Talga Presentation at Benchmark EV Fest - Graphite vs Silicon

Battery anode company Talga Group Ltd ("**Talga**" or "**the Company**")(**ASX:TLG**) is pleased to provide a copy of the presentation delivered by the Company's Managing Director, Mark Thompson, during Benchmark Minerals EV Fest on Friday 4th June 2021 at 11pm AWST (4pm London).

The presentation is available on the Company's website via the link below:

http://www.talgagroup.com/irm/content/presentations.aspx?RID=301

Authorised for release by:

Dean Scarparolo
Company Secretary
Talga Group Ltd
T: +61 (0) 8 9481 6667

For further information please contact:

Mark Thompson
Managing Director
Talga Group Ltd
T: +61 (0) 8 9481 6667

Nikki Löf
Group Communications Manager
Talga Group Ltd
T: +61 (0) 8 9481 6667

About Talga

Talga Group Ltd (ASX:TLG) is building a European battery anode and graphene additives supply chain, to offer advanced materials critical to its customers' innovation and the shift towards a more sustainable world. Vertical integration, including ownership of several high-grade Swedish graphite projects, provides security of supply and creates long-lasting value for stakeholders.

Company website: **www.talgagroup.com**

Graphite vs Silicon

Complementary or Competing?

Benchmark EV Fest 4 June 2021

Mark Thompson – Managing Director
Talga Group Ltd (ASX:TLG)

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Talga Group

Becoming a significant and vertically integrated producer of lithium-ion battery anode products and technologies

Talga is developing a fully integrated graphite anode production facility in Sweden running on 100% renewable electricity, to produce ultra-low emission material for greener Li-ion batteries

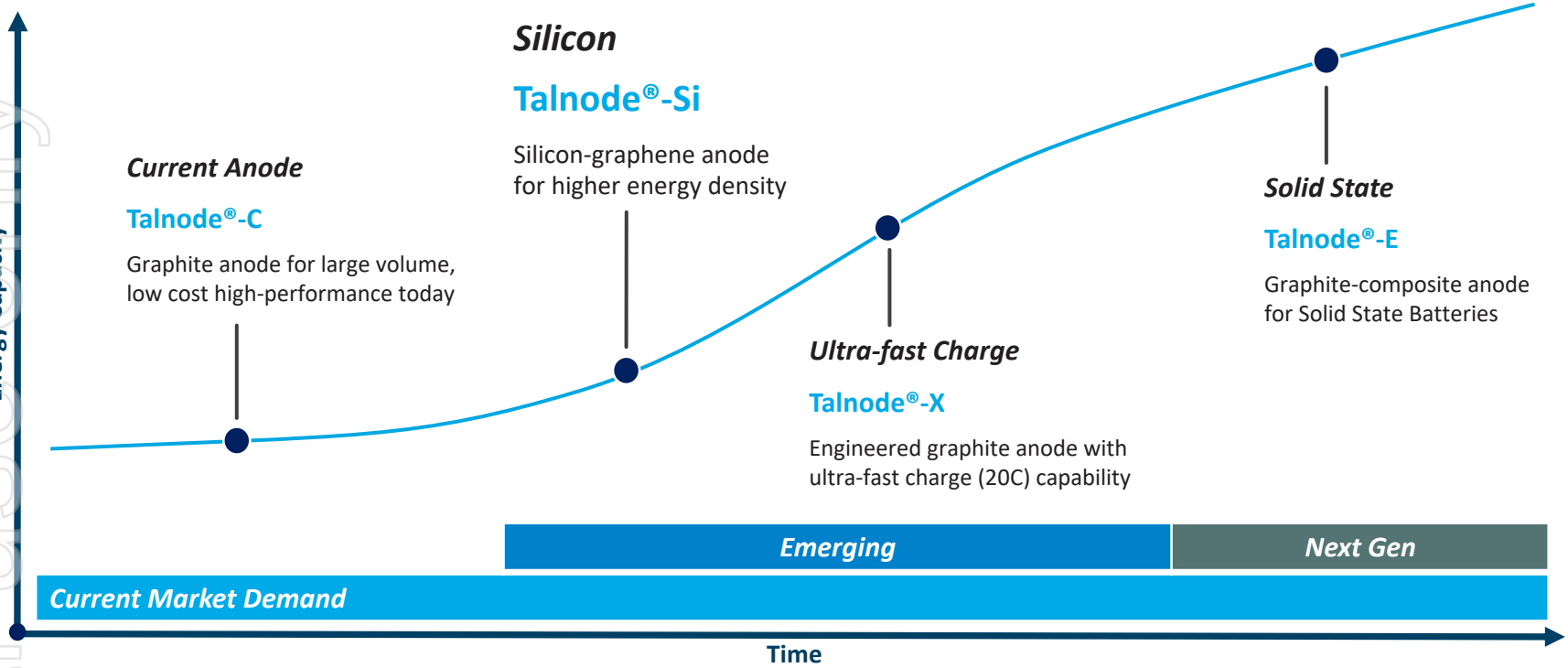
Ownership over industry-leading natural graphite deposits for processing into anode products and graphene provides complete control over supply and captures more margins

Whilst **graphite anode remains the dominant choice** the market demand shows an increased interest in silicon anode products.

Talga has designed and developed a silicon composite anode, **Talnode®-Si**, utilising graphite-graphene to address the commercial and technical issues, and **complement** use of silicon.

Talga Anode Products

Talga graphite battery anode range designed for growth across major Li-ion developments



SEE: ASX:TLG 16 OCT 2018, 19 FEB, 21 MAR, 26 MAR and 2 OCT 2019, 14 OCT 2020.

Silicon Potential in Li-ion Anode

There is interest in higher energy capacity Li-ion batteries

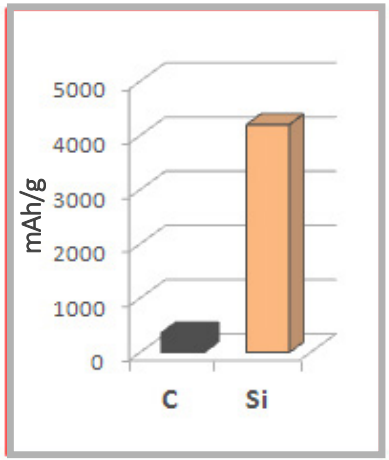
Silicon as a pure material is ***theoretically*** capable of >10x energy capacity of graphite in Li-ion batteries, *by weight*

Higher energy capacity can translate to longer range of electric vehicles or less weight (smaller batteries for same range)

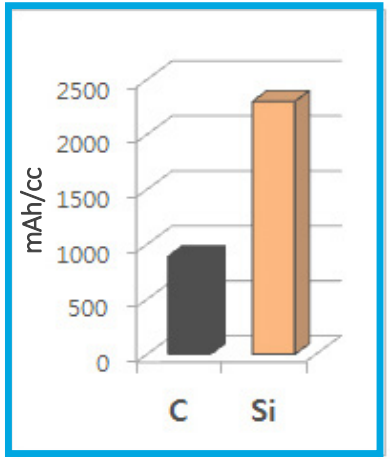
Therefore, silicon anodes seem great! **But they have some big issues to overcome in practical and commercial use**

Today only minor amounts are used (as an additive into graphite-based anodes) but there is much work underway

Gravimetric Energy Density



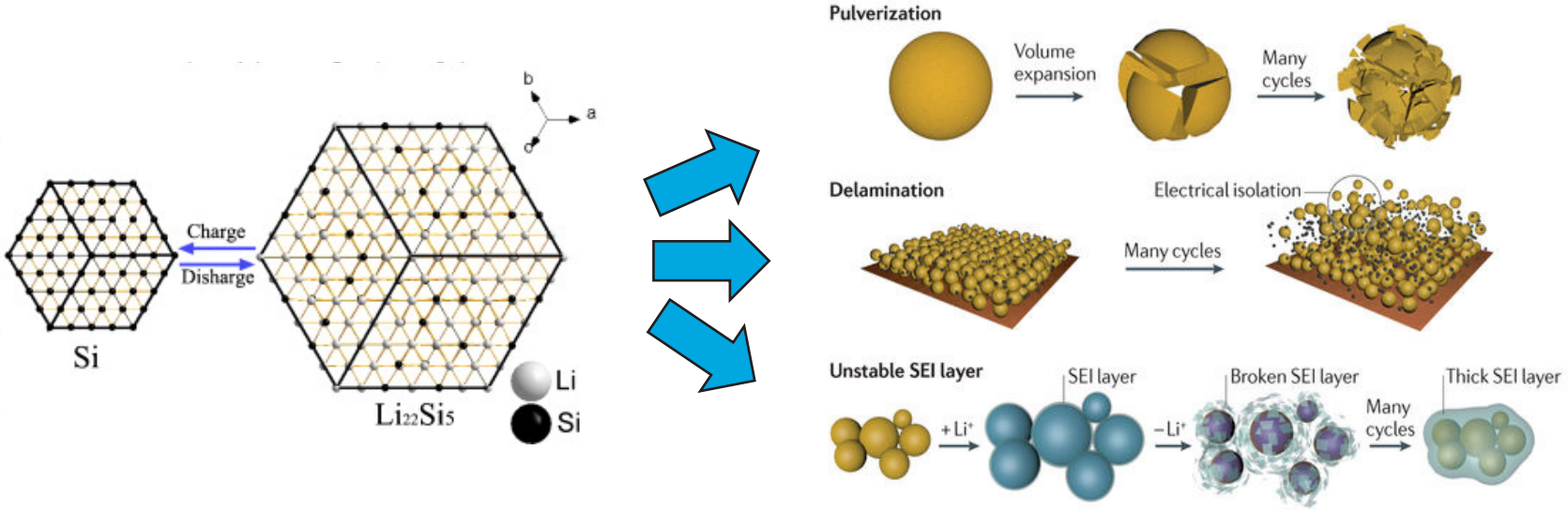
Volumetric Energy Density



The Many Challenges of Silicon Anodes

Silicon anodes have profound issues to overcome in practical use

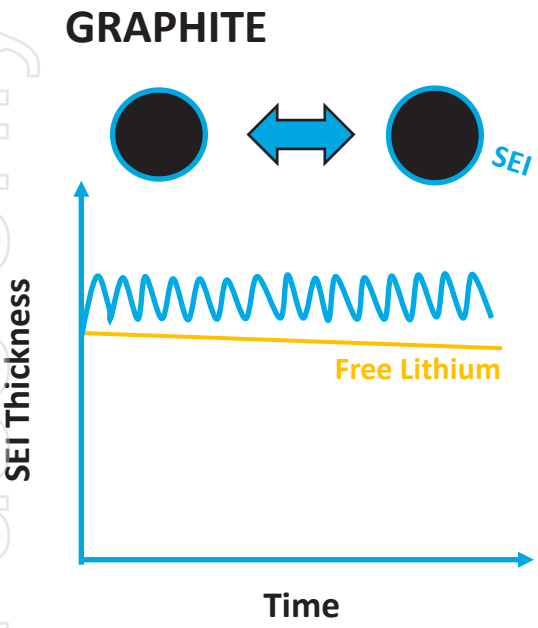
When charged/discharged Silicon **changes volume by 300%** (compared to graphite ~10%) causing a wide range of physio-chemical issues, including repeated cracking of the anode particles

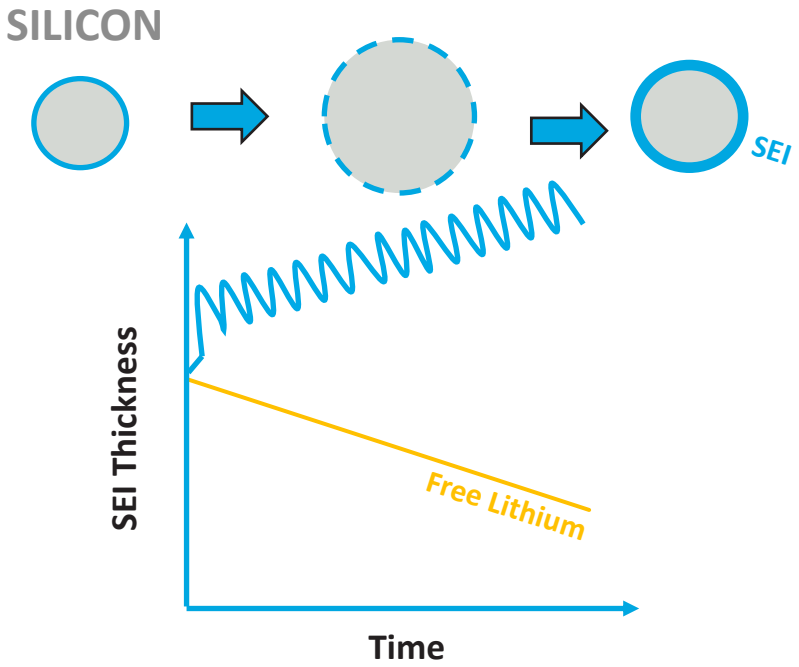


NOTE: Image from Choi & Aurbach 2016, https://www.nature.com/articles/natrevmats201613#f2

Silicon ‘The Lithium Robber’

The repeated changes in volume keeps cracking the solid electrolyte interface (SEI), continuously ‘robbing’ lithium from cathode and electrolyte to reform it, decreasing lithiation kinetics

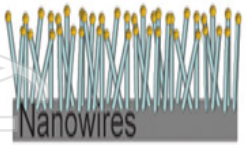


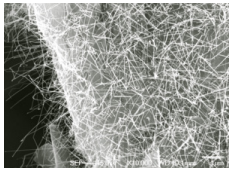


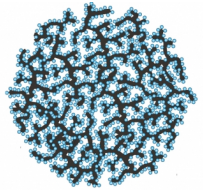
NOTE: Diagrams are schematic only/not to scale

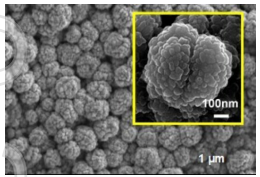
Possible Solutions

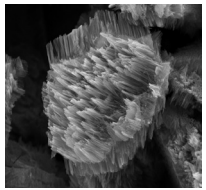
Wide range of silicon anode morphologies and composites developed but higher silicon content products tend to be most challenged by cost and scalable production outlook

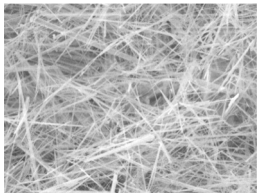


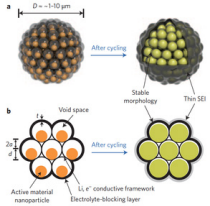


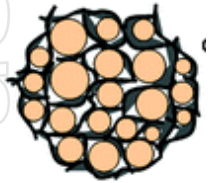


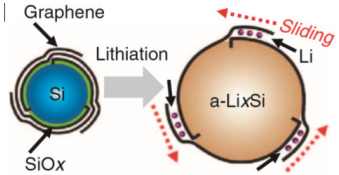


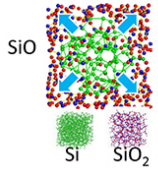










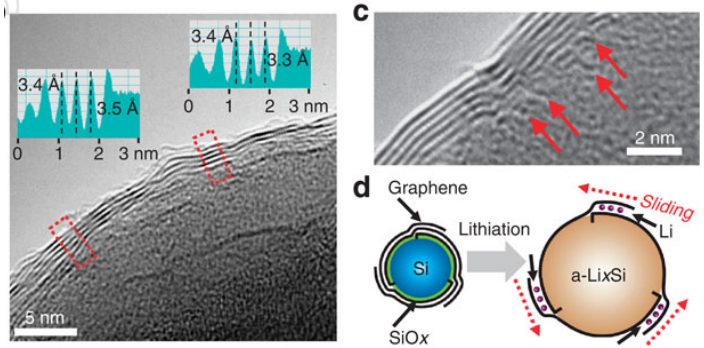


NOTE: Image from Choi & Aurbach 2016, https://www.nature.com/articles/natrevmats201613#f2

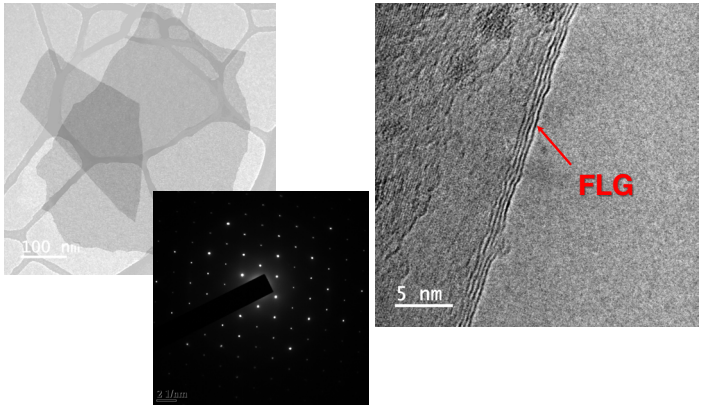
Graphene Can Complement Silicon

One approach is to use graphene to help control charge kinetics and SEI during volume change

SAMSUNG GRAPHENE COATED SILICON



TALGA GRAPHENE



[1] Source "Graphene balls for lithium rechargeable batteries with fast charging and high volumetric energy densities", Nature Communications 8:1561. Samsung
SEE: ASX:TLG 19 FEB 2019 and 14 OCT 2020.

Talga Approach to Silicon

Design strategy for silicon composite anode

Silicon anode design strategy **starting 2018** under UK Government funded Talga-led program with Johnson Matthey, the University of Cambridge and manufacturing research group, TWI

Targeted significant but incremental gains in energy density sought by **customers battery roadmaps rather than theoretical maximums**

Particle design enables a range of loadings in existing commercial anode blends **without re-tooling, avoid pre-lithiation and use existing commercial electrolytes**

Particle design to enable high-capacity silicon loading but **retain focus on high volume production process** and off-the-shelf equipment

Talga Silicon Source and Graphite Ore Sample from Vittangi Project

SEE: ASX:TLG 19 FEB 2019 and 14 OCT 2020.

Talnode®-Si a practical approach

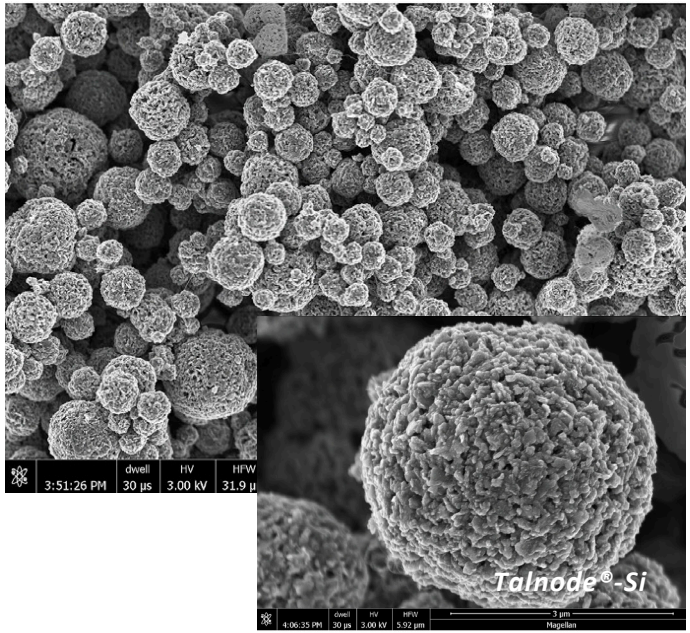
Talnode®-Si is a graphene silicon composite electrode additive with ~30-50%Wt silicon for 'drop-in' blending with commercial graphite anodes

Talga's graphene additives and production technology enables silicon-loaded anodes to stabilise

Graphene works in various modes including protective coatings and nano-structures to control pulverization issues, retain kinetics and moderate SEI formation

First cycle efficiency up to 91% dependent on silicon loading. Has good cycle life (**using commercial electrolytes**) and coulombic efficiency, with lower production costs and large scale manufacture capability

Uses lower-cost metallurgical silicon for large volume production



SEE: ASX:TLG 19 FEB 2019 and 14 OCT 2020.

C + Si = Complementing

Talnode®-Si activities and next steps

Scaled up sample production facilities in UK and Germany

Intellectual Property lodged and more underway

Commercial samples in multitude of testing programs with battery makers and auto companies - Large scale trials for high-performance auto brand underway

Positive feasibility study completed for mass production under UK Government Automotive Transformation Fund

Exploration of advanced commercial partners underway

Talnode®-Si anode trial for high-performance auto customer

SEE: ASX:TLG 19 FEB 2019 and 14 OCT 2020.

Partnerships for a greener future

Working with respected battery customers and technology & development partners

SEE: ASX:TLG 30 OCT 2015 and 5 FEB, 26 MAR, 4 SEP 2018 and 15 JAN, 2 OCT, 8 OCT, 24 OCT 2019 and 31 JAN, 20 MAR, 13 MAY, 27 MAY, 24 JUNE, 2 NOV and 24 NOV 2020.

Corporate Overview

ASX:TLG PERFORMANCE (12 MONTHS)

STOCKMARKET CODES

Primary listing in Australia on the ASX (TLG)
with OTC trading in USA (TLGRF) and Germany (TGX)

CAPITAL STRUCTURE

ASX Listing Code:	TLG
Market Capitalisation:	$497M
Listed Shares:	303.2M
Unlisted Options:	12.9M[(1)]
Cash as at 31 March 2021:	$58.4M

MAJOR SHAREHOLDERS

Mark Thompson – MD	4.7%
Kinetic Investment Partners	4.5%
UBS Securities Australia	2.9%
UBS AG	2.4%
Yandal Investment Pty Ltd	1.6%
Total number of shareholders	**10,472**

NOTE: MARKET CAPITALISATION AS AT 1 JUNE 2021, SHAREHOLDER REGISTER AS AT 28 APRIL 2021. [(1)] UNLISTED OPTIONS INCLUDE PERFORMANCE RIGHTS SUBJECT TO VESTING CONDITIONS.

TALGA GROUP LTD

ASX Code: TLG

Head Office: 1st Floor, 2 Richardson Street
West Perth WA 6005, Australia

Phone: +61 8 9481 6667
Email: info@talgagroup.com
Website: www.talgagroup.com

GLOBAL OPERATIONS

Talga Sweden: Storgatan 7, 972 38 Luleå, Sweden
Talga Sweden: Vänortvägen 2, 981 32 Kiruna, Sweden
Talga UK: The Bradfield Centre, 184 Cambridge Science Park, Cambridge CB4 0FQ, UK
Talga Germany: Prof.-Hermann-Klare-Str. 25, 07407 Rudolstadt, Germany
Talga Japan: Takatsuki, 569-1046, Osaka, Japan