EcoGraf

ENGINEERING CLEAN ENERGY

ASX: EGR
FSE: FMK

Annual General Meeting - Presentation

25 NOVEMBER 2020

www.ecograf.com.au

Overview

Vertically integrated graphite business positioned to support the global transition to clean energy and e-mobility.

BATTERY PRODUCTS

Kwinana development ready 20,000tpa processing facility

RECYCLING

Recovery of battery anode materials from lithium-ion batteries

EPANKO MINE

Scalable mining projects for long-term supply of graphite products

Corporate summary

Board and Executive Management

Chairman
Robert Pett

Managing Director
Andrew Spinks

Director
John Conidi

Chief Financial Officer
Howard Rae

Development of German pilot plant provides market leading technical capabilities:

- battery graphite manufacturing
- product testing, analysis and development
- flake graphite processing

Capital structure	Major shareholders	ASX : EGR Börse Frankfurt : FMK
Ordinary fully-paid shares 363,986,768	Mitsubishi UFJ Group 12% Board 10%	Share price A$0.18 Market capitalisation A$65.5m

Vertically integrated graphite business poised for development

Environmentally friendly EcoGraf™ processing technology to produce 20,000 tonnes per annum of purified graphite for lithium-ion batteries

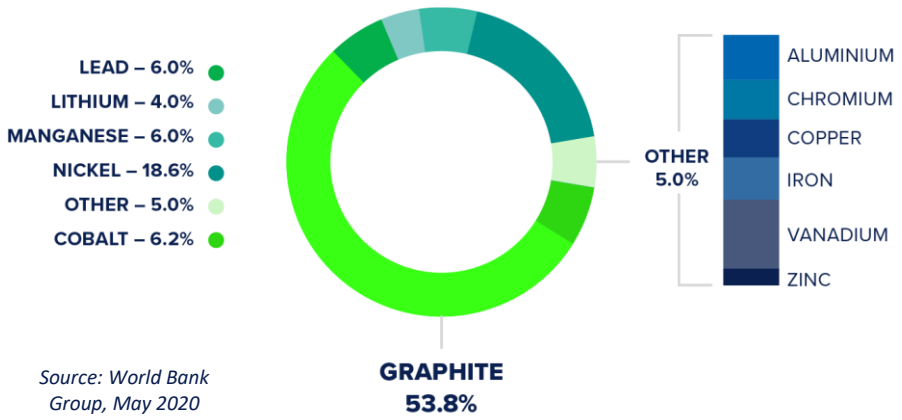
Produced using leading equipment design, independent certification and a commitment to sustainable manufacturing

Supporting the Global Transition to Clean Energy and E-Mobility

- Proprietary processing technology developed through extensive research & development in Australia and Germany
- Global trademarks registered, patent in progress and leading ESG credentials
- Strategic interest for use of EcoGraf™ purification for global anode recycling and high purity graphite fines markets
- Establishing key relationships with anode, battery and electric vehicle manufacturers
- Long-term sales arrangements signed with thyssenkrupp AG
- Financing support from the Australian and German Governments
- COVID-19 expected to intensify customer focus on supply chain security and sustainability

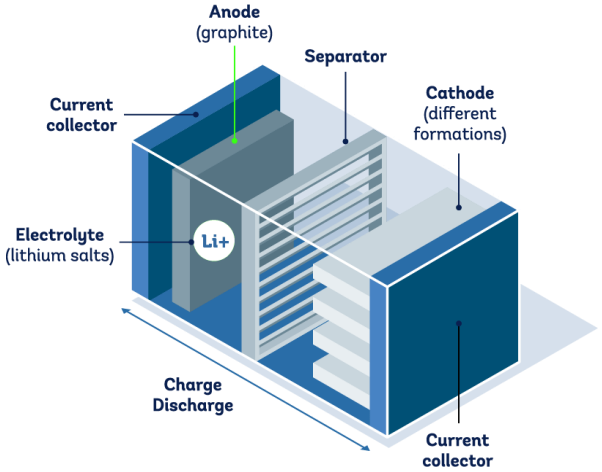
Compelling lithium-ion battery market opportunity

Graphite forecast to dominate battery mineral demand to 2050



Source: World Bank Group, May 2020

EV market forecast to drive +**700% growth** in natural graphite demand **by 2025** *Roskill*



Source: World Bank Group, May 2020

27kg

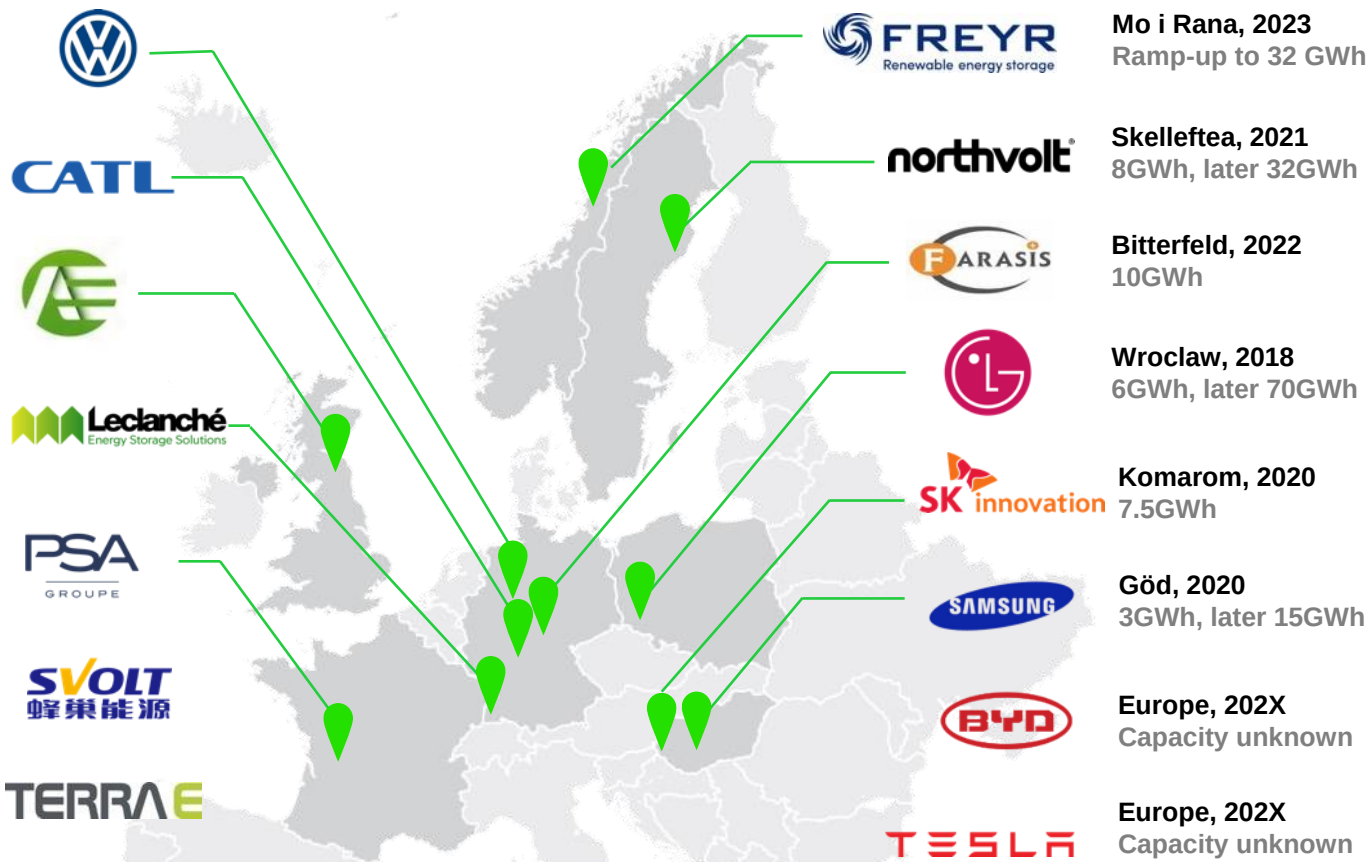
Purified natural graphite per EV

Requires 50-55kg of flake graphite

Battery graphite is processed from natural flake graphite into a +99.95% high purity product suitable for anode manufacturing

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

Unprecedented investment in new European battery capacity



Salzgitter, 2024
16GWh, later 24GWh

Erfurt, 2022
14GWh, later 100GWh

Sunderland, 2010
2.5GWh

Willstätt, 2020
1GWh

France, 2023
32GWh, later 64GWh

Germany, 2023
20GWh, later 24GWh

Germany, 202X
4GWh, later 8GWh

Mo i Rana, 2023
Ramp-up to 32 GWh

Skelleftea, 2021
8GWh, later 32GWh

Bitterfeld, 2022
10GWh

Wroclaw, 2018
6GWh, later 70GWh

Komarom, 2020
7.5GWh

Göd, 2020
3GWh, later 15GWh

Europe, 202X
Capacity unknown

Europe, 202X
Capacity unknown

Source: After Roland Zenn (Europe)

EcoGraf is positioned to support the massive demand for high quality, sustainably produced battery minerals for the global transition to electric energy

- **December 2019: EU commits €3.2 billion to improve sustainability in battery value chains:**
  - Raw materials
  - Manufacturing
  - Management systems
  - Recycling
- **Expected to unlock additional €5 billion in private investment**

Battery & EV joint ventures provide significant supply chains

Source: After Roland Zenn (Europe)

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

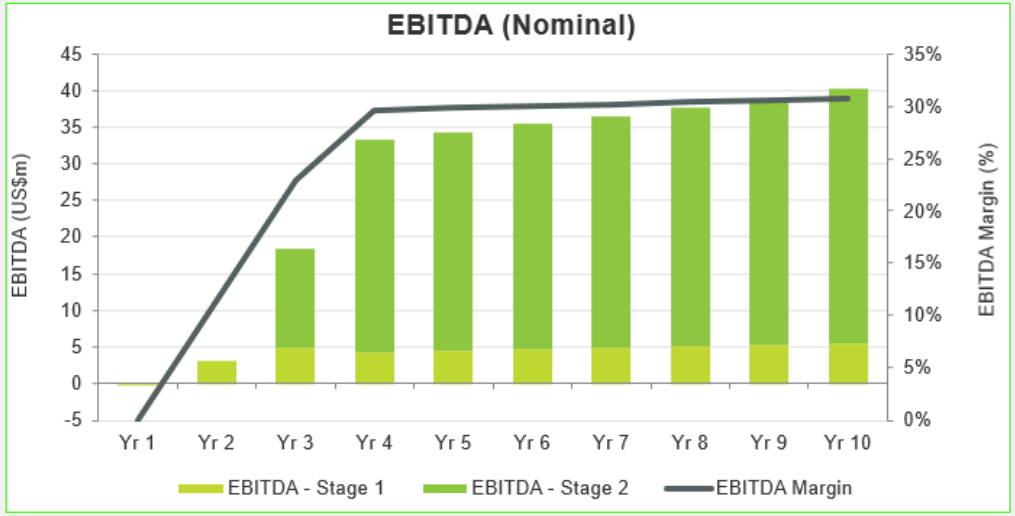
thyssenkrupp

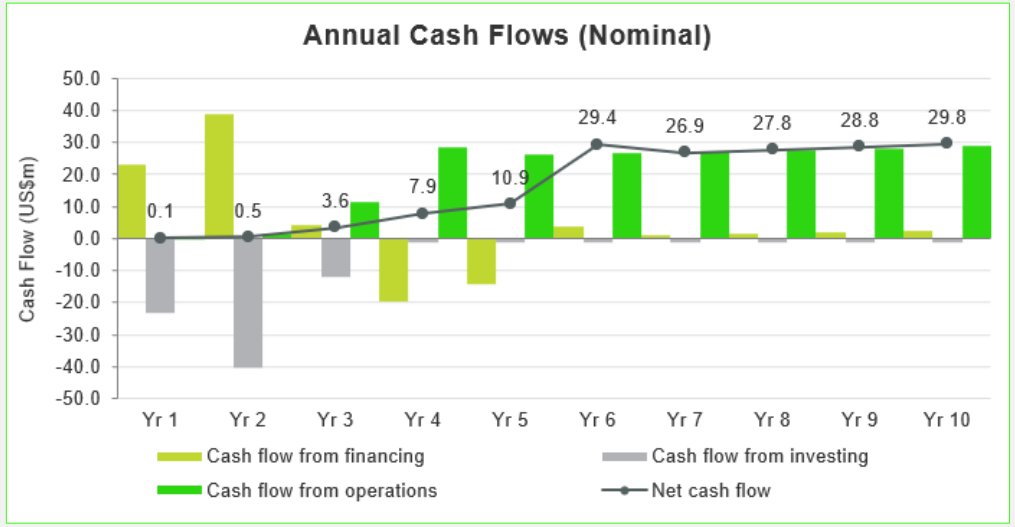
Capital investment		Financial returns @ 20,000tpa		
Initial 5,000tpa	**15,000tpa Expansion**	**Pre-tax NPV_8**	**Annual EBITDA**	**IRR**
US$22.8m	US$49.2m	US$317m	US$35m	42.4%

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 and reach 1.2 million tonnes per annum by 2030



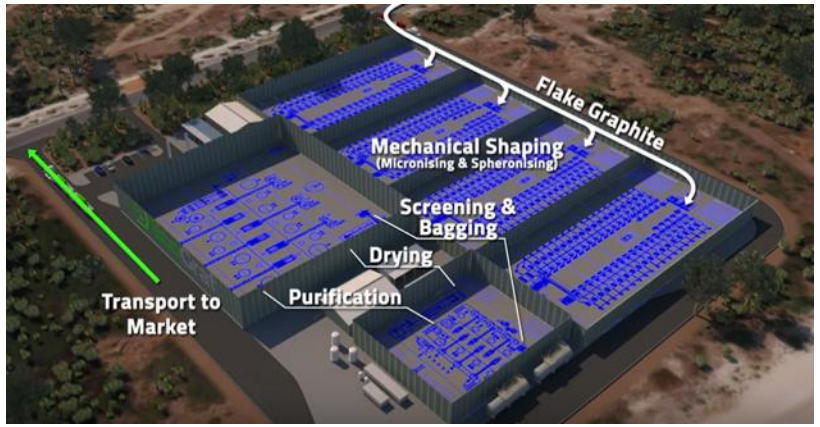


Initial battery graphite facility to be constructed in Western Australia

PLAY MOVIE

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

Flexibility via scalable modular design



Australian Government support

Federal and State Government support for new technology and value added manufacturing

- Australian Government funding support and debt financing in progress
- Lead Agency role managed by Western Australian Government Department of Jobs, Tourism, Science and Innovation
- 6.7ha industrial site located in the Kwinana Strategic Industrial Area
- Advance approval granted by AusIndustry for research and development programs totaling A$8m

PLAY VIDEO - ECOGRAF BATTERY GRAPHITE MANUFACTURING FACILITY SITE LOCATION
https://youtu.be/Jb0xIhFSdsU

PLAY VIDEO – AUSTRALIAN GOVERNMENT MAKE IT HAPPEN ECOGRAF CASE STUDY
https://youtu.be/1fiWmYrd3WM

Australian Government | export finance australia

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

DevelopmentWA

FUTURE BATTERY INDUSTRIES CRC

GOVERNMENT OF WESTERN AUSTRALIA

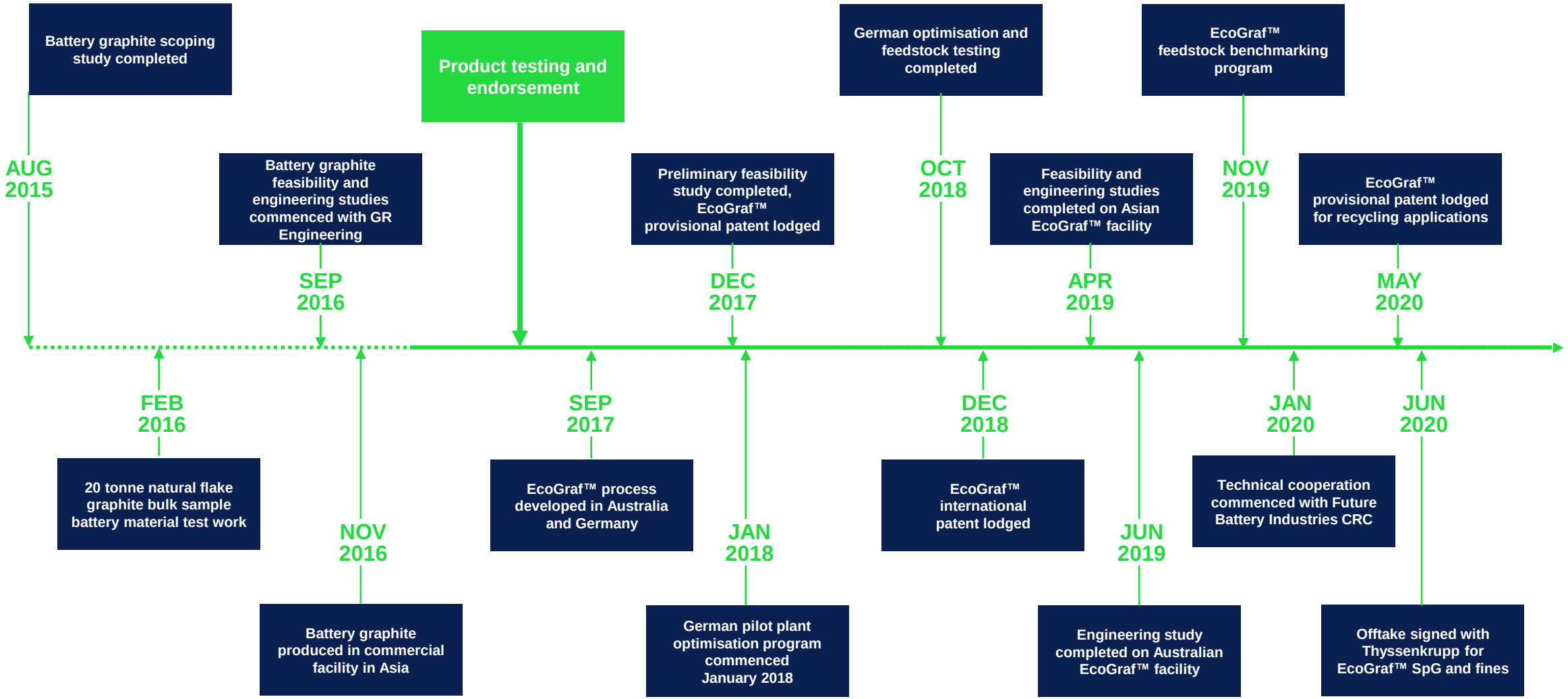
Kwinana expected to become a major global battery mineral processing centre

***Photo (R-L)** – 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*

Western Australian advantages

- Australia's strong reputation as a reliable supplier of high-quality industrial products
- 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

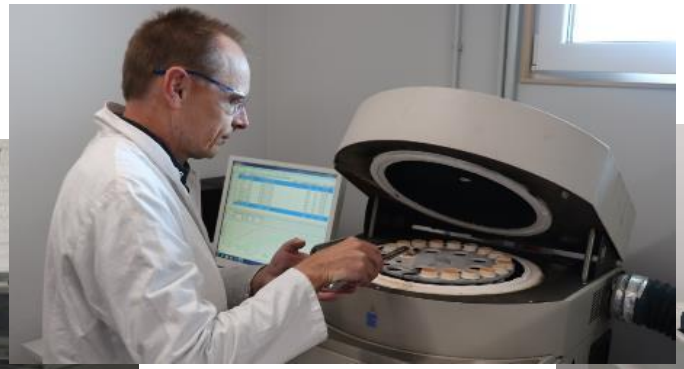
EcoGraf™ development timeline

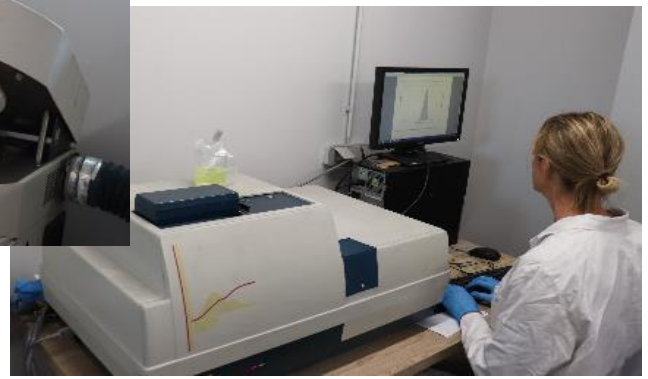


Rigorous commitment to on-going technical development

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





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^2/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 3rd Cycle	367 mAh/g
Discharge Efficiency 1st Cycle	94.5%

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

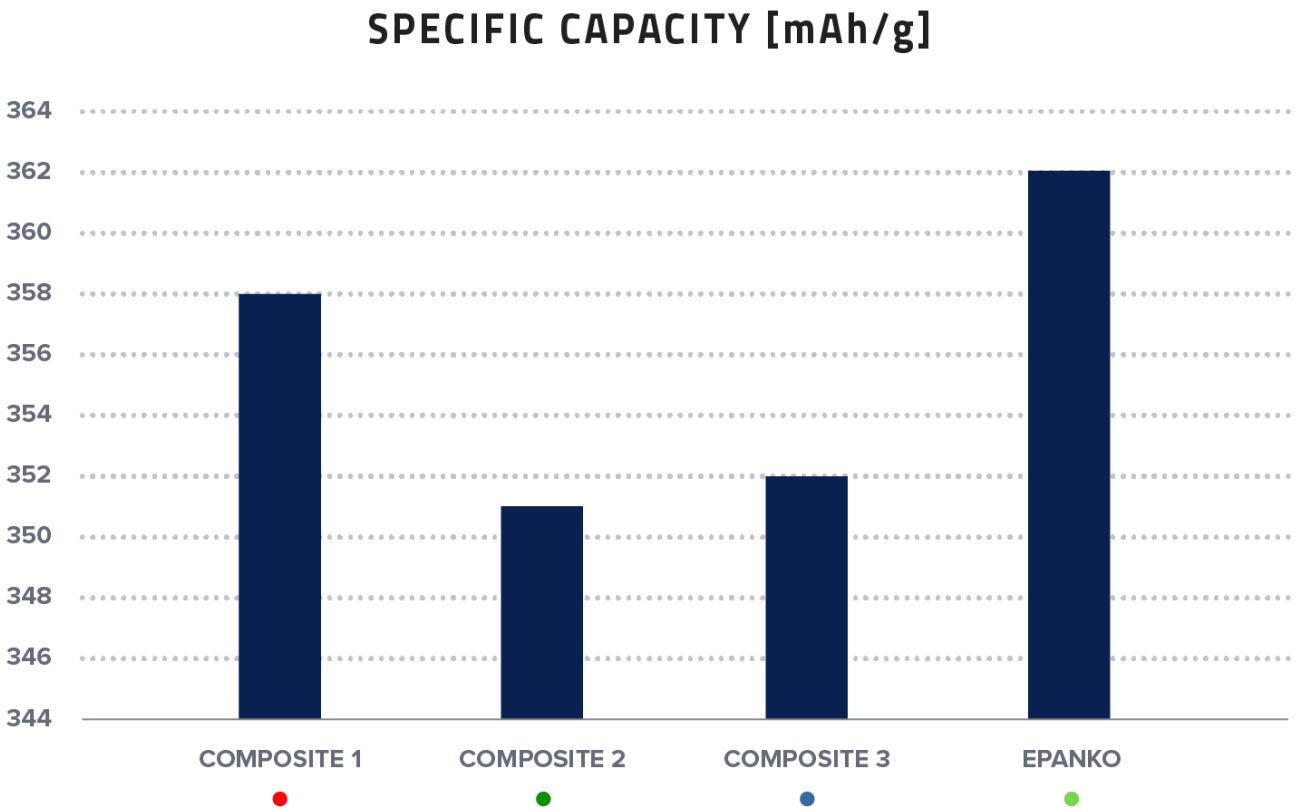
- **Eco-friendly**
- **Cost-effective**
- **High quality**

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

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



Recycling opportunity

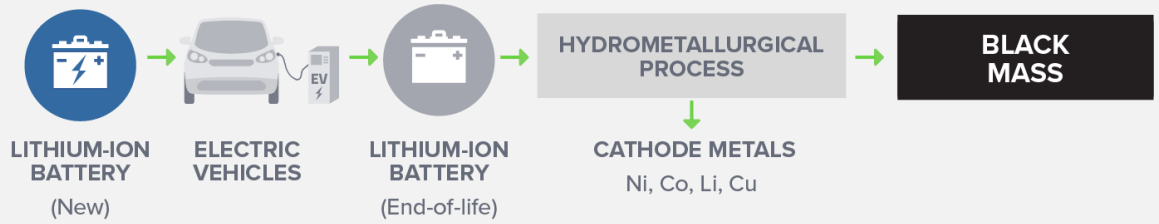
Market Overview

- Recycling efforts focus on cathode metals
- Carbon anode material is currently not recovered

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

Benefits and Opportunity

- Sustainability benefits from reuse of recovered anode material
- Contributing to lowering the EV carbon footprint
- Reduction in battery unit costs



Cost effective purification process to recover carbon anode material

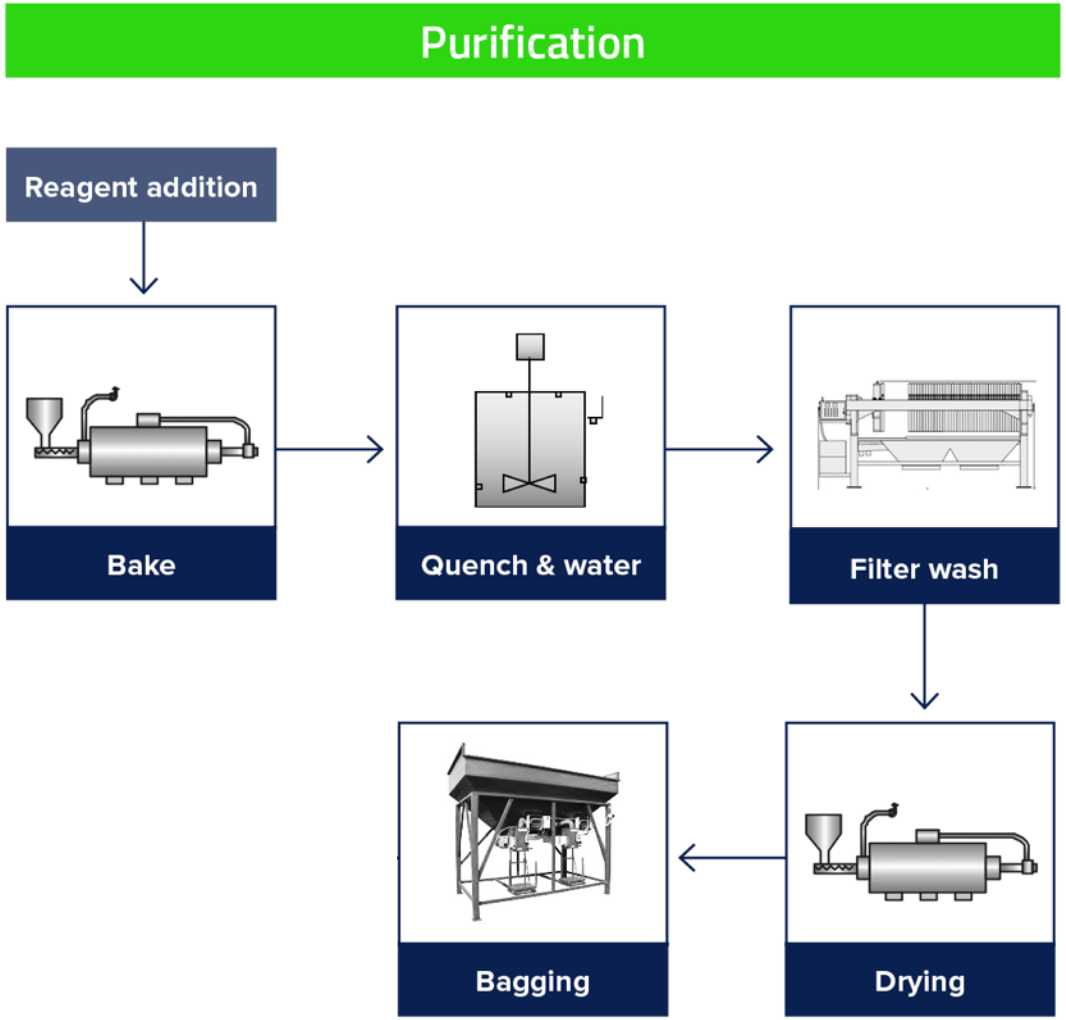
Recovery of carbon anode material uses the same proprietary purification process

International patent pending for chemical purification process

EcoGraf

- Eco-friendly
- Cost-effective
- High quality

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



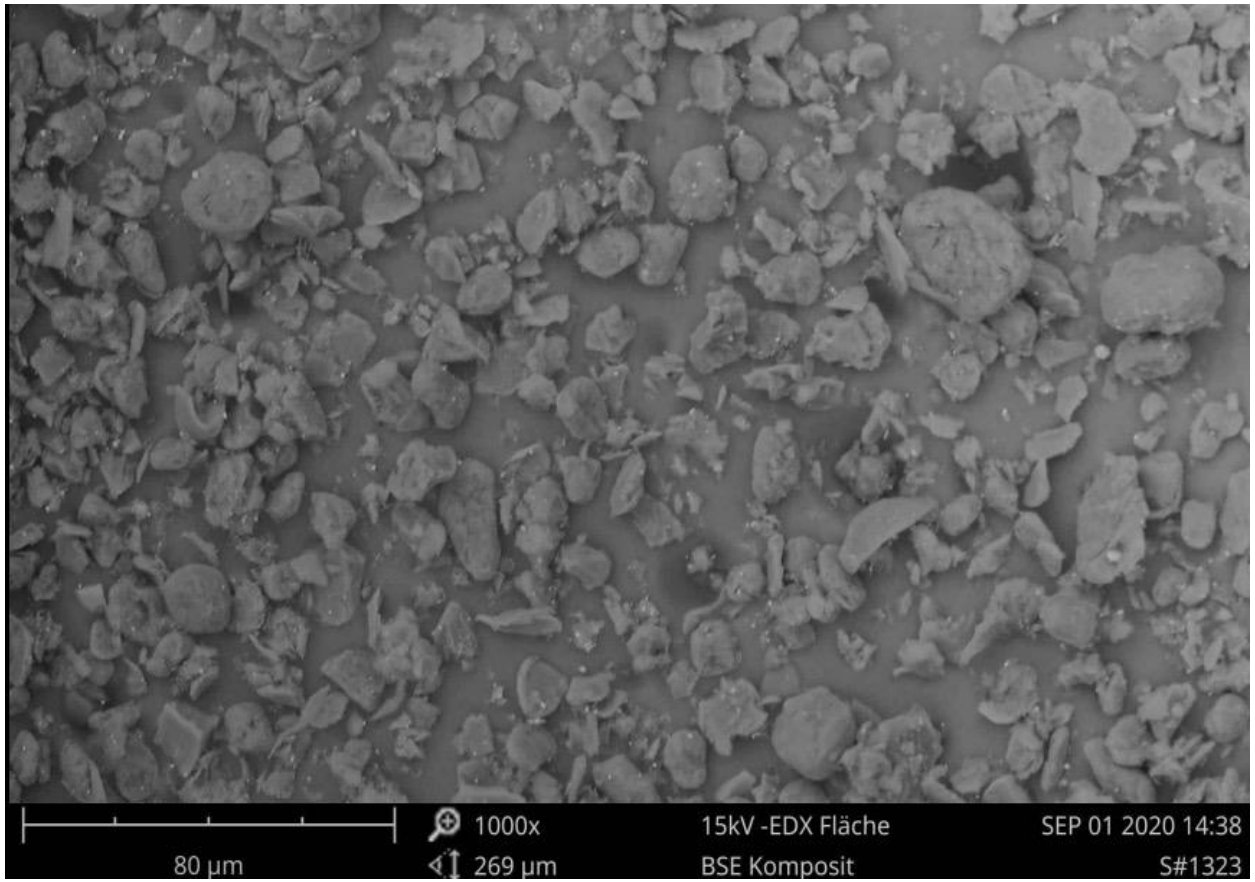
EcoGraf™ purification results

The EcoGraf™ proprietary purification process has **successfully recovered high purity carbon anode material** from both lithium-ion battery ‘production scrap’ and ‘black mass’ materials

	PRODUCTION SCRAP (%C)	BLACK MASS (%C)
Product Sample	98-99.85%	30-50%
EcoGraf™ Purification	98.6%-100%	98-99.6%

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

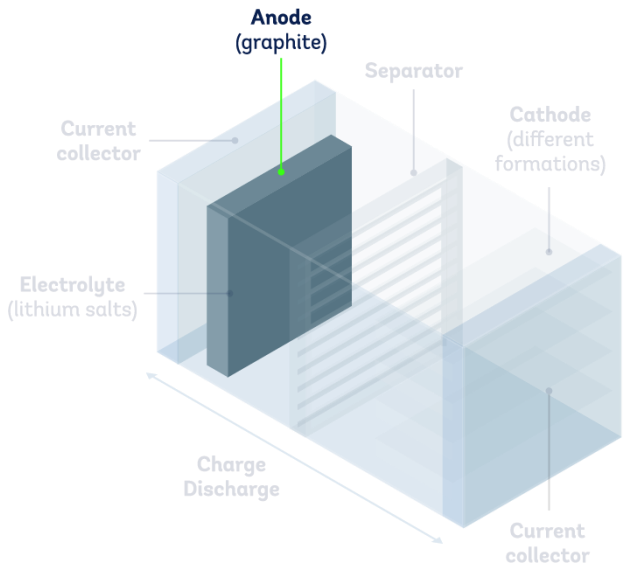
EcoGraf™ recovered high purity carbon anode material



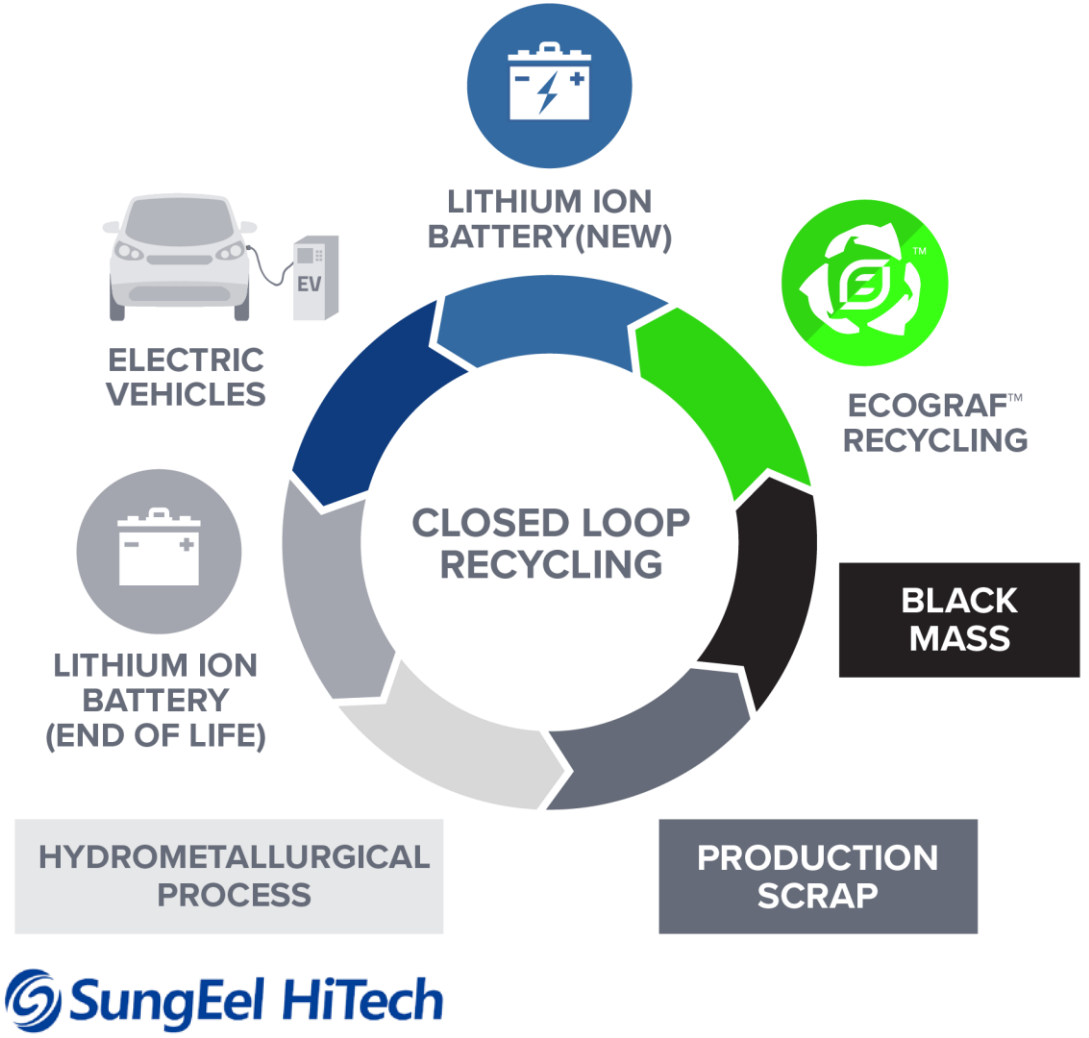
Microscopic picture: Recovered carbon anode material showing particle shapes. Oval shaped particles (spheronised natural graphite) and plate shapes synthetic graphite.

EcoGraf™ process retains particle shape for reuse.

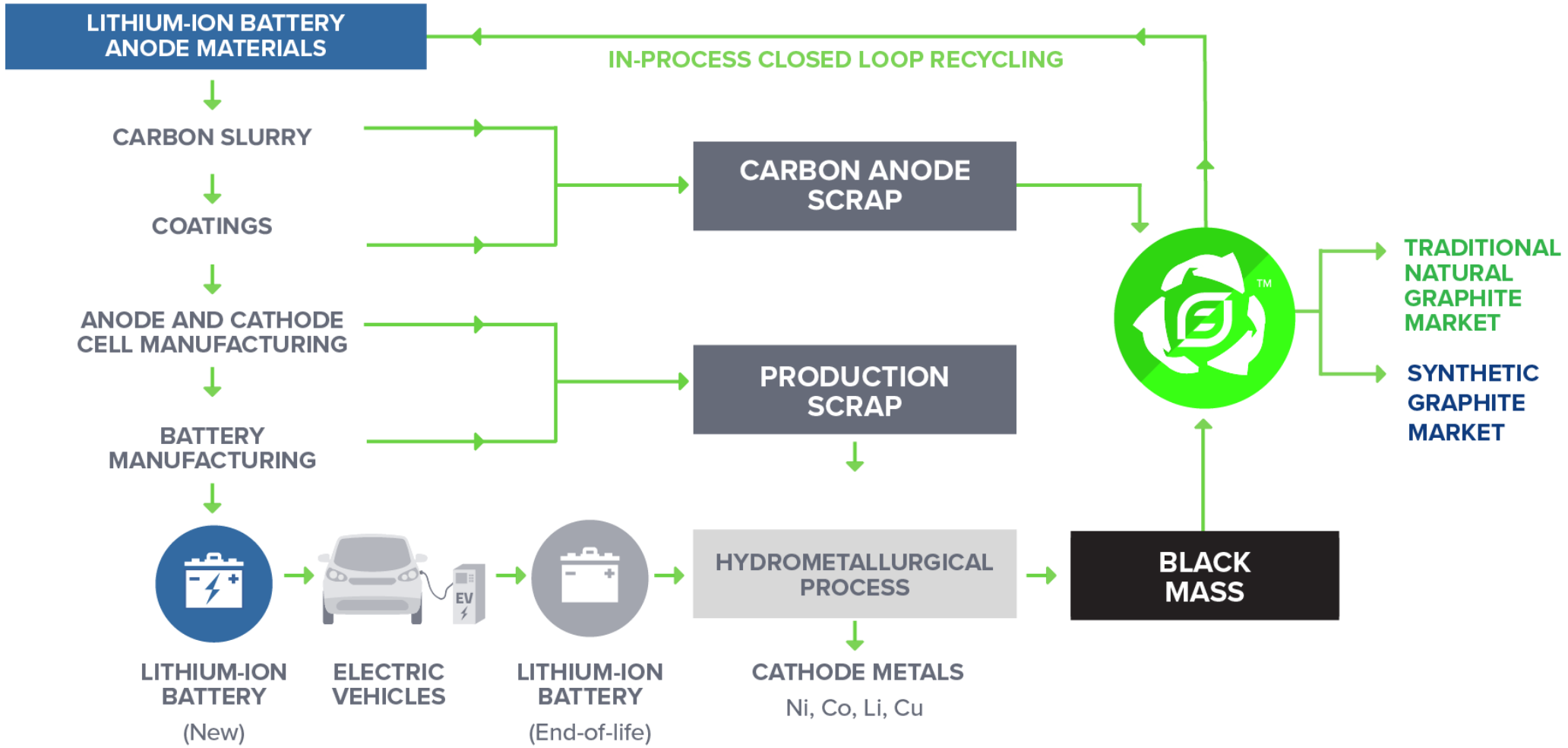
EcoGraf positioned to recover and reuse the carbon anode material



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

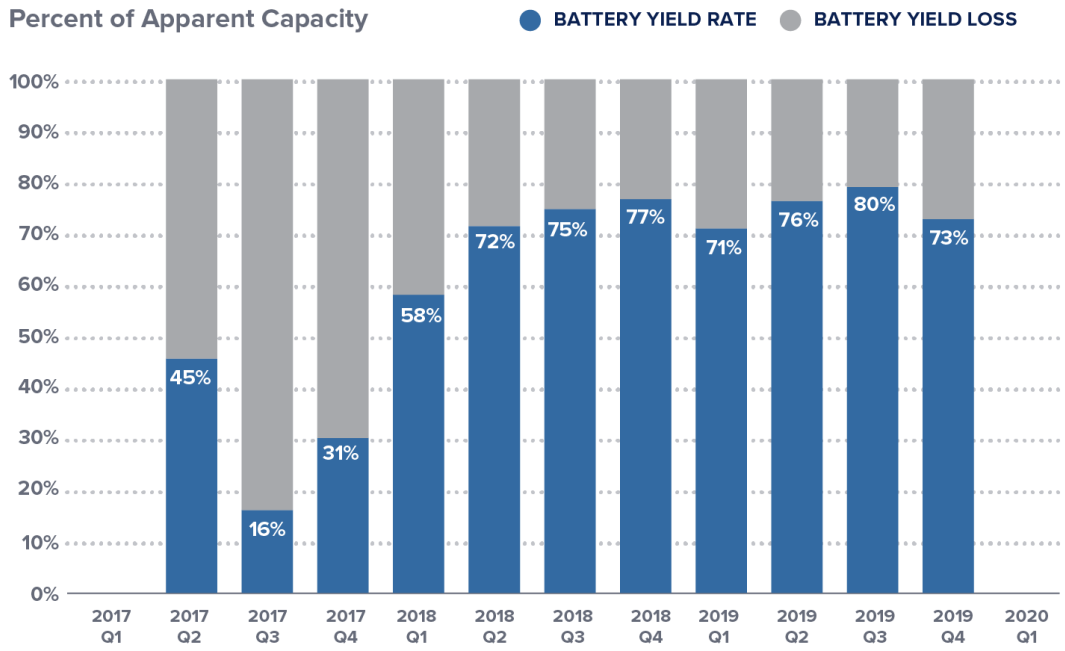


EcoGraf's strategy to recover and reuse carbon anode material



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

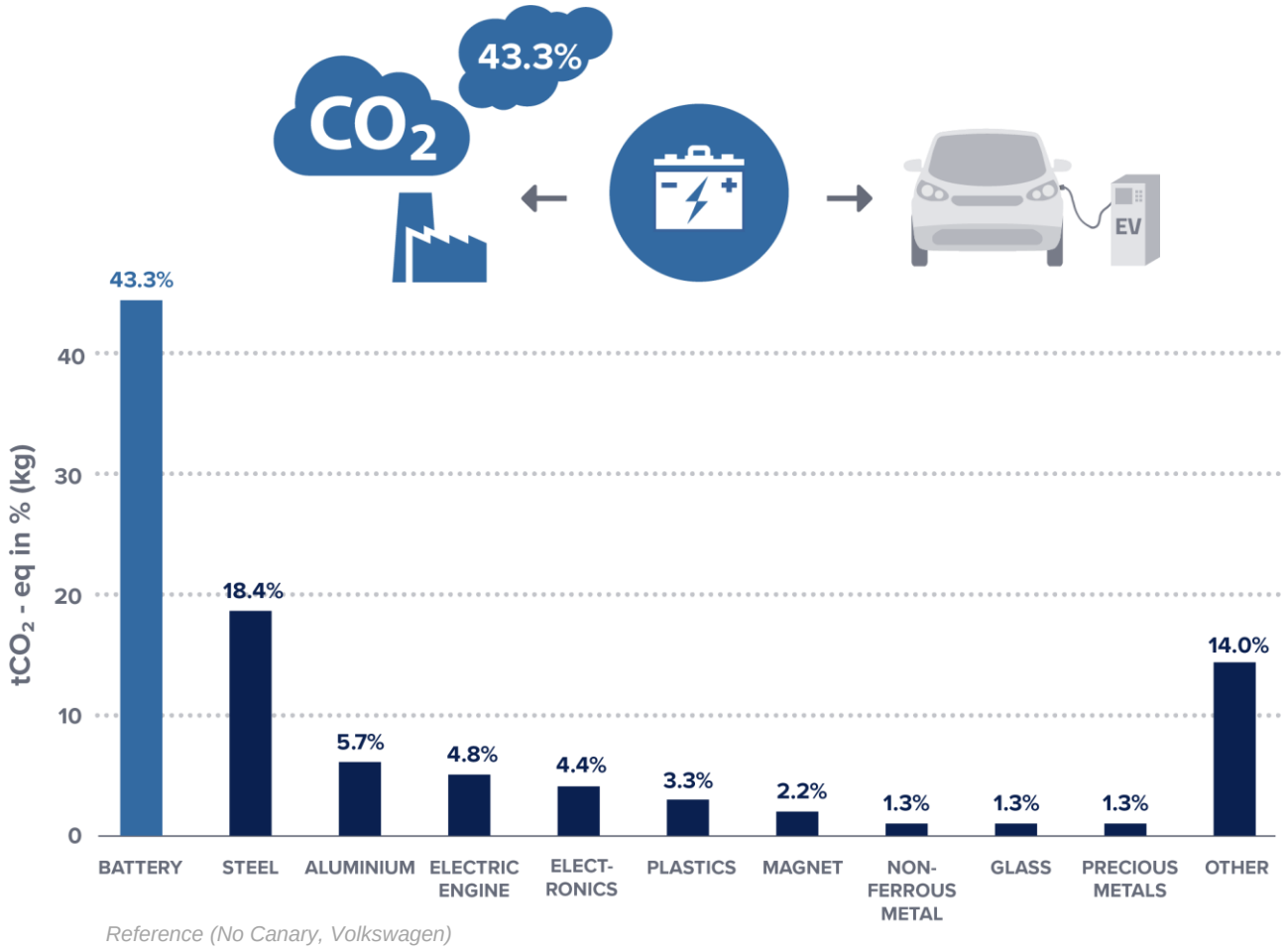
>30%

Target

~10%

Recycling - lowering carbon emission footprint of EV production

Battery represents over 40% Carbon (CO_2) emission footprint of EV production



Reference (No Canary, Volkswagen)

PRODUCTION SCRAP

- Estimated 10% to 30% production loss in cell manufacturing and in battery testing
- **Solution**: Develop 'In-Process' recovery of production scrap, i.e. slurries and coating process Waste
- Re-use would reduce 13.5kg of CO_2 per kWh

Reference (No Canary)

BLACK MASS

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

Recycling of carbon anode material has an important role to reduce carbon emissions

Recycling opportunity

EcoGraf™ proprietary purification has the potential to provide a tailored solution to increase recycling of recovered carbon anode material.

Blending EcoGraf's Kwinana high purity 'Battery Graphite' with 'Recovered Carbon Anode Materials' provides a compelling opportunity to support the transition to clean energy.

ECOGRAF BLENDED ANODE MATERIAL

Battery Spherical Graphite (99.98% C) + **Recovered Carbon Anode Material**

- Lower battery unit cost
- Lower carbon emissions

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
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_{10}**	**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_{10} 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

High returning 60ktpa BFS positions Epanko for development

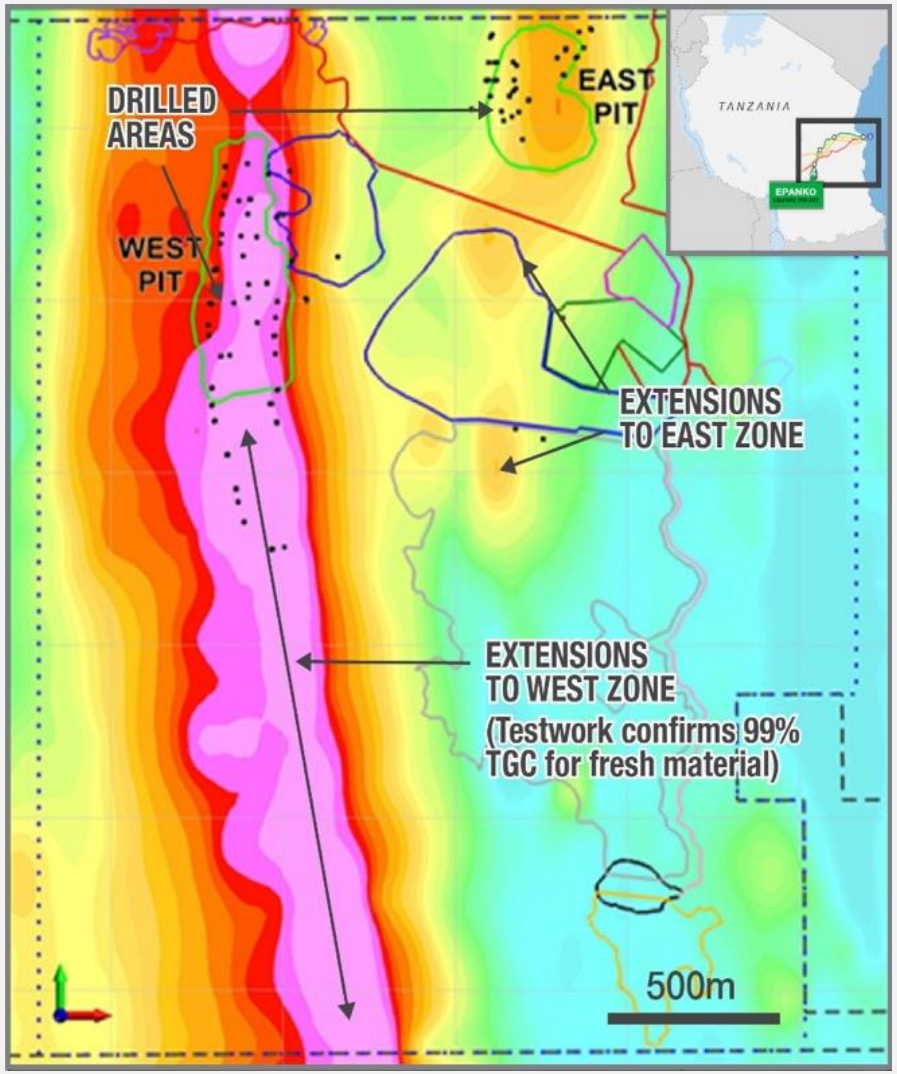
- Robust technical and financial BFS completed, conforming with IFC standards
  - Average production of 60,000tpa graphite concentrate
  - High proportion of >150 micron concentrate at carbon grades demanded by the market
  - Potential to produce a 99% carbon concentrate from <150 micron flake to supply 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$/t sold)	500
All in Sustaining cost[1]	(US$/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)

VTEM shows highly conductive undrilled western zone with significant graphite potential

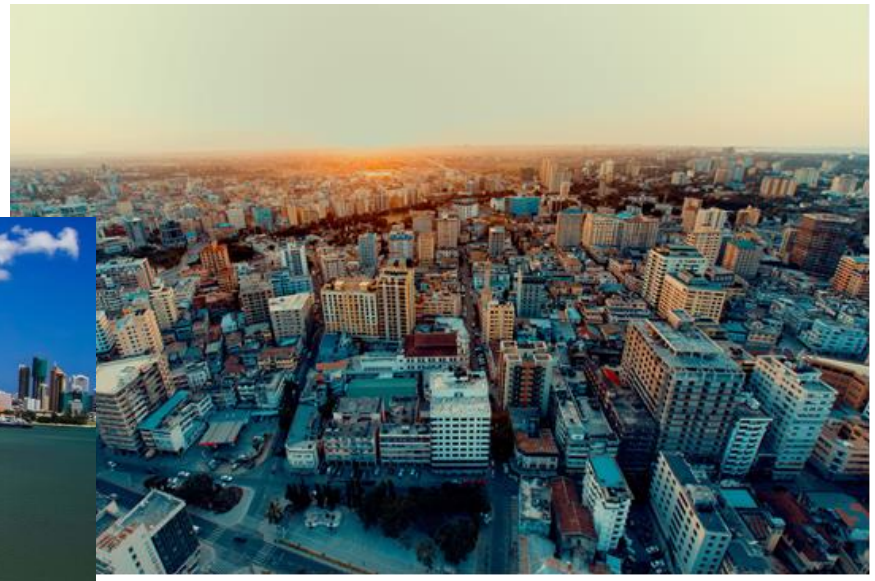
- Significant mineralisation exists outside of the Mineral Resource estimate modelled on an 8% TGC cut-off compared to the 5% TGC cut-off utilised for the Ore Reserve
  - Mineral Resource at lower 5% TGC is 113.3Mt at 7.2% TGC grade for 8.1Mt contained graphite
  - Importantly the 7.2% TGC grade under the 5% TGC cut-off above is higher than comparable Tanzanian deposits of relative scale
- Strong conductivity identified in VTEM survey highlights the potential for the delineation of additional mineralisation along strike and at depth
- Only 1.13km of the 4km strike identified by VTEM survey has been drilled on the West Pit
  - Remains open at depth with the deepest reported graphite intersection at 200m
  - Potential to provide significant tonnages of additional graphite mineralisation



Epanko provides mine-to-market ESG supply chain assurance

- 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
- Subject to the agreement of the Government of Tanzania, EcoGraf and KfW IPEX-Bank are ready to proceed to prepare formal loan documentation to enable the financing arrangements to be implemented.

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



Summary and valuation proposition

EcoGraf

Battery Graphite Manufacturing Project – Kwinana, WA

- 20,000tpa Battery (Spherical) Graphite
- US$35M Annual EBITDA
- 42.4% Internal Rate of Return
- US$317M Pretax NPV_8
- Payback ~3.3yrs

TANZGraphite

Epanko Graphite Mining Project – Tanzania

- 60,000tpa Natural Flake Graphite
- US$44.5m Annual EBITDA
- 38.9% Internal Rate of Return
- US$211m Pretax NPV_{10}
- US$3B Forecast Contribution to Tanzania

Vertically integrated graphite business positioned for the global transition to clean energy

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

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

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”, available at www.ecograf.com.au and 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, 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 and 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.

The future is electric.

EcoGraf

ASX: EGR
FSE: FMK

Head Office
Level 1, 18 Richardson Street
West Perth, Western Australia 6005
T: +61 8 6424 9000

www.ecograf.com.au