

Talga Presentation at Benchmark Minerals Graphite & Anodes 2019

Advanced battery anode materials and graphene additives provider Talga Resources Ltd (“**Talga**” or “**the Company**”) (**ASX:TLG**) is pleased to provide a copy of the presentation to be delivered today by the Company’s Managing Director, Mark Thompson, at Benchmark Minerals Week Graphite & Anodes 2019 in Marina del Rey, California, USA.

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

<http://www.talgaresources.com/irm/content/presentations.aspx?RID=301>

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Feeding the Beast

Establishing a European Li-ion Anode Supply

Mark Thompson
Managing Director

Benchmark Minerals Week
Los Angeles, 11-12 November 2019



Forward Looking Statement & Disclaimer

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Introduction

Talga is a vertically integrated producer of advanced battery anode materials and graphene additives

We are building Europe's first large scale lithium-ion battery anode plant to produce at first 19,000t annum coated anode

100% ownership of mineral supply in Sweden, processing and product technology enables a high margin business and provides long term security and clean chain-of-custody for customers

Talga has built an in-house team of 35 mining, technology and product professionals include ex-Toyota, Tata, Dyson and Cambridge University alumni who are leading the Company's creation of products, R&D and market development





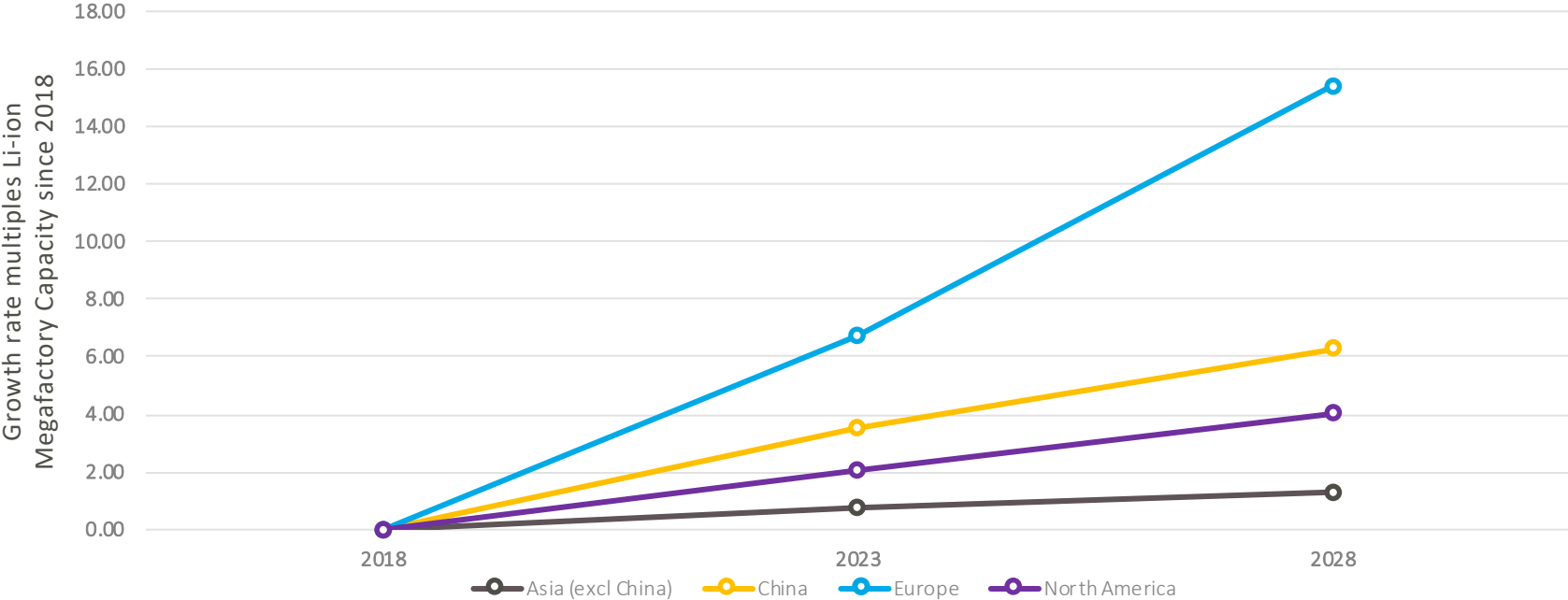
Leading the Way

Europe is charging ahead with electrification plus governments legislate change to achieve low/zero emission targets at ambitious timelines

Norway	Restrictive policies	2025
Germany	Ban of ICEs	2030
Netherlands	Ban of ICEs	2030
Sweden	Ban of ICEs	2030
France	Ban of ICEs	2040
UK	Ban of ICEs	2040
Denmark	CO ₂ targets	2050

Fastest Growing Demand is in Europe

Growth rate of Li-ion Battery Manufacturing (GWh)



SOURCE: BENCHMARK MINERAL INTELLIGENCE LI-ION BATTERY MEGAFACTORY REPORT NOV 2019

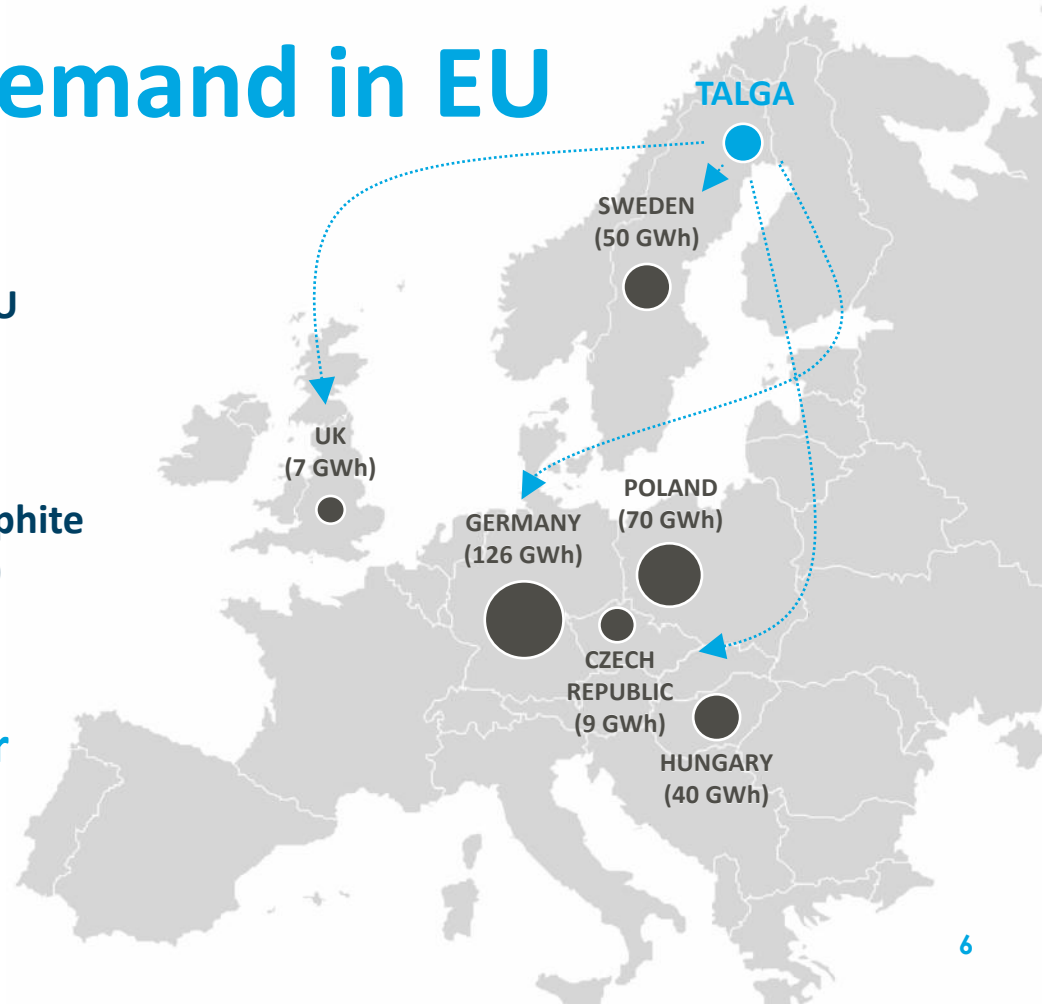
Growing Anode Demand in EU

303Kt
DEMAND

For graphite anode in EU
by 2028

0Kt
TODAY

Current EU sourced graphite
anode (100% imported)

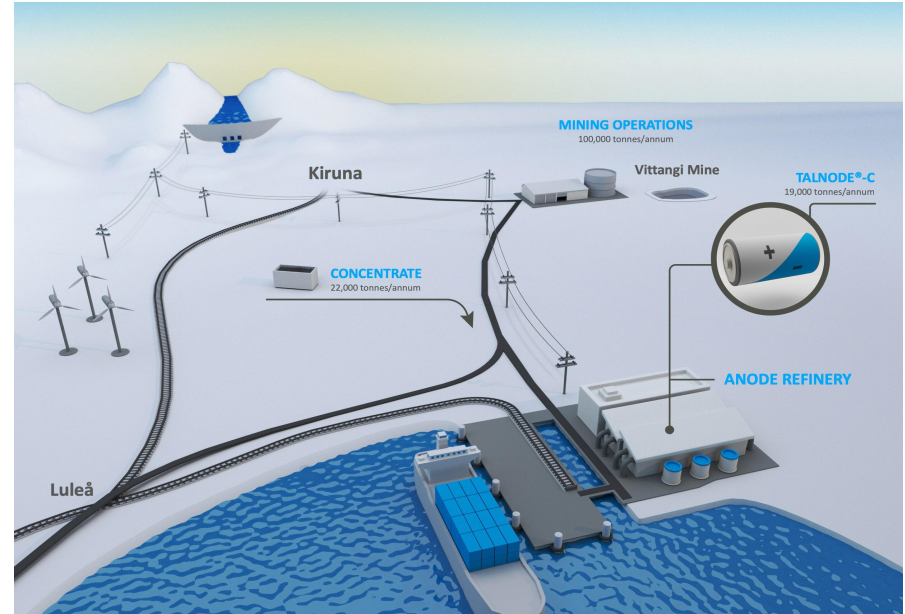


Talga is strategically located to enter the market at this disruptive time

Talga Anode Project

TALGA IS BUILDING A WORLD CLASS ANODE PLANT IN NORTHERN SWEDEN

- Project integrates a high-grade natural graphite mine & concentrator to a wholly owned anode refinery
- Close proximity to road, rail & export facilities linking directly to customers
- In-house technology and low cost/low CO₂ grid power makes Talga a globally competitive and sustainable producer
- Permit processes underway for mining, processing and refining to commence 2020



Vittangi Mine & Concentrator



23.5%
ORE GRADE

Ore Reserve grade
as used in PFS



100K
TPA

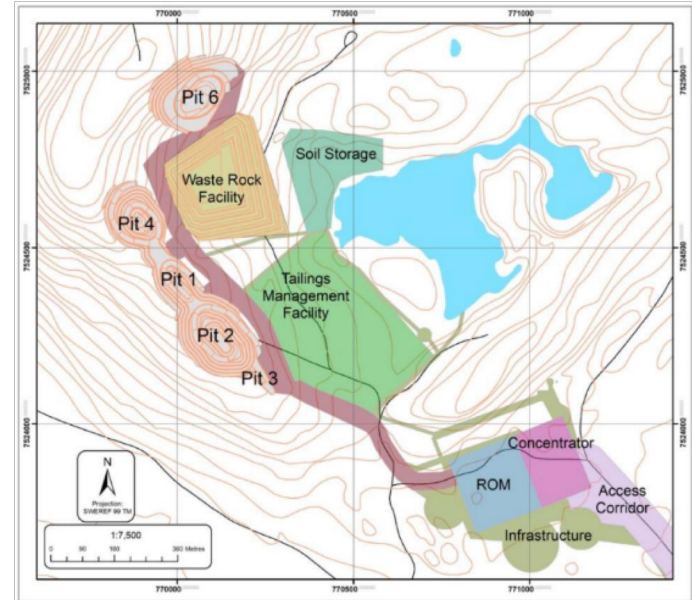
Ore throughput rate at
onsite concentrator



22
YEARS

Project mine life solely
from 2Mt Ore Reserve

**PFS based solely on 1.9Mt ore reserve – part of
Vittangi Project total 16.9Mt @ 25.6%*C_g***



Open pit mine sequence to backfill and
rehabilitate as the operation progresses

Luleå Anode Refinery



LOW
CO₂ POWER

Sustainable grid power
from hydroelectricity



19K
TONNES

Average annual (year 3-22)
anode production



2020
CONSTRUCTION

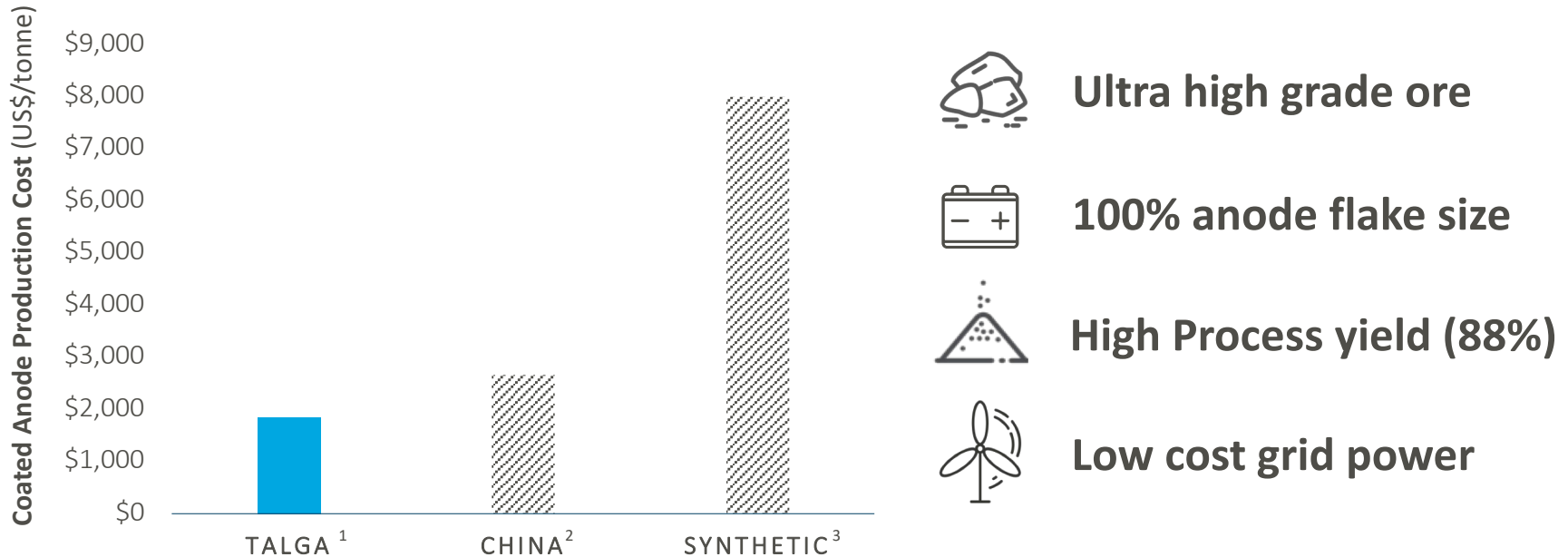
First module construction
then operation to 2043+

Refinery purifies, shapes and coats the Vittangi flake concentrate into 'coated spherical anode' product Talnode[®]-C for battery manufacturers



Global Margin Leader

COLLECTIVE ADVANTAGES ENABLE TALGA TO BE GLOBALLY LOW COST PRODUCER



SEE: ¹ ASX:TLG 23 MAY 2019. SOURCE: ² BENCHMARK MINERAL INTELLIGENCE PRESENTATION: 'CHINA' REFERS TO COATED NATURAL GRAPHITE ANODE PRODUCED IN CHINA, BASED ON BULK SALES AND MID-POINT AVERAGE COSTS AS OF H1 2018. ³ RECRUIT REPORT: 'SYNTHETIC' REFERS TO COATED ANODE MADE FROM SYNTHETIC GRAPHITE SOURCE e.g. NEEDLE COKE.

Exceptional PFS Project Economics

PFS HAS ESTABLISHED HIGH ECONOMIC PERFORMANCE FROM STAGED DEVELOPMENT

\$1,056M
NET PRESENT VALUE

Estimated pre-tax project
net present value

55%
IRR

Estimated pre-tax project
internal rate of return

\$188M
ANNUAL REVENUE

Estimated LOM 22 year
annual steady state revenue

\$27M
STAGE 1 CAPEX

Capturing near term
market opportunities

\$147M
STAGE 2 CAPEX

Capturing margins in
value-added project

1.5 YEAR
PAYBACK PERIOD

At Stage 2 steady state
production

NOTE: ESTIMATED KEY ECONOMIC OUTCOMES ALL IN USD. SEE: ASX:TLG 23 MAY 2019

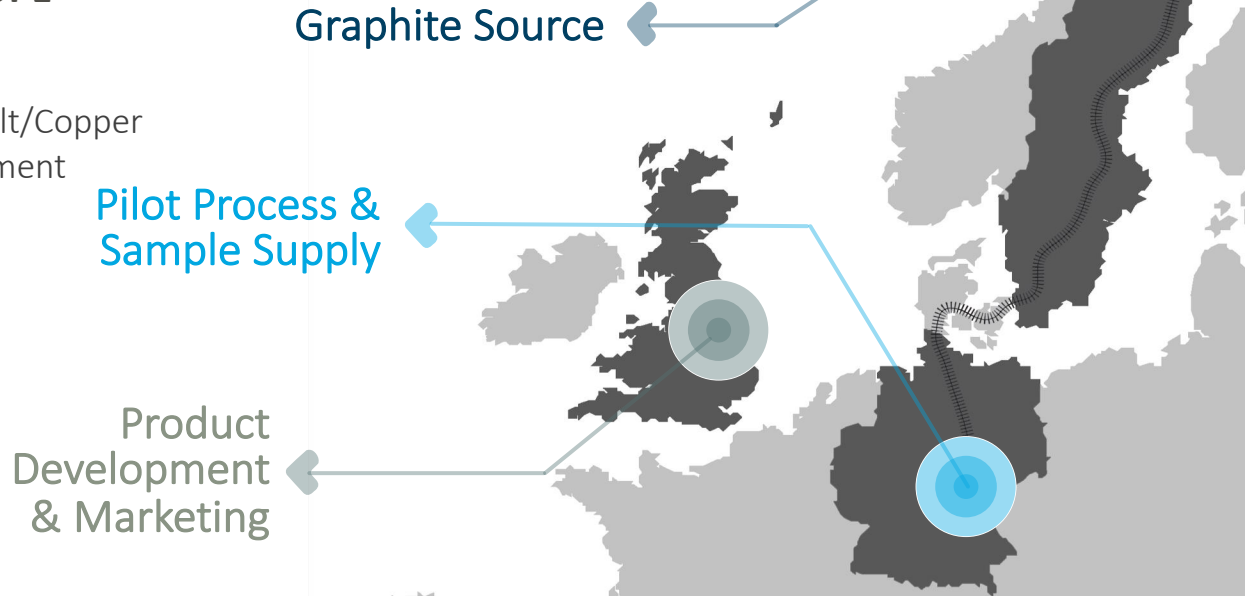
Executing on Anode Project Plan

Talnode-C Scale Up and Project Development Stages

Talga Operations

HEADQUARTERED IN AUSTRALIA WITH MAJOR OPERATIONS AND BUSINESS UNITS IN EUROPE

- ▶ **Talga Sweden**
100%-owned Graphite and Cobalt/Copper mineral deposits under development
- ▶ **Talga Germany**
100%-owned pilot scale facility scaling up process technology & customer samples
- ▶ **Talga UK**
100% in-house science and marketing team in Cambridge





BATTERY & ANODE

Our Expertise

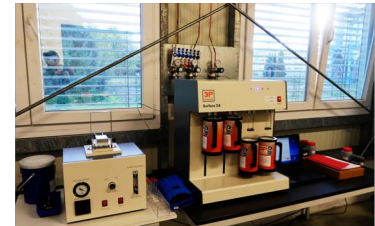
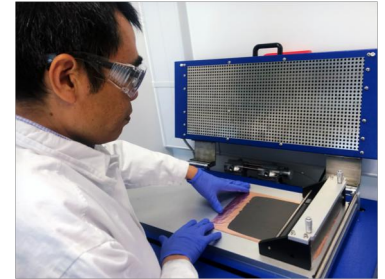
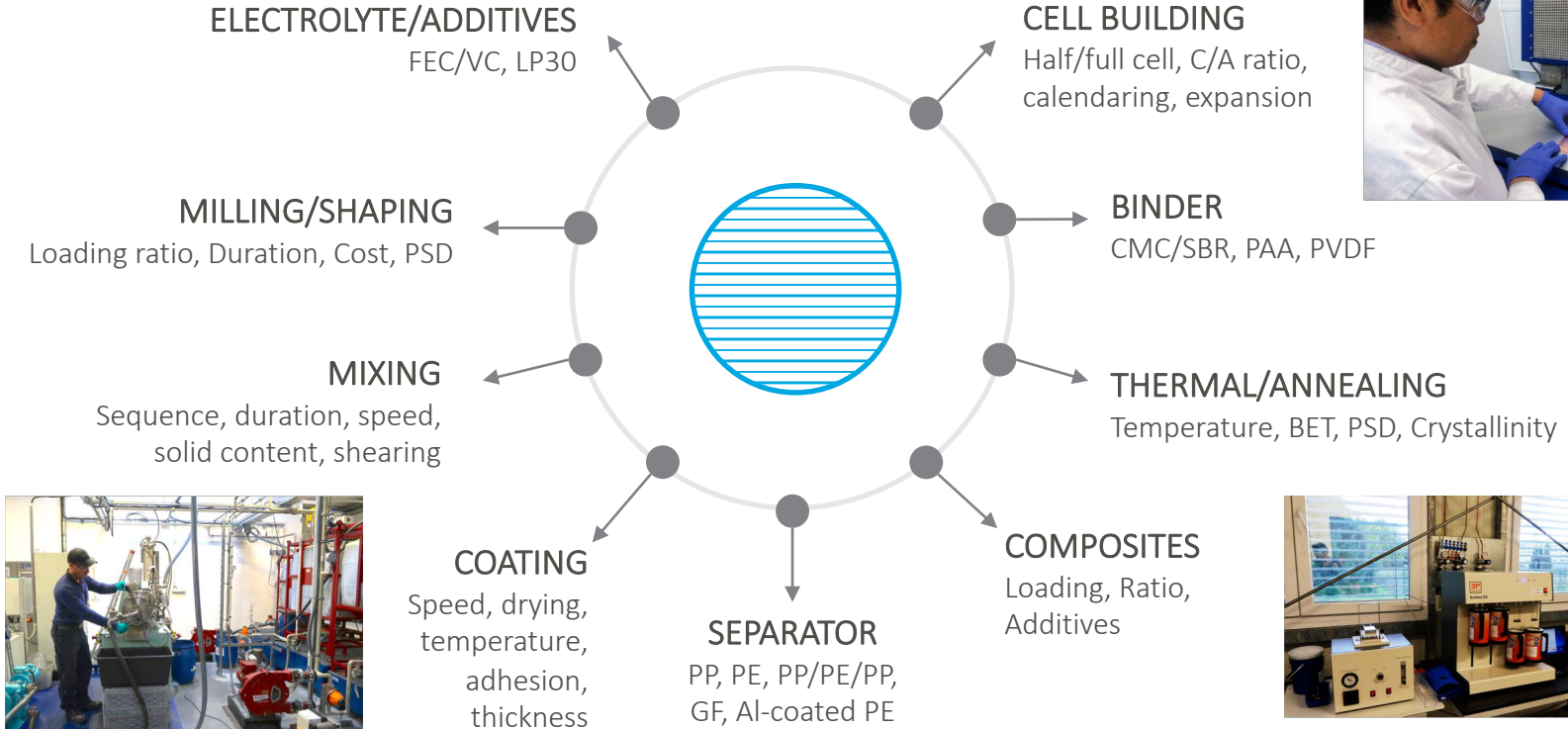
Talga develops its own high performance Li-ion anodes and battery materials enabled by its unique;

- ▶ natural carbon source type
- ▶ processing technology
- ▶ in-house material engineering technology

Strong in-house technology capability with over 20 PhD's and Engineers experienced in energy products including ex-Toyota, Tata, Dyson and Cambridge Uni alumni

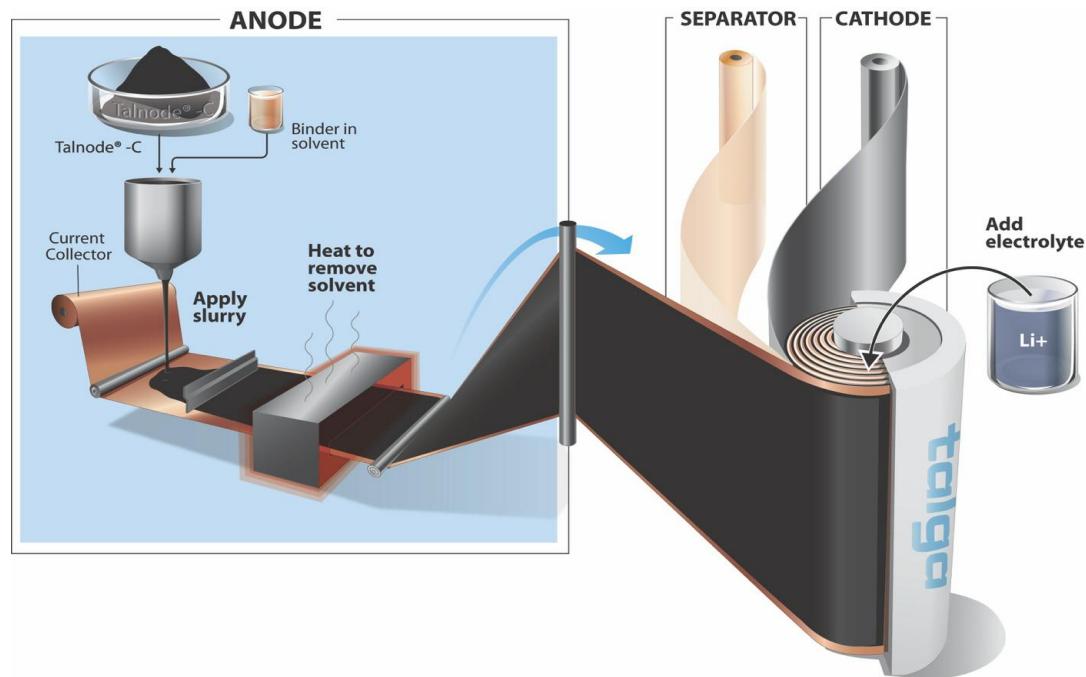
Deep industry knowledge enabling downstream strategy and cell maker/OEM interactions

In-house Anode Development



Talnode-C

FULLY COATED <math><10\mu\text{m}</math> ACTIVE ANODE POWDER READY FOR CELL MANUFACTURER USE



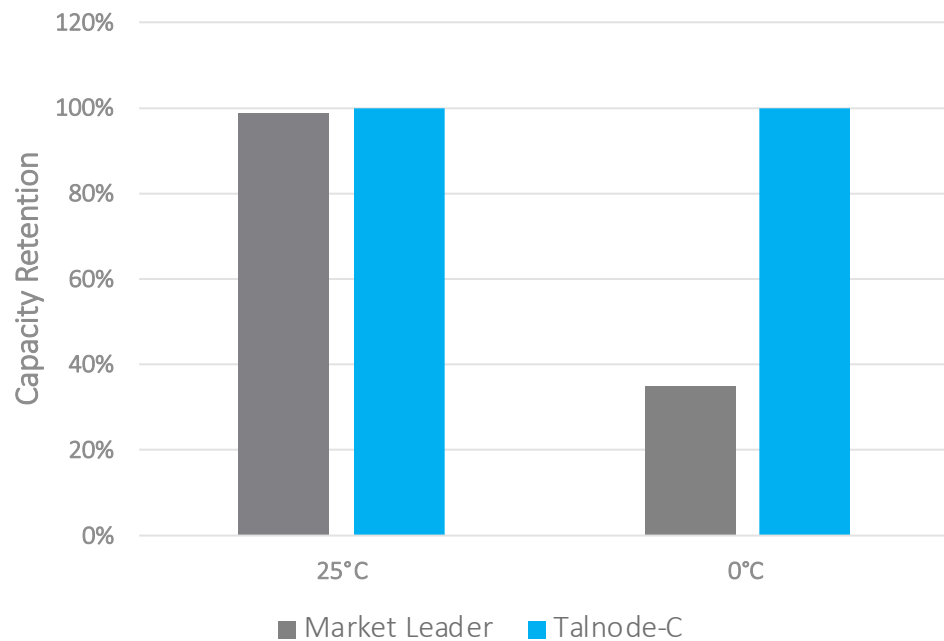
❄️ Freezing temperature performance

📈 High power and fast charge

🌐 Semi-synthetic properties

Outstanding at Low Temperature

RETENTION OF 100% CAPACITY AND 100% CYCLE EFFICIENCY AT FREEZING TEMPERATURE (0°C)



Endurance Under High Power + Fast Charge

TALNODE-C IN REAL-WORLD ENDURANCE TEST OF INDUSTRIAL POUCH CELLS AT LOW TEMPERATURE



▶ THE LACAMA, DEVELOPED BY IV ELECTRICS

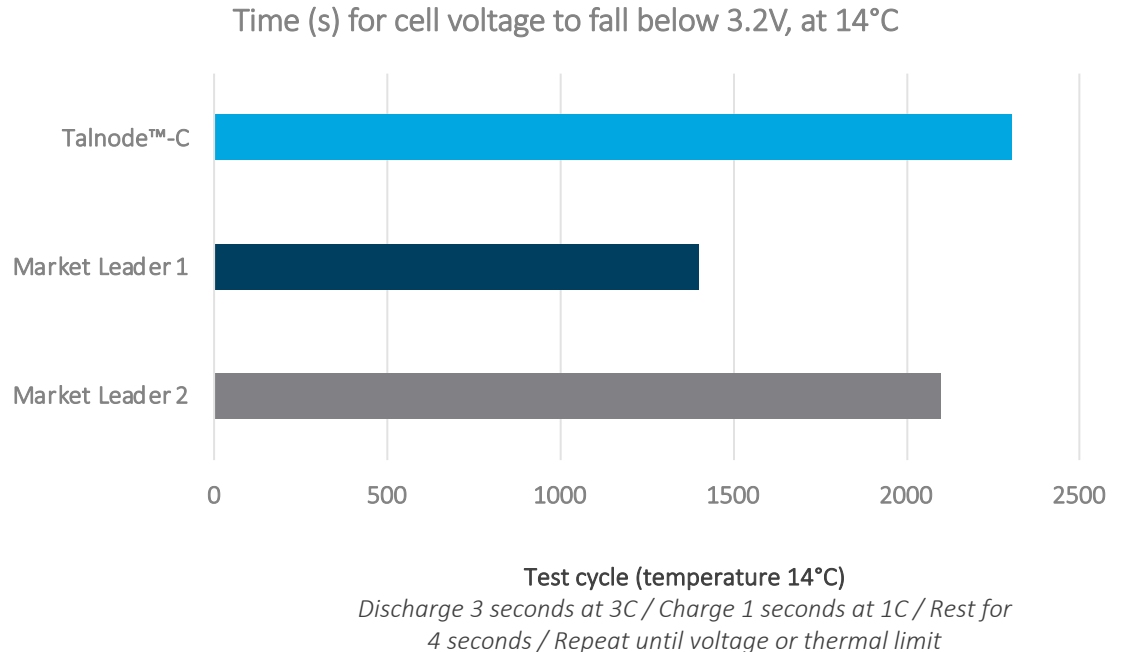


▶ THE STELVIO PASS, ITALY

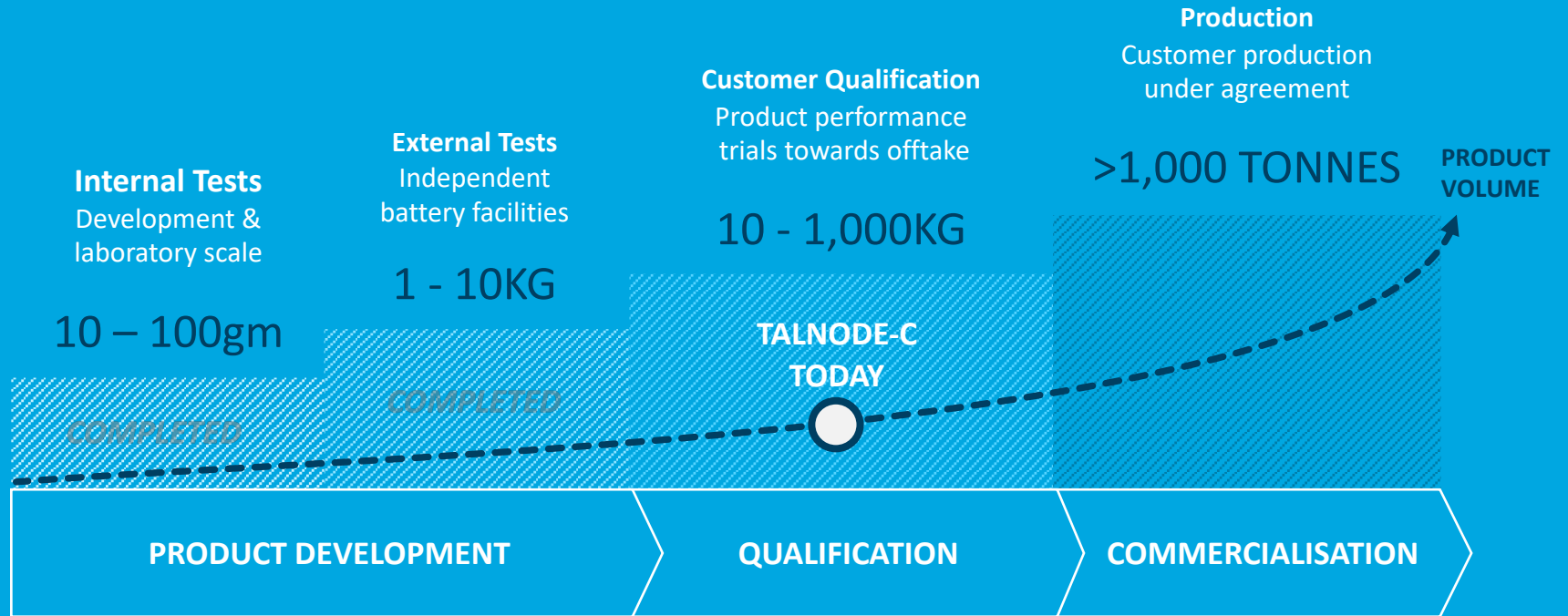
IV Electrics – ‘Stelvio’ test

BENCHMARKING OF TALNODE-C BY ELECTRIC M/CYCLE MANUFACTURER IV ELECTRICS (FORMER ITALIAN VOLT)

- ▶ Cyclic test simulating driving up a mountain at high speed
- ▶ Measures the ability of the cell to collect the regenerative current with high efficiency after high-power discharge
- ▶ The test continues until voltage drop or cell temperature limits are reached



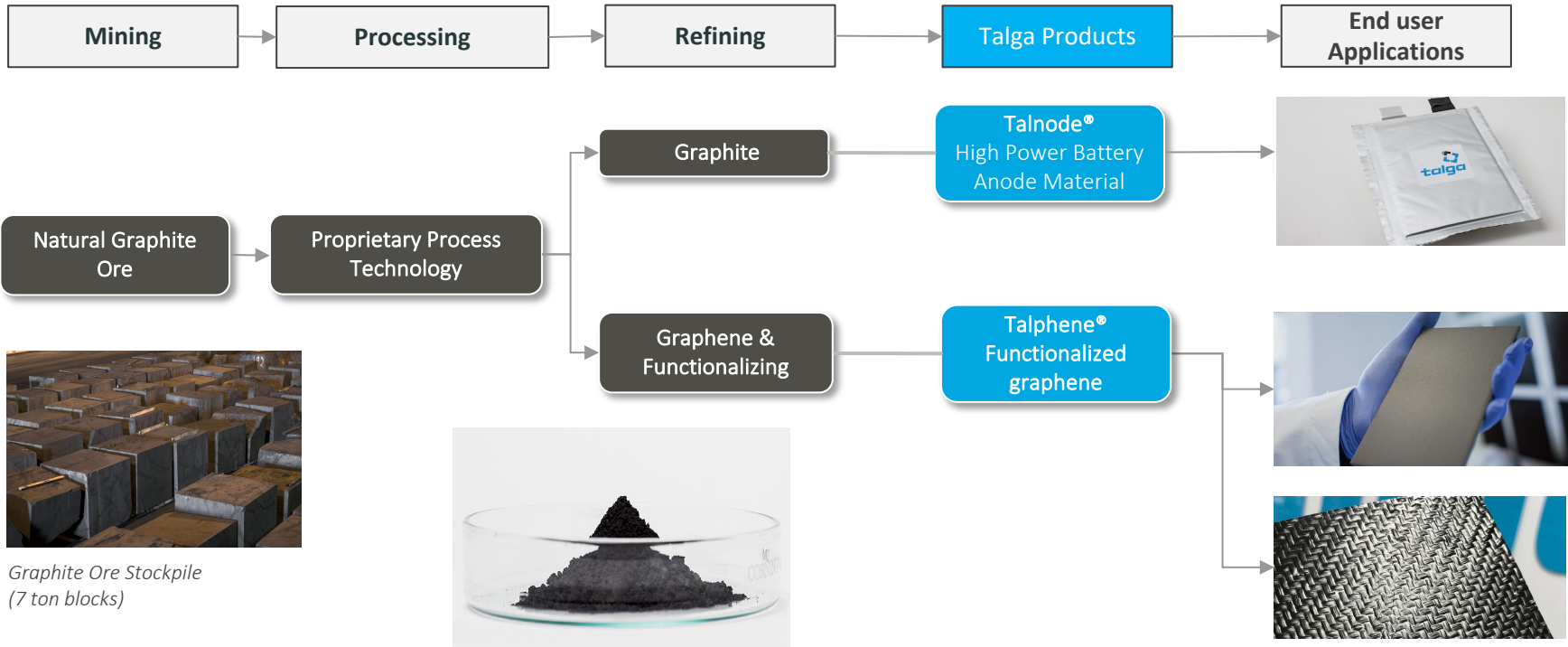
Talnode Path To Market



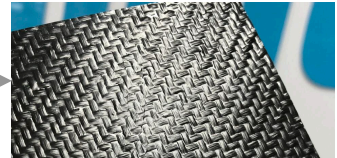
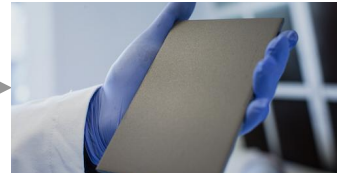
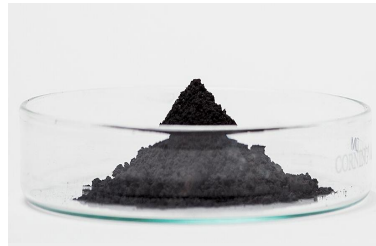
Anode materials require customer testing in batteries at increasing volumes to enter long term contracts

Talga Production Overview

MINE-TO-PRODUCT BATTERY ANODE MATERIAL AND GRAPHENE ADDITIVE SUPPLY CHAIN



Graphite Ore Stockpile
(7 ton blocks)



Rudolstadt-Schwarza Industrial Estate, Thuringia, Germany



Talga Pilot Plant



Talga Pilot Plant

Staged Development Underway

HIGH VALUE, LOW VOLUME OPERATION LOWERS ENVIRONMENTAL FOOTPRINT



Stage 1 commencement planned for 2020, with output of 5,000 tonnes of Talnode-C over two years from trial mining of 25,000 tonnes of ore processed via toll-milling and first Luleå Refinery module

Stage 2 commissioning proposed for 2023, once the exploitation concession has been received, with full-scale integrated mine-to-anode production of approximately 19,000tpa of Talnode-C for 22 years

Planned Mining and Refinery

Q1 2021 STAGE 2 MINING OPERATION AND ANODE REFINERY (22 YEAR MINE LIFE)

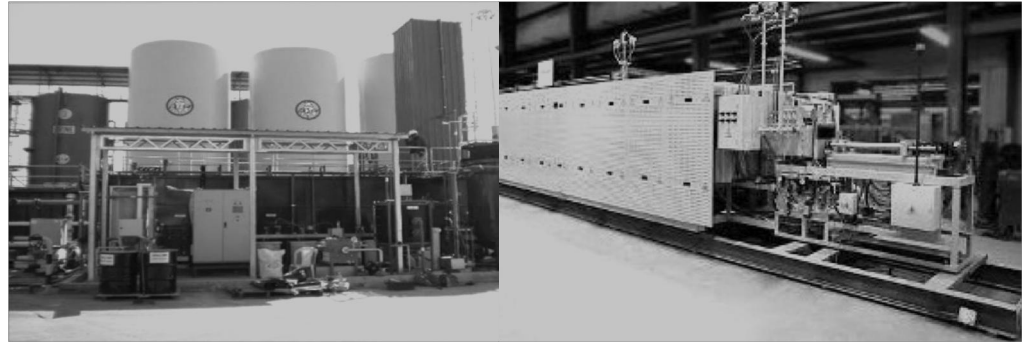
Full Scale Mining Operation
Vittangi Project, Nunasvaara, Sweden



100,000 ton/year
graphite ore

22,000 ton/year
graphite concentrate

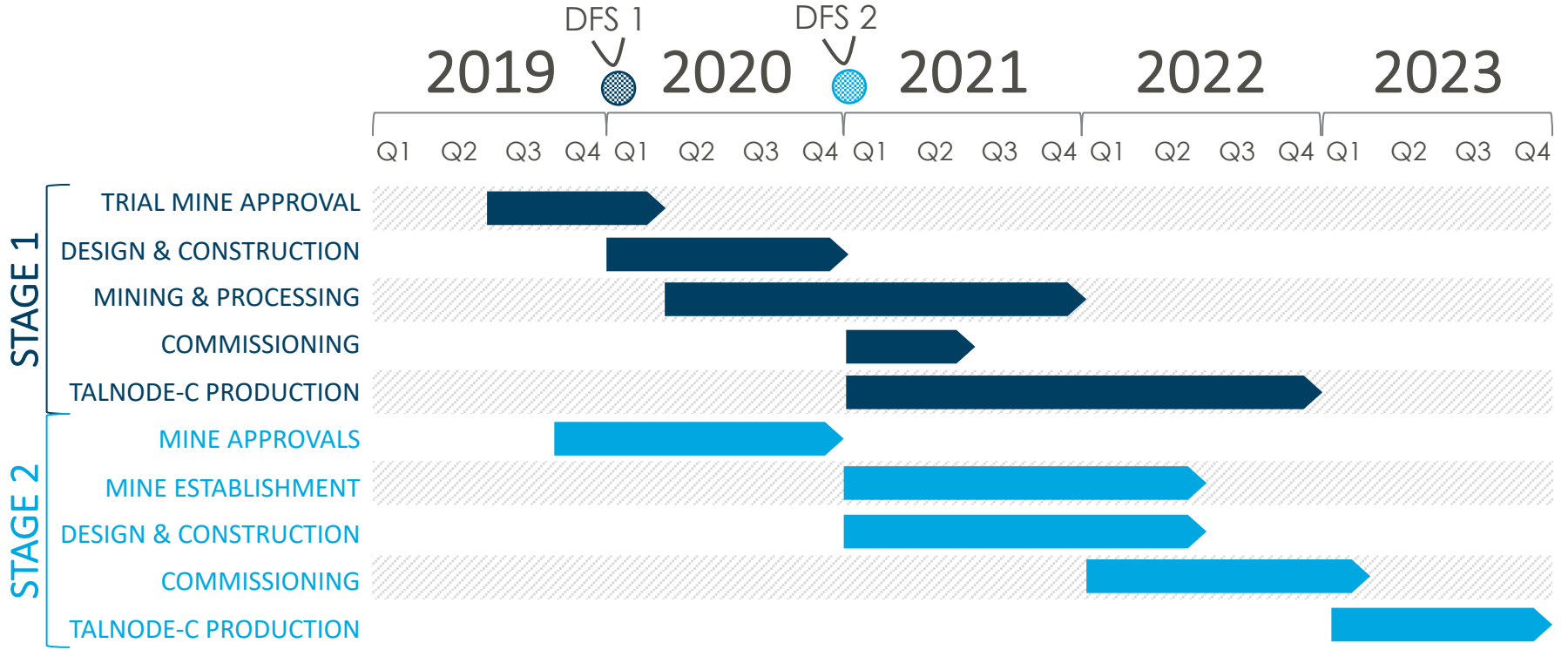
Purification, Coating, Shaping & Thermal Treatment
Luleå, Sweden



Stage 2 Anode Refinery:
19,000 ton/year shaped & coated active anode powder

Production: 19,000 ton/year Talnode-C

Indicative Timeline





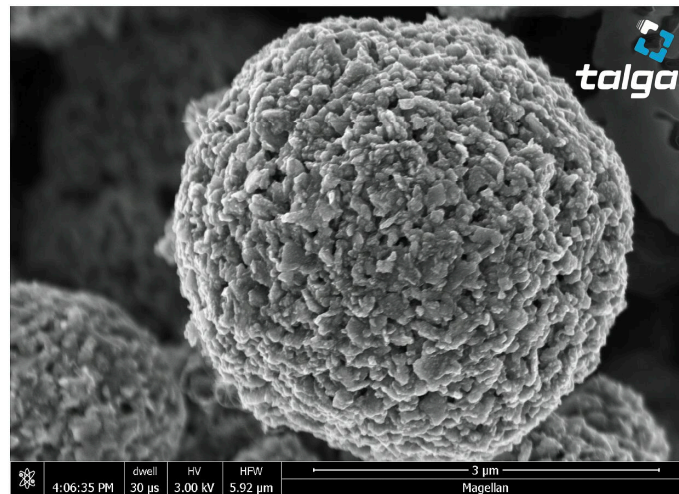
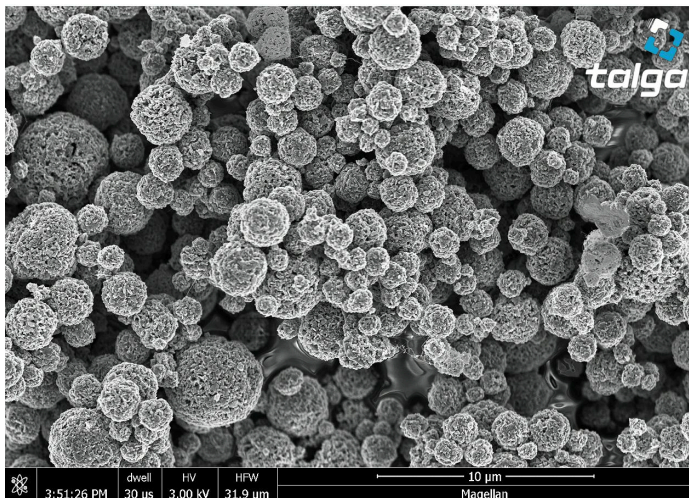
Further Growth Opportunities

Developing range of new high-performance anode materials

Silicon Anode: Talnode-Si

HIGH CAPACITY ANODE USING SILICON AND IN-HOUSE GRAPHENE UNDER DEVELOPMENT

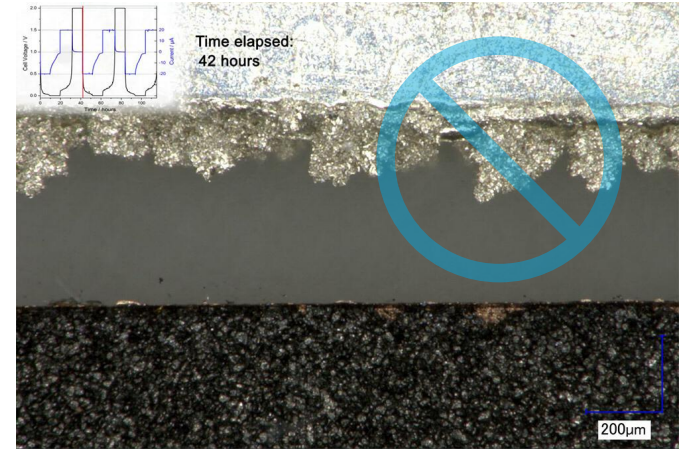
- ▶ Graphene silicon composite (containing 31% Si) as additive for existing Li-ion graphite anodes
- ▶ Reversible capacity up to **1,100 mAh/gr** in half cell tests using **80% Talnode-Si/20% Commercial graphite**
- ▶ First cycle efficiency >91% (**FCE is dependent on silicon loading**) and reversible coulombic efficiency 99.7%-99.9%.



Solid State Anode: Talnode-E

DEVELOPING COMMERCIAL ANODE FOR SOLID STATE LI-ION BATTERIES

- Solid state batteries suffer technical and commercial issues in practice, particularly at larger scale and where metallic lithium used as anode
- Talga is developing a **graphitic anode to replace metallic lithium in solid state batteries** to offer more scalable manufacturing, lower cost, easier processability and safer handling
- Development under co-funding from UK Government ISCF Faraday Battery Challenge in partnership with Johnson Matthey and University of Sheffield



Li-ion cell section showing problematic dendrite formation from Lithium metal (top) extending down towards graphite electrode
©Ei-Cell Image

Technical Partners

IN-HOUSE AND COLLABORATIVE PRODUCT DEVELOPMENT

Innovate UK



Department for
Business, Energy
& Industrial Strategy



JM Johnson Matthey
Inspiring science, enhancing life


BILLERUDKORSNÄS

 **WV**
THE UNIVERSITY OF WARWICK

SCHUNK 



BOSCH



The
University
Of
Sheffield.

BIOMER
TECHNOLOGY



UNIVERSITY OF
CAMBRIDGE

FARADION
Advanced Energy Storage Solutions

 **Leclanché**
Energy Storage Solutions





TALGA

The Opportunity

Uniquely leveraged to **booming Li-ion battery demand in Europe**

Downstream market position and lowest cost curve ensures **economic performance & longevity**

Own IP and product pipeline to **capitalise on emerging battery technologies**

Complies with **greener and more secure supply chain** for global quality customers

Poised to **enter major commercial relationships and start Stage 1 anode production in 2020**

Corporate Snapshot

Capital Structure

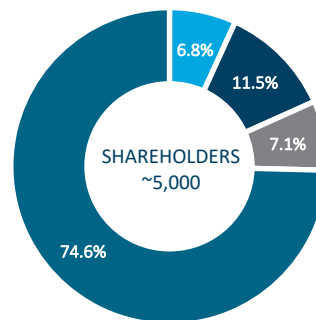
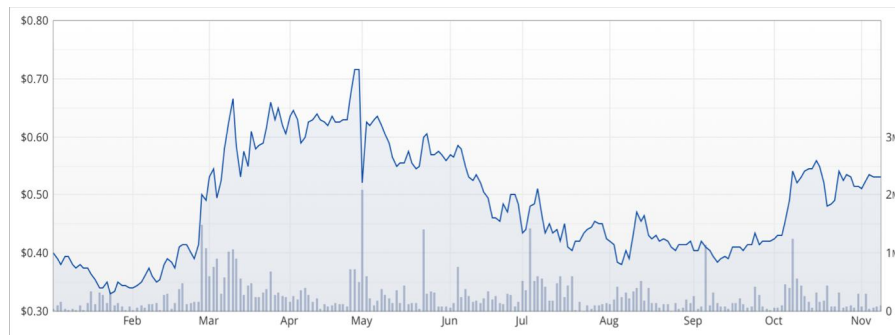
ASX Code:	TLG
Share on Issue	222m
ASX Share Price	A\$0.53
Cash (EO September Qtr)	A\$5.6m
Debt	Nil
Market Cap	A\$117.7m
Enterprise Value	A\$112.1m

Board of Directors

Terry Stinson	Chairman
Mark Thompson	Managing Director
Grant Mooney	NED
Steve Lowe	NED
Ola Rinnan	NED
Andrew Willis	NED

NOTE: MARKET CAP AS AT 8 NOVEMBER 2019

Share Price Year To Date



- Board & Management
- Smedvig
- Institutional Investors
- Other

Competent Person Statements

The information in this report that relates to Graphite Resource Estimation for the Vittangi Project is based on information compiled by Oliver Mapeto and reviewed by Albert Thamm. Both Mr Mapeto and Mr Thamm are consultants to the Company. Mr Mapeto is a Member of both the Australian Institute of Mining and Metallurgy (Membership No.306582) and Australian Institute of Geoscientists (Member No 5057) and Mr Thamm (Member No 203217) is a Fellow Member of the AusIMM. Both Mr Mapeto and Mr Thamm have sufficient experience relevant to the styles of mineralisation and types of deposits which are covered in this document and to the activity which both are 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 Mapeto and Mr Thamm consent to the inclusion in this 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 the Mineral Resource Estimate and metallurgical results for the Vittangi Graphite Project was first released to ASX on 27 April 2017 and 10 April 2019 respectively. The Company confirms that it is not aware of any new information or data that materially affects the information included in the relevant market announcements and, in the case of the Mineral Resource Estimate, that all material assumptions and technical parameters underpinning the Mineral Resource Estimate continue to apply and have not materially changed.

The information in this report that relates to Reserve Estimation is based on and fairly represents information that has been compiled by John Walker. Mr Walker is a Principal Mining Engineer with Golder Associates Ltd. who act as consultants to the Company. Mr Walker is a Professional Member of the Institute of Materials, Minerals and Mining (Membership No.451845) a Fellow of the Institute of Quarrying (Membership No.22637) and a Fellow Member of the Geological Society (Membership No.1021044). He has been involved in the mining industry for 30 years acting in various roles including production, project development and consulting. Mr Walker has sufficient experience relevant to the styles of mineralisation and types of deposits which are covered in this report and to the activity 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 Walker consents to the inclusion in this 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 Reserve Estimation was first released to ASX on 23 May 2019. The Company confirms that it is not aware of any new information or data that materially affects the information included in the relevant market announcements and, in the case of the Reserve Estimation, that all material assumptions and technical parameters underpinning the Reserve Estimation continue to apply and have not materially changed.

The information in this report that relates to Graphite Resource Estimation for the Jalkunen and Raitajärvi Projects is based on information compiled and reviewed by Mr Simon Coxhell. 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.

The information in this report that relates to the Mineral Resource Estimate and metallurgical results for the Vittangi Graphite Project was first released to ASX on 27 August 2015 and 26 August 2013 respectively. The Company confirms that it is not aware of any new information or data that materially affects the information included in the relevant market announcements and, in the case of the Mineral Resource Estimate, that all material assumptions and technical parameters underpinning the Mineral Resource Estimate continue to apply and have not materially changed.

Appendix

PFS Key Outcomes

CONFIRMS TECHNICALLY AND FINANCIALLY ROBUST PROJECT

PARAMETER	UNITS	OUTCOME
Annual ore mining rate	tonnes	100,000
Average annual production of Talnode-C	tonnes	19,000
Life of Mine (LOM)	years	22
Pre-tax NPV ₈ (real)	\$M	\$1,056
Pre-tax IRR	%	55%
Capex Stage 1	\$M	\$27
Capex Stage 2	\$M	\$147
Payback	years	1.5
Talnode-C average price	\$/t product	\$11,250
Revenue (LOM)	\$M	\$4,148
Cash cost of production of Talnode-C	\$/t product	\$1,852
EBITDA (LOM)	\$M	\$3,254
Net profit before tax (LOM)	\$M	\$3,133

NOTE: PFS STUDY DETAILS FOR THE VITTANGI GRAPHITE PROJECT, ESTIMATED KEY ECONOMIC OUTCOMES ALL IN USD.
SEE: ASX:TLG 23 MAY 2019

JORC Graphite Reserve & Resources

Ore Reserve ^{3, 6}	Tonnes	Graphite (% Cg)
Nunasvaara (JORC 2012)	1,935,000	23.53
Proven	0	0
Probable	1,935,000	23.53

Mineral Resources ^{1, 2, 4, 5, 7, 8, 9}	Tonnes	Graphite (% Cg)
Vittangi Nunasvaara (JORC 2012)	12,300,000	25.57
Indicated	10,700,000	25.7
Inferred	1,600,000	23.9
Vittangi Niska (JORC 2012)	4,600,000	25.8
Indicated	4,600,000	25.8
Jalkunen (JORC 2012)	31,500,000	14.9
Inferred	31,500,000	14.9
Raitajärvi (JORC 2004)	4,300,000	7.1
Indicated	3,400,000	7.3
Inferred	900,000	6.4
Total Mineral Resources	52,700,000	

NOTE: ¹ MINERAL RESOURCES ARE INCLUSIVE OF ORE RESERVES.

² MINERAL RESOURCES ARE REPORTED AT VARIOUS CUT OFF GRADES: NUNASVAARA 17% Cg, NISKA 10% Cg, JALKUNEN 5% Cg AND RAITAJÄRVI 5% Cg.

³ ORE RESERVE IS REPORTED AT A CUT OFF GRADE OF 12% Cg.

⁴ ERRORS MAY EXIST DUE TO ROUNDING.

SEE: ASX:TLG ⁵ 27 APR 2017, ⁶ 23 MAY 2019, ⁷ 15 OCT 2019, ⁸ 27 AUG 2015 AND ⁹ 26 AUG 2013

Peer Comparison Information

MINERAL RESOURCES ESTIMATE GRADE JORC/NI43-101

Company	Project	Stage	MRE Grade	Cut-off Grade	Information Source
Talga	Nunasvaara	Development	25.5	17	ASX Announcement, 27 April 2017 https://www.asx.com.au/asxpdf/20170427/pdf/43hrrm62qg5hp8.pdf
Mason	Lac Guéret	Development	16.3	6	Company Website, 19th September 2019 www.masongraphite.com/projects/lac-gueret-graphite-project/default.aspx
Buxton	Yalbra	Development	16.2	4	Company Interim Financial Report, 16 March 2016 www.asx.com.au/asxpdf/20160316/pdf/435w84kwc5j5gl.pdf
Lincoln	Kookaburra Gully	Development	15.1	5	ASX Announcement, 19 December 2013 www.asx.com.au/asxpdf/20131219/pdf/42lqg554xp15w.pdf
Focus	Lac Knife	Development	14.8	3	Press Release, 28 January 2014 www.marketwired.com/press-release/focus-graphite-reports-92-increase-measured-indicated-mineral-resource-categories-its-tsx-venture-fms-1873218.htm
Syrah	Balama Mozambique	Operating	10.0	3	ASX Announcement, 29 March 2019 www.asx.com.au/asxpdf/20190329/pdf/443w7j8hbl9gtd.pdf
Triton	Balama North Nicanda Hill	Development	11.1	3	Company Website, 19th September 2019 www.tritonminerals.com/projects/balama-north/#nicanda
Kibaran	Epanko	Development	9.9	8	ASX Announcement, 31 March 2017 www.asx.com.au/asxpdf/20170331/pdf/43h5qh0m1jmf4h.pdf

Peer Comparison Information

MINERAL RESOURCES ESTIMATE GRADE JORC/NI43-101

Company	Project	Stage	MRE Grade	Cut-off Grade	Information Source
Sovereign	Mallingunde	Development	7.1	4	Company Website, 19th September 2019 www.sovereignmetals.com.au/projects
Graphex	Chilalo	Development	5.4	2/5	ASX Announcement, 28 August 2019 www.asx.com.au/asxpdf/20190828/pdf/447xrt01m63qyp.pdf
Next Source	Molo	Development	6.13	2	Company Website, 19 September 2019 www.nextsourcematerials.com/graphite/molo-graphite-project
Graphite One	Graphite Creek	Development	7.2	6	Company Website, 19 September 2019 www.graphiteoneresources.com/projects/graphite-creek/resource-estimates/
Magnis	Nachu	Development	5.4	3	ASX Announcement, 1 February 2016 www.asx.com.au/asxpdf/20160201/pdf/434rl82h51bvd7.pdf
Hexagon	McIntosh	Development	4.45	3	ASX Announcement, 5 April 2019 www.asx.com.au/asxpdf/20190405/pdf/4442qj43jgxh5x.pdf
Westwater	Coosa	Development	2.39	1	Company Website, 19 September 2019 www.westwaterresources.net/projects/graphite/coosa-graphite-project
Ontario	Kearney	Development	2.14	1.10	Company Website, 19 September 2019 www.ontariographite.com/s/kearney_mine.asp
Northern	Bissett Creek	Development	1.74	1.02	Company Website, 19 September 2019 www.northerngraphite.com/project/bissett-creek-project/overview/