first graphite

A high-quality graphene producer

MAXIMISING LEVERAGE TO THE ENTIRE GRAPHENE VALUE CHAIN

February 2017

THE BUSINESS PLAN

THE BUSINESS PLAN – THE STRATEGY

FGR is positioning itself to maximise earnings and growth through capture of the entire graphite and graphene value chains.

First, obtain security of raw material supply by…

- Developing new vein graphite mines
- Securing off-take agreements from existing mines

Secondly, establish graphene production capability …

- With the development of the Graphene Cell
- Secondary processing to customise graphene product

Thirdly, acquire disruptive technology and related IP for graphene applications such as …

- The BEST Battery (supercapacitor)
- Vortex Fluidic Device and Turbo Thin Film Technology
- Fire retardant intellectual property

THE BUSINESS PLAN – POTENTIAL EARNINGS PROFILES

FGR intends to profit from three earnings profiles;

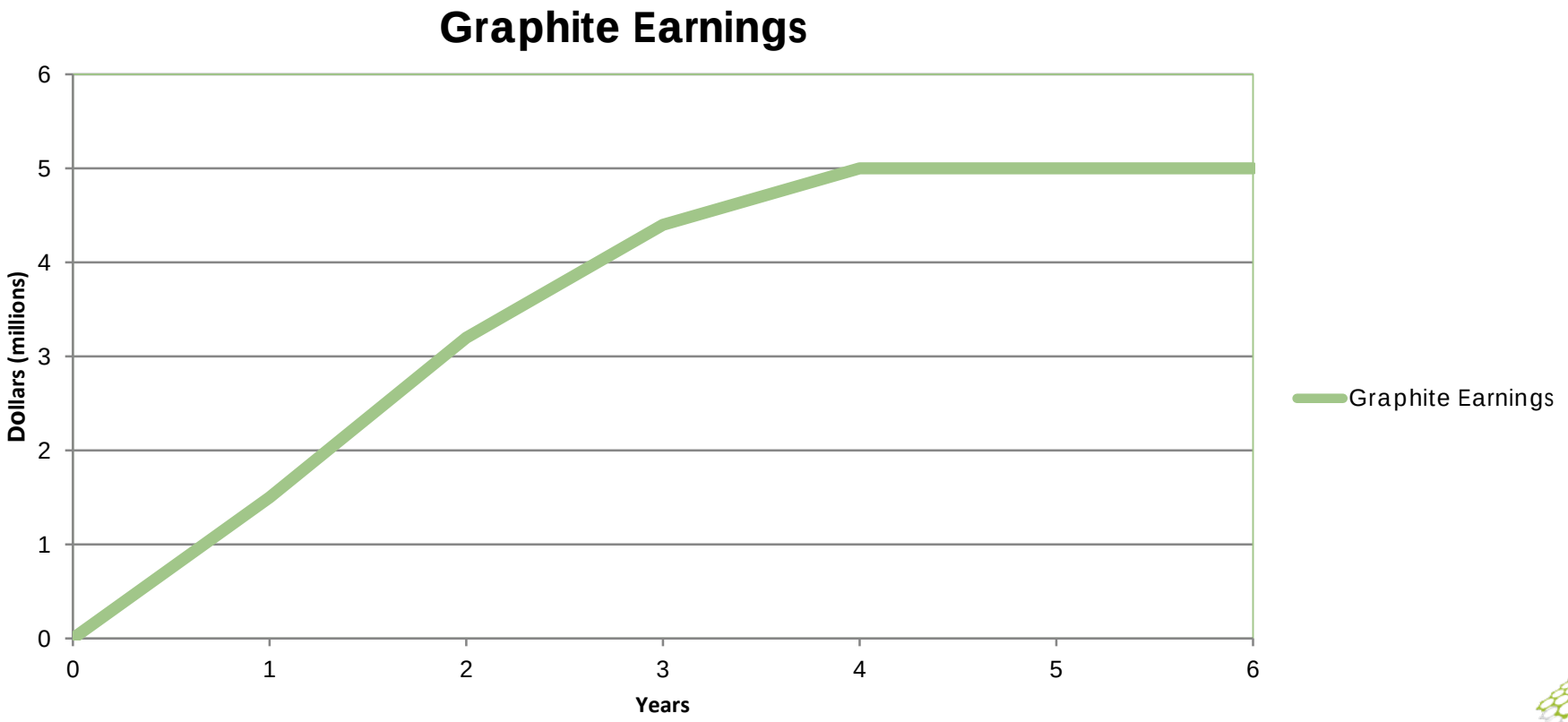
1. Mine production and trading in the premium vein graphite
   - long term *baseline* earnings

2. Graphene production and sales
   - from modular, low cost cells (no capex hurdle)
   - potentially an *exponential growth curve* as graphene becomes commercialised over the coming years

3. Technology, IP acquisitions and development
   - opportunities to participate in disruptive technologies due to the foundation in graphene
   - *capital gains* from sales of licences
   - *royalty streams*

BASELINE EARNINGS FROM GRAPHITE MINING

- Mine production and graphite trading earnings will ramp up over several years and then flatten out
- Assuming selling price of US$2,000 per tonne, AISC US$700 per tonne

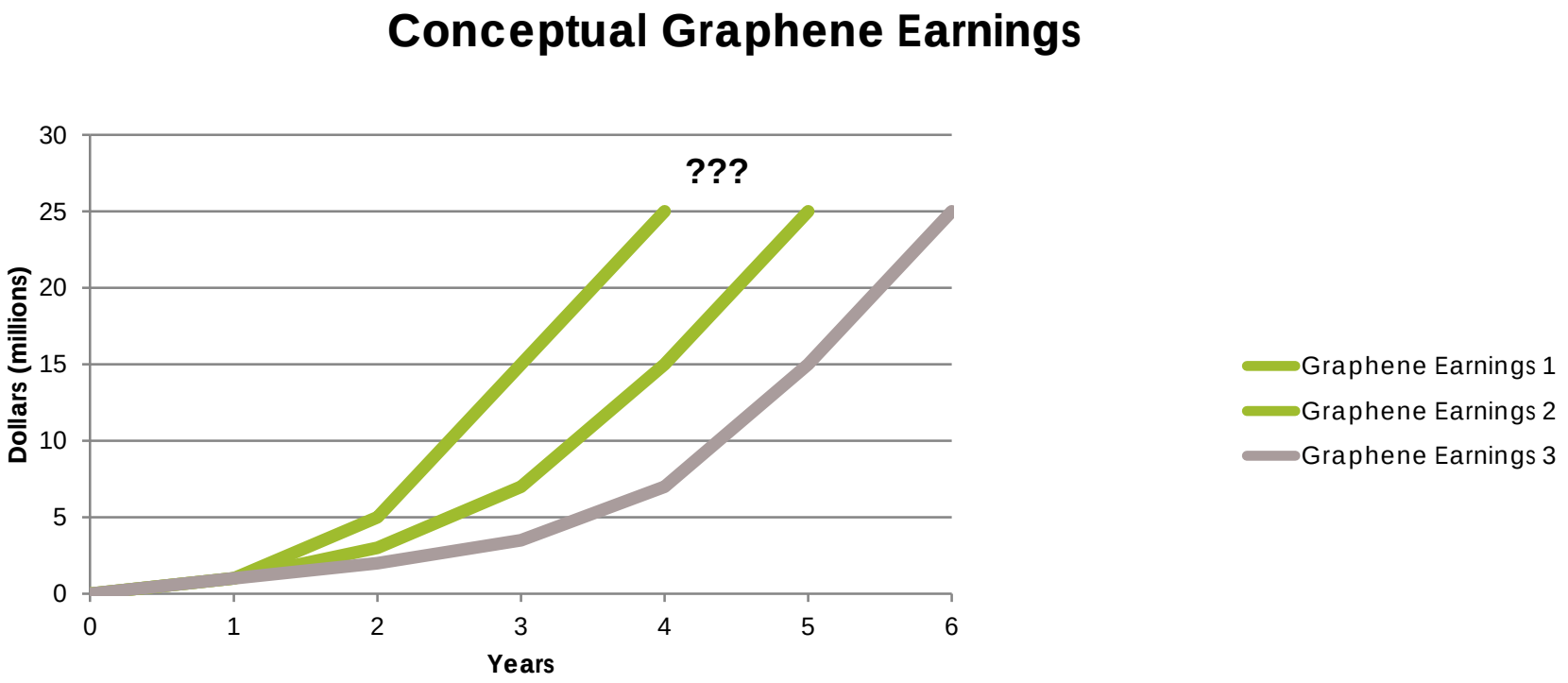


* Based on Company business plan, lifting production to 5,000 tonnes per annum

first graphite

GROWTH FROM CONVERSION TO GRAPHENE

- Graphene earnings start from a zero base and rise exponentially at some point.
- 10 – 20x uplift in selling price on conversion to graphene

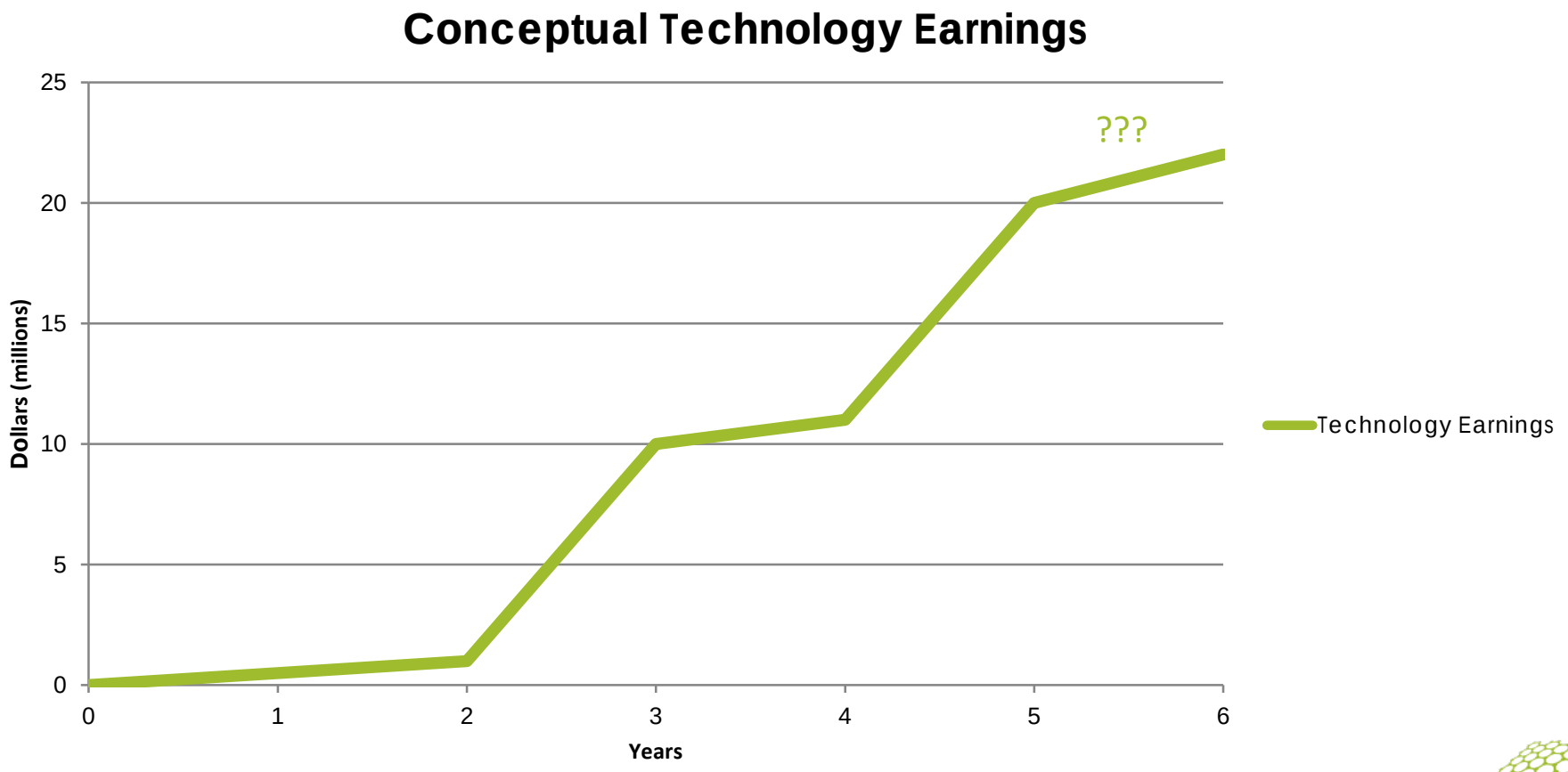


* Based on conceptual growth estimates for graphene

first graphite

TECHNOLOGY EARNINGS GROWTH WILL BE VARIABLE

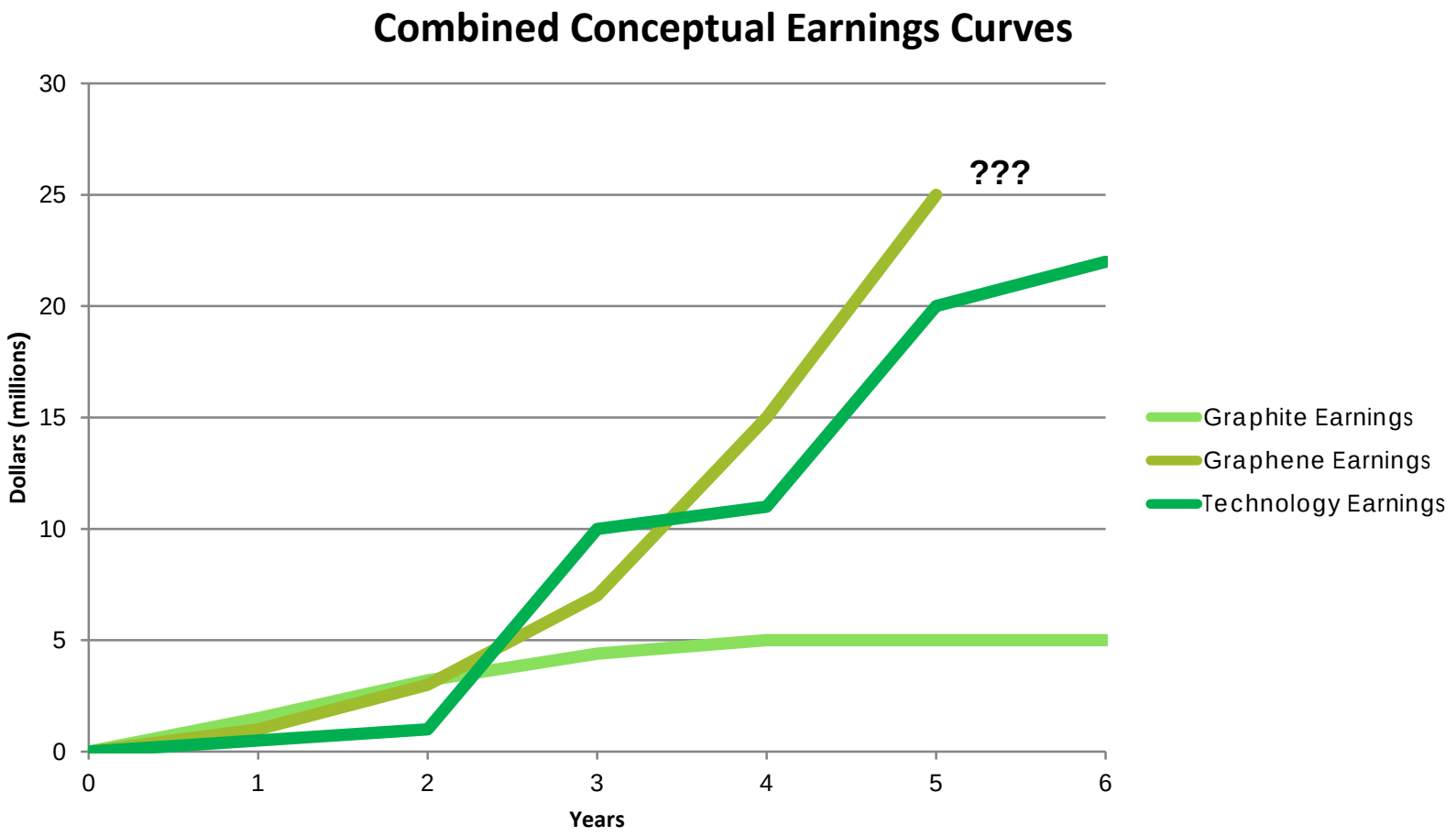
Technology earnings will be a combination of royalty streams and capital gains as the IP is commercialised.



first graphite

POTENTIAL EARNINGS PROFILES COMBINED

The three divisions, when combined, provide diversified growth across the entire value chain



* Based on possible scenarios

first graphite

IT IS ALL ABOUT QUALITY

THERE IS NOTHING BETTER THAN VEIN GRAPHITE

It starts with ….

… the highest grade graphite

… and the best quality

… in the world.

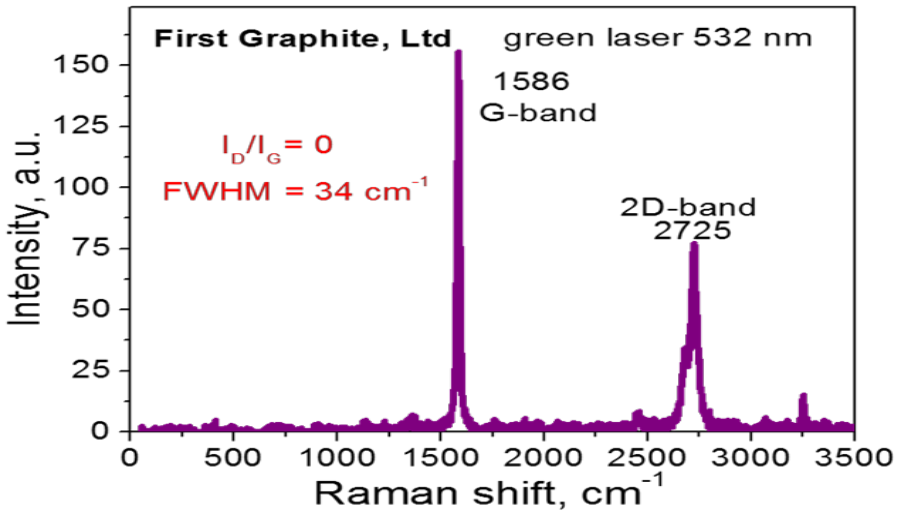
	Compound Name	Concentration (%)	Absolute Error (%)
1	C	99.87	
2	Mg	0.01	0.003
3	Al	0.01	0.003
4	Si	0.04	0.006
5	Cl	0.02	0.004
6	Ca	0.00	0.002
7	Fe	0.04	0.006

Results of XRF WDS Analysis

first graphite

THE HIGHEST QUALITY GRAPHENE

… which enables the production of the highest quality graphene, confirmed with Raman Spectroscopy and product specs



Products Specifications

Form:	**Light Grey Powder**
Odour:	**Odourless**
Carbon Content:	**>99%**
Ash Content:	**<1%**
Particle Size:	**Av 40 um**
Av Thickness:	**4 layers (1 to 4 nm)**
Surface Area:	**>500m^2/g**

A combination of microscopic and spectroscopic techniques was used to evaluate the structural, morphological, and chemical quality of the material.

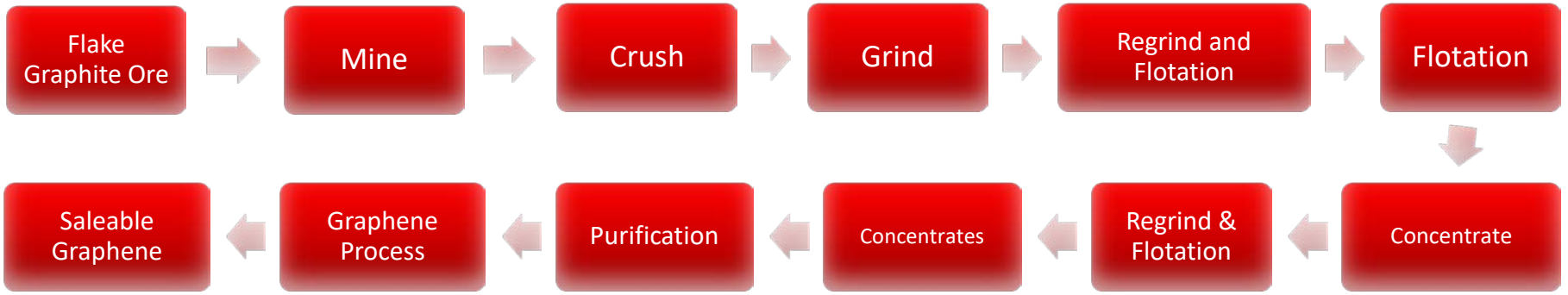
- 99.87 % of Carbon detected with no impurities >50 ppm level.
- Raman shows no D-peak evidencing high quality of material
- Quality evaluation test of graphene from FGR is in progress

first graphite

ITS ALL ABOUT SIMPLICITY

First Graphite Process…one step, low cost to graphene

Flake Graphite Process…> 10 steps



first graphite

GRAPHENE PRODUCTION CAPABILITY

The Graphene Cell can, at very low capex and opex;

- Produce graphene on demand
- On location
- Just in time
- With > 80% conversion of graphite to graphene

- Modular unit each capable of 5 to 7 tonnes per annum of graphene
- Capex US$50,000 installed on location
- Modest size, smaller than a small car
- Avoids transportation costs of graphene
- Potential for dozens of cells around the world in the factories of customers

first graphite

THE GRAPHENE CELL – 250 LITRE CAPACITY

first graphite

TECHNOLOGY AND APPLICATIONS OFFER THE GREATEST UPSIDE

TECHNOLOGY AND IP OPPORTUNITIES

The BEST Battery (Bolt Electricity Storage Technology)

Patent-pending technology developed by Swinburne University of Technology overcomes the energy density limitations with supercapacitors, achieving the following potential advantages;

- 10x better energy density than competing devices
- 10,000x faster charge/discharge rates
- 10,000 charge/discharge cycles
- Ultra-thin and ultra-light in weight
- highly flexible and integratable
- environmentally friendly due to the absence of chemicals

Efficiencies offered through the use of laser printing technology and graphene oxide to create an ultra-efficient energy storage medium in a greatly simplified process.

DIFFERENCE BETWEEN BATTERIES & SUPERCAPACITORS

Rechargable batteries … use old technology

- Store energy via a reversible chemical reaction
- Each cycle causes degredation of materials – they wear out
- They are slow to charge
- They can short circuit, causing runaway reactions and fire (Li-ion)
- They are old technology

Supercapacitor batteries … will make chemical batteries obsolete

- Physically store electricity in an electric field between metal electrodes i.e. no chemical reaction
- There is no degredation of materals, so they can offer the same level of performance for 10,000 cycles +
- Are lighter in weight – carrying electrons rather than chemicals
- Are the future of electricity storage

"If I were to make a prediction, I'd think there's a good chance that it is not batteries but capacitors" that deliver a breakthrough, he said in 2001 …"

Elon Musk, p. 29 New Scientist 12 November 2016.

first graphite

CHEMICAL BATTERIES HAVE PROBLEMS

Chemical batteries are less than perfect

One button battery can contaminate more than 60 m litres of water, which equals one person's lifetime consumption

Environmental Pollution

Short life span

Long charging time

Additional Storage space

We need

- ***Large storage capacity***
- ***Environmentally friendly***
- ***Fast charging***
- ***Long lifetime***
- ***Integratable***

first graphite

ELEMENTS OF BEST BATTERY TRANSACTION

- Elements of the Transaction to Acquire Licence
  - Stage One Earning 30% - $700,000 commitment
  - Stage Two Increasing to 60% - Additional $1.3m
  - Issuing 10 mill. opts (10¢, 21 May 2017) and 2 mill. shares (escrowed)
  - FGR underwriting expenditure of $2m
  - Due diligence completion by March 19
- Contracting Parties
  - Swinburne University of Technology (Melbourne)
  - Kremford Pty Ltd (introducing agent, Project Manager)
  - Graphene Solutions Pty Ltd (holder of licence)
- Asset Being Acquired
  - Global exclusive licence
  - Sliding scale royalty, falling to 2.75%

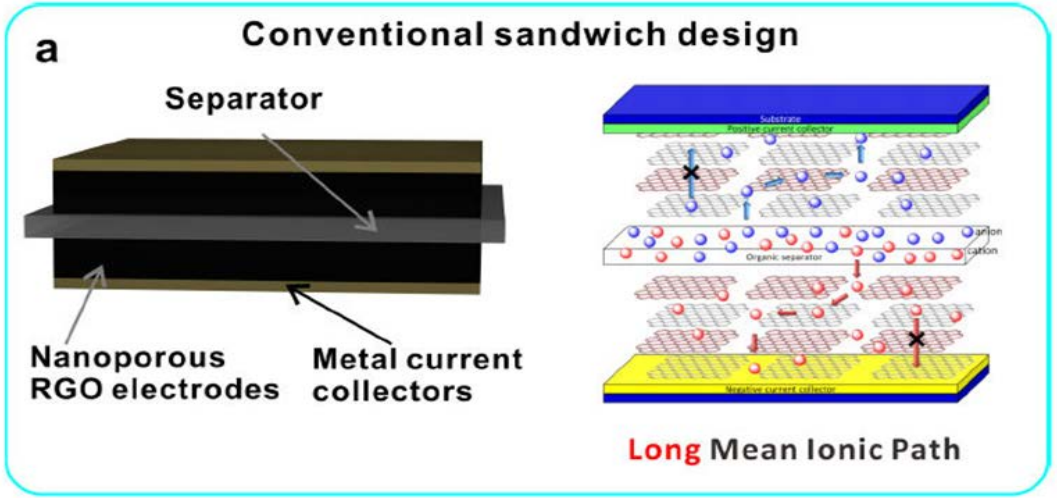
THE **BEST** BATTERY

Comparison of BEST Battery to Lithium-ion Battery

Parameters	Supercapacitor (BEST Battery)	AA Rechargeable battery
Storage mechanism	Physical	Chemical
Charge time	1-10 seconds	1 – 4 hours
Cycle life	Minimum 10,000 cycles	300 – 1,000 cycles
Cell voltage	1.5 to 2.3 V	1.25 – 1.5 V
Energy density (Wh/L)	5 (current state) 50- 60 (target for this project)	100 to 200
Power density (W/L)	Up to 10,000	35 to 300
Cost per Wh	$20 (current state) $0.30 (target for this project)	$0.50 - $1.00 (large system)
Service life	10 to 15 years	1 to 2 years
Disposal	No special requirement, environmentally friendly	Land fill, harmful to environment

first graphite

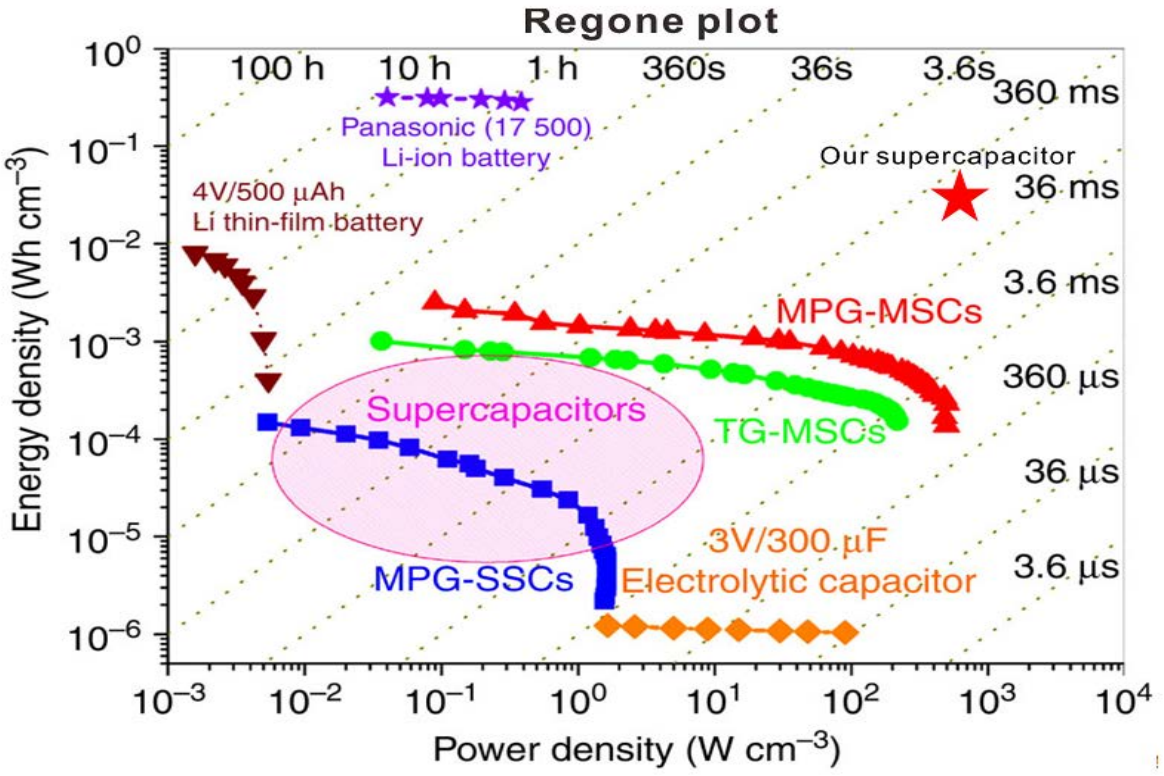
INCREASING THE ENERGY DENSITY



first graphite

ENERGY DENSITY AND POWER DENSITY PERFORMANCE

Performance of our supercapacitors break new ground



first graphite

VEIN GRAPHITE SUPPLIES

ESSENTIAL ACCESS TO PREMIUM VEIN GRAPHITE

- Three sources of product for FGR;
  1. Development of own mines
     - Granted the first (and only) new underground graphite mining licence in SL in 25 years
     - Three shafts approaching orebodies now
     - Behind schedule but improving with personnel and procedural changes
  2. Off-take agreement with the Government mine
  3. Third party purchases
- Two existing historical producers from underground mines;
  - Kahatagaha (Government)
  - Bogala (80% German-owned)
  - Both are deep and mature (around 650m depth)
- Other sources
  - A number of jointly owned companies with foreigners
  - Much talk and promotion, but short on delivery
  - Numerous artisan workings

OPERATIONAL UPDATE

Aluketiya – Shaft H

- Now in competent ground
- First ore zone only 4m from shaft
- Three ore zones to be access initially, including high grade zone of 1.72m at 99.8% TCG (40m drive)

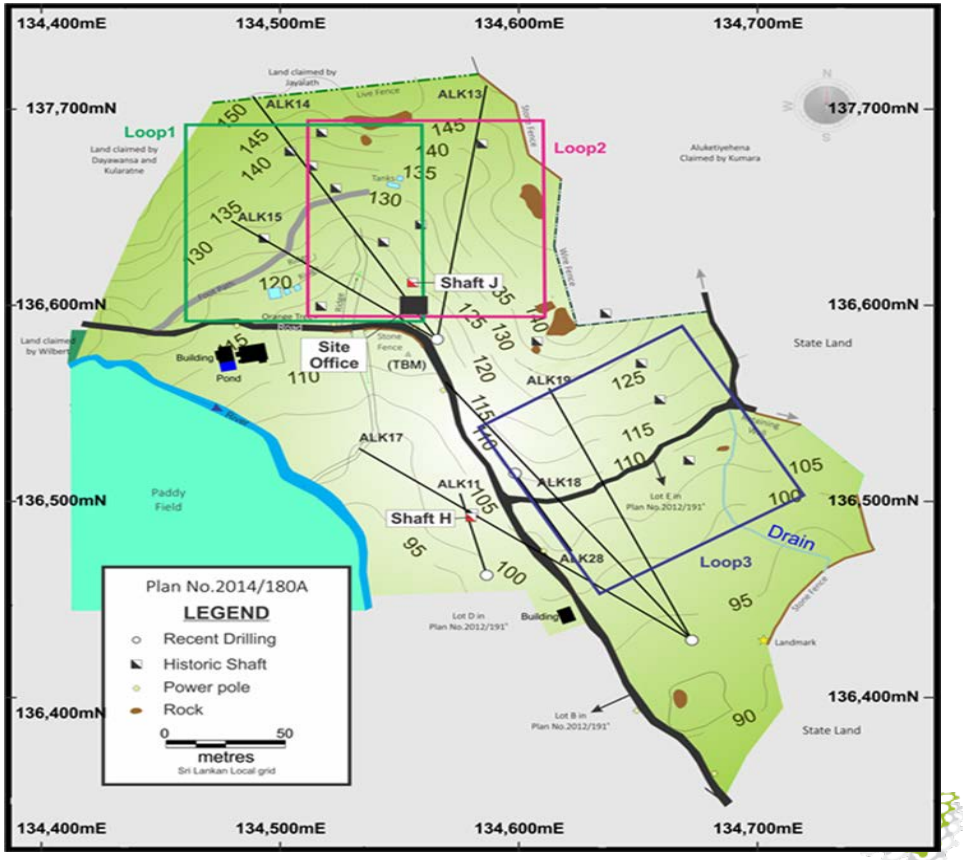
Shaft H site development area

OPERATIONAL UPDATE

Other shafts

- Aluketiya Shaft J – shaft sinking commenced mid-January
- Expect to be in ore early in Q2 2017

Shaft J 2.5 metres liner showing weathered graphite vein in shaft



Aluketiya project site plan with Shafts H and J and exploration drill hole traces and transmitter loop locations

first graphite

THE GRAPHENE THEMATIC

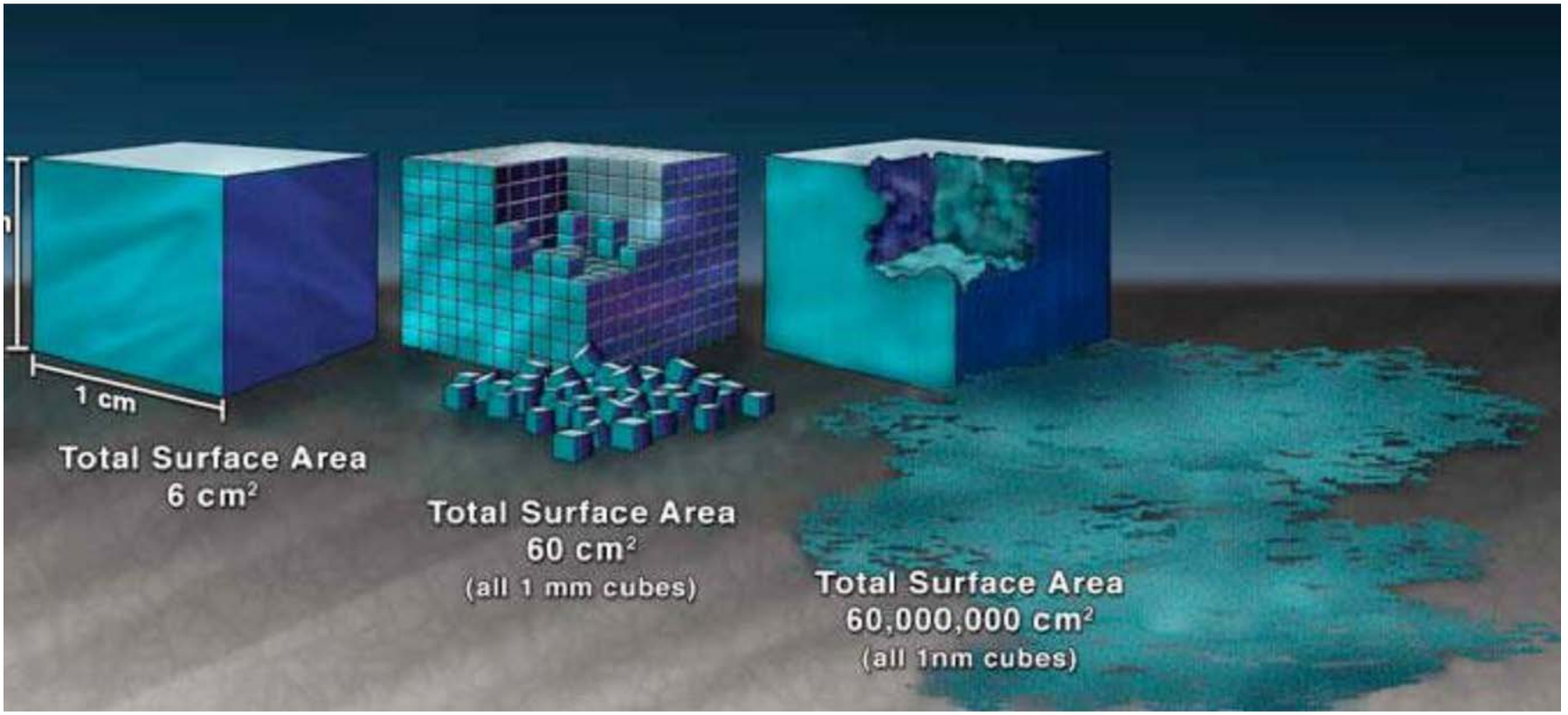
THE AMAZING PROPERTIES OF GRAPHENE

Thinnest material	It is only one carbon atom in thickness i.e. only ~0.345 nm thick
Stronger than steel	It is one of the hardest materials in the world, being harder than diamonds and 200x stronger than steel (1,100TPa/125 GPa) of the same thickness but it is very flexible and will not break. As an example, a graphene sheet 1 m^2 in size could support a 4 kg cat, but that sheet would weigh only as much as the cat's whiskers (1).
Optical properties	One atom thick layer sheets absorb ~2.3% visible light, making it transparent.
Light and stretchable	It weighs only 0.77 milligrams per square meter and is stretchable up to 20% of its initial length. It has the largest volume to surface area ratio of any material.
Impermeable	It is completely impermeable. Even helium atoms cannot pass through it.
Thermal conductivity	It is a perfect thermal conductor (over 5,000 W/mK), being 5x the conductivity of graphite. It conducts heat in all directions i.e. it is an isotropic conductor.
Electronic properties	It has the highest electrical current density (one million times that of copper) and the highest intrinsic mobility (100x that of silicon). It has a lower resistivity than any other know material, at room temperature.
Chemical properties	It is an inert material and does not readily react with other atoms. However, it can "absorb" different atoms and molecules, leading to changes in its properties. It can be functionalised by several different chemical groups, resulting in different materials such as graphene oxide and fluorinated graphene.
Other qualities	Self repairing - graphene can self-repair holes in its sheets when exposed to molecules containing carbon. Reactive - it is the most reactive form of carbon.

first graphite

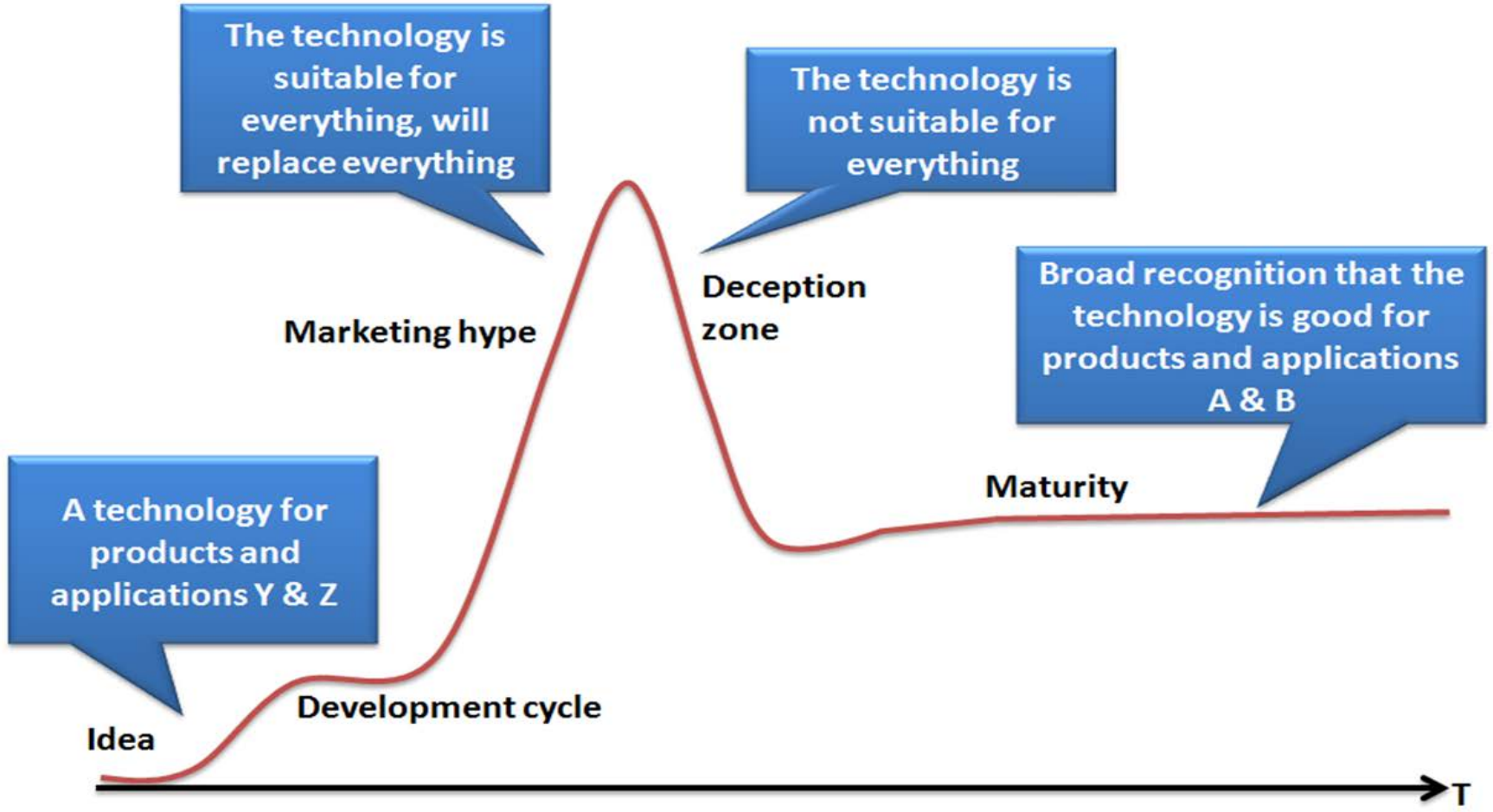
ITS ALL ABOUT THE SURFACE AREA FOR REACTIONS

The increase in the surface areas greatly improves bonding



www.nano.gov

THE TIMING OF THE GRAPHENE REVOLUTION



ACCORDING TO THE WORLD GRAPHENE COUNCIL

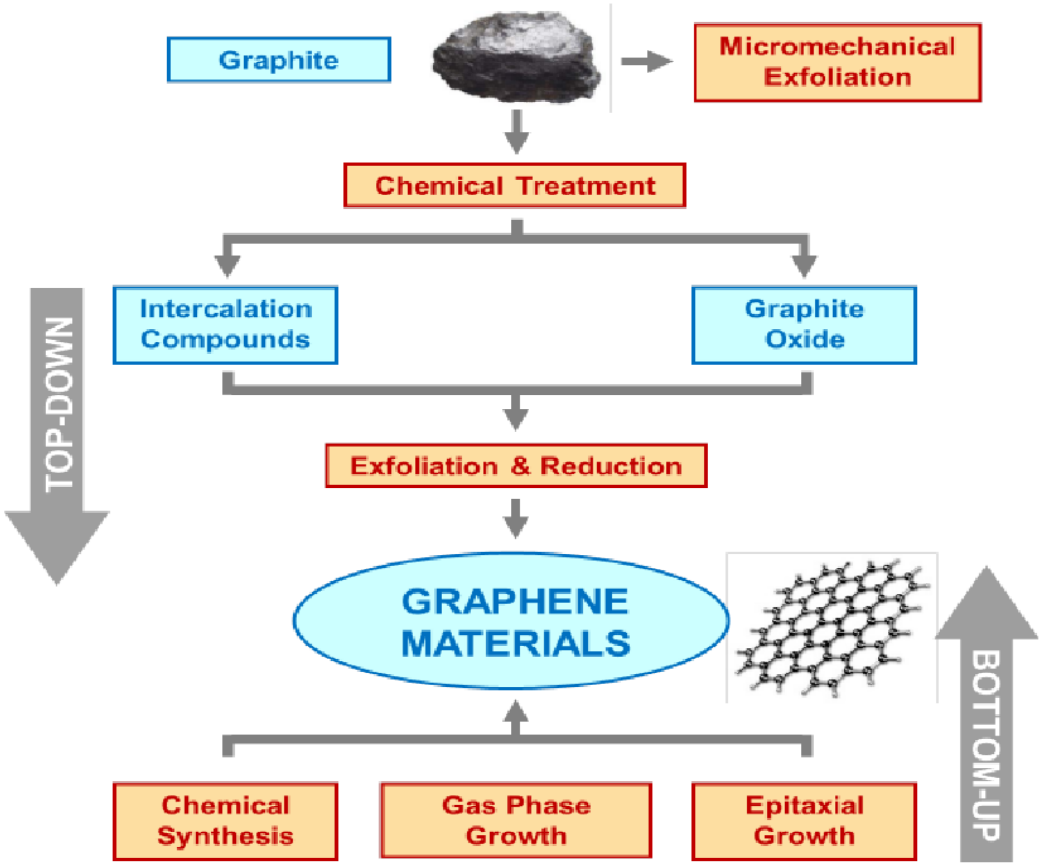
Three recognised hurdles to the commercialisation of graphene;

1. Availability of a sufficient quantity,
   - Perhaps 60-80 manufacturers
   - Mostly for research
   - CVD & other methods are not scaleable
2. Availability of consistent quality,
   - No standardised nomenclature
   - Sampling issues
   - Graphene or micro-graphite?
3. At an acceptable price.
   - High capital costs
   - High cost of inputs and low productivity
   - No economies of scale yet

BUT, FGR addresses all of the concerns

first graphite

TWO APPROACHES TO MAKING GRAPHENE



first graphite

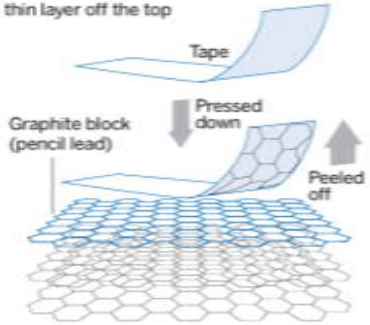
METHODS OF MAKING GRAPHENE

1. Chemical Vapour Deposition (CVD)
   - Reacting a mixture of hydrogen and methane at 1000^0C
   - Epitaxial growth of graphene films on substrates e.g. copper
2. Micromechanical exfoliation
   - "Scotch tape" method – physical separation
3. Dispersion/Exfolitation of Graphite
   - Solution-based exfoliation in organic solvents
   - Graphite ultrasonication in surfactant-water solutions
   - Large amounts of multilayer (< 5 layers), small amounts of single layer
   - Stabilised against re-agglomeration for several weeks
4. Reduced Graphene Oxide
   - Oxidise graphite then mechanical, chemical or thermal exfoliation to make graphene oxide (GO), then remove oxygen to get RGO

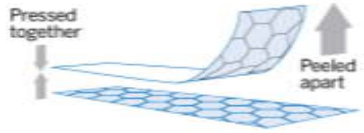
METHODS OF MAKING GRAPHENE

Mechanical exfoliation

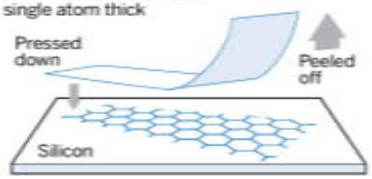
1 A sticky 'tape' is placed on to a block of graphite and then peeled back, stripping a thin layer off the top



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

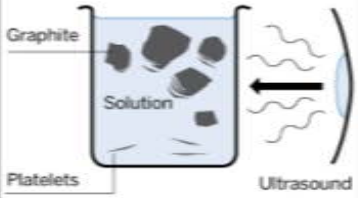
Greater than 1mm

Applications

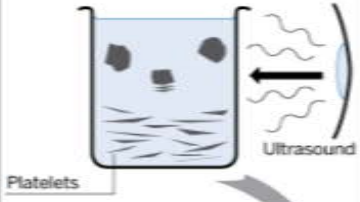
Research

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

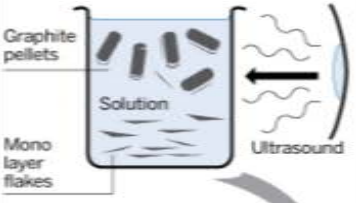
Applications

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

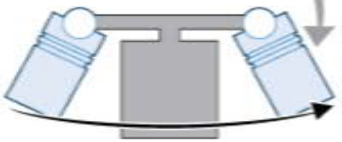
Chemical exfoliation via graphene oxide

1 Related to chemical exfoliation but graphite pellets are first oxidised

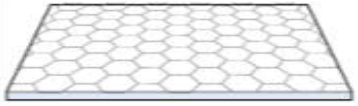
2 Pellets exfoliated in chemical solution to produce mono-layers of graphene



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

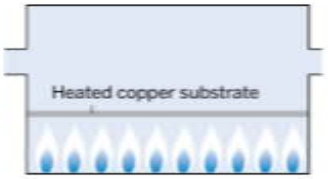
Infinite but with larger flake size than simple chemical exfoliation

Applications

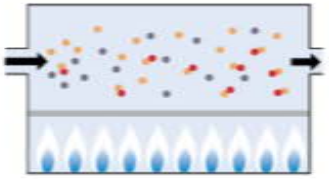
The same as chemical exfoliation

Chemical vapour deposition

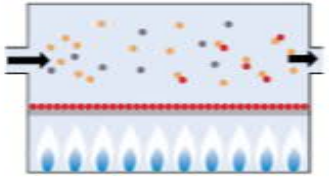
1 A substrate (usually copper) is heated in a furnace at low pressure to about 1,000°C. This anneals the copper



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 continous graphene sheet



Sample size

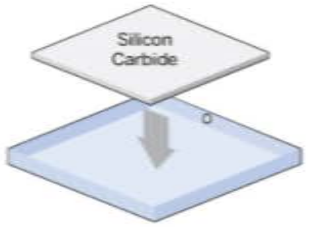
About 1m

Applications

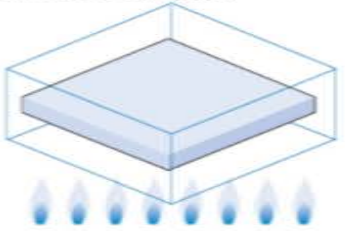
Photonics, nanoelectronics, transparent conductive layer sensors and bioapplications

Silicon carbide

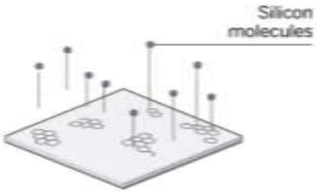
1 A small amount of silicon carbide (about 10mm x 10mm) is placed in a box with a small hole in it



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



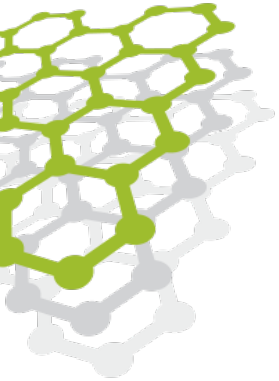
Sample size

About 100mm

Applications

Transistors and other electrical devices

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



MEASURING GRAPHENE QUALITY

Graphene quality is tested using the following tools

Number of Layers:	Atomic Force Microscopy (AFM)
Crystallite Size:	Optical Microscopy
Flake Quality:	Raman Spectroscopy
Morphology:	Scanning (SEM) and Transmission (TEM) Electronic Microscopies
Chemical Composition:	Elemental Analysis (CNHS) and X-Ray Photoelectric Spectroscopy (XPS)

Directors and Management

Warwick Grigor- Non-Executive Chairman

- Respected and experienced mining analyst
- Mr Grigor's research knowledge and market intelligence gives First Graphite a strong strategic direction.
- Bachelors of Law and Economics from the Australian National University, Diploma of Company Director

Craig McGuckin - Managing Director

- Qualified mining professional with in excess of 35 years experience in the mining, drilling and petroleum industries
- Held senior positions in private and publicly listed companies

Peter Youd – Executive Director, Chief Financial Officer & Company Secretary

- Chartered Accountant and has extensive experience within the resources, oil and gas services, and mining
- For over 35 years has held senior management positions and directorships for publicly listed and private companies in Australia and overseas
- Bachelor of Business from the W.A Institute of Technology (now Curtin University).

Chris Banasik - Non-Executive Director

- Master's Degree in Mineral Economics from University of WA and Bachelor's Degree in Applied Physics from Curtin University
- Formerly Director of Exploration and Geology of Silver Lake Resources
- Held senior geological management positons over 12 years' with organisations including WMC Resources Ltd, Reliance Mining Ltd, Goldfields Mine Management and Consolidated Minerals Ltd

Corporate Overview

Capitalisation

Shares On Issue		339,824,589
Options		
* FROB exp. 21-05-17 $0.10		129,853,100
Price (23/02/17)	($)	$0.115
Market Cap	($m)	~$39.1
52 Week High	($)	$0.165
52 Week Low	($)	$0.050
Cash (28/02/17)	($m)	$3.7
Debt	($m)	$0.00
Enterprise Value	($m)	$35.4

Share Price History (Source Westpac)

Board and Management

- Warwick Grigor – Non-Executive Chairman
- Craig McGuckin – Managing Director
- Peter Youd – Executive Director, CFO & Co. Secretary
- Chris Banasik – Non-Executive Director

first graphite

Important Notice

These presentation materials **Presentation Materials**) are being issued solely to and directed solely to Sophisticated and Professional Investors, as those terms are defined in the Corporations Act 2001 (Cth), who may have interest in investing in First Graphite Limited (the **Company**). The Presentation Materials are not intended to be distributed or passed on, directly or indirectly, to any other class of persons. They are being supplied to you solely for your information and may not be copied or otherwise reproduced, forwarded to any other person or published, in whole or in part, for any other purpose. The Presentation Materials are not investment or financial product advise and is not intended to be used as the basis for making a financial decision, nor is it intended to constitute legal, tax, or accounting advice or opinion.

The Presentation Materials do not comprise a prospectus nor have they been nor will they be lodged with the Australian Securities and Investments Commission.

The Presentation Materials do not constitute or form any part of any offer or invitation to sell or issue or purchase or subscribe or arrange for any securities in the Company nor shall they or any part of them, or the fact of their distribution, form the basis of, or be relied on in connection with, any contract with the Company relating to any securities.

In furnishing the Presentation Materials the Company undertakes no obligation to provide the recipient with access to any additional information. The Company reserves the right, without giving reasons, at any time to revise, supplement or withdraw the Presentation Materials provided to the recipient and to terminate discussions with any or all of the recipients.

The distribution of the Presentation Materials in jurisdictions outside Australia may be restricted by law. Neither this document, nor any copy of it, may be taken or transmitted into the United States or into any jurisdiction where it would be unlawful to do so. The Company advises that recipients who receive these Presentation Materials in countries other than Australia should consult their professional advisers as to whether any governmental or other consents are required or whether any other formalities need to be considered and followed. Any failure to comply with this restriction may constitute a violation of relevant local securities laws.

It is the responsibility of all recipients of these Presentation Materials to obtain all necessary approvals to receive these Presentation Materials and receipt of the Presentation Materials will be taken by the Company to constitute a representation and warranty that all relevant approvals have been obtained.

The potential quantity and quality of the targets identified in this presentation are conceptual in nature and there has been insufficient exploration to date to define a mineral resource in accordance with JORC.

The content of the report is based on low level technical and economic assessment and is insufficient to support estimation of reserves or to provide assurance of an economic development case or to provide certainty that the production conclusions will be realised. Furthermore is it uncertain if further exploration will result in the determination of mineral resources.

The potential quality and grade of targets are conceptual in nature, there has been insufficient exploration to determine mineral resources and there is no certainty that further exploration work will result in the determination of a mineral resources or that the production targets will be realised.

Accordingly, this document contains reference to certain targets and plans of FGR which may or may not be achieved. The performance of FGR may be influenced by a number of factors, uncertainties and contingencies, many of which are outside the control of FGR and its directors, staff and consultants.

Important Notice

NO DISCLOSURE DOCUMENT REQUIRED

By receiving the Presentation Materials, you acknowledge and represent to the Company that you have read, understood and accepted the terms of this disclaimer and are a sophisticated or professional investor or a person to whom an offer and issue of shares may be made without lodgement or approval of a formal disclosure document or other filing.

FORWARD LOOKING STATEMENTS

Certain statements contained in the Presentation Materials, including information as to the future financial or operating performance of the Company and its projects, are forward looking statements. Such forward looking statements:

a. are necessarily based upon a number of estimates and assumptions that, while considered reasonable by the Company, are inherently subject to significant technical, business, economic, competitive, political and social uncertainties and contingencies;

b. involve known and unknown risks and uncertainties that could cause actual events or results to differ materially from estimated or anticipated events or results reflected in such forward looking statements; and

c. may include, among other things, statements regarding estimates and assumptions in respect of prices, costs, results and capital expenditure, and are or may be based on assumptions and estimates related to future technical, economic, market, political, social and other conditions.

The Company disclaims any intent or obligation to publicly update any forward looking statements, whether as a result of new information, future events or results or otherwise.

The words “believe”, “expect”, “anticipate”, “indicate”, “contemplate”, “target”, “plan”, “intends”, “continue”, “budget”, “estimate”, “may”, “will”, “schedule” and similar expressions identify forward looking statements.

All forward looking statements contained in the Presentation Materials are qualified by the foregoing cautionary statements. Recipients are cautioned that forward looking statements are not guarantees of future performance and accordingly recipients are cautioned not to put undue reliance on forward looking statements due to the inherent uncertainty therein.

The Presentation Materials do not purport to be all inclusive or to contain all information about the Company.

Certain parties named in the Presentation Materials have not reviewed the references to them and may seek amendments to these references once this review has occurred.