



June 2021



## German-Australian Chamber of Industry and Commerce Webinar Presentation

ASX: EGR    FSE: FMK    OTCQX: ECGFF

ENGINEERING CLEAN ENERGY

# Disclaimer



## Securities Disclaimer

This presentation is for informational purposes only and does not constitute an offer to sell, or solicit to purchase, any securities. Such offer can be made only through proper subscription documentation and only to investors meeting strict suitability requirements. Any failure to comply with these restrictions may constitute a violation of applicable securities laws.

## Forward looking statements

Various statements in this document constitute statements relating to intentions, future acts and events. Such statements are generally classified as “forward looking statements” and involve known and unknown risks, uncertainties and other important factors that could cause those future acts, events and circumstances to differ materially from what is presented or implicitly portrayed herein. The Company gives no assurances that the anticipated results, performance or achievements expressed or implied in these forward-looking statements will be achieved.

## Production targets and financial information

Information in relation to the feasibility study conducted on the production of battery graphite using the Company’s EcoGraf technology, including production targets and forecast financial information derived from the production targets, included in this document is extracted from an ASX announcement dated 5 December 2017 “Battery Graphite Pilot Plant”, as updated on 17 April 2019 “EcoGraf Delivers Downstream Development” and 5 November 2020 “Completion of EcoGraf™ Processing Facility Development Report”, available at [www.ecograf.com.au](http://www.ecograf.com.au) and [www.asx.com.au](http://www.asx.com.au). The Company confirms that all material assumptions underpinning the production targets and forecast financial information derived from the production targets set out in the announcement released on 5 December 2017, as updated on 17 April 2019 and 5 November 2020 continue to apply and have not materially changed.

Information in this document relating to the Bankable Feasibility Study conducted on the Epanko Graphite Project, including production targets and forecast financial information derived from the production targets, included in this document is extracted from an ASX announcement dated 21 June 2017 “Updated Bankable Feasibility Study” available at [www.ecograf.com.au](http://www.ecograf.com.au) and [www.asx.com.au](http://www.asx.com.au). The Company confirms that all material assumptions underpinning the production targets and forecast financial information derived from the production targets set out in the announcement released on 21 June 2017 continue to apply and have not materially changed.

## Competent persons

Any information in this document that relates to Exploration Results, Mineral Resources or Ore Reserves is based on information compiled by Mr Andrew Spinks, who is a Member of the Australasian Institute of Mining and Metallurgy included in a list promulgated by the ASX from time to time. Andrew Spinks is a director of EcoGraf Limited and has sufficient experience which is relevant to the style of mineralisation and type of deposit under consideration 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”. Andrew Spinks consents to the inclusion in this document of the matters based on his information in the form and context in which it appears.

Information in this document that relates to Mineral Resources is based on information compiled by Mr David Williams, a Competent Person, who is a Member of the Australasian Institute of Mining and Metallurgy. David Williams is employed by CSA Global Pty Ltd, an independent consulting company and has sufficient experience which is relevant to the style of mineralisation and type of deposit under consideration 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”. David Williams consents to the inclusion in this document of the matters based on his information in the form and context in which it appears.

Information in this document that relates to Ore Reserves has been compiled by Mr Steve O’Grady, who is a Member of the Australasian Institute of Mining and Metallurgy. Steve O’Grady is a full-time employee of Intermine Engineering and produced the Mining Reserve estimate based on data and geological information supplied by Mr Williams. Mr O’Grady has sufficient experience which is relevant to the estimation, assessment and evaluation of the economic extraction of the Ore Reserve that 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”. Steve O’Grady consents to the inclusion in this document of the matters based on his information in the form and context in which it appears.



*Diversified **HFfree™** battery anode material business supporting the global transition to clean energy and e-mobility*



**HFfree™ = Purification process eliminates Hydrofluoric (HF) Acid**

# Corporate summary



## Board and Executive Management



**Chairman**  
Robert Pett



**Managing Director**  
Andrew Spinks



**Director**  
John Conidi



**Executive Director - Finance**  
Howard Rae



**Executive Manager - Product Development**  
Michael Chan

## Business Locations



## Share Price 2021



**Shares on issue: 449m**  
**Unlisted performance rights: 8.55m**

## Major Shareholders (Top 20 = 55%)

JP Morgan Nominees 23.7%  
First Sentier Investors 8.6%  
Board & Management 7.5%

Allianz Global Investors 5.1%  
Paradice Investment 5.1%

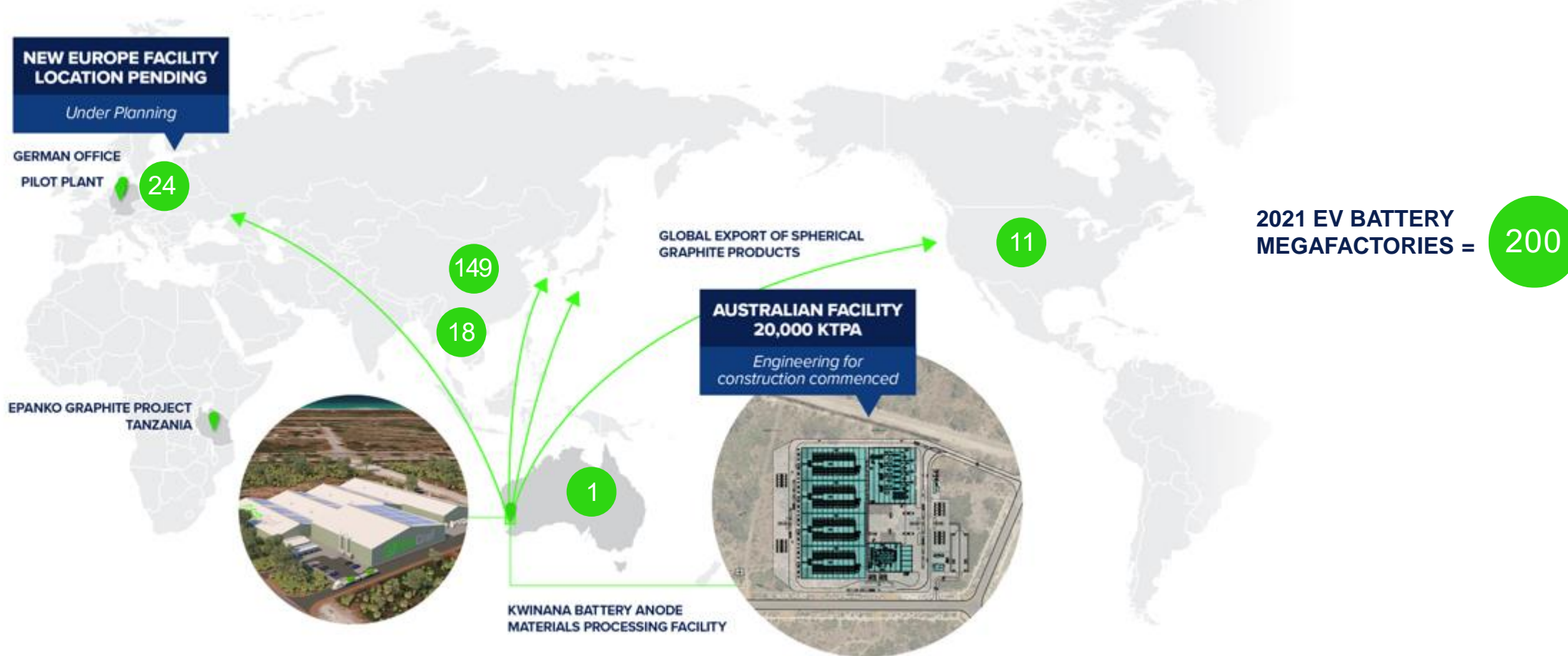
**ASX : EGR**  
**Börse Frankfurt : FMK**  
**USA OTCQX : ECGFF**

Share price A\$0.61  
Market capitalisation A\$274m  
Cash on hand A\$53m



# Global expansion strategy

## SUPPLY OF BATTERY ANODE MATERIALS TO KEY GROWTH MARKETS



Current battery anode materials supply chain is 100% reliant on China. Strategy to expand production and regionalise additional manufacturing facilities in Europe, Asia and the US to support increasing demand.

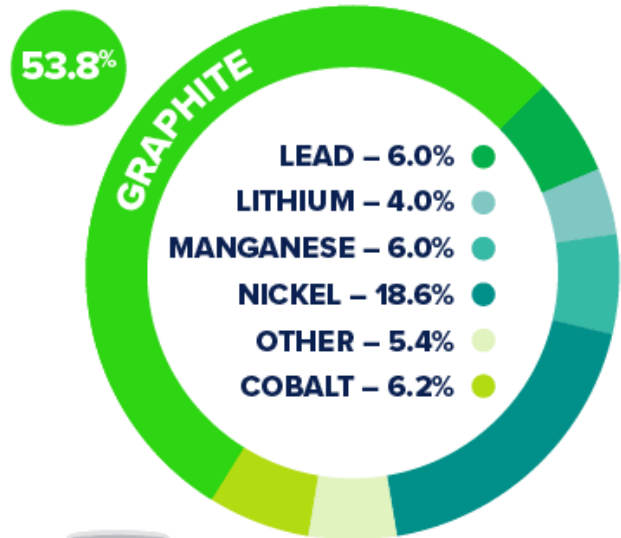


# Lithium-ion Battery Market Overview.

# Compelling lithium-ion battery market opportunity



## MINERAL DEMAND FROM ENERGY STORAGE



**+700% BY 2025**

EV MARKET FORECAST TO DRIVE +700% GROWTH IN NATURAL GRAPHITE DEMAND BY 2025

## GOVERNMENTS GLOBALLY PHASING OUT SALES OF NEW INTERNAL COMBUSTION VEHICLES



**MOSTLY BY 2030**



**BY 2022**

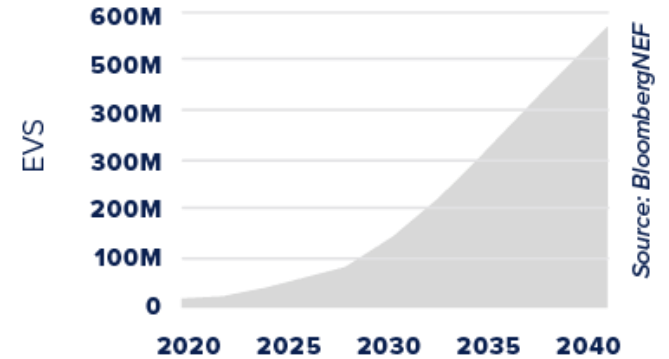
**THERE WILL BE**



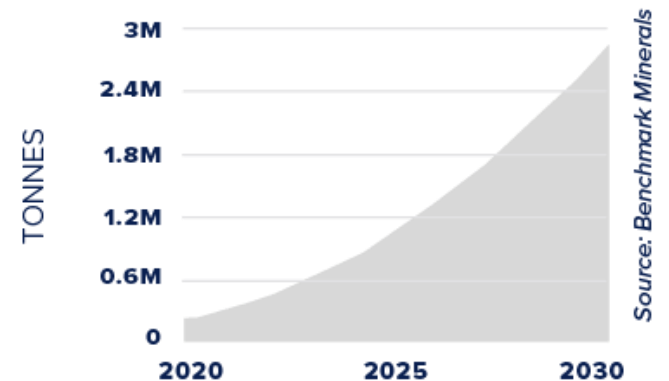
**500+**

**DIFFERENT EV MODELS GLOBALLY**

## EV DEMAND



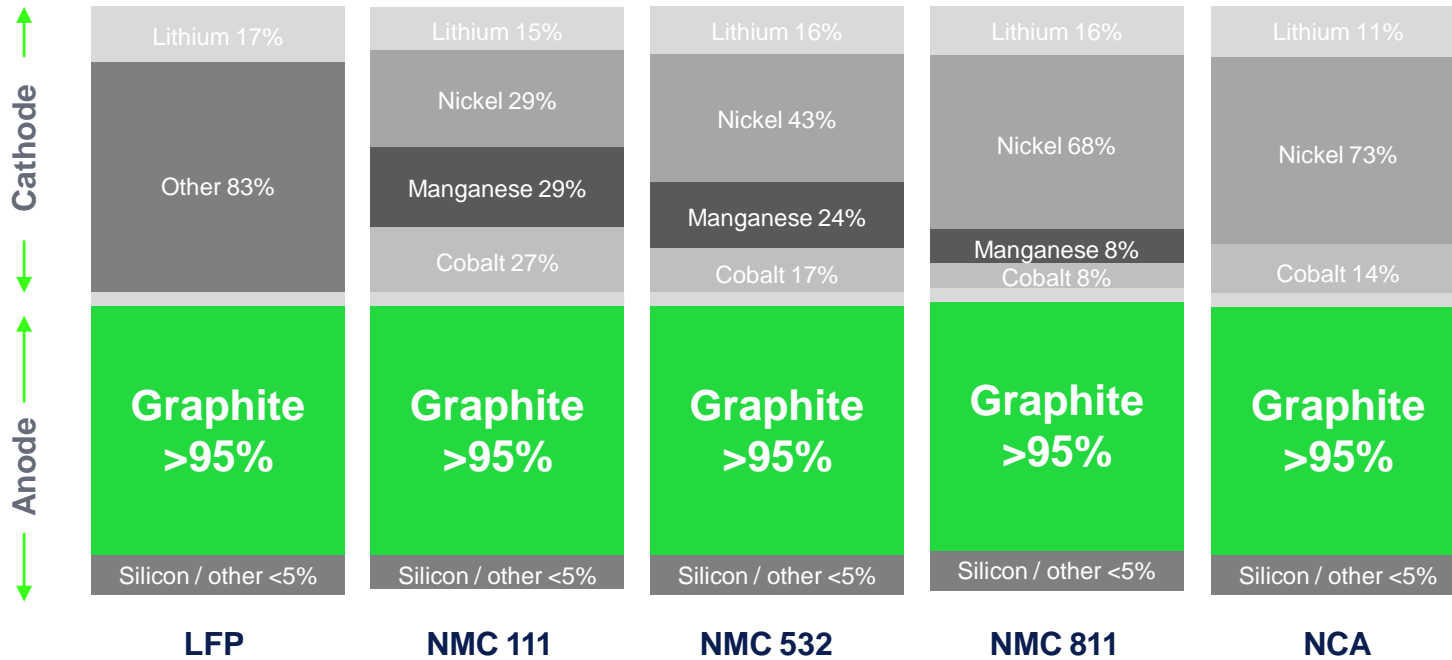
## ANODE DEMAND



# Lithium-ion battery chemistry



## Graphite is the major raw material in lithium-ion batteries



27kg

**PURIFIED NATURAL GRAPHITE PER EV WHICH REQUIRES**



**50KG – 55KG FLAKE GRAPHITE**

99.95%

**BATTERY GRAPHITE = HIGH PURITY PRODUCT FOR ANODE MANUFACTURING**

EcoGraf™ provides a high quality, cost competitive alternative to existing battery graphite produced using toxic hydrofluoric (HF) acid

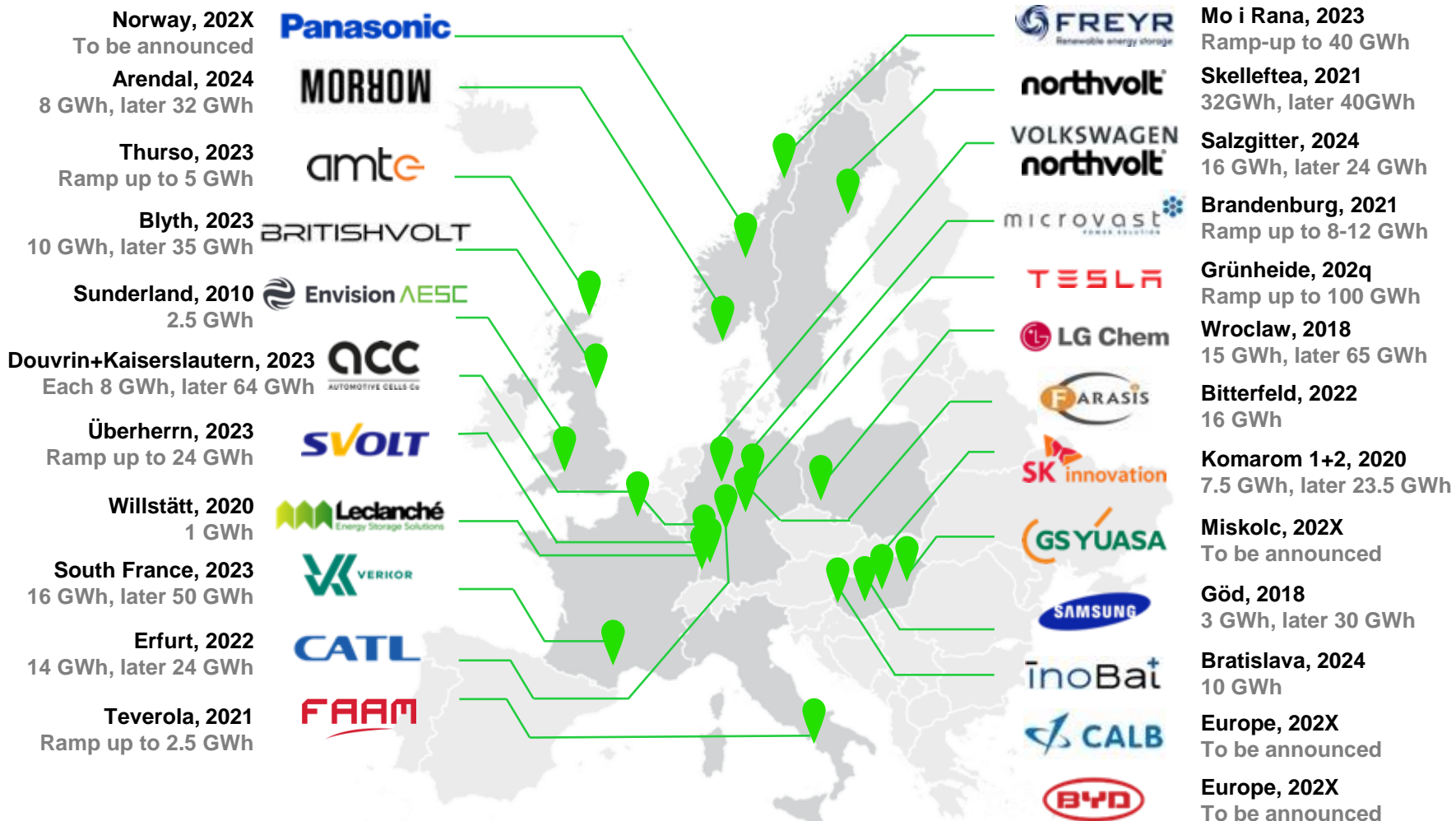
Graphite dominates lithium-ion battery anodes – 1.1kg per kWh required to drive strong demand





# Unprecedented investment in new European battery capacity

24 Gigafactories announced with 600 GWh total annual production capacity  
= 9-10 million electric vehicles per year



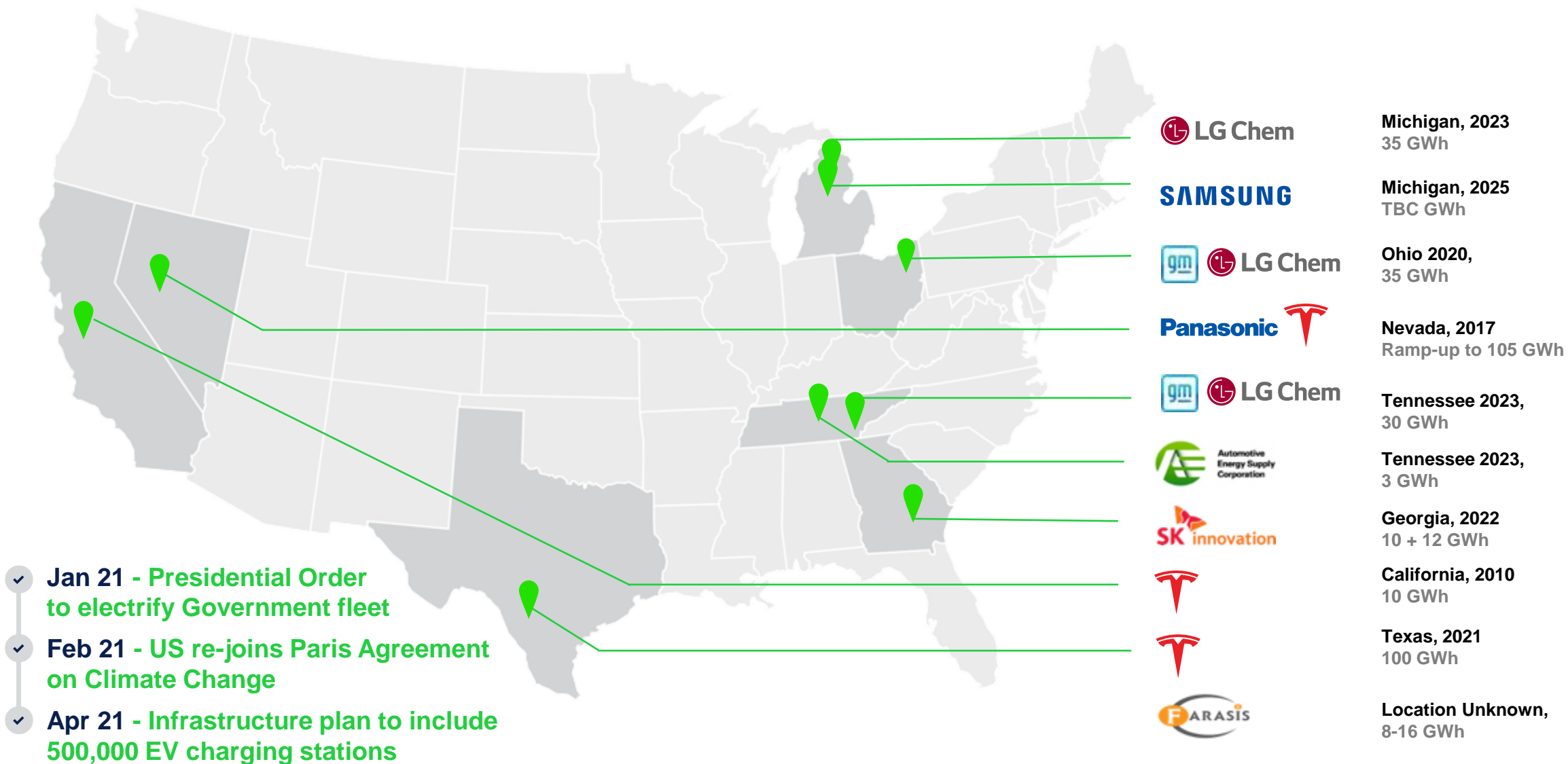
- ✓ EU fastest growing market in the world
- ✓ Demand requires new supply
- ✓ Increasing requirement for low carbon supply chains coupled with greater recycling

✓ Exposure to European supply chains from partnership with EU support

Source: Roland Zenn



# US lithium-ion battery capacity to accelerate under President Biden



# EU Commission's battery ESG regulations

## NEW MEASURES ANNOUNCED TO PROMOTE SUSTAINABILITY



### POLICY

**Responsible sourcing.** New mandatory procedures to ensure sustainable and ethical sourcing of raw materials such as graphite.



**Carbon (CO<sub>2</sub>) footprint, performance and durability labelling.** All batteries sold in Europe must declare their carbon footprint.



**Traceability.** All raw materials used in batteries to be procured according to OECD recognised guidelines for sustainable sourcing. Thanks to blockchain technology, each battery will have a digital passport tracking all upstream components.



**Recycling and establishing a circular economy.** A minimum proportion of battery content to be made up of recycled materials. To close the loop and retain valuable materials used in batteries - such as cobalt, lithium, nickel and graphite - for as long as possible, the Commission proposes to establish new requirements and targets on the collection, treatment and recycling of batteries.

### ECOGRAF'S ESG

- ✓ EcoGraf™ HFfree proprietary purification process
- ✓ Epanko developed under Equator Principles
- ✓ EcoGraf™ recycling
- ✓ Renewable energy inputs into businesses
- ✓ Implementing low impact mining methods
- ✓ Implementation of Block Chain technology
- ✓ EcoGraf™ HFfree proprietary purification process eliminates use of toxic hydrofluoric acid
- ✓ EcoGraf™ recycling enables customers to achieve improved recycling efficiencies

**EcoGraf's sector leading ESG credentials are matched to support the global transition to clean energy**



*EIB new energy lending policy supporting projects relating to the supply of critical raw materials*



# Battery Anode Material Business.

# Initial battery graphite facility to be constructed in Western Australia



Staged expansion from 5,000tpa to 20,000tpa



Flexibility via scalable modular design



[PLAY MOVIE](#)

# Battery graphite business summary



## Establishing the world's first commercial battery graphite purification facility outside of China

Initial commercial production plant commencing at 5,000tpa, expanding to 20,000tpa

- ✓ EcoGraf™ **HFFree™** proprietary purification process eliminates use of toxic hydrofluoric acid
- ✓ Feasibility, engineering and costing studies completed by GR Engineering Services
- ✓ Four years of pilot plant test work undertaken in Germany:
  - ✓ Successful application of EcoGraf™ purification process to a range of global feedstock supplies
  - ✓ Long-term feedstock agreement with leading German trading group TECHNOGRAFIT GmbH
- ✓ Extensive product testing completed and long-term sales via thyssenkrupp AG
- ✓ Financing with Australian Government US\$35 million debt facility
- ✓ Finalising construction, operations and maintenance arrangements



**EcoGraf's first facility to meet growing global battery demand**



### Capital investment

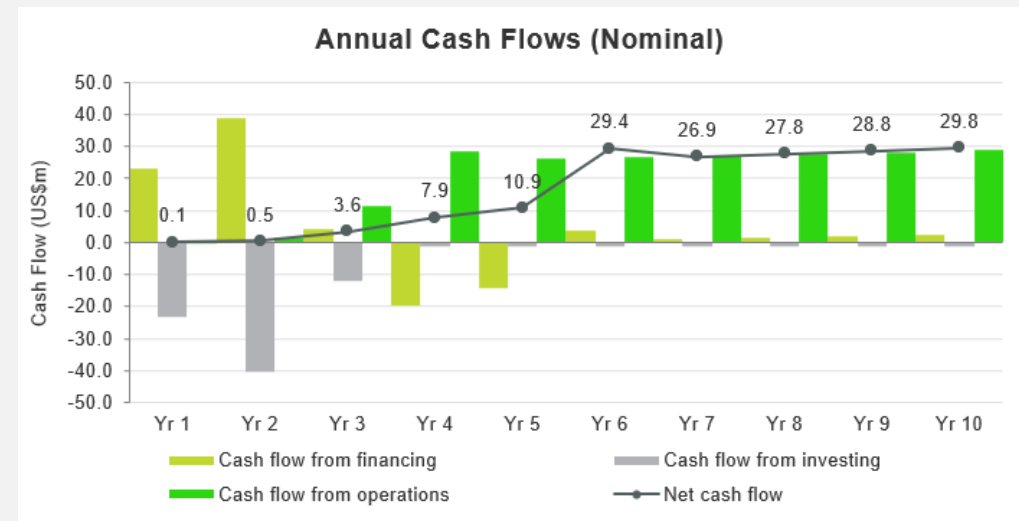
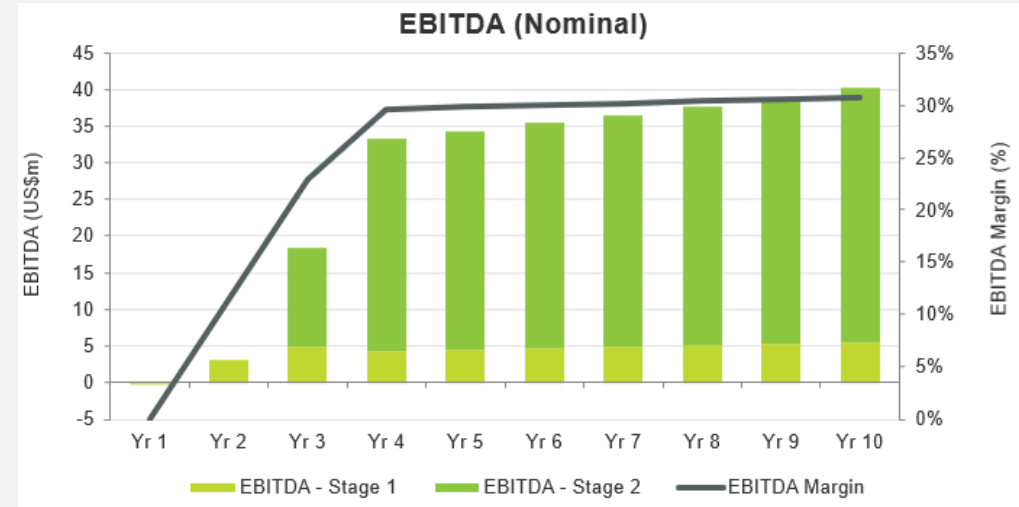
### Financial returns @ 20,000tpa

Initial 5,000tpa	15,000tpa Expansion	Pre-tax project NPV <sub>8</sub>	Pre-tax equity NPV <sub>8</sub>	Annual EBITDA	IRR
US\$22.8m	US\$49.2m	US\$642m	US\$448m	US\$35m	42.4%

# Strong economic returns

World's first purified spherical graphite processing facility outside of China at a time when electric vehicle, battery and anode producers are actively seeking to diversify battery mineral supply chains.

**Demand for spherical graphite forecast to grow 31.5% per annum over the next decade**



# Western Australia: Kwinana-Rockingham location





# Federal Government support

## Support for new technology and value added manufacturing

- ✓ Major Project Status (MPS) approved
- ✓ Australian Government funding support
- ✓ 6.7ha industrial site located in the Kwinana-Rockingham Industrial Area
- ✓ Advance approval granted by AusIndustry for research and development programs totaling A\$8m
- ✓ Australia's strong reputation as a reliable supplier of high-quality industrial products



PLAY VIDEO - ECOGRAF BATTERY GRAPHITE MANUFACTURING FACILITY SITE LOCATION

<https://youtu.be/Jb0xlhFSdsU>



PLAY VIDEO – AUSTRALIAN GOVERNMENT MAKE IT HAPPEN ECOGRAF CASE STUDY

<https://youtu.be/1fiWmYrd3WM>



# State Government support



## Kwinana-Rockingham area expected to become a major global battery mineral processing centre

- ✓ Lead Agency role managed by Western Australian Government Department of Jobs, Tourism, Science and Innovation
- ✓ EcoGraf invited to join WA Ministerial Battery Taskforce
- ✓ Emerging industrial zone for value added processing of battery materials
- ✓ Direct port access and readily available infrastructure
- ✓ High transparency over ethical raw material production supply chain
- ✓ Protection of intellectual property rights for further downstream processing activities, including battery recycling



*WA's State Premier Mr Mark McGowan, Minister for Energy Mr Bill Johnston and DevelopmentWA Chief Executive Mr Frank Marra with EcoGraf's Robert Pett, Howard Rae and Andrew Spinks*



Government of Western Australia  
Department of Jobs, Tourism, Science and Innovation





# WA Kwinana-Rockingham Industrial Zone (KRIA)

## Downstream value-added manufacturing and scientific research for the lithium-ion battery market

<b>FBI CRC</b> , Cooperative Research Centre at <b>Curtin University</b>	<b>1</b>
<b>CSIRO</b> , National Scientific Organisation	
<b>Albemarle</b> , Lithium/Bromine/Catalyst Solutions, <i>Producer</i>	<b>2</b>
<b>EcoGraf</b> , Battery Graphite, <i>Engineering works for Construction</i>	<b>3</b>
<b>BHP Nickel West</b> , Nickel Refinery, <i>Producer</i>	<b>4</b>
<b>FYI Resources</b> , HPA Manufacturing, <i>Under Planning</i>	<b>5</b>
<b>Hazer</b> , Hydrogen/Synthetic Graphite, <i>Pilot Plant</i>	<b>6</b>
<b>Mineral Resources</b> , Lithium, <i>Producer</i>	<b>7</b>
<b>BP Australia</b> , Oil Refinery, <i>Producer</i>	<b>8</b>
<b>Covalent Lithium</b> , Lithium, <i>Under Planning</i>	<b>9</b>
<b>Tianqi Lithium</b> , Lithium, <i>Under Construction</i>	<b>10</b>
<b>BASF</b> , Chemical Manufacturer	<b>11</b>
<b>Independence Group</b> , Nickel/Copper/Cobalt, <i>Producer</i>	<b>12</b>
<b>Coogee Chemicals</b> , Chemical Manufacturer	<b>13</b>
<b>Alcoa of Australia</b> , Alumina Refinery, <i>Producer</i>	<b>14</b>



“Global uptake of electric vehicles presents significant opportunities for industry in Western Australia. We have among the world’s largest reserves for all the critical battery minerals and we have the skills, infrastructure and standards to become a key player in the global battery value chain.”

2020 STATE ELECTRIC VEHICLE STRATEGY FOR WESTERN AUSTRALIA



**South Metropolitan TAFE**

**Murdoch University**, Rockingham Campus Innovation Hub, Focus on Global Energy Transformation

**KRIA is positioned to transform into a globally leading location for lithium-ion battery materials**

# Western Australian Battery Anode Materials Processing Facility

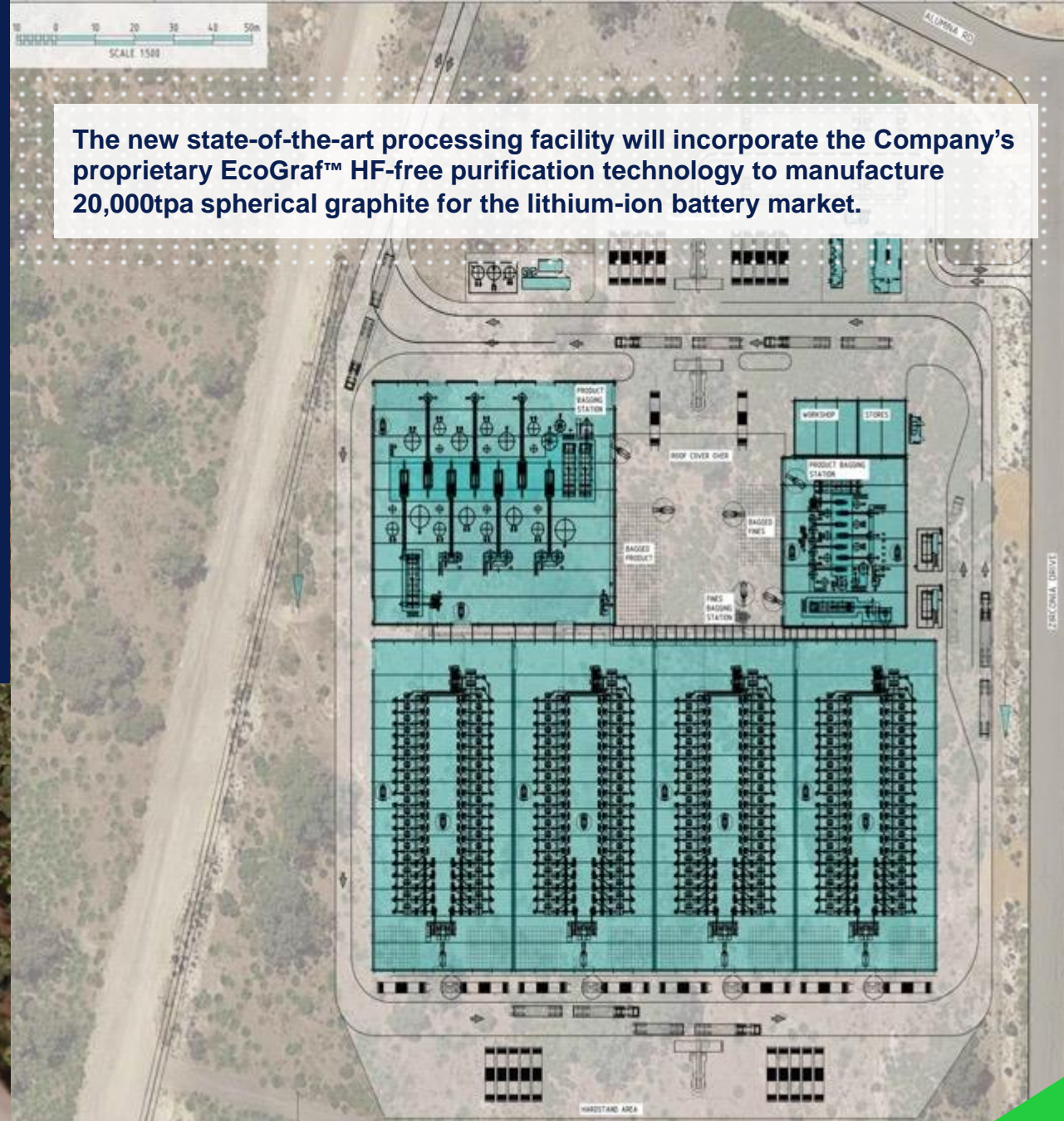
## CURRENT STATUS

- Completed due diligence documentation for debt financing process.
- GR Engineering commenced pre-construction works for the detailed engineering design.
- Finalising regulatory approvals, site infrastructure and services, including power, water, gas and reagent procurement arrangements.
- Commenced recruitment process to secure experienced graphite and project development professionals to support the construction and operational commissioning programs.



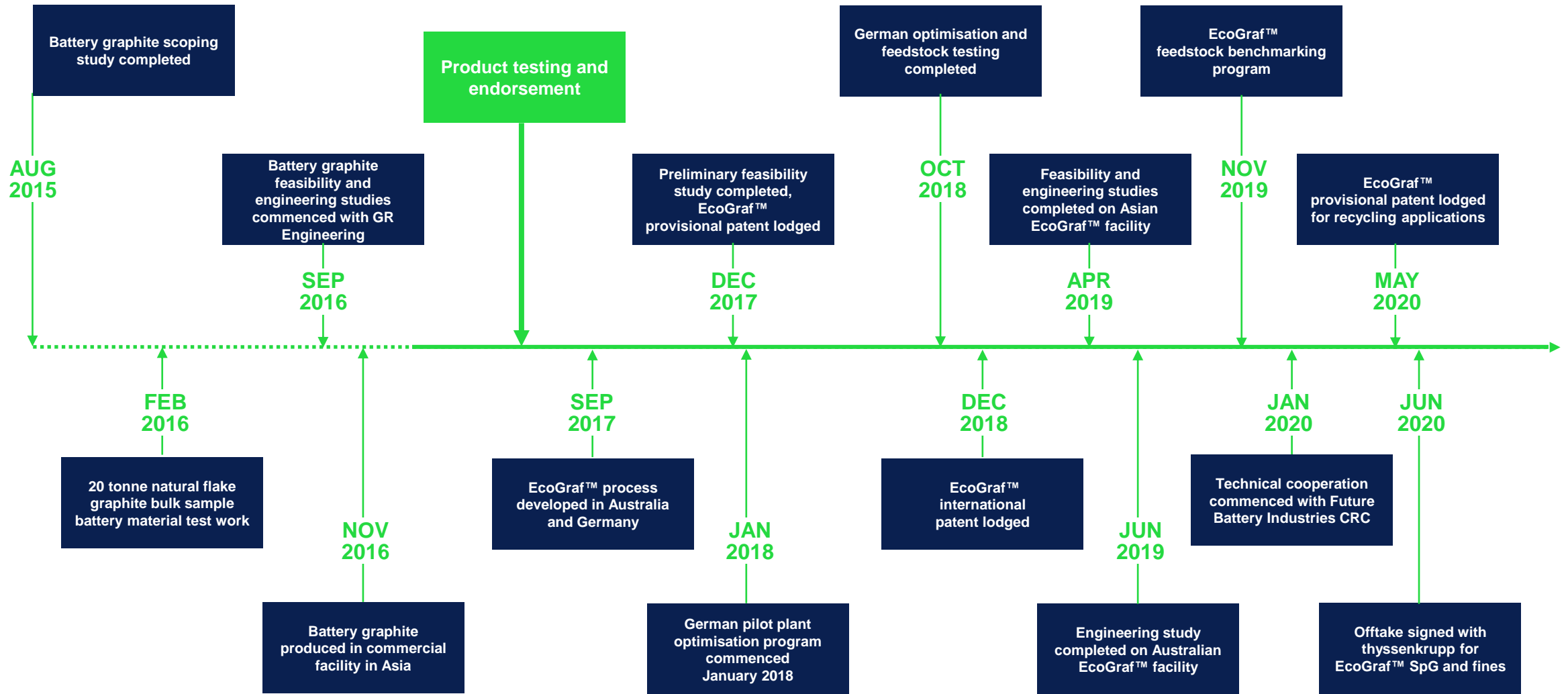
**EcoGraf™**

ENGINEERING CLEAN ENERGY



The new state-of-the-art processing facility will incorporate the Company's proprietary EcoGraf™ HF-free purification technology to manufacture 20,000tpa spherical graphite for the lithium-ion battery market.

# EcoGraf™ development timeline

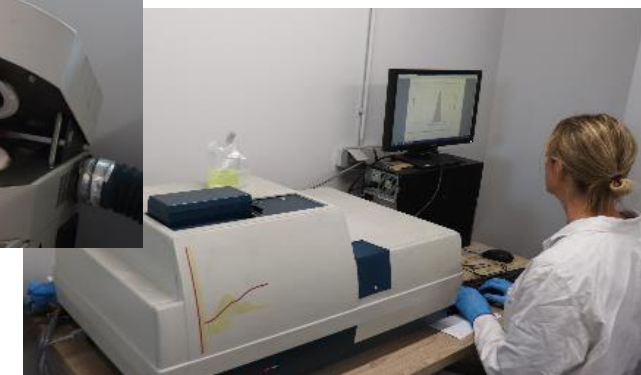
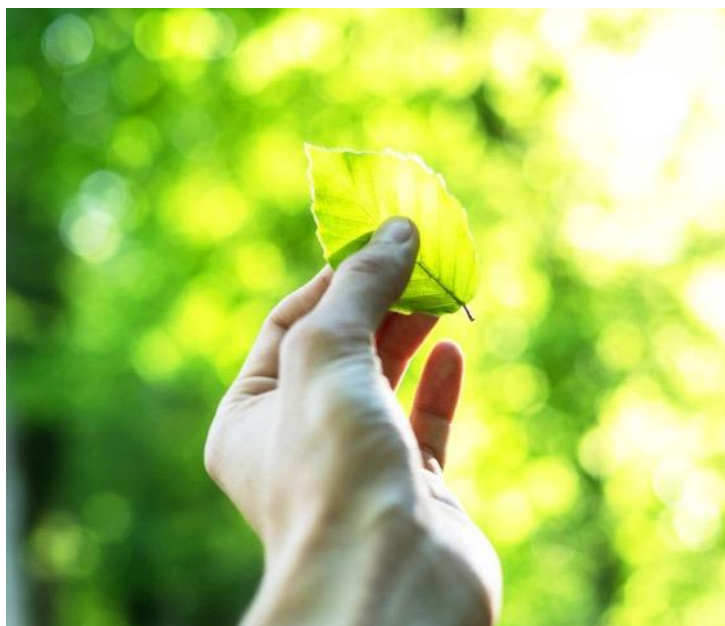




# Rigorous commitment to on-going technical development

**4 years of intensive test work and process design to develop a new eco-friendly chemical process that provides a cost competitive alternative to the use of toxic hydrofluoric acid**

- Test work performed in Australia and Germany conducting >100 trials using a systematic, scientific method to optimise the purification process with research and development support from the Australian Government
- Micronising and spheronising study delivered industry leading yields of 45-55%
- On-going evaluation by potential customers in Asia and Europe confirms attractiveness of EcoGraf™ products as a high quality and cost-effective alternative to existing supplies
- Effectiveness of EcoGraf™ purification demonstrated through successful application to 10 existing sources of natural flake graphite from Europe, Africa, Asia and South America
- Successful application for use in battery recycling and graphite fines purification is attracting strong interest for new market opportunities



# Cost-effective and scalable manufacturing process



Process flowsheet and planned scale-up de-risked through extensive engineering, optimisation and product qualification programs, achieving strong customer endorsement

Agreement in place to secure feedstock



**-100 mesh @ 94-95%C natural flake graphite**

Produced through crushing, grinding and flotation

Standard equipment



**Mechanical grinding and shaping**

Micronising and spheronising using proven milling equipment

- ✓ **Fines by-products for industrial customers**
- ✓ **Purification of fines for high purity specialty products and carbon markets**

International patent pending for chemical purification process



Multi-stage chemical purification, washing and filtration process that eliminates hydrofluoric acid

**EcoGraf**

- ✓ **Eco-friendly**
- ✓ **Cost-effective**
- ✓ **High quality**



**Purified >99.95%C battery graphite for lithium-ion batteries**

# Extensive product qualification testing successfully completed



Over 80 graphite product samples, including various grades of spherical graphite, tested successfully by battery anode manufacturers in Asia and potential customers in Europe and North America



## Product specifications (SpG15)

Carbon content	>99.95%
Moisture	<0.2%
pH-Value	6-8

d10	> 9 micron
d50	14.5 – 15.5 micron
d90	< 25 micron
Tap density	>0.93 g/ml
SSA	< 7 m <sup>2</sup> /g

Fe	<15 ppm
Ni	< 6 ppm
Zn	< 5 ppm
Cr	< 5 ppm
Al	< 10 ppm
Ca	< 10 ppm
Cu	< 5 ppm
S	< 20 ppm
Si	< 20 ppm

## Typical physical properties

Particle size distribution:  
d10 = 10 micron  
d50 = 15 micron  
d90 = 23 micron

Tap density: 0.99 g/ml  
Carbon content: 99.97%  
Moisture: 0.1%

- ✓ Testing confirms EcoGraf™ products achieve battery anode manufacturers' specifications
- ✓ Positive feedback from potential customers on consistency of quality attributes, battery performance and environmental advantages

## Typical ICP analysis result of EcoGraf™ purified spherical graphite

Element	Ag	Al	Ba	Bi	Ca	Cd	Co	Cr	Cu	Fe	K	Mg
ppm	>0.1	6.3	5.2	>0.6	5.9	>0.1	>0.2	0.3	0.3	7.1	6.6	1.5

Element	Mn	Mo	Ni	P	Pb	Si	Sn	Sr	Ti	V	W	Zn	Zr
ppm	0.2	<0.3	5	>0.8	>0.6	12	<0.5	<0.4	<0.4	<0.1	<0.5	<0.1	0.9

## Battery results of EcoGraf™ purified spherical graphite

Discharge Capacity 3<sup>rd</sup> Cycle                      367 mAh/g  
Discharge Efficiency 1<sup>st</sup> Cycle                      94.5%

# EcoGraf™ results confirm superior performing battery material

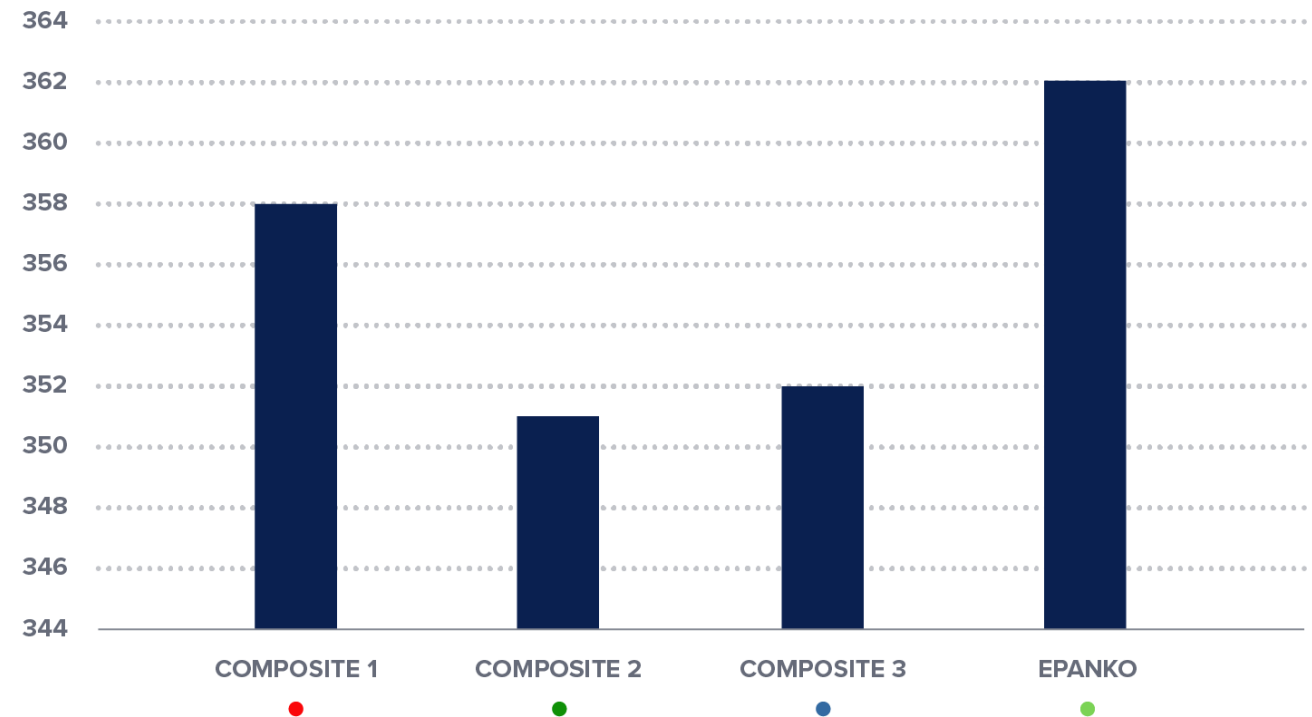


Not all graphite is equal - crystallinity is an important property in the lithium-ion battery as the level of crystallinity affects the electrochemical performance. In natural graphite deposits, crystallinity is determined by the geological setting.

- EcoGraf's preferred feedstocks, including Epanko material from the Company's development ready project in Tanzania, demonstrated superior performance against existing material used in the lithium-ion battery market
- Results demonstrate the importance of battery graphite crystallinity which has a direct effect on battery performance factors such as power output, battery life and charging capability
- Superior and cost competitive alternative material for the battery anode supply chain



SPECIFIC CAPACITY [mAh/g]







# Natural Flake Graphite Business.

# Flake graphite business summary



## Long life Epanko Graphite Mine to supply industrial and battery markets

### Defined, de-risked and ready for construction

- ✓ Bankable Feasibility Study completed by GR Engineering Services
- ✓ Bank appointed Independent Engineer's Review completed by SRK Consulting
- ✓ Supporting Tanzania's industrialisation strategy
- ✓ Granted Mining Licence



### Sector leading ESG credentials

- Equator Principles development model, satisfying:
- ✓ International Finance Corporation Performance Standards
  - ✓ World Bank Group Environmental, Health & Safety Guidelines



### Scalable production plant

60,000tpa initial development with low cost expansion to meet market demand

### Sales agreements with major international customers

thyssenkrupp (Germany) and Sojitz Corporation (Japan)



## Capital investment

## Financial returns @ 60,000tpa

60,000tpa	Pre-tax NPV <sub>10</sub>	Annual EBITDA	IRR
US\$89m	US\$211m	US\$44.5m	38.9%



# Bankable feasibility study (BFS) key highlights

- 50% increase in production to 60,000tpa positions Epanko to be a major baseload supplier of high value graphite products to traditional and emerging graphite markets
- Low pre-production capital of US\$88.9m
- C1 operating costs FOB Dar es Salaam of US\$500/t
- BFS delivers a high returning project:
  - Pre-tax NPV<sub>10</sub> of US\$211m
  - Internal rate of return:38.9%
  - Annual EBITDA of US\$44.5m
- Economics do not include sales into the high-growth lithium-ion battery market
- **Metallurgical test work demonstrates potential to produce 99% carbon concentrate from fresh ore with no additional milling or cleaning stages**
- Executed marketing strategy with strong alignment to German industry and the battery supply chain in Japan, Korea and Taiwan
- 44ktpa - binding sales and offtake agreements in place covering initial production
- 16ktpa - under negotiation with existing partners and leading European carbon groups
- Debt financing program with Germany's KfW IPEX-Bank
- Manufacturing of EcoGraf™ battery grade graphite to add further value



99% carbon purity provides a long-term supply of high quality feedstock for the manufacture of battery graphite



High carbon purity will reduce EcoGraf™ battery graphite purification costs



# Rigorous 60,000tpa BFS and strong economic returns positions Epanko for development

- Robust technical and financial BFS completed, conforming with IFC standards
  - Average production of 60,000tpa graphite concentrate
  - High proportion of >150 micron concentrate at carbon grades demanded by the market
  - Potential to produce a 99% carbon concentrate from <150 micron flake to supply high growth battery anode market
- BFS utilised industry leading consultants
  - Including GR Engineering, Knight Piesold, CSA Global and IMO Metallurgy
  - Technical due diligence completed by independent bank appointed engineer SRK
- BFS economics are based on sale into refractory and other established markets
  - Significant upside potential through access to high value markets, including spherical and expandable graphite



## Epanko bankable feasibility study outcomes

Development period	(months)	19
Average annual throughput	(tonnes)	695,000
Strip ratio	(waste to ore)	0.4:1
Average feed grade	(% TGC)	8.3
Graphite recovery	(%)	94.7
Average product carbon grade	(%)	96
Graphite production	(tonnes per year)	60,000
Mining cost	(US\$/t processed)	7.93
Processing cost	(US\$/t processed)	19.61
General & administration cost	(US\$/t processed)	4.75
Transport and port charges	(US\$/t sold)	107
C1 FOB cost	(US\$/t sold)	500
All in Sustaining cost <sup>1</sup>	(US\$/t sold)	572
Pre-production capital cost	(US\$ million)	88.9

1: Includes royalties (US\$39/t), sustaining capital (US\$15/t), off-site corporate functions (US\$10/t) and rehabilitation (US\$8/t)

# EcoGraf provides mine-to-market ESG supply chain assurance



- EcoGraf's Epanko mine development satisfies Equator Principles social and environmental planning standards
- Long-life, high quality supply of natural flake graphite for industrial and battery markets
- Ideally located to support European customers' supply chain management under the Paris Agreement on climate change
- German and Australian Government funding support
- US\$60m debt funding proposal developed in conjunction with Germany's KfW IPEX-Bank and presented to the Government of Tanzania with the aim of simplifying and fast-tracking the financing process
- Recent initiatives by the Government of Tanzania to encourage greater foreign investment expected to support the project funding program

**Epanko to transform the regional economy, operating for over 40 years and contributing over US\$3 billion to Tanzanian economic and social development**





# Lithium-ion Battery Recycling Business.

# Battery recycling



## Market Overview

Recycling efforts have focused on cathode metals

Carbon anode materials are currently not recovered

<b>PRODUCTION SCRAP</b>	Carbon material which is a waste product generated from each stage of battery anode manufacturing, cell manufacturing and battery testing
<b>BLACK MASS</b>	Carbon material remaining after hydrometallurgical processes have recovered the high value cathode metals from end-of-life lithium-ion batteries

## Benefits and Opportunity

Reducing battery production costs

Lowering the EV carbon footprint

Proposed EU legislation requires more battery recycling and greater transparency in the raw materials supply chain.



# Positive EcoGraf™ purification results



The EcoGraf™ proprietary purification process has now been **successfully** applied to **recycling** of both 'production scrap' and 'black mass' materials

Anode recycling program for major EV manufacturer achieved >99.95% carbon purity from battery production scrap material

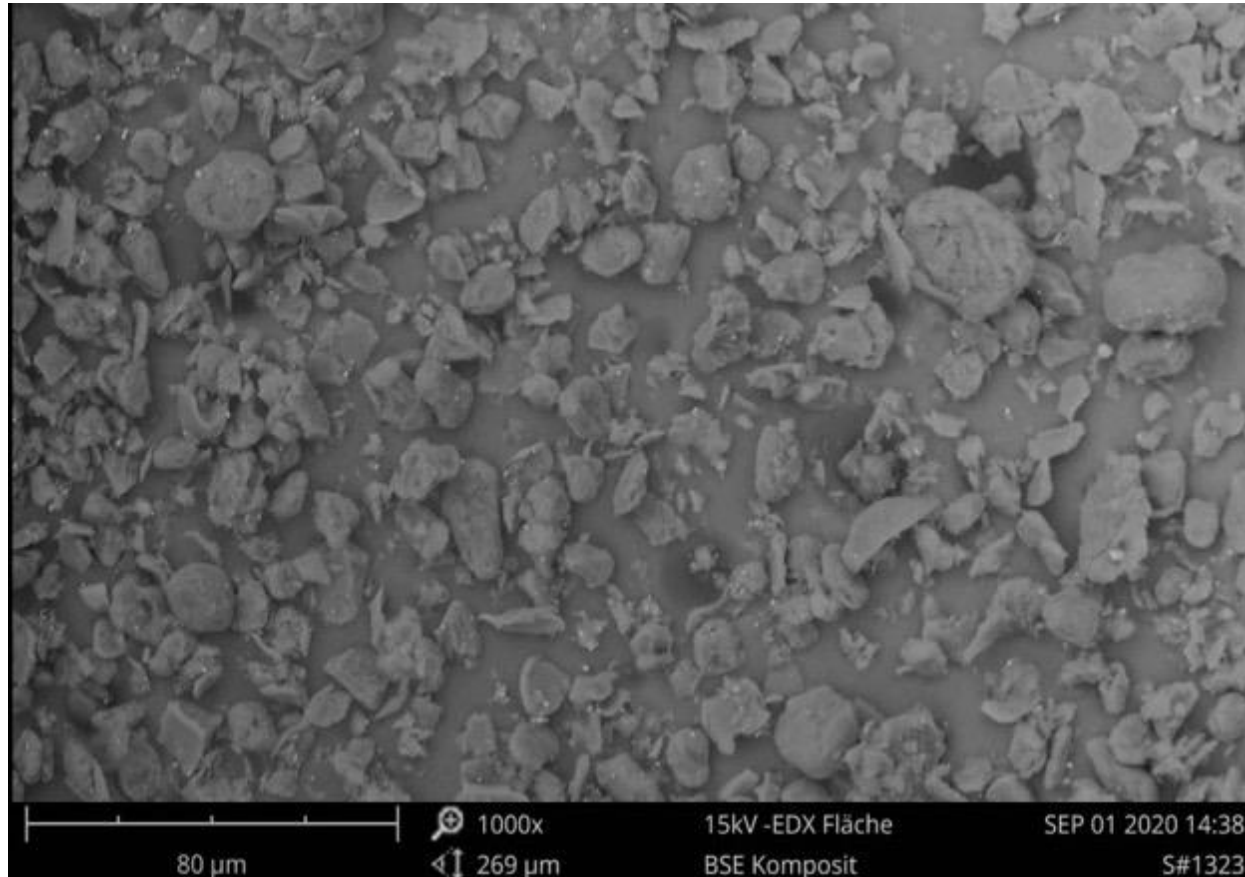


	PRODUCTION SCRAP (%C)	BLACK MASS (%C)
Product Sample (before)	98-99.85%	30-50%
EcoGraf™ Purification (after)	98.6% - >99.95%	98.0 - 99.83%

Carbon (%C) grades determined by Loss on Ignition (LOI) method.



# EcoGraf™ recovered high purity carbon anode material



**Microscopic picture:** Recovered carbon anode material showing particle shapes. Oval shaped particles (spheronised natural graphite) and plate shapes synthetic graphite.

**EcoGraf™ process retains particle shape for reuse.**



# Cost effective purification process to recover carbon anode material



Recovery of carbon anode material uses the same purification process



International patent pending for chemical purification process

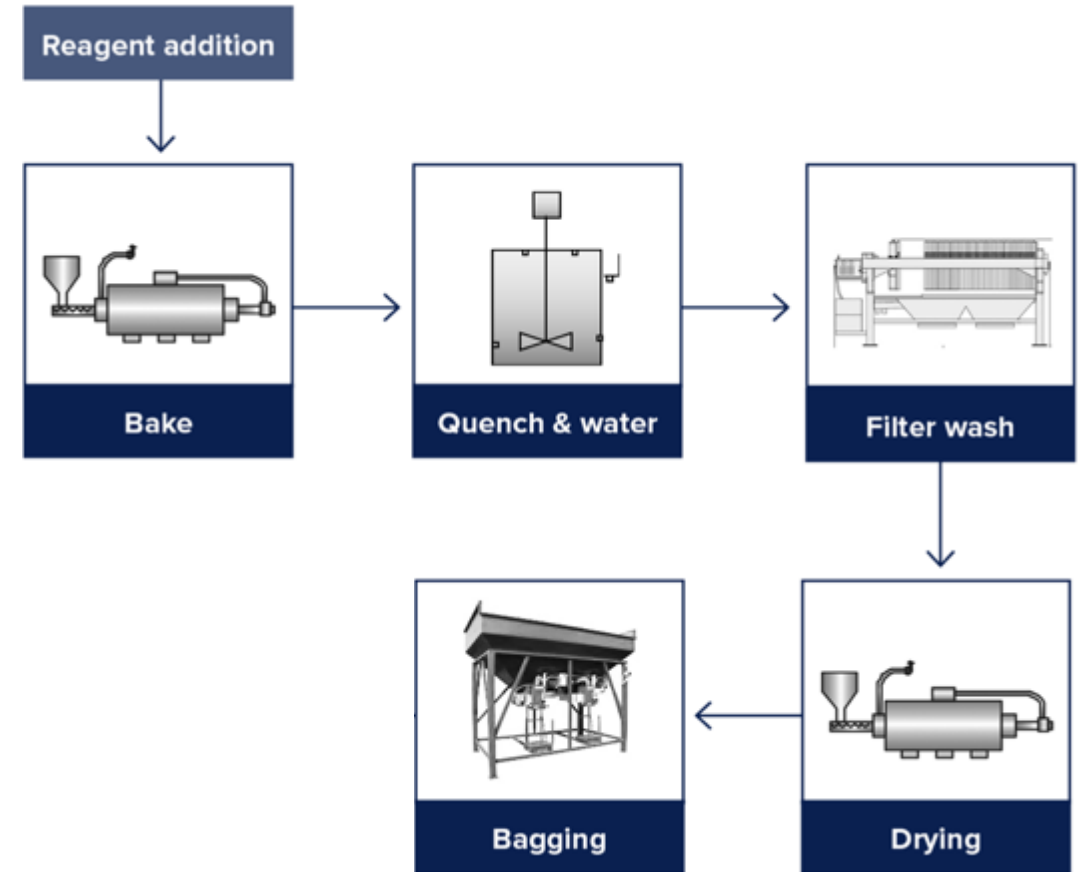


- ✓ Eco-friendly
- ✓ Cost-effective
- ✓ High quality

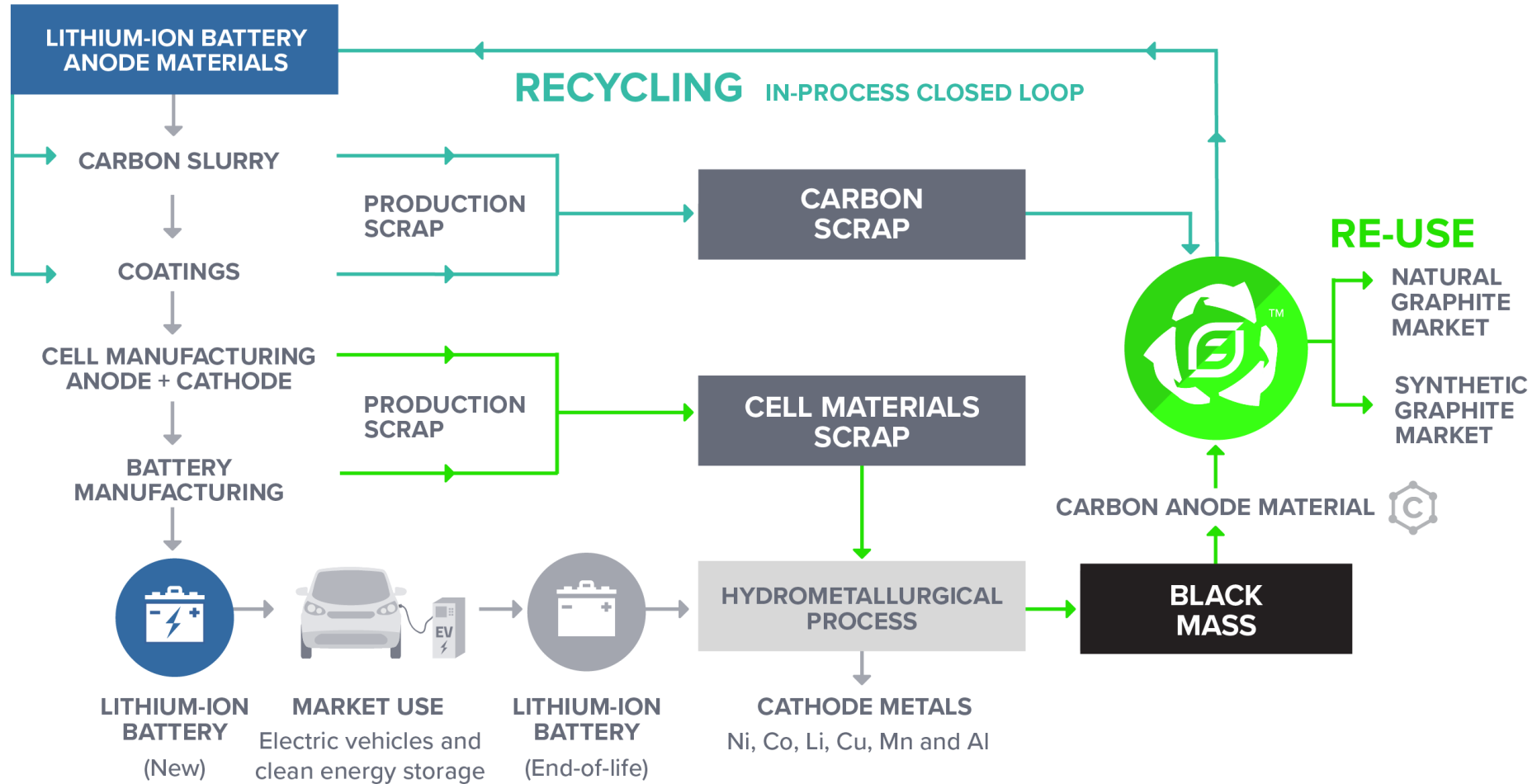


Multi-stage chemical purification, washing and filtration process that eliminates hydrofluoric acid

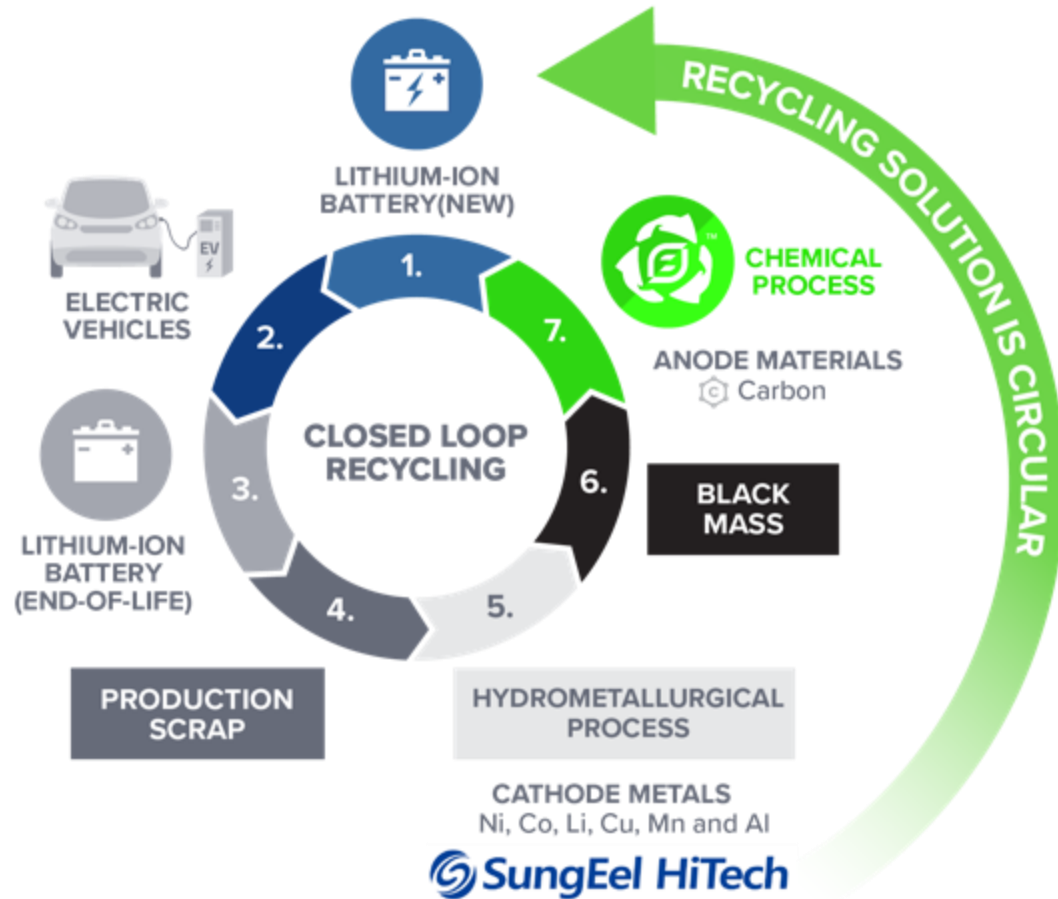
## EcoGraf™ Proprietary Purification



# EcoGraf's strategy to recover and reuse carbon anode material



# EcoGraf positioned to recover and reuse carbon anode material



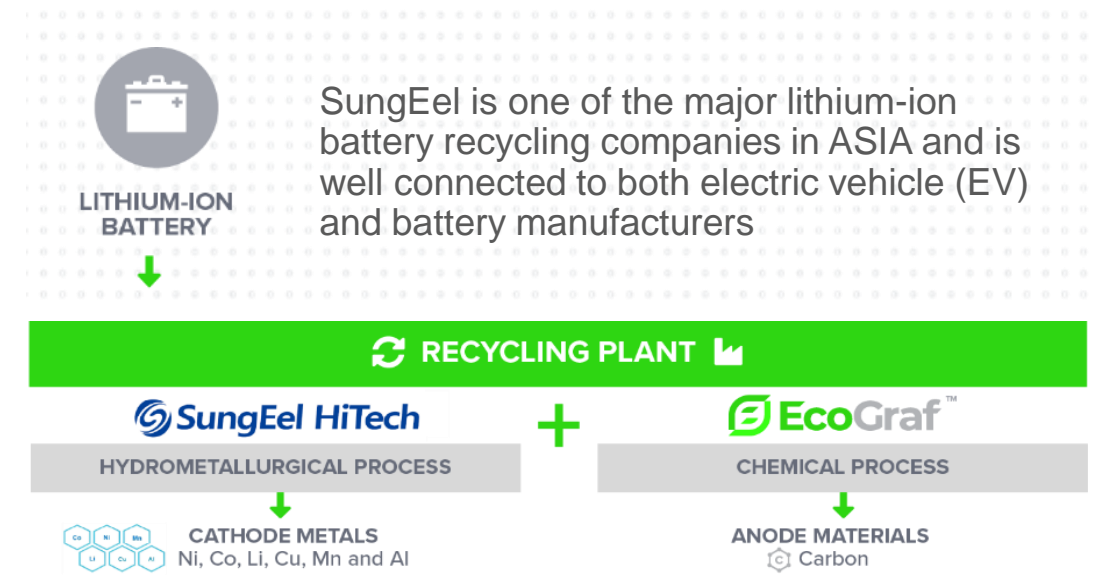
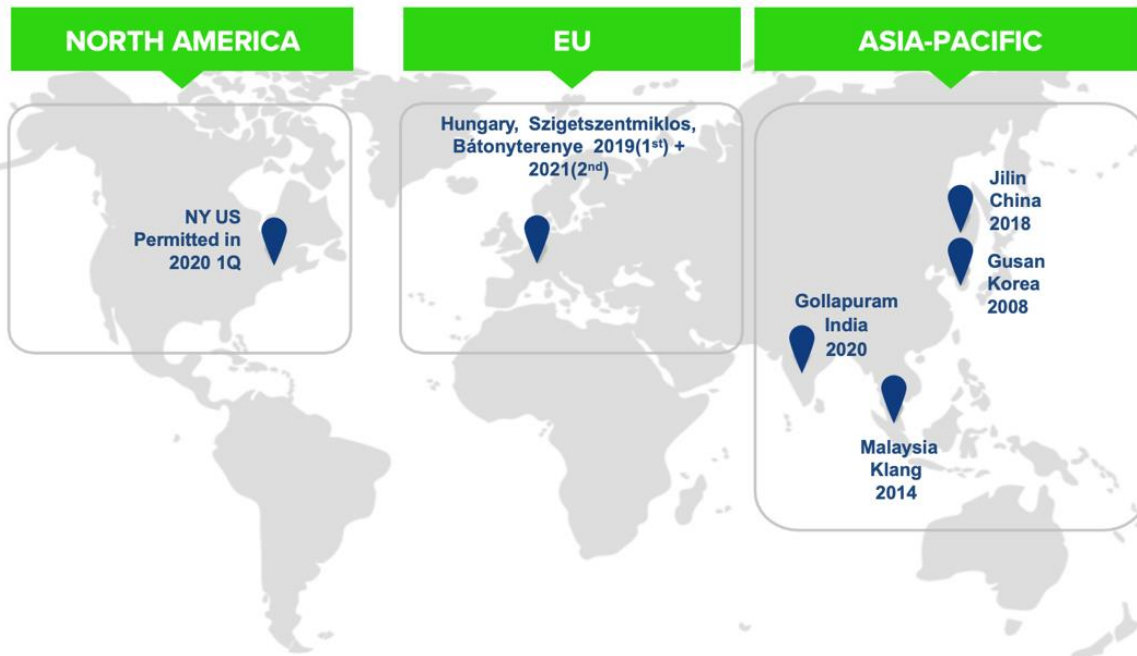
**Agreement signed with South Korea's largest lithium-ion battery recycling group SungEel HiTech**

# SungEel HiTech Agreement



Collaboration presents opportunity to provide tailored EcoGraf™ process in future lithium-ion battery recycling plants

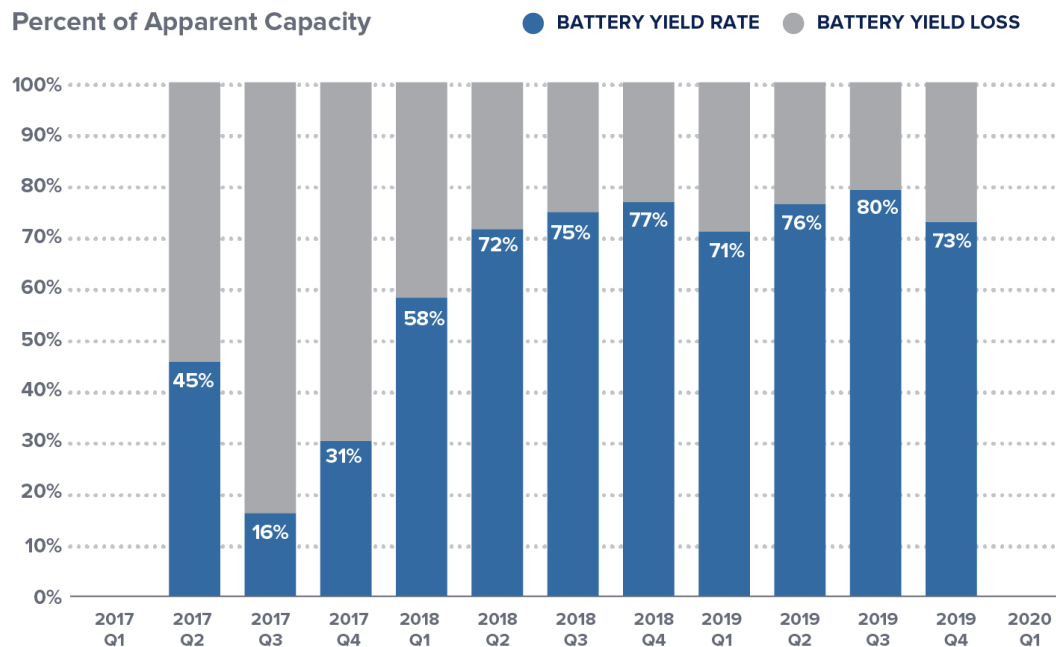
## SungEel Global Pre-treatment Plants





# Production scrap market

## Battery Cell Production



Source: Panasonic Investor Presentation , Tesla company reports

Production losses during cell production are significant

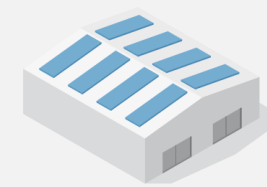
Production loss during battery cell manufacturing and product testing estimates:

### Potential Market Size as % of Battery Production



Early Production

>30%



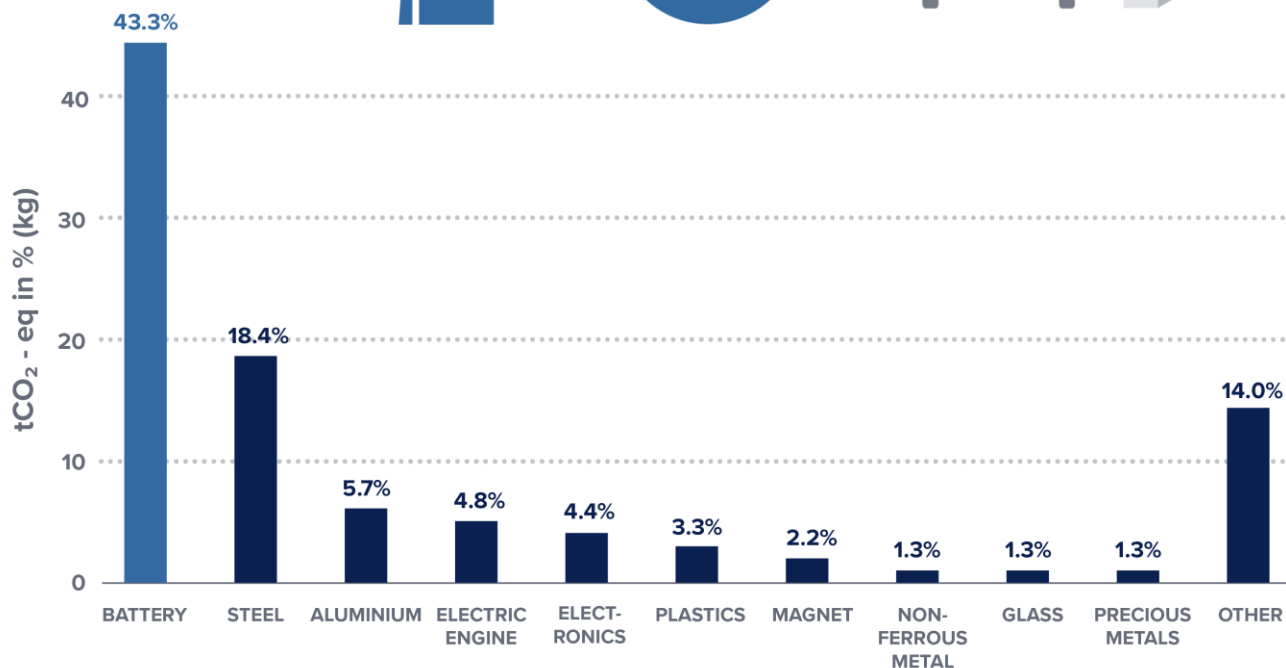
Target

~10%



# EcoGraf™ recycling - lowering EV production carbon emission footprint

Battery represents over 40% of total carbon (CO<sub>2</sub>) emission footprint from EV manufacturing



Reference (No Canary, Volkswagen)

## PRODUCTION SCRAP

- Estimated 10 - 30% production loss during cell manufacturing and battery testing
- **Solution:** Develop 'In-Process' recovery of production scrap (slurries and coatings waste)
- Reuse would eliminate 13.5kg of CO<sub>2</sub> per kWh

Reference (No Canary)

## BLACK MASS

- **Solution:** Recover and reuse carbon anode material in high purity carbon markets and battery supply chains

Recycling of carbon anode material has an important role in reducing CO<sub>2</sub> emissions

# Blended battery anode material opportunity



Lower battery production cost



Lower carbon emissions



## BLENDED ANODE MATERIAL PRODUCTS

Blending EcoGraf's high purity 'Battery Graphite' with 'Recovered Carbon Anode Materials' provides an attractive opportunity to support the transition to clean energy



Battery Spherical Graphite (99.98% C)



Recovered Carbon Anode Material



Battery Cell Manufacturers' Carbon Grade Specification (99.95% C)



# Modular recycling pilot plant



## TAILORED CUSTOMER SOLUTION

EcoGraf™ proprietary HF free purification technology has the potential to provide a tailored solution to increase recycling of recovered battery anode material

- Engineering design commenced for a containerised pilot plant
- Funding for the pilot plant to be supplemented through the Company's R&D programs and collaboration with potential customers
- Pilot plant to provide recovered carbon anode material for product qualification process, focused on the reuse of graphite in lithium-ion batteries and specialised industrial carbon products



Product development programs to target a range of market opportunities

<b>Industrial Application Markets for Recovered Carbon Anode Material</b>	<b>Natural</b>	<b>Synthetic</b>
Alkaline and zinc carbon batteries	✓	✓
Lithium-ion batteries	✓	✓
Friction materials	✓	-
Refractories	✓	-
Carbon additives	-	✓



# **Advantages and Opportunities.**

## Key advantages



### *Diversified **HFFree™** battery anode material business supporting the global transition to clean energy and e-mobility*

- ✓ Over 8 years of technical work programs and extensive product qualification with a range of potential customers
- ✓ Bank due diligence processes undertaken with rigorous reviews of technical and engineering studies
- ✓ Product sales and collaboration with market leading counterparties
- ✓ Production levels matched to market demand with engineering designs to allow rapid expansion
- ✓ Downstream processing strategy centered on producing uncoated purified spherical graphite for a market forecast to grow 15x over the next decade
- ✓ Diversified battery anode materials business positioned to support recent EU legislative changes on sustainability
- ✓ Lithium-ion battery recycling business provides the opportunity to lower battery production costs and reduce carbon emissions from EV manufacturing
- ✓ Blended battery anode material provides a unique eco-friendly product
- ✓ Strategy to expand production and regionalise additional facilities in Europe, Asia and the US to support increasing demand
- ✓ Planning initiated on 2<sup>nd</sup> plant in Europe with significant capital savings
- ✓ On-going research and innovation to identify further value adding opportunities using the EcoGraf™ purification process

# Outlook and next steps



## BATTERY PRODUCTS

- Complete engineering programs with GR Engineering and regulatory approvals for the construction of the initial 5,000tpa EcoGraf™ processing facility in Western Australia
- Arrange US\$35m debt financing with the Australian Government for the expansion of the Western Australian facility to 20,000tpa
- Advance works for a 2<sup>nd</sup> plant site in Europe
- Continue to build strategic partnerships with key battery industry participants

## NATURAL GRAPHITE PROJECT

- Advance the US\$60 million debt financing proposal submitted to the Government of Tanzania for construction of the new Epanko Graphite Mine

## BATTERY RECYCLING

- Finalise engineering and construction of a containerised pilot plant to provide recovered carbon anode material for product development and qualification processes
- Continue testwork with EV and battery manufacturers
- Develop strategic partnerships in key markets

## CORPORATE

- Recruitment of executive team to execute growth strategy
- Support trading on the US OTCQX Market to increase global investor engagement
- Secure further support for research, innovation and advanced manufacturing programs



**BATTERY PRODUCTS**  
**Western Australia**  
**development ready**  
**20,000tpa processing facility**



**NATURAL GRAPHITE**  
**Scalable mining projects**  
**for long-term supply of**  
**graphite products**



**RECYCLING**  
**Recovery of battery**  
**anode materials from**  
**lithium-ion batteries**

# Value proposition



## TANZGraphite



### Battery Anode Material Facility Australia

- ✓ 20,000tpa Battery Graphite
  - ✓ US\$35m Annual EBITDA
  - ✓ 42.4% Internal Rate of Return
  - ✓ US\$642m Pre-tax project NPV<sub>8</sub>
  - ✓ US\$448m Pre-tax<sup>1</sup> equity NPV<sub>8</sub>
- Payback ~3.3yrs

### Epanko Graphite Project Tanzania

- ✓ 60,000tpa Natural Flake Graphite
- ✓ US\$44.5m Annual EBITDA
- ✓ 38.9% Internal Rate of Return
- ✓ US\$211m Pre-tax equity NPV<sub>10</sub>
- ✓ US\$3B Forecast Contribution to Tanzania

### Recycling – Recovery of Battery Anode Materials

- ✓ Significant results achieved
- ✓ Production waste – large market
- ✓ Lower battery cost and emissions
- ✓ Blended anode material opportunity
- ✓ Engineering design for pilot plant commenced

**Diversified battery anode material business positioned for the global transition to clean energy**

**Development ready businesses forecast to generate US\$80m EBITDA per annum**

**Proprietary EcoGraf™ purification technology provides sector leading ESG credentials with application to battery recycling industry**

#1: Post-tax equity NPV<sub>8</sub> is US\$317m (refer ASX Announcement *Completion of EcoGraf™ Processing Facility Development Report* 5 November 2020)

# The future is **electric.**



**BATTERY  
PRODUCTS**



**RECYCLING**



**NATURAL  
GRAPHITE**



## **Head Office**

18 Richardson Street  
West Perth, Western Australia 6005  
T: +61 8 6424 9000

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