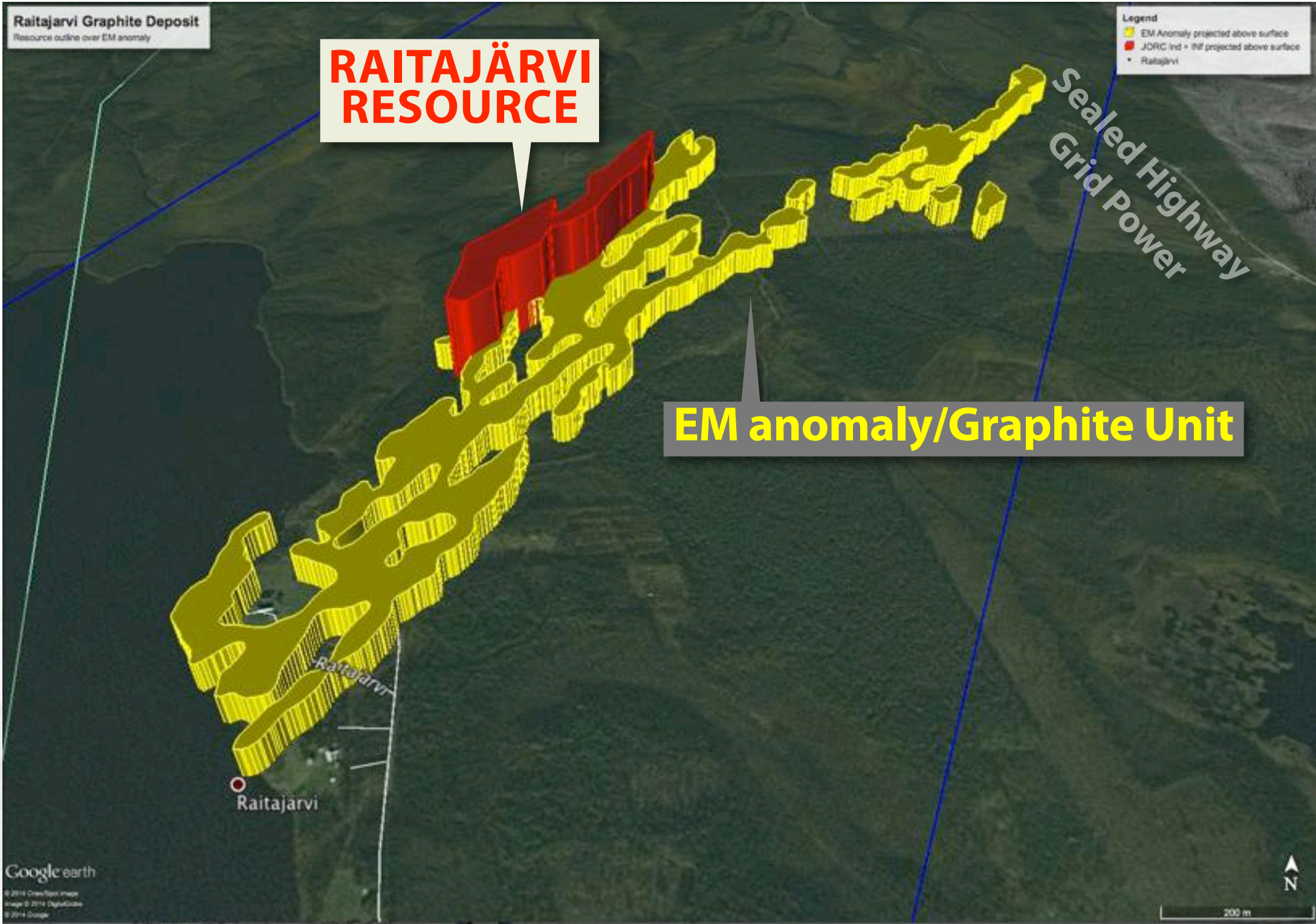
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Appendix

Other Projects - Raitajärvi

- ▶ Indicated and Inferred **4.3 Million tonnes @ 7.1% Cg**, JORC 2004 resource¹ 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.



Raitajärvi Mineral Resource¹ (5% Cg lower cut-off)

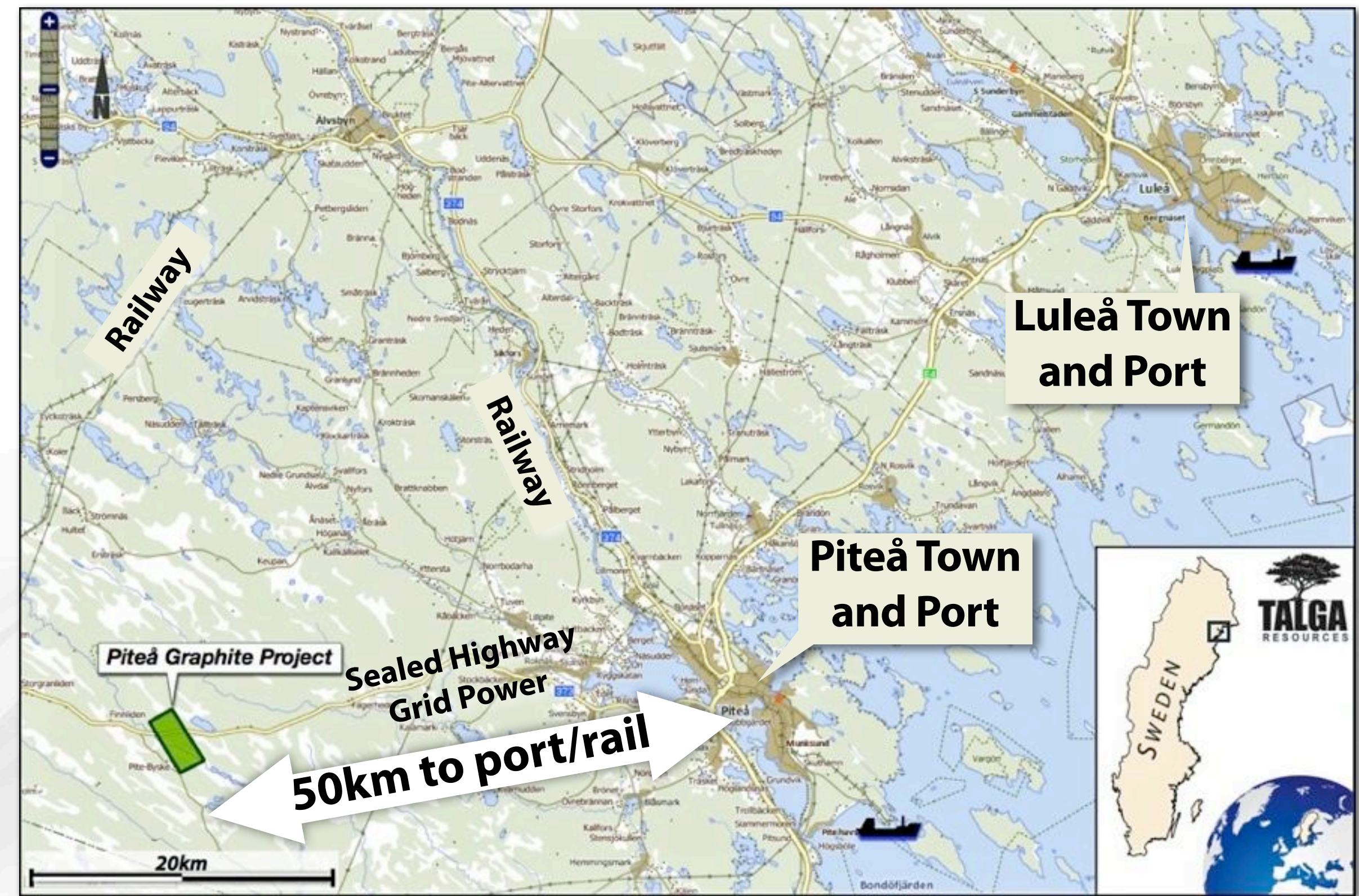
JORC 2004 Classification	Tonnes (Mt)	Grade (%Cg)
Indicated	3.4	7.3
Inferred	0.9	6.4
Total	4.3	7.1

Raitajärvi graphite flake size

< 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 .



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

Piteå average graphite flake size

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

Appendices

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.

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.