

TALGA
RESOURCES



ASX: TLG

Talga Resources Ltd Corporate Presentation

Graphene
March 2015

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Who we are

- ▶ Talga Resources Ltd (“Talga”) ASX:TLG is an Australian based technology materials development company with operations in Sweden and Germany.
- ▶ Talga owns five 100% owned high grade graphene/graphite projects (including the **world’s highest grade graphite mineral resource***) as well as non-core **iron ore, cobalt** and **gold** deposits.
- ▶ Listed in 2010 with WA gold assets and focus now on graphite and graphene development with a view to being high margin industrial scale producer of graphene with graphite by-product.
- ▶ Talga’s 2014 breakthrough demonstrated a **world-first ability** to produce **high quality graphene** direct from its **raw graphite ore** (unprocessed) which provides Talga with **unique economic advantages** compared to global graphene peers.
- ▶ Small but growing team in Australia and Europe as development status advances rapidly (scoping study complete, European trial mining and demonstration production in train).

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

Directors and Management



Mark Thompson
Managing Director

Mr Thompson has more than 25 years industry experience in mineral exploration and mining management, working extensively on major resource projects throughout Australia, Africa and South America. He is a member of the Australian Institute of Geoscientists and the Society of Economic Geologists, and holds the position of Guest Professor in Mineral Exploration Technology at both the Chengdu University of Technology and the Southwest University of Science and Technology in China. Mr Thompson founded and served on the Board of ASX listed Catalyst Metals Ltd and is a Non-Executive Director of Phosphate Australia Ltd.



Keith Coughlan
Non-Executive Chairman

Mr Coughlan has over 26 years' experience in stockbroking and funds management where he has been largely involved in the funding and promoting of resource companies listed on the ASX, AIM and TSX. He has advised various companies on the identification and acquisition of resource projects and was previously employed by one of Australia's then largest funds management organisations. Mr Coughlan is a current executive director of ASX listed Equamineral Holdings Ltd.



Grant Mooney
Non-Executive Director

Mr Mooney has a wealth of experience in resources and technology markets that will benefit Talga as it proceeds with the Company's dual graphene/graphite project development at its world-class deposits in Sweden. Mr Mooney serves as Director and Company Secretary to several ASX listed companies including Chair of renewable energy developer, Carnegie Wave Energy Ltd and Director of ASX-listed resource companies, Barra Resources Ltd, Carbine Resources Ltd, Phosphate Australia Ltd and Wild Acre Metals Limited. Mr Mooney is a member of the Institute of Chartered Accountants.

Management

Commercial Manager

Mr Jeremy McManus

Financial Controller & Company Secretary

Mr Dean Scarporolo

Group Geologist

Mr Simon Coxhell

Project Manager

Mr Kane Freeman

Permitting Manager

Ms Louise Lindskog

Current Collaborations/Research Programs

Australia - CSIRO

Germany - Schubert group, Friedrich-Schiller University, Jena

Feng group, Centre for Advancing Electronics, Technical University of Dresden and Müllen Group, Max Planck Institute of Polymer Research

Financial and Corporate Summary



Capitalisation Summary	
ASX:TLG Ordinary Shares	124.6M
ASX:TLGO Options (<i>exp 30 Nov 2015 at 35c</i>)	7.72M
Unlisted Options ¹	10.9M
Market Capitalisation (<i>undiluted @ \$0.42</i>)	A\$52.3M

Top Shareholders (+3%)	
Lateral Minerals Pty Ltd (<i>Mark Thompson</i>)	11.4%
Gregorach Pty Ltd and related co.	8.3%
HSBC Custody Nominees Australia Pty Ltd	5.4%
UBS Nominees Pty Ltd	3.2%
Yandal Investments Pty Ltd	3.1%
Two Tops Pty Ltd	3.0%

Cash: Dec 2014 \$2.72m

Debt: Nil

Revenue: Immaterial

Stage 1 Flagship Project Financial Metrics:

Pre-tax NPV A\$490m (12% discount rate)

Capital cost A\$29m (1.4yr payback inc. construction)

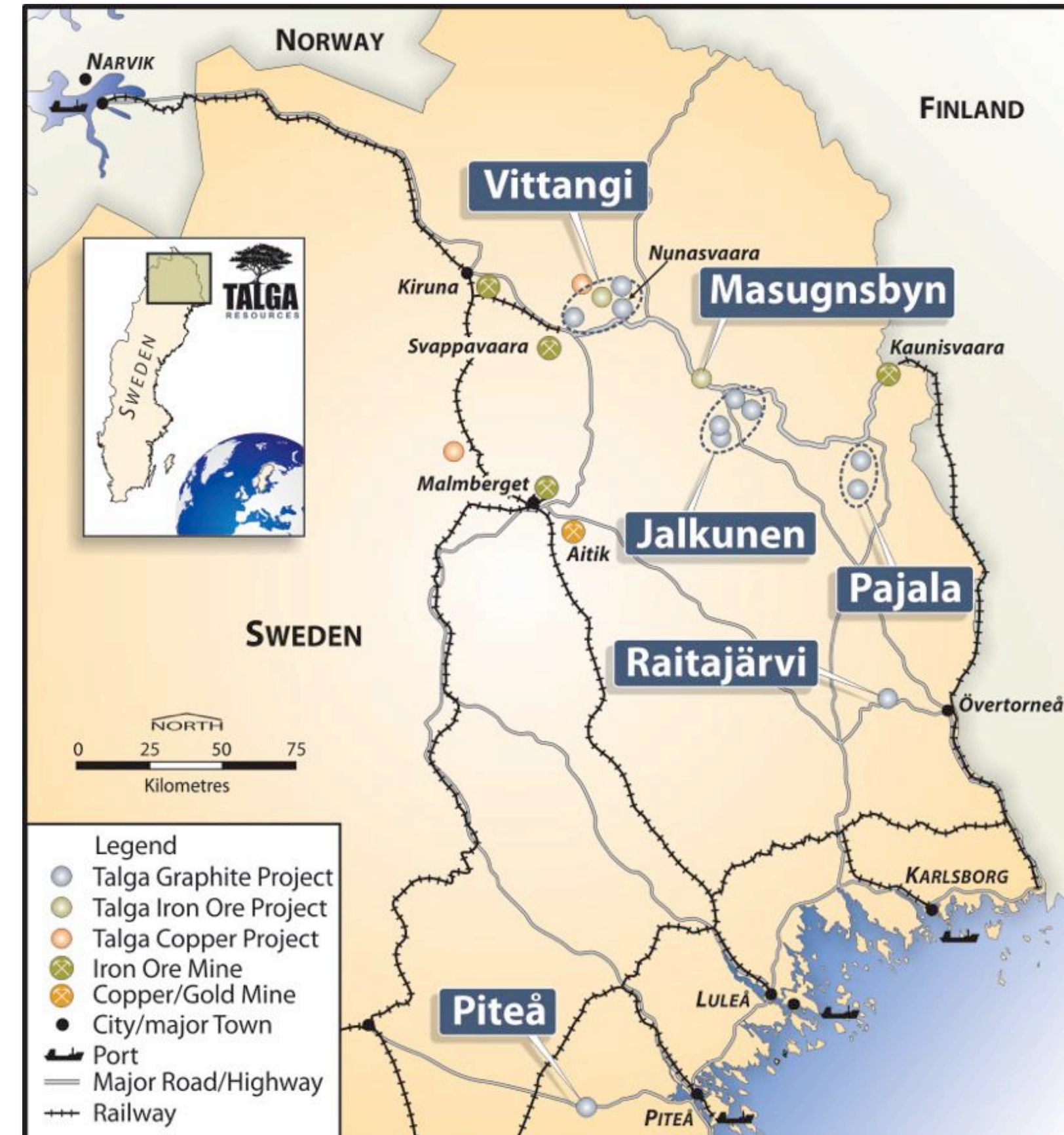
Minelife ~20yr at up to 7,000tpa graphene

Note: full scale production at Vittangi project could have capex requirements met by intervening graphene sales, equity, project level investment or a combination.

¹ As at 8 February 2015, various strike prices with majority exp 2016 at 50-60c

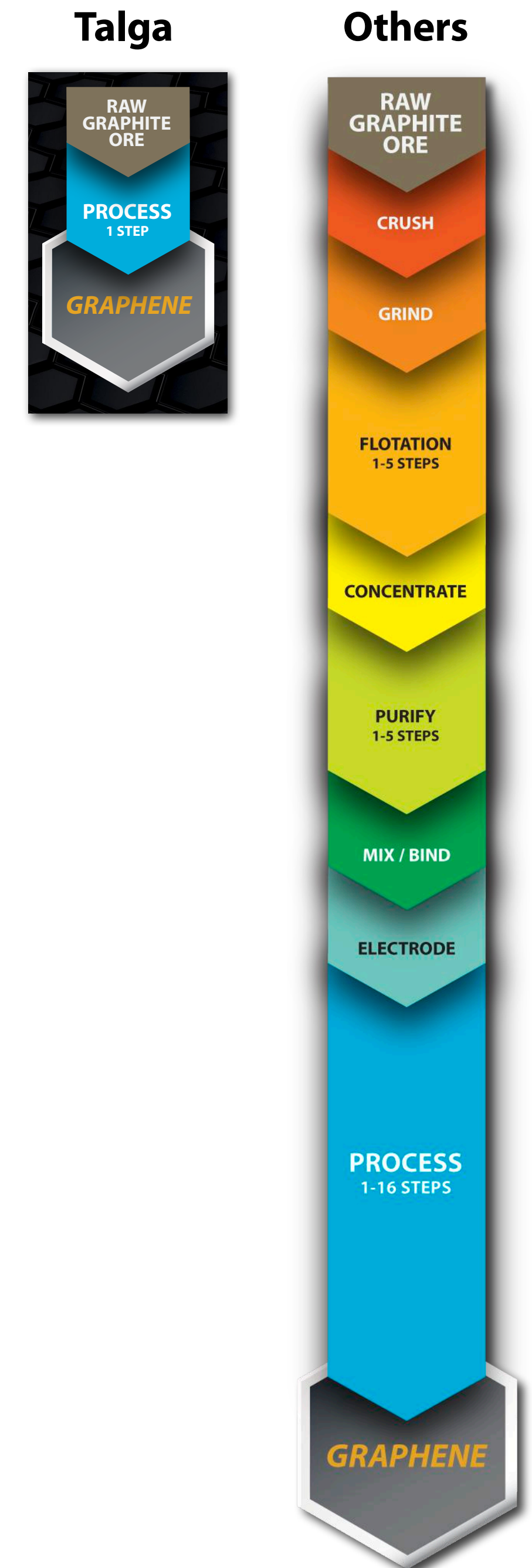
What we do

- ▶ Future **bulk** supplier of crystalline carbon materials.
- ▶ Technology company with 100% owned source for precursor graphene material and future low impact mining operations.
- ▶ Unique process to liberate large quantities of graphite and graphene direct from ore. 2 of the 5 core projects will produce both products while remaining 3 are graphite specific.
- ▶ Proposing to produce graphene feed material for functionalisation by industrial end users for use in a range of high technology applications. Graphite by-products at projects where graphene is the focus.
- ▶ Talga aims to enable large commercial graphene applications which have to date been impeded by absence of bulk supply and prohibitive pricing.



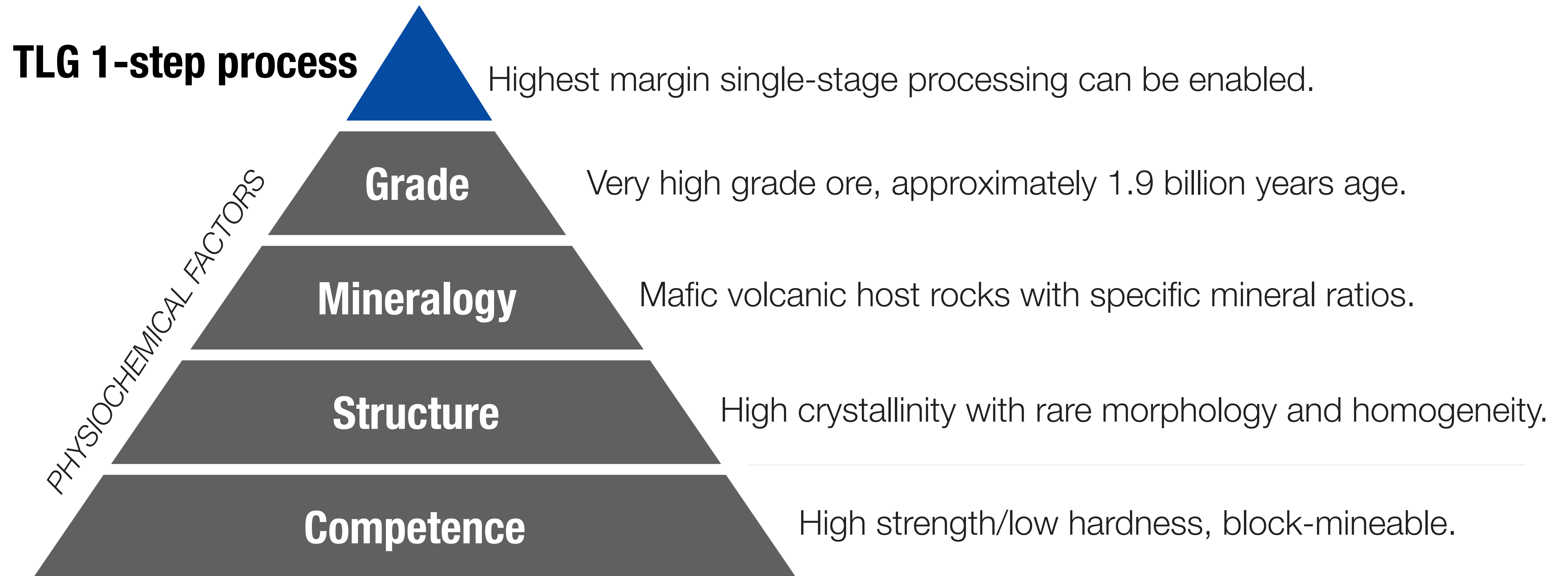
Processing Technology

- ▶ Graphene is everywhere you find graphite. *But separating graphite to a few atoms thick is expensive and hard to scale up.*
- ▶ Talga extracts graphene **directly** from **natural** microcrystalline graphite ore using recently discovered physio-chemical techniques. Talga ore is unique as doesn't require purification processes usually required to upgrade graphite minerals to graphene. **Mono-to-multi layered graphene platelets liberated** in a single step.
- ▶ **No requirement** for crushing, grinding and other multiple-processes that add cost. Entirely scalable to large volumes and graphite is also recovered as a saleable by-product.
- ▶ 2 distinct stages (Liberation and Recovery) to the process where recovery stage may be patented in future - but the ore itself is the differentiating factor, enabling the process and is 100% owned by Talga. Liberation stage is protected as a trade secret.



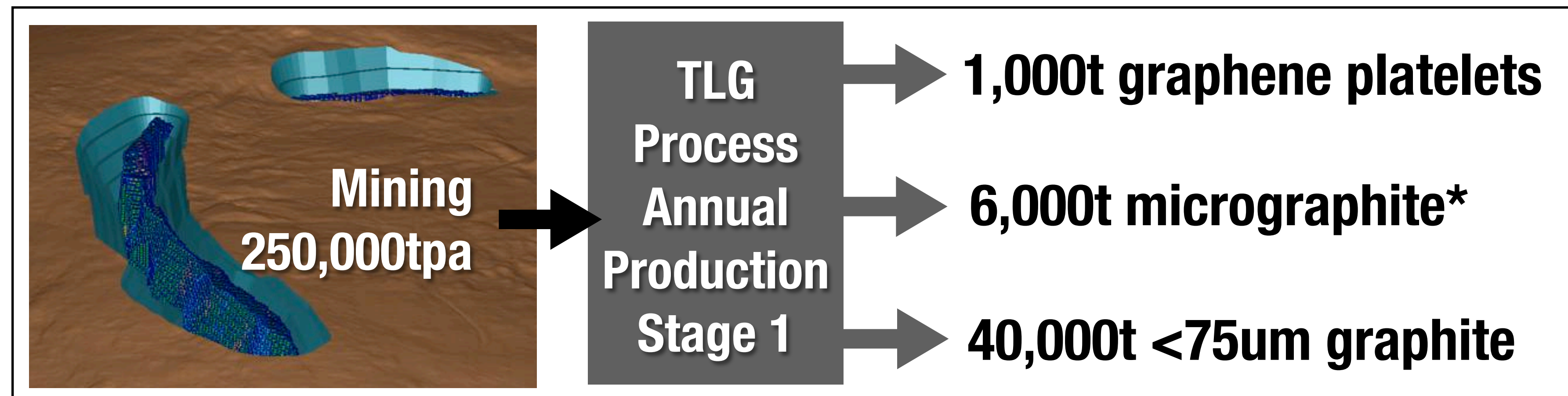
Why Is The Talga Approach Unique

- ▶ Graphite is made from layers of graphene so in theory anyone can produce graphene in a laboratory - but at what volume and cost? Talga ore is differentiator.
- ▶ Talga's production process unlikely to work on other deposits due to multiple physio-chemical factors required for raw ore to liberate graphene without physical comminution.



Production Model

- ▶ Graphite and graphene platelets can be liberated from ore in a **single step** with minimal downstream recovery processing compared to many purification stages (complex/costly).
- ▶ Paradigm shift in the production outlook for **bulk graphene cost and scale**.
- ▶ Current aim to sell non-functionalised bulk graphene to large end users developing specific applications for nanoplatelets (polymers, coatings, additives, inks etc).
- ▶ Other future possibilities include licencing parts of the processing technique and equipment, and supplying semi-beneficated ore for certain segments of the market.



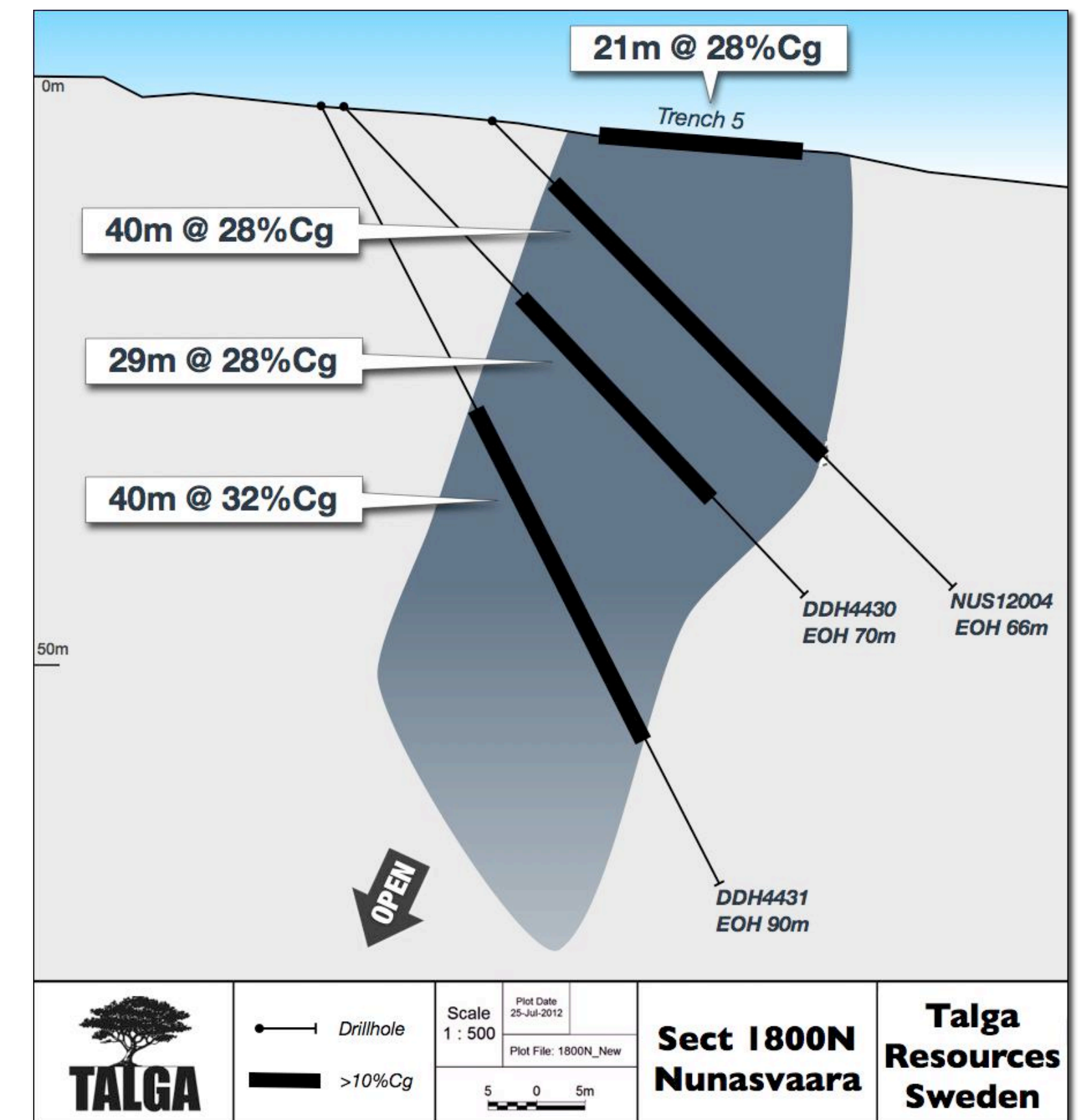
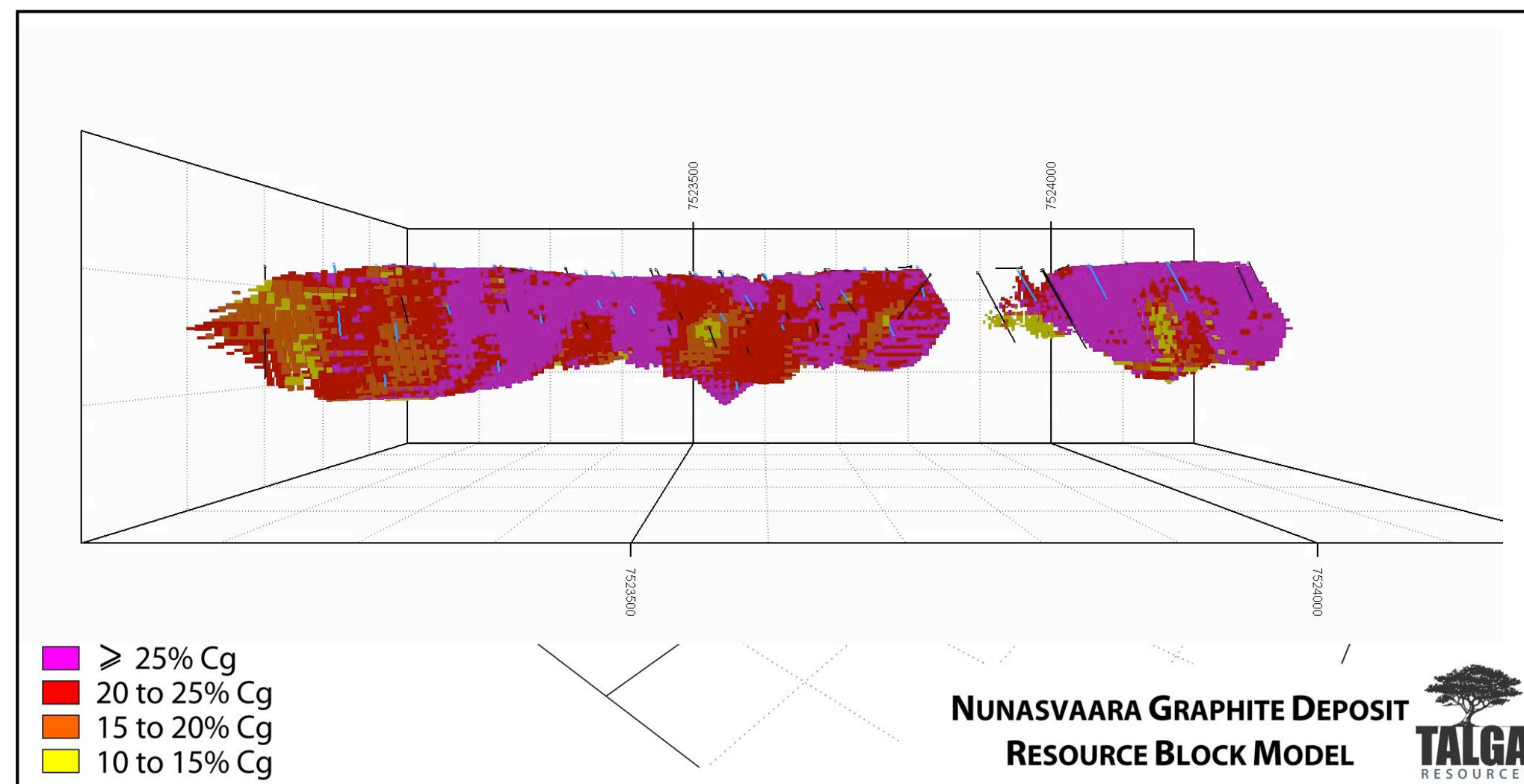
* As used in Scoping Study 2014. Can be beneficiated to graphene upon demand.

Vittangi Project - Nunasvaara Graphite Deposit

- ▶ World's highest grade graphite resource - JORC compliant graphite resources¹ totalling 7.6Mt @ 24.4% Cg (ASX:TLG 8 Nov 2012). Indicates initial ~20 year production life at current stage.
- ▶ Deposit is 1.9 billion years age and hosted in greenstone volcanics unlike peers in sheared or contact metamorphic deposits hosted within granite/gneiss. Combined with extreme homogeneity makes north Sweden a unique source for large scale high margin natural graphene production.
- ▶ Less than 2% of the graphite formation has been drilled to date. The deposits and process are entirely scalable to meet what additive markets may require.

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



Talga Differentiation

Unique ore allows for low cost bulk production - partly processed by 'mother nature' and no issues with scale of graphene production

Technology materials company amongst resource peers

Unlike peers we start from raw ore precursor to produce graphene - no crushing or grinding

We have opportunity to enable disruptive fast-growing industries starved of source material

Highest JORC grade open cut deposit in world

Business model can withstand graphene price pressure over time

Safe source of supply in tier 1 mining jurisdiction - minimal country risk

Production from pilot operations while full scale permitting underway

Industry Introduction - 2 Overlapping but Different Markets

Graphene

- ▶ While the media is excited by future 'hi-tech' applications, the main driver of near term graphene commoditisation is **additives**.
- ▶ Small amounts of graphene (**0.05-2.0% vol**) added to many materials can impart **exponential increases in strength and/or conductivity** allowing making stronger, lighter (more energy efficient) current products and enabling new types of materials.
- ▶ Major volume markets for graphene include conductive inks, anti-corrosion coatings/galvanics, paints, plastics, carbon fibre composites, battery materials, 3-D printing inks, alloys and concrete/civil materials.

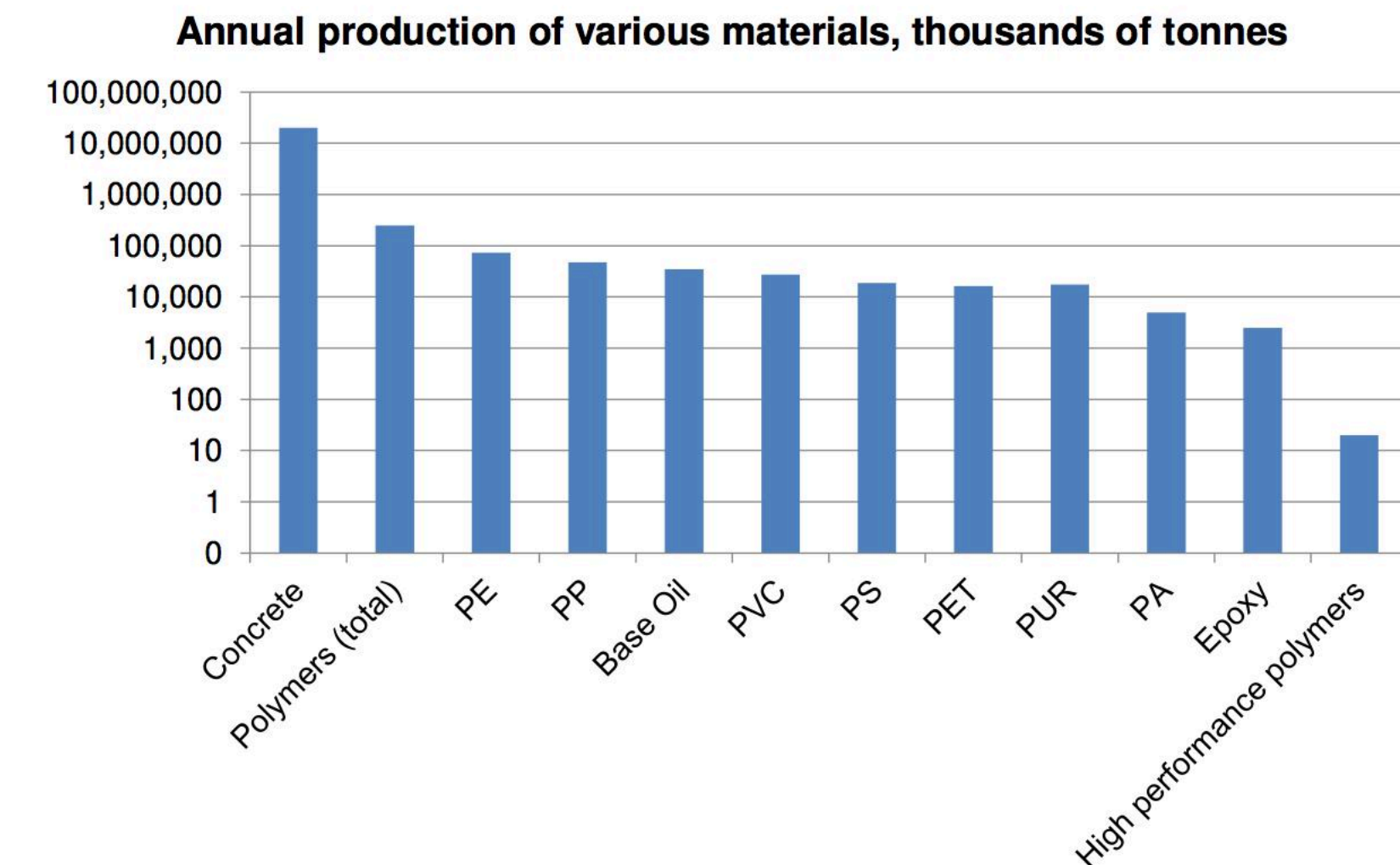
Graphite

- ▶ ~2mt/pa production. Of this ~1mt derived from natural graphite for \$1b value versus ~1mt derived from synthetic sources for \$15b value
- ▶ Synthetic material very pure yet expensive so dedicated to niche products while natural product ranges in specification and price with ~50% being <75um in size. Europe imports 95% of its graphite of which 90% from China.

Graphene media darling - Flexible device screens



Annual production volumes of major industrial materials (Log scale), many that have graphene additive potential



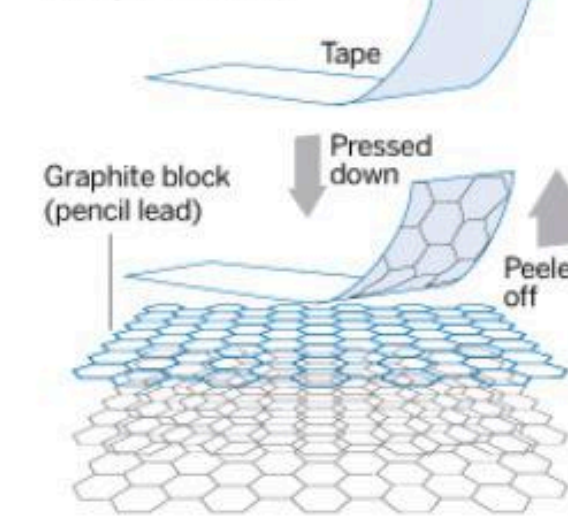
Worldwide Graphene Production Methods

- ▶ There are many processes to make graphene, using different carbon precursors both natural and synthetic, and various combinations of yield, quality, volume and cost.
- ▶ Graphene comes in many shapes, lengths, layers, functionalised state and defect levels.
- ▶ The carbon source dictates most suitable process which imparts qualities required for certain applications and industries.
- ▶ Talga's unique ore enables a more direct and higher margin route to produce nanoplatelets with a large size range that access the majority of bulk applications.

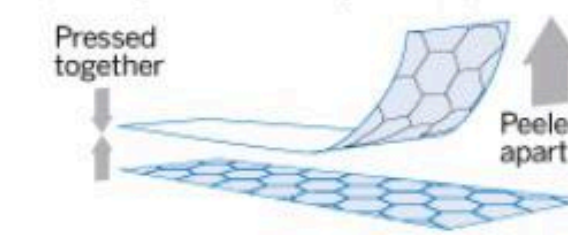
Five recipes for graphene

Mechanical exfoliation

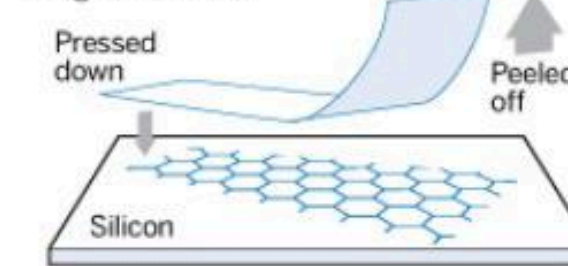
1 A sticky 'tape' is placed on to a block of graphite and then peeled back, stripping a thin layer off the top



2 This layer of carbon is thinned further by pressing it on to other layers of tape



3 The tape is finally pressed on to a very smooth substrate such as silicon then peeled off, leaving a graphene layer a single atom thick

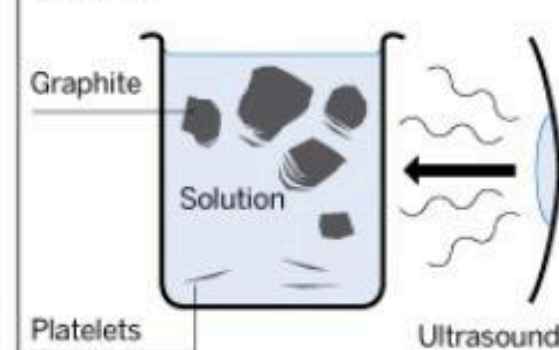


Sample size
Greater than 1mm

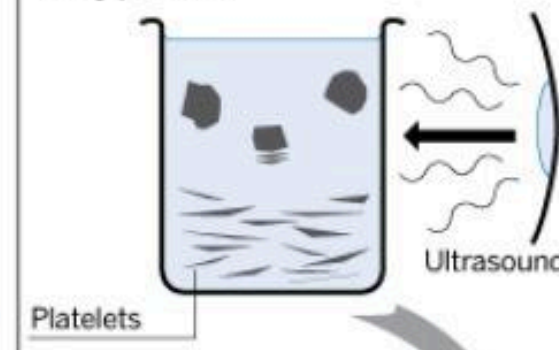
Applications
Research

Chemical exfoliation

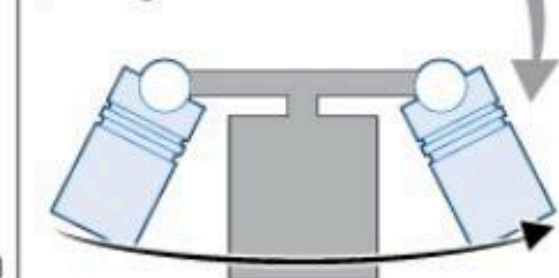
1 Graphite is exposed to a solvent which with the aid of ultrasound causes it to split into individual mono-layer flakes or platelets



2 Prolonged treatment leads to many platelets



3 These mono-layers of graphene can be further enriched by centrifuge



Sample size
Infinite as a layer of overlapping flakes

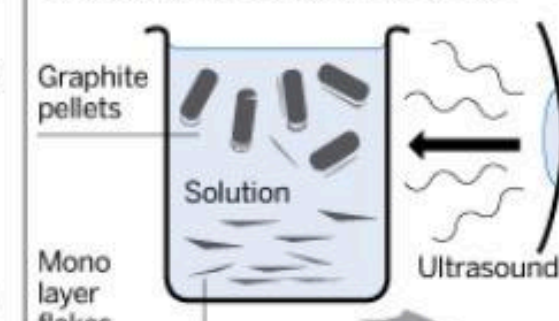
Applications
Coating, paint, ink, composites, transparent conductive layer energy storage and bioapplications

Chemical exfoliation via graphene oxide

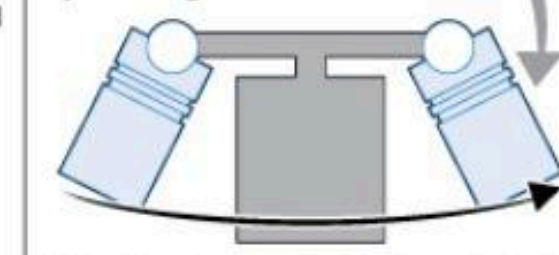
1 Related to chemical exfoliation but graphite pellets are first oxidised



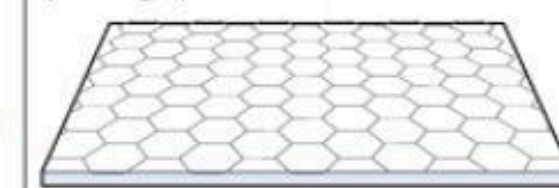
2 Pellets exfoliated in chemical solution to produce mono-layers of graphene



3 Solution is processed by centrifuge



4 Solution is deposited on to a substrate and reduced (chemically or thermally) to parent graphene state

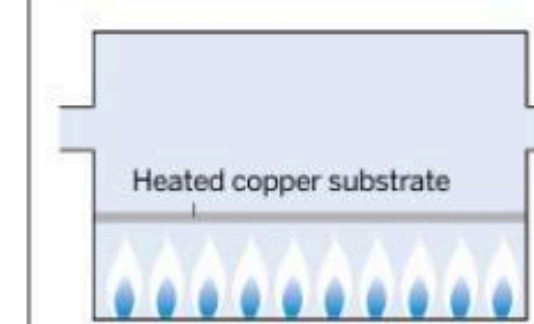


Sample size
Infinite but with larger flake size than simple chemical exfoliation

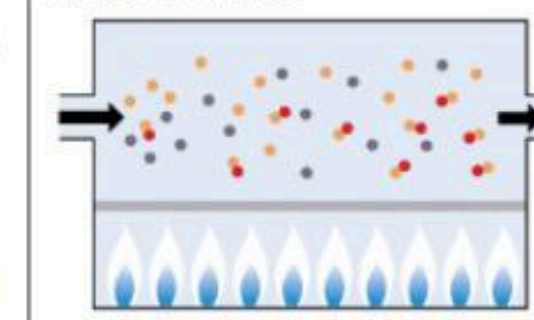
Applications
The same as chemical exfoliation

Chemical vapour deposition

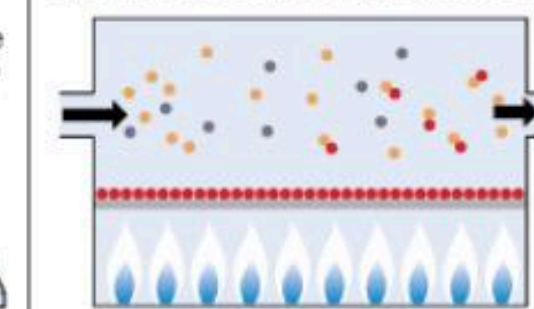
1 A substrate (usually copper) is heated in a furnace at low pressure to about 1,000°C. This anneals the copper



2 Methane and hydrogen gases flow through the furnace



3 Carbon atoms from the methane are deposited on to the copper. They crystallise as a continuous graphene sheet

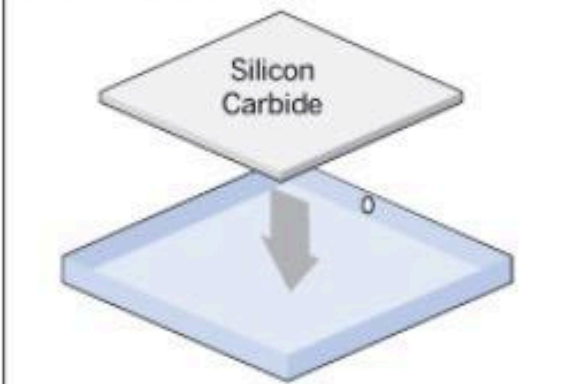


Sample size
About 1m

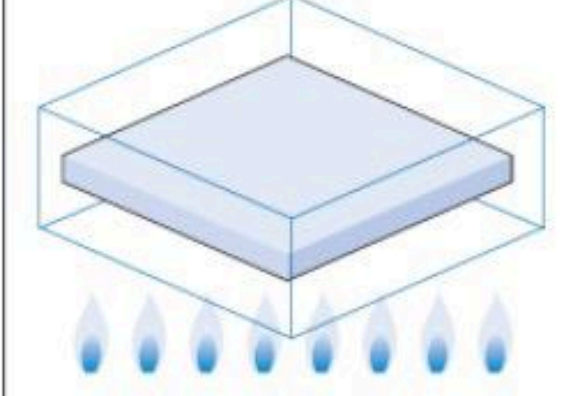
Applications
Photonics, nanoelectronics, transparent conductive layer sensors and bioapplications

Silicon carbide

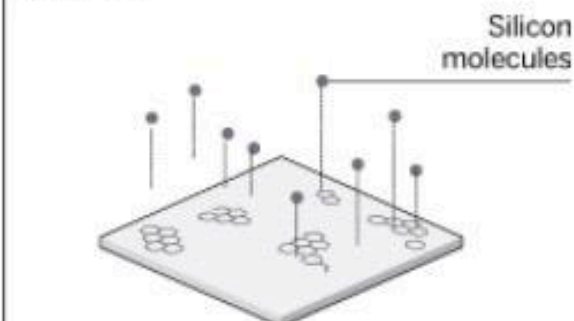
1 A small amount of silicon carbide (about 10mm x 10mm) is placed in a box with a small hole in it



2 The box is sealed in a vacuum or argon and heated to about 1,500°C



3 Silicon molecules 'evaporate' from the surface, leaving a high quality layer of graphene



Sample size
About 100mm

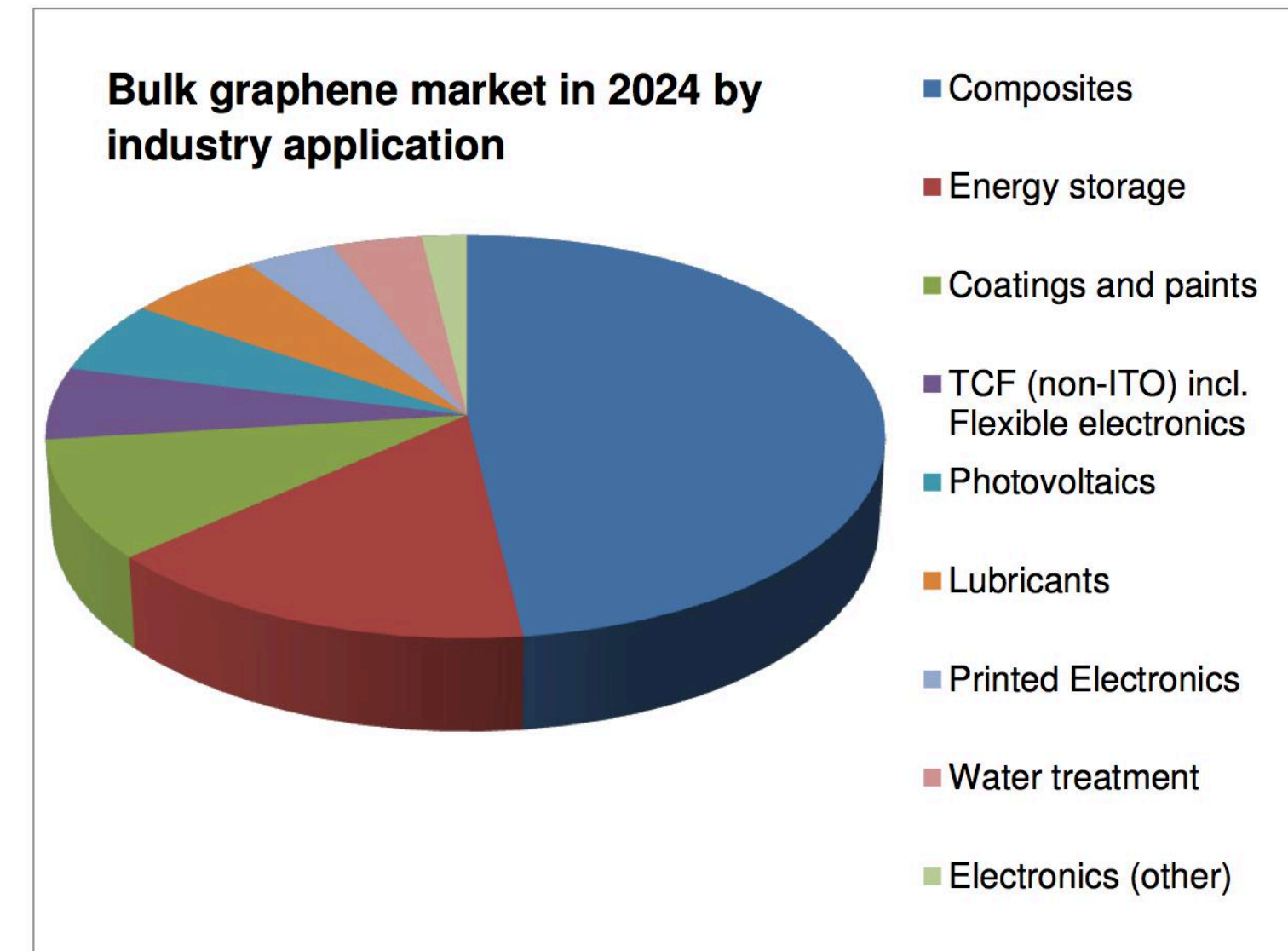
Applications
Transistors and other electrical devices

Sources: Benjamin Pollard, Department of Physics, Pomona College; Nature; Review Research; Electronics Weekly

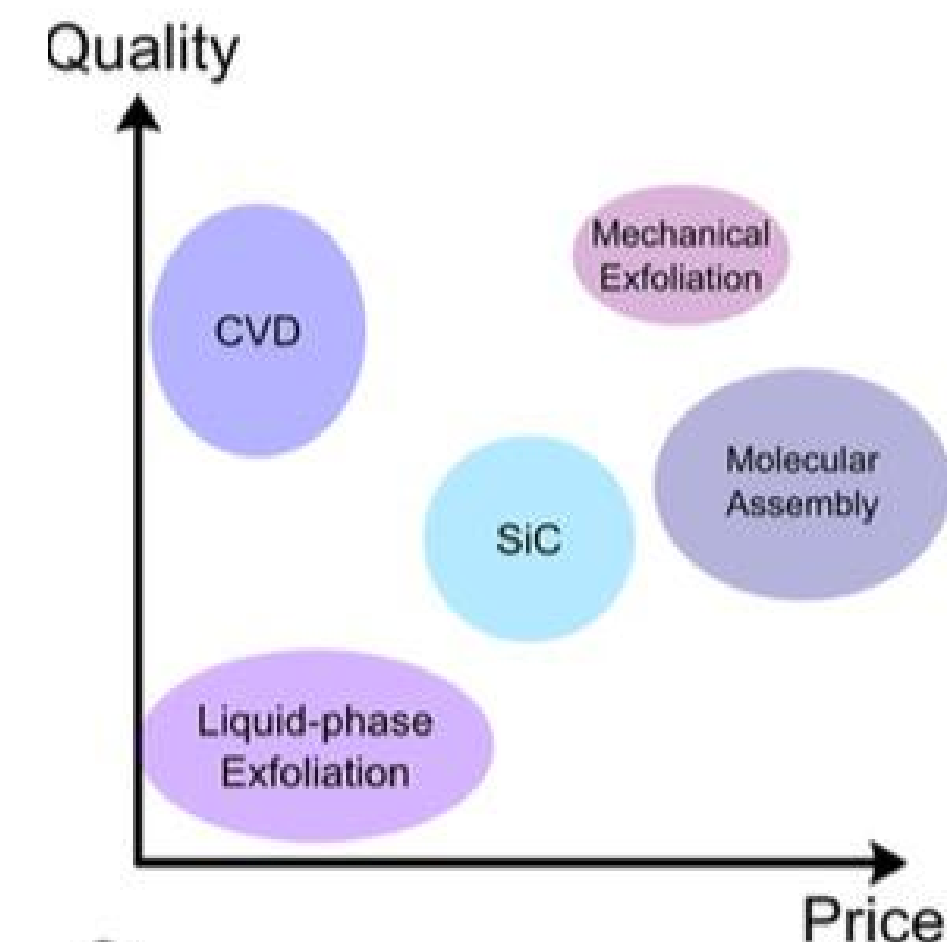
Market

- ▶ Numerous research publications estimate the global graphene market will be worth in excess of \$1B by the early 2020's. Products available now/2015 (paints, 3D printing inks, sports equipment, bicycle frames/wheels).
- ▶ Pricing predictions for nanoplatelets differ widely from hundreds of \$1000's/kg for gram quantities to hundreds of dollars/kg for bulk. Talga assumed \$55/kg (\$55,000/t) for future bulk pricing in it's scoping study.
- ▶ Market in it's infancy; When supply and pricing bottleneck is removed and big industrial users are "enabled" to conduct large scale R&D and commercialise their applications that require supply in the tonnes, price will certainly come down (much like carbon fibre).
- ▶ Those companies with sufficient margin insulation will remain and prosper.

Segmentation of industrial applications for bulk graphene by 2024 (Fullerex Data)



Different production methods for graphene; price vs quality without allowing for market scale

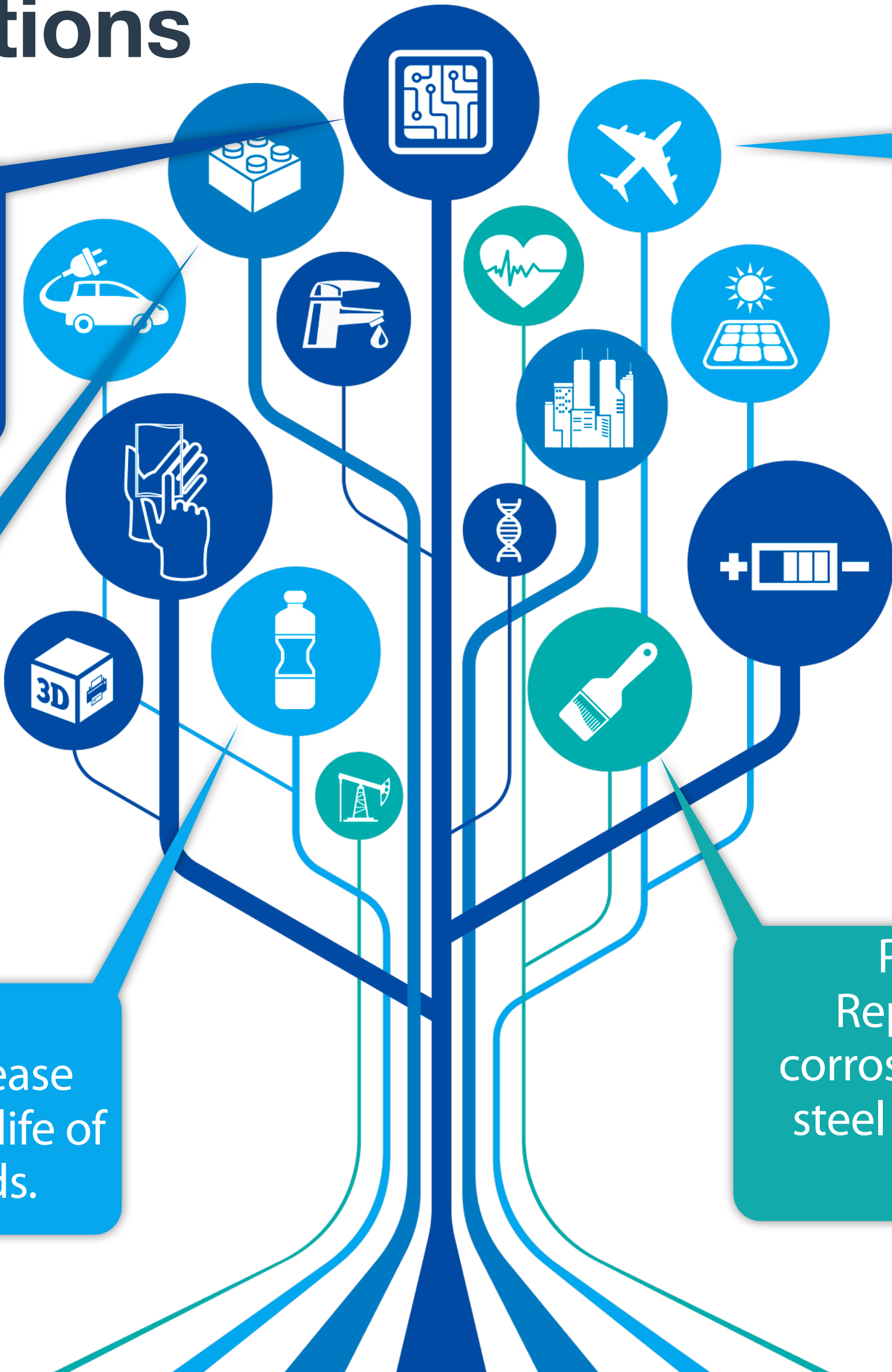


Talga Target Applications

CONDUCTIVE INKS
Replace currently used carbon black and silver/copper composites in conductive inks for rapid growth "Internet of Things" devices/RFID tags

PLASTICS
- additive to plastics/3D printable materials to make conductive structures for battery use or increase strength for quality print at home products eg, Lego

POLYMERS/FOOD PACKAGING
Additive to increase strength and decrease permeability of plastics to increase shelf life of foods eg, PET bottles, packaged goods.



CARBON FIBRE COMPOSITES
Added to current carbon fibre composites for increased strength/ decreased weight and emissions

BATTERY/ENERGY STORAGE
Added to or replace spherical graphite in current Li-ion and other batteries to increase performance & range in vehicles, capacity in green energy/off-grid storage

PAINTS/COATINGS/GALVANICS
Replace zinc and chrome in current corrosion resistant paints and galvanized steel for increased corrosion resistance, flexibility and longevity

Development Status

- ▶ Talga has moved from metallurgical breakthrough in lab to benchtop scale and now commissioning demonstration plant.
- ▶ Process has been replicated by 4 independent parties in two countries and opens the door to commoditising supply into everyday applications.
- ▶ Currently Talga awaits permitting approval for late 2015 Swedish trial mining. Sawn blocks of ore will feed a demonstration plant in Germany.
- ▶ Trial mining operations can be conducted prior to full scale mining which provides an opportunity for material graphene sale revenue from demonstration facility. Iterative process improvements (yields, quality) will continue in parallel.
- ▶ Company focus is now on striking commercial relationships to place graphene and graphite production and finance the path to full scale production if required.

Example of sawn-block mining to be trialled at Vittangi 2015



Potential demo plant site, Germany.



Talga Europe Operations

Sweden Operations *Talga Mining P/L filial Sweden*

- ▶ Trial mining and exploration
- ▶ Rail/road ore blocks direct to German operations

Research, Development and Analytics

- ▶ Jena
- ▶ Dresden/Mainz

Local Industry/Graphene End users

- ▶ Use research as interface
- ▶ Product testing/development



German Operations *Talga Advanced Materials GmbH*

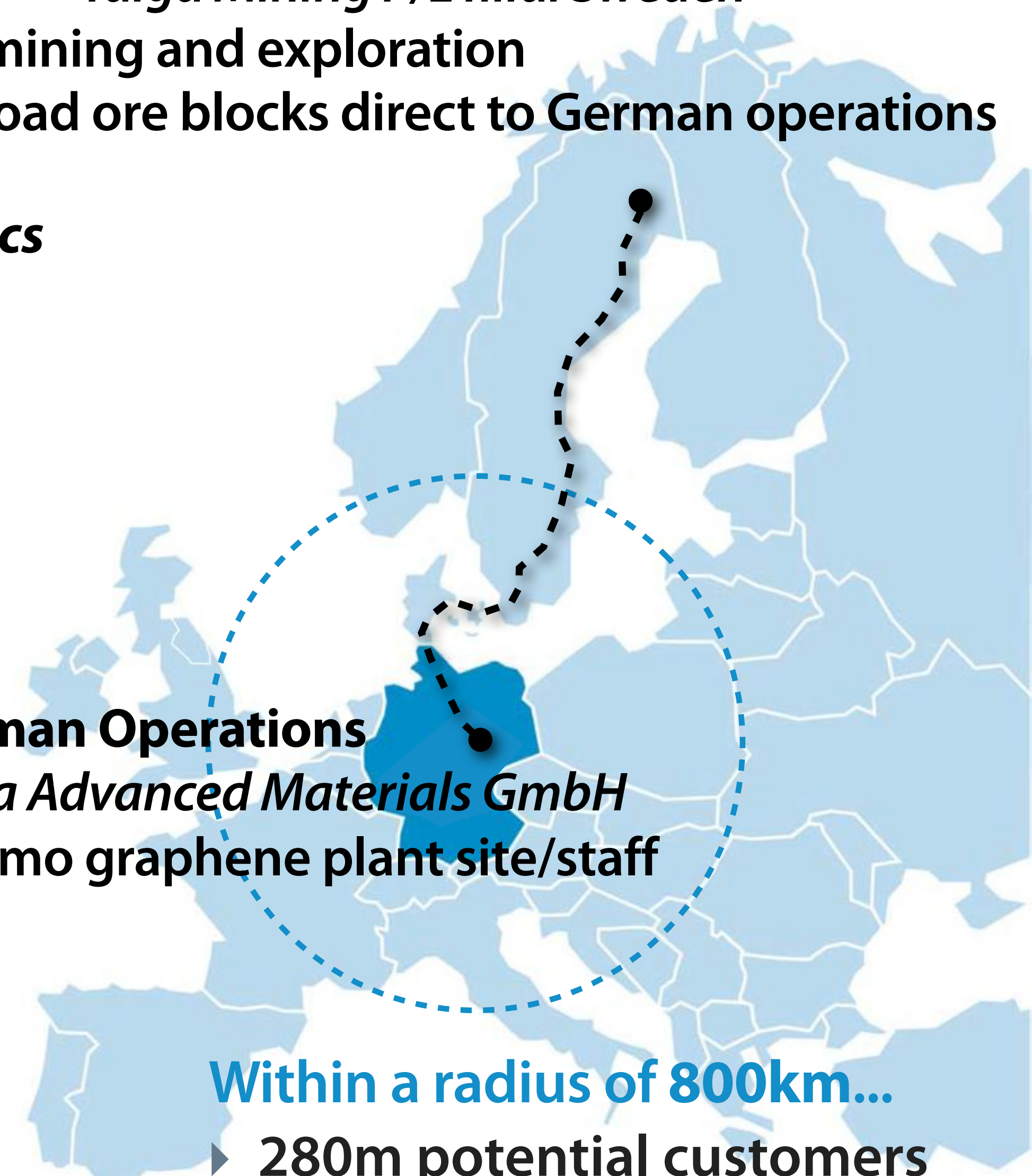
- ▶ Demo graphene plant site/staff

Consultants

- ▶ General Research GmbH
- ▶ Conduit to research, industry, local finance

Within a radius of 800km...

- ▶ 280m potential customers
- ▶ € 8.7 Billion GDP



Full Scale Plant Design



Milestones on path to full-scale Production



Jan-Jun 2015

- ▶ Permitting receipt for trial mining
- ▶ Ongoing offtake, collaboration discussions with end-users
- ▶ Euro-based research collaboration results
- ▶ Ongoing metallurgical development
- ▶ Gold asset divestment
- ▶ Further exploration - test Exploration Targets for new resources

Jul-Dec 2015

- ▶ Demonstration plant construction in Germany
- ▶ Distribution of larger samples from demonstration plant
- ▶ Ongoing product development with end users
- ▶ IOCG/iron ore assets divestment
- ▶ Further exploration on flagship projects to grow resource base
- ▶ Demo plant lock-cycle production
- ▶ Samples to end users
- ▶ Sales

Jan-Jun 2016

- ▶ Continue scale up of demonstration plant
- ▶ Pre-feasibility study
- ▶ Permitting for second trial mine
- ▶ Begin permitting for aspects of full scale production targeting 2017
- ▶ Ongoing commercial developments with end users etc.

Summary of Highlights



- ▶ **Highest grade** JORC/NI43-101 global graphite resource.
- ▶ Truly unique ore that facilitates high margin bulk production of graphene.
- ▶ Best in class research partners optimising processes in world class facilities.
- ▶ Growth profile of Swedish graphene producing resources is immense.
- ▶ Significant financial metric upside as yield and production profile increase.
- ▶ Strong differentiation and leverage to peers.
- ▶ Strong margin protection as graphene price normalises.
- ▶ Development status - positioned to commercialise aspects of project development.
- ▶ Assets located in premier mining jurisdiction with low geopolitical risk, 100% ownership of assets, supportive government and first class infrastructure next to European market.
- ▶ Funding requirement small - small capex, potential material revenues this year and beyond with full scale permitting in the background.

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 be 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.