

Completion of EcoGraf™ Processing Facility Development Report

Results Confirm Attractive Market Opportunity and Support Financing and Construction Early Works Programs

EcoGraf Limited (EcoGraf or the Company) (ASX: **EGR**) has prepared the Development Report for the financing, construction and operation of the new EcoGraf™ Processing Facility in the Kwinana-Rockingham Strategic Industrial Area of Western Australia.

The Development Report supports due diligence processes for project funding arrangements, including debt financing with Export Finance Australia and was prepared in conjunction with Australian engineering and construction group GR Engineering Services Limited.

Highlights

- 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.
- High growth battery graphite market forecast by Benchmark Mineral Intelligence to expand by an annual growth rate of 31.5% over the next decade and reach 1.2 million tonnes per annum by 2030.
- Proprietary EcoGraf™ purification processing technology provides competitive advantages through environmental sustainability, product quality and low cost with patent pending and trademarks registered.
- Financial modelling shows strong economic returns, with an equity NPV₈ of US\$317m, equity IRR of 42.4% and payback period of 3.3 years.
- Conservative development schedule provides opportunity for capital savings through scheduling and procurement strategies, with GR Engineering to undertake an optimisation process during the construction early works program.
- Recycling application of the EcoGraf™ purification process to recover high purity carbon anode material from lithium-ion battery production waste and recycled batteries, provides the opportunity to assist anode and battery manufacturers reduce production costs, lower carbon emissions and progress towards closed-loop manufacturing processes.

Overview

EcoGraf is building a vertically integrated business to produce high purity graphite for the lithium-ion battery market. The new 20,000 tonne per annum EcoGraf™ Processing Facility in Western Australia will manufacture spherical graphite products for export to Asia, Europe and North America using a superior, environmentally responsible purification technology to provide customers with sustainably produced, high performance battery anode graphite.



Western Australia is a global leader in mineral extraction and processing and the location is part of Federal and State Government initiatives to establish Australia as a key participant in the global lithium-ion battery supply chain, with EcoGraf Limited receiving strong support from all levels of Government.

Development of the new EcoGraf™ Processing Facility is consistent with the Government's Future Battery Industry strategy and will create long-term skilled employment opportunities in an advanced manufacturing industry and assist in scientific research on new battery material technologies through co-operation with the Government's Future Battery Industries Co-operative Research Centre and a dedicated on-site research and development facility.

An overview of the development location and new EcoGraf™ Processing Facility are available via the following links:

<https://youtu.be/Jb0xIhFSdsU>

<https://www.ecograf.com.au/#>



Development Report Summary

The Development Report has been prepared to support funding and project implementation programs for the 6.7 Ha industrial site secured in the Kwinana-Rockingham Strategic Industrial Area of Western Australia.

It includes the results of the intensive technical program undertaken to develop the unique purification process to produce an environmentally sustainable battery graphite product, all feasibility work on micronising, spheronising, purification, process engineering, equipment selection, reagent use, capital and operating costings, detailed design, construction strategy and scheduling, site specific layout, services and infrastructure. It also incorporates an independent Graphite Market Study which confirms the opportunity for EcoGraf to provide cost competitive and environmentally superior graphite products for the high growth lithium-ion battery market. A summary of the key findings of the Development Report are provided below.

1. Financial Evaluation

An updated financial model has been prepared with the assistance of advisors Ernst & Young, incorporating the physical and cost data produced by GR Engineering from the purification testwork, feasibility and engineering programs, a summary of which was reported to the ASX on 11 June 2019 (*EcoGraf Lithium Valley Development*).

The funding structure for the US\$72m new development includes assumed debt financing of US\$35m, which is progressively drawn-down during construction and fully repaid 3 years after reaching full production.

The financial model confirms that the EcoGraf™ Processing Facility will generate strong economic returns, comfortably supporting the debt financing and providing cash flow for future development. Key financial metrics, using a base case purified spherical graphite sales price of US\$3,250/t are as follows:

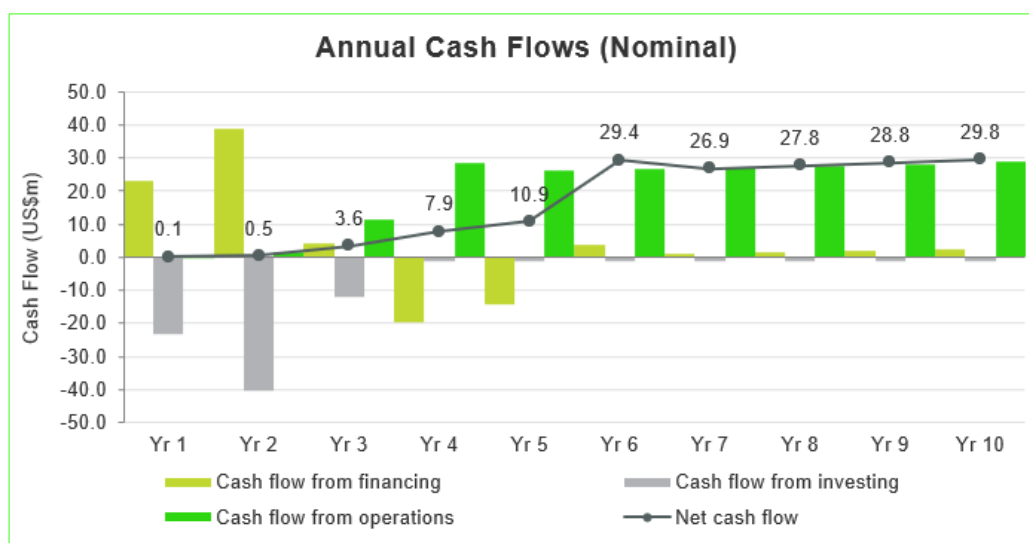
KPI	
Construction cost – initial 5,000 tpa	US\$22.8m
Construction cost – expansion to 20,000 tpa	US\$49.2m
EBITDA margin @ 20,000 tpa	38.5%
Annual EBITDA/tonne @ 20,000 tpa	US\$1,531 /t SpG
Post-tax equity NPV ₈	US\$317m
Equity pre-tax IRR	42.4%
Equity post-tax IRR	35.1%
Payback	3.3 years



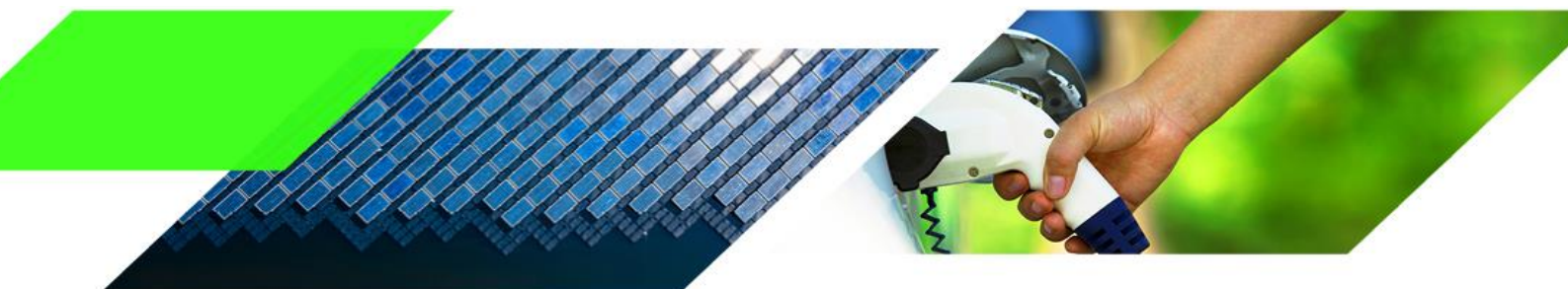
A summary of sensitivities is shown below, indicating the impact of changes in key variables, with all other assumptions remaining constant.

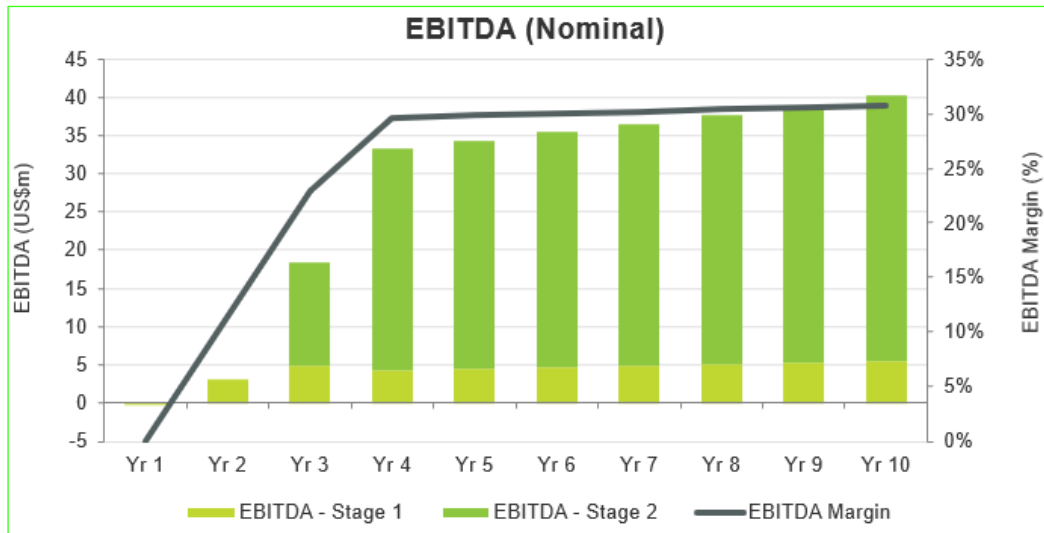
KPI @ 20,000 tpa		EBITDA Margin	Annual EBITDA	Post-tax equity NPV ₈	Pre-tax equity IRR
Base case		38.5%	US\$1,531 /t	US\$317m	42.4%
<i>Percentage change relative to base case metric</i>					
SpG pricing	+/- 10%	↑ 12% ↓ 14%	↑↓ 25%	↑↓ 28%	↑↓ 24%
Capex	+/- 10%	n/a	n/a	↑↓ 2%	↓ 10% ↑ 12%
Plant availability	+ 10%	↑ 2%	↑ 3%	↑ 15%	↑ 13%
Mechanical shaping yield	+/- 10%	↑ 7% ↓ 8%	↑ 5% ↓ 6%	↑↓ 18%	↑↓ 15%
Power cost	- 15%	↑ 3%	↑ 4%	↑ 4%	↑ 4%

Robust cash flows produced by the new EcoGraf™ Processing Facility provide for flexibility in structuring financing arrangements and for enabling further development. Base case annual cash flows relating to financing (debt and equity funding), investing (plant and equipment) and operations are shown below.



Annual EBITDA (earnings before interest, tax, depreciation and amortisation) is set-out in the following chart, highlighting positive EBITDA from the commencement of production, increasing to over US\$35m per annum once full production is achieved.





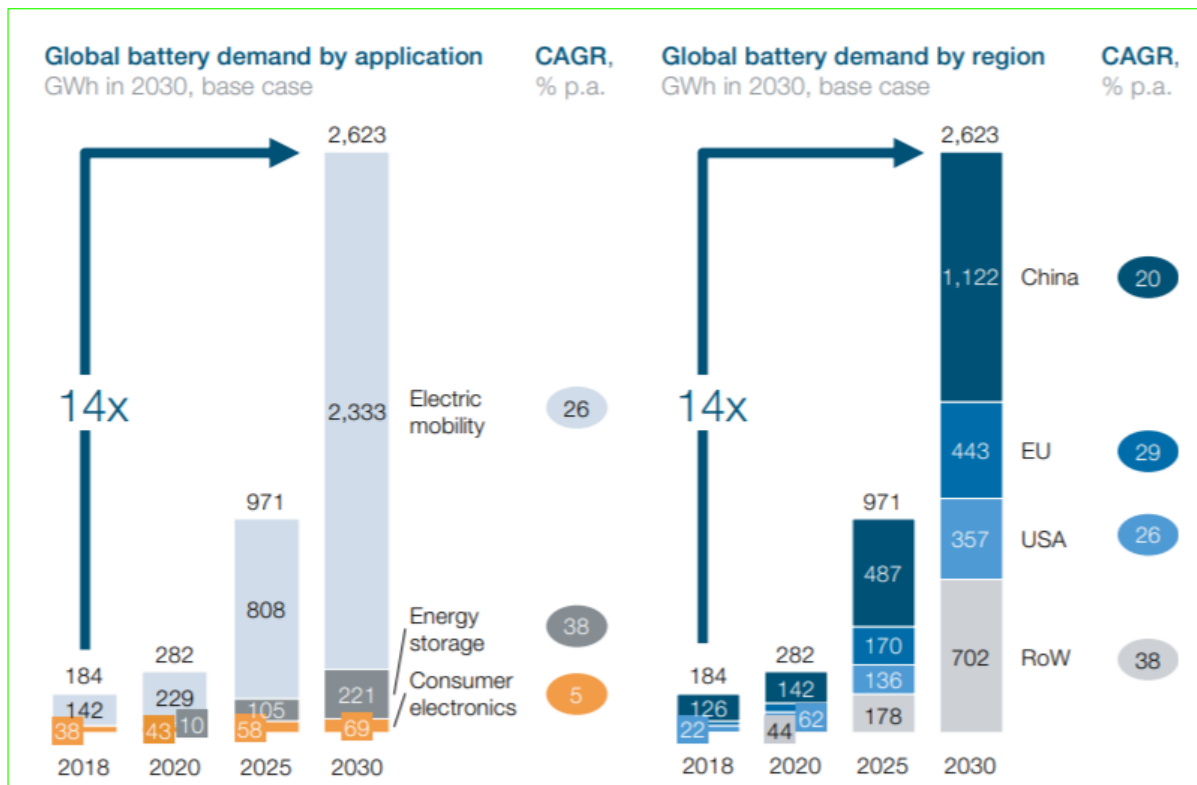
2. Battery Graphite Market

Lithium-ion batteries are at the forefront of the global transition away from fossil fuels to clean, renewable energy and graphite is required to manufacture the anodes for these batteries.

Graphite is the largest mineral component of a lithium-ion battery and its importance is highlighted by the World Bank Group in its May 2020 report 'Minerals for Climate Action: The Mineral Intensity of the Clean Energy Transition' that found natural graphite is expected to comprise 54% of the volume of all minerals required for battery manufacturing through to 2050.

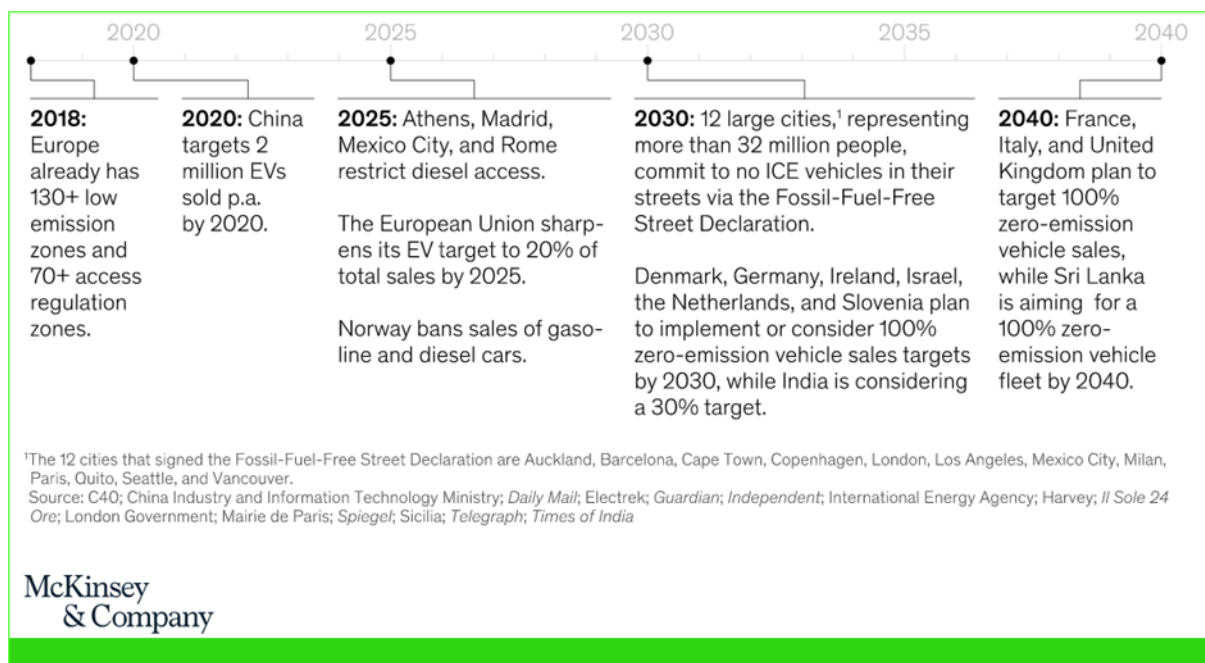
The forecast growth in battery graphite demand over the next decade is enormous, with unprecedented investment underway in Asia, North America and Europe to establish gigafactories to supply lithium-ion batteries for electric vehicles, energy storage and electronic products.





Source: World Economic Forum, "A Vision for a Sustainable Battery Value Chain in 2030", 2019

The global adoption of electric vehicles will provide the greatest source of new demand for lithium-ion batteries and graphite, supported by co-ordinated Government climate change legislation to phase out internal combustion engines as shown in the timeline below.



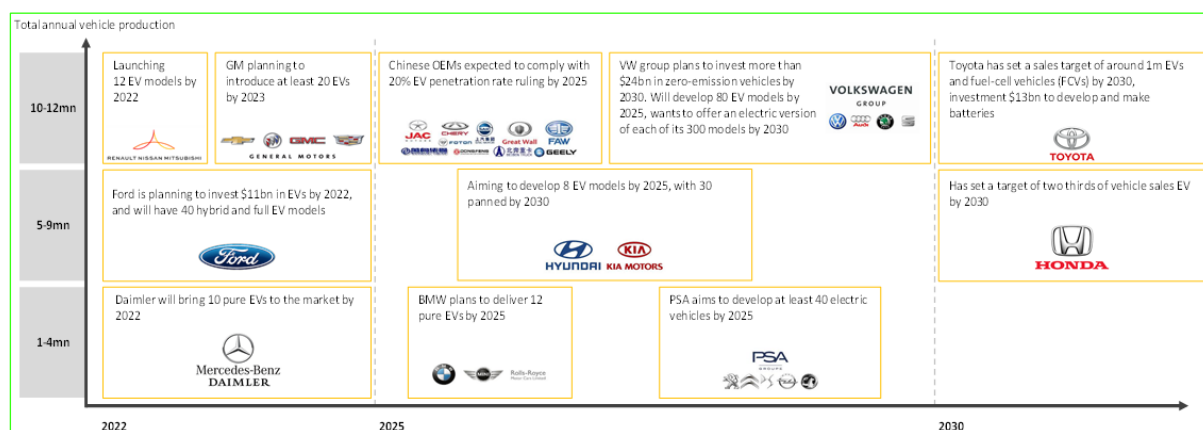
As a result of these legislative changes, the International Energy Agency forecasts the global number of electric vehicles will grow from just over 7 million in 2019 to approximately 250 million by 2030, at which time electric vehicles are expected to comprise approximately 30% of the 110 million vehicles sold each year.



By 2050, almost all vehicles sold are projected to be electric, with a typical electric vehicle battery containing 25-30kg of graphite, that is used in the battery anode to store and release lithium-ions during charging and discharging cycles.

The growth in lithium-ion batteries is just beginning and represents a long-term, Government supported, structural opportunity for the purified spherical graphite market. To date this market has centred on China, which has produced anode material for lithium-ion batteries primarily for electronic devices and a limited production of electric powered vehicles.

With global vehicle manufacturers now in the process of transitioning their existing production models to electric energy systems at an increasing rate, new lithium-ion battery manufacturing facilities are in planning and under construction to support the huge demand from the automobile industry. Announcements from vehicle manufacturers to date indicate that over US\$300 billion is being invested in electric vehicle production plants and supply chains over the next decade.



The significant expansion that is underway in battery manufacturing capacity around the world for these additional electric vehicles will underpin strong long-term demand for EcoGraf™ products, especially among European customers requiring alternative, more sustainable supply chains for high performance vehicle applications.

As part of the EcoGraf™ market development program, a new entrant Graphite Market Study was commissioned from industry forecasters Benchmark Mineral Intelligence to provide a detailed analysis of the key drivers and outlook for the battery graphite market.

The key findings from the Graphite Market Study are that the global battery graphite market is projected to increase by a compound annual growth rate of 31.5% in the decade to 2030 and as a result, there is a significant opportunity for EcoGraf™ products to target battery anode material for Tier-1 electric vehicle manufacturers, with the advantages of Australia's reputation as a reliable, high quality supplier of processed materials.

The battery graphite market is currently supplied by producers based in China who all use a graphite purification process which involves a highly toxic hydrofluoric acid treatment. In contrast, the proprietary EcoGraf™ process is non-toxic, avoids the use of hydrofluoric acid and will provide anode and battery manufacturers with an alternative source of high quality, cost competitive and sustainably responsibly produced graphite.



Potential customers in Asia, Europe and North America have indicated strong support for the value proposition offered by EcoGraf™ products that provides:

- Diversification of supply to reduce the current sole source dependence on China;
- A new and unique eco-friendly EcoGraf™ graphite purification process that eliminates the requirement for hydrofluoric acid, which is currently used by all existing producers;
- An ability to produce high purity graphite products to precise chemical and physical specifications for more demanding battery applications;
- Processing efficiency to provide a high-quality product at a competitive price point; and
- Ability to utilise the EcoGraf™ purification process to recover natural and synthetic graphite from end-of-life batteries and battery production losses as part of recycling processes.

After developing and optimising the EcoGraf™ purification process in Australia and Germany, an extensive product testing program has been undertaken and approximately 100 separate product samples have now been evaluated as part of this joint program with prospective customers, using a range of natural graphite feedstocks.

Feedback from prospective customers has been extremely positive and resulted in the signing of an inaugural sales agreement with German engineering technology company thyssenkrupp in June 2020 (<https://www.thyssenkrupp.com/en>). The agreement is a major milestone for the new development and covers at least 50% of all production for an initial term of 10 years, renewable by mutual agreement (refer ASX announcement *Term Sheet with thyssenkrupp Materials Trading* 4 June 2020).



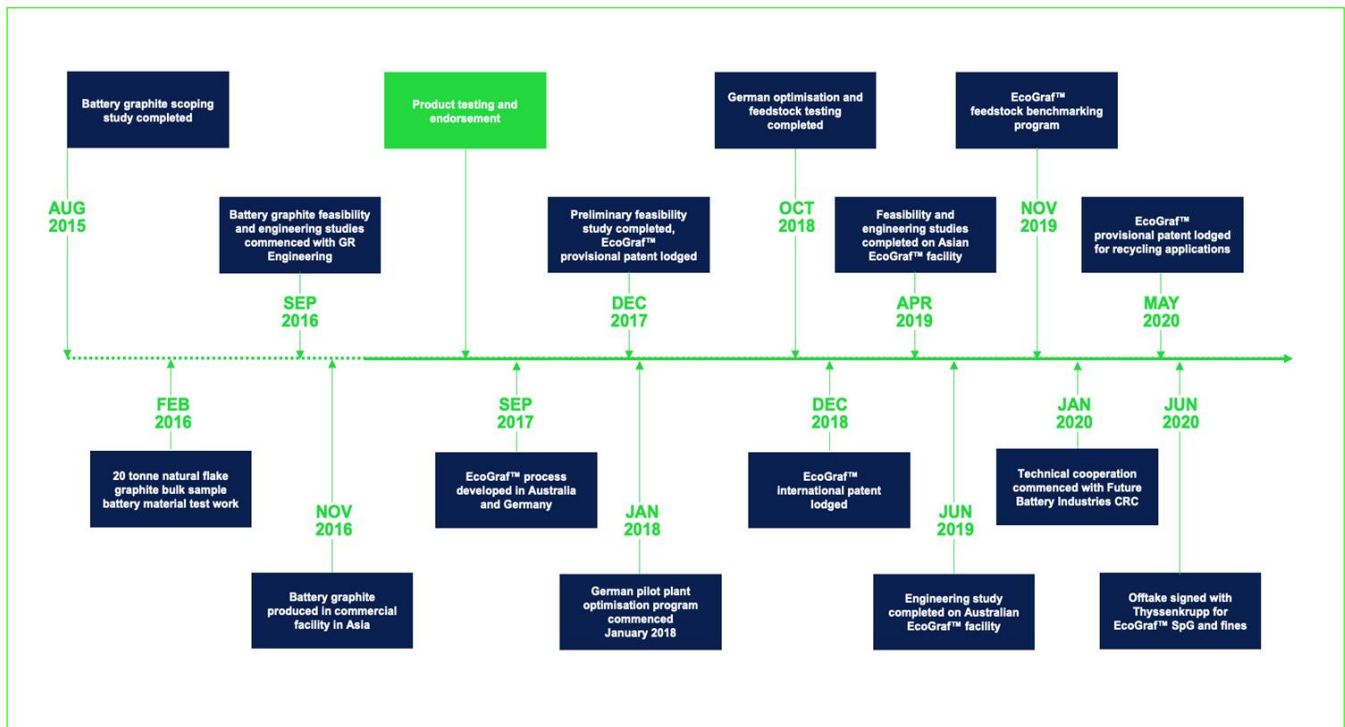
The support from thyssenkrupp demonstrates the significant opportunity for EcoGraf™ products in the new, high growth battery market and offtake and investment discussions are continuing with electric vehicle, battery and anode manufacturers in Asia, Europe and North America.



3. EcoGraf™ Purification Process and Flowsheet Design

Over the last five years an intensive technical program has been undertaken to develop a unique, patent pending EcoGraf™ purification process, capable of consistently and cost effectively producing high purity spherical graphite products to the high quality standards demanded by anode and battery manufacturers.

Key milestones during this process development journey are shown below:



The program commenced with an initial scoping study in 2015 and progressed to a feasibility study in 2016-17 with GR Engineering and CSIRO to identify the preferred chemical purification process.

Once the preliminary process route was successfully identified, the program then continued in Germany during 2017-18 to confirm and then optimise the purification process flowsheet.

The EcoGraf™ purification process is sufficiently flexible to enable specifications to be modified depending on customer requirements, but typically falls within three main categories based upon a d50 particle size of 10µm, 15µm or 25µm.

After developing and optimising the purification process, it was then successfully applied to a range of natural graphite feedstocks from existing sources of production, confirming the potential to establish a new EcoGraf™ Processing Facility independently of the development of the Company's 100% owned Epanko Graphite Mine in Tanzania.



As a result, it was decided to undertake a follow-up benchmarking program in 2019 to determine the preferred sources of material for the feedstock supply arrangements and EcoGraf then entered into an agreement with German graphite trading group Technogرافit GmbH for the sourcing and supply of natural flake graphite feedstocks for the EcoGraf™ Processing Facility.

Technogرافit GmbH is a business managed by Mr Dominik Georg Luh and is a leader in trading mineral raw materials, graphite sales and distribution in Europe. Mr Luh is the 4th generation of the Luh family, which has been dealing in graphite for the last 110 years. Technogرافit GmbH is also certified under international standard ISO 14001 for effective environmental management systems and practices.

Once the initial EcoGraf™ purification process route was identified, GR Engineering was commissioned to assess the mechanical shaping and purification steps and to develop a robust and efficient production process flowsheet, which consists of two stages:

- Mechanical shaping (micronising and spheronising); and
- Chemical purification.

There are two commercial scale techniques used for mechanical shaping, a continuous staged process containing multiple hammer mills used in series or a batch process, where both micronising and spheronising occurs in a single machine.

A typical mechanical shaping plant layout is shown below.



Visits were undertaken to suppliers in Asia to assess the type of equipment available and testwork was completed with selected suppliers to compare equipment options for the two alternative mechanical shaping techniques.

After conducting an evaluation with the equipment vendors, EcoGraf decided to use the more common continuous staged process equipment that is capable of achieving a narrower particle size distribution, which is preferred by anode manufacturers.

To enable GR Engineering to design the purification facility, each step in the EcoGraf™ purification process has been specified in detail, including graphite feedstock, reagent addition ratios, water volumes, temperatures, residence times and throughput rates.

These criteria were used by GR Engineering to establish mass balances for heat, water and power. Industrial process flowsheets were then developed for each step of the process, recognising the need for additional tankage to accommodate residence time requirements for a continuous process.

Equipment lists have been prepared by GR Engineering for more than 2,000 line items and were used to obtain budget quotes for the specified equipment and delivery times.

All of the equipment selected for the purification plant is currently in commercial use in various industries, with most to be sourced from vendors in Australia, Europe and North America. GR Engineering has prepared the capital cost estimates based on vendor quotations and applied Western Australian contractor and consulting rates for installation and construction activities.

Estimates for piping of water and gas and cabling for electrical reticulation have been calculated from the process flow diagrams and costs for each were developed from the GR Engineering database. Where specialised equipment is required, vendor quotes have been received and the vendor design data incorporated into the various cost estimates and flow diagrams.

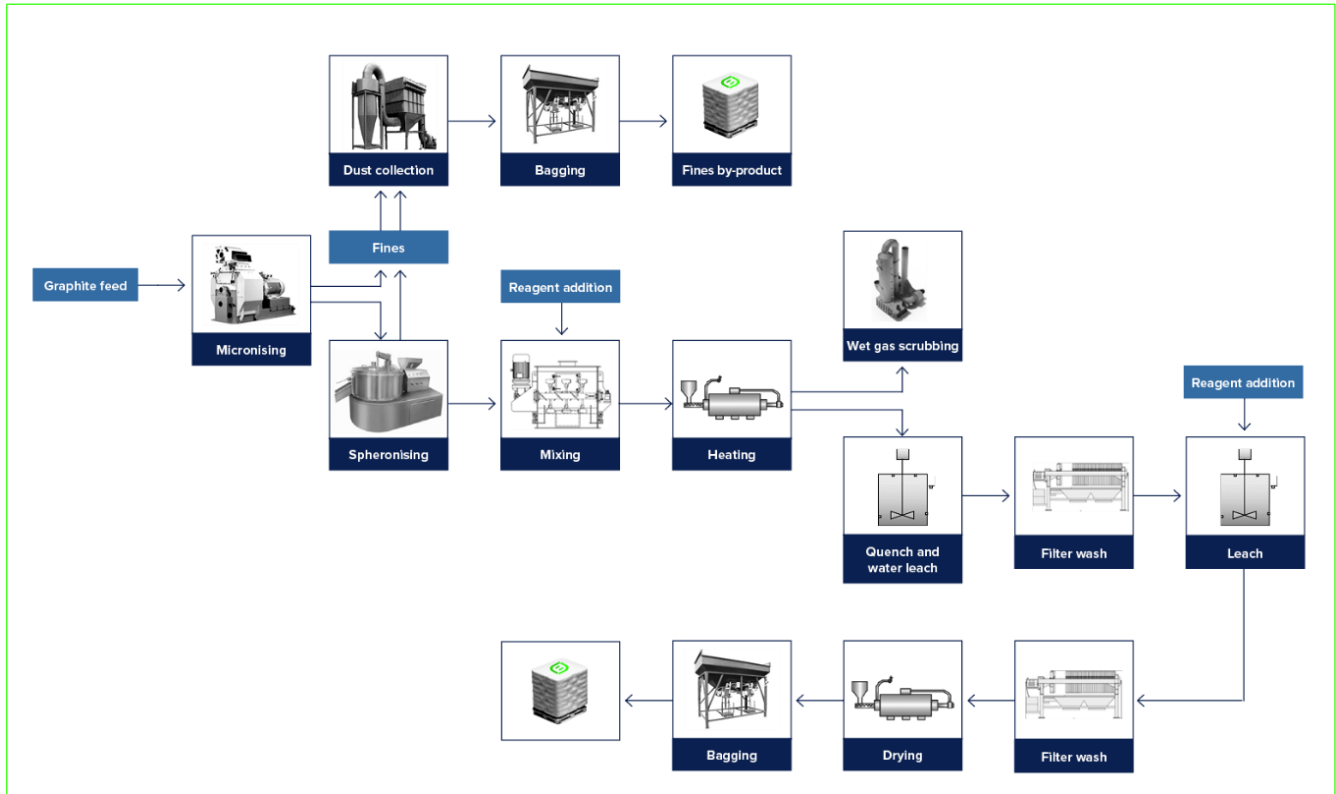
Operating cost estimates are based on the cost of power, reagents and services in the Kwinana-Rockingham industrial region and the GR Engineering database.

A detailed design and construction schedule has been developed by GR Engineering based on experience with other similar sized projects and vendor indicated delivery times for key items of plant and equipment.



The EcoGraf™ purification process is a unique, staged process where impurities are removed through the creation of new chemical compounds that are soluble in either water or chemical reagents. After the final washing and filtration stage, purified spherical graphite products are dried prior to packing and export to customers.

A summary of the EcoGraf™ mechanical shaping and purification process is provided below.



Key findings of the GR Engineering studies are that the EcoGraf™ process route:

- Can be successfully applied to a range of natural flake graphite feedstocks;
- Provides an environmentally sustainable alternative to the current purification process used by existing battery graphite producers that requires the use of toxic hydrofluoric acid;
- Delivers a high purity battery graphite product that meets the stringent physical and chemical specifications required by anode manufacturers;
- Can be successfully replicated within an industrial scale processing facility; and
- Involves modest reagent usage, resulting in competitive production costs.



4. Battery Recycling

The EcoGraf™ purification process has been successfully applied to recycle various lithium-ion battery anode materials (refer ASX announcement *Significant Battery Recycling Results* 17 August 2020).

The initial trials and testwork have been undertaken in Germany with the following results:

- Up to 100% carbon purity was achieved from EcoGraf™ purification of battery anode production waste generated during the manufacture of lithium-ion batteries, indicating the potential to re-use this material in the battery production process and reduce operating costs.
- Recovery of high purity anode material of up to 99.6% carbon from a range of 'black mass' materials sourced from recycled end of life lithium-ion batteries, indicating the potential to re-use this recovered material in both natural and synthetic high purity industrial graphite markets.



The recycling program was conducted on lithium-ion battery production scrap and black mass that contains natural and synthetic graphite combined with other components that would otherwise be considered waste. As graphite comprises approximately 50% of the mass of a typical lithium-ion battery cell, the successful trials represent a major step forward to support electric vehicle and battery manufacturers achieve more sustainable, closed-loop manufacturing processes.



These results highlight the effectiveness of the EcoGraf™ purification process for use in a range of applications, delivering a powerful and cost-effective solution for customers in a new high growth global market.



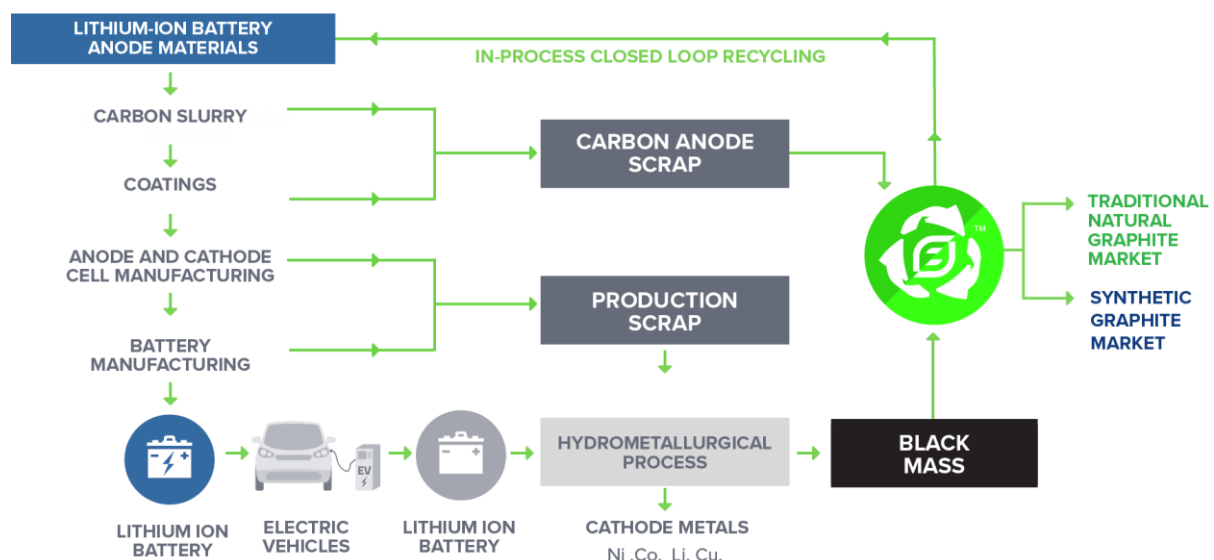
An opportunity to capture additional economic value from the development of new spherical graphite purification facilities

Following release of the results, EcoGraf has been approached by various electric vehicle and lithium-ion battery manufacturers to undertake additional testing and analysis on their specific battery materials.

Recycling of lithium-ion batteries is an area of increasing focus for Governments and industry, especially in Europe where regulations such as EU Battery Directive 2006/66/EC require battery manufacturers (or third parties acting on their behalf) to finance the cost of collecting, treating and recycling waste batteries.

The Global Battery Alliance expects the volume of lithium-ion batteries in use to grow by almost 400% over the next 5 years, presenting a major environmental challenge as the world transitions to the increasing use of electric energy for mobility and storage applications. Solutions to this challenge are focused on re-use or re-purposing of lithium-ion batteries after initial application and ultimately on recycling at end-of-life.

Recycling is an important component of the EcoGraf™ value proposition for customers who are seeking to improve lithium-ion battery manufacturing efficiencies and reduce the environmental and social costs resulting from the growing volume of battery waste. As such it represents an opportunity to capture additional economic value from the development of the new EcoGraf™ Processing Facility.



At present only the cathode metals are recovered and so recovering the carbon anode material supports greater battery recycling and has the potential to contribute to lowering both the battery unit cost and carbon emissions for electric vehicle manufacturers.



5. Research and Development

Development of the EcoGraf™ purification process is a significant achievement which is the first non-hydrofluoric acid process that can consistently produce high purity spherical graphite at a cost that is competitive with current production techniques.

To secure the intellectual property rights associated with this process, a number of patent applications have been submitted for examination and EcoGraf™ trademarks have been registered in applicable jurisdictions. Patent and trademark activities have been carried-out for EcoGraf by Wrays, one of Australia's largest independent intellectual property firms.

EcoGraf conducts extensive research and development in Australia and overseas to continue developing the EcoGraf™ purification process. These activities have been registered with the Australian Government under the research and development tax incentive program administered by AusIndustry and the Australian Taxation Office.

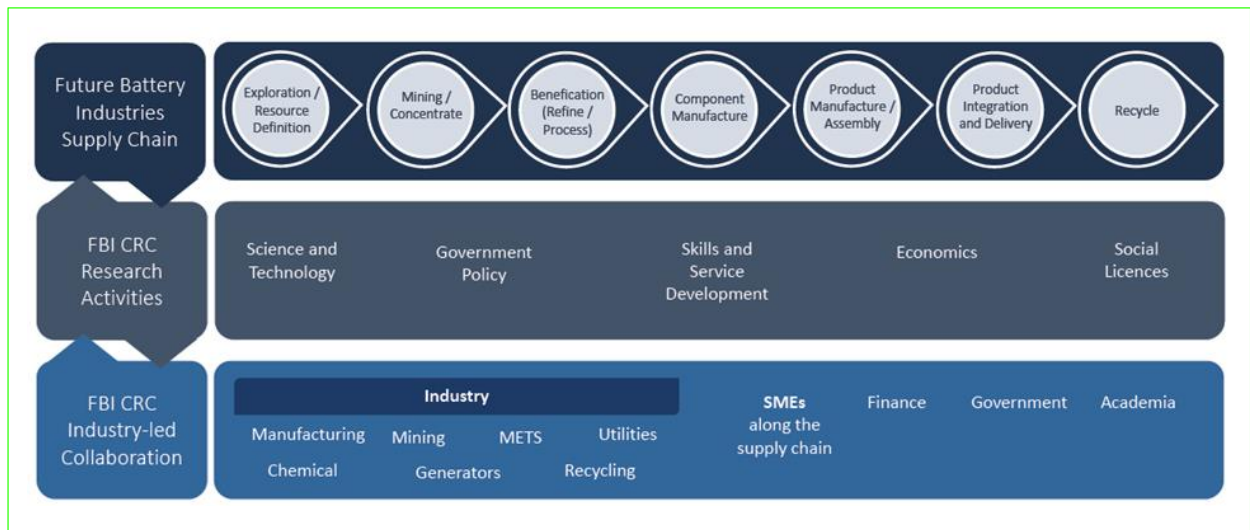
The research and development tax incentive program seeks to encourage innovation and scientific advancement in Australia by providing a financial rebate of up to 43.5% of the applicable costs of undertaking eligible research and development programs.

Construction and operation of a commercial scale EcoGraf™ Processing Facility also incorporates activities and expenditures that will be eligible for Australian Government financial support under the research and development tax incentive. To manage this process effectively, EcoGraf has appointed KPMG to provide advice on research and development matters and plant designs for the new facility include provision for a dedicated on-site research and development laboratory.

As part of its focus on further technical development, EcoGraf is collaborating with the Australian Future Battery Industries Co-operative Research Centre (FBI-CRC), a joint-venture between industry, the Australian Government and a number of University research centres. The objective of the FBI-CRC is to advance Australia's technical capabilities in lithium-ion battery related activities and to support the development of a strong battery material supply chain in Australia.



The FBI-CRC secured initial program funding of A\$150 million in 2019 and officially launched its operations in March 2020. It's adopting a holistic approach for supporting the Australian battery industry across a broad range of research activities as set-out in the figure below:



Internationally, EcoGraf is also a member of the EBA250 network, an industrial workstream of the European Battery Alliance, established by the European Commission to support the development of a European battery industry, forecast to be worth more than €250 billion annually by 2025.

MEMBERS OF



6. Western Australia

The site of the new EcoGraf™ Processing Facility is just south of the Western Australian capital city of Perth in the Kwinana-Rockingham Strategic Industrial Area. Western Australia is a global centre for mineral extraction and processing, which provides a number of key competitive advantages:

- Federal and State Government support for the establishment of a world class battery mineral production centre;
- Location links between existing east African natural graphite feedstock supplies and the north Asian lithium-ion battery market;
- Excellent transportation, energy and water infrastructure;
- Highly developed construction and mineral processing expertise; and
- Availability of reagents and consumables within the local Strategic Industrial Area.



Suitable land for the EcoGraf™ Processing Facility has been identified in the Kwinana-Rockingham Strategic Industrial Area adjacent to the major highway link to the Port of Fremantle, approximately 32 km to the north.

An area of 6.7 Ha has been secured under a two-year option agreement with the Western Australian Government land development agency, DevelopmentWA.

The property is divided into two land Lots, with the plant and infrastructure to be located facing Alumina Avenue, which is the main conduit to Patterson Road and access to the Port of Fremantle.

The new EcoGraf™ Processing Facility site layout consists of the following areas:

- Materials receiving
- Mechanical shaping
- Purification
- Product storage and dispatch
- Reagent storage
- Water treatment
- Laboratory for testing, research and development
- Plant administration
- Parking

Perth and its surrounds experience a mild, Mediterranean climate which is unlikely to pose any construction or operations risks and the availability of extended hours of sunshine is expected to promote the broader use of industrial solar panels within the Kwinana-Rockingham area, enabling the new EcoGraf™ Processing Facility to benefit from a renewable energy contribution in due course.

The land Lots will be serviced by a connection to the Western Power South West Interconnected System, which has a 22 kV circuit running directly along part of the perimeter of the site.

Water for the EcoGraf™ Processing Facility is available from two sources, recycled wastewater and municipal scheme water. The facility is favourably located adjacent to the East Rockingham Waste Water Treatment Plant (ER Waste Water Treatment Plant).

Discussions are underway with the Government owned Water Corporation of Western Australia to obtain wastewater from the ER Waste Water Treatment Plant to feed an on-site Demineralised Water Treatment Plant that will produce demineralised water for the operation. Scheme water will be used for potable requirements, including office ablutions, the research laboratory and safety showers.

Compressed air will come from air compressors and will be stored in air receivers to deliver constant air pressure and volume to the plant. Filters and dryers will be installed for instrument air.

All reagents required for operations are available locally.



To ensure strict environmental management several steps have been taken to minimise dust, aqueous and gaseous emissions, including:

- A negatively pressurised micronising and spheronising building.
- Each mill in the micronising and spheronising area is under suction with the product from the mills being collected using cyclones and bag filters, with >99.5% efficiency, prior to the exhaust air exiting to atmosphere.
- Micronised and spheronised graphite will be transported pneumatically to the bagging plant and to the purification area (wet process) thereby containing the fine material and avoiding physical handling.
- Dust and gaseous emissions from the baking process will be captured in wet scrubbers and sent to the on-site waste-water treatment plant, along with other effluent streams, for processing and recycling. Wet scrubbers generally have efficiencies of 95-98%.
- Waste-water products will be neutralised prior to disposal.
- All dry areas will have concrete slabs and all wet areas will be bunded.



The site that has been selected has had a series of environmental studies completed on behalf of DevelopmentWA. EcoGraf is committed to minimising the environmental impacts of its operations, to deliver customers with sustainably and ethically produced graphite products.

The key components of the EcoGraf™ Processing Facility that contribute to its carbon footprint are energy consumption for operations and transport.

Western Australia benefits from vast reserves of natural gas, but also experiences abundant sunshine and wind for the generation of renewable energy, with approximately 30% of the population using rooftop solar and the State Government recently initiating a number of programs to increase the use of renewable energy. EcoGraf is in discussions with third parties to evaluate the use of sustainable energy options, including solar and geothermal power generation. The outcomes of these studies will be incorporated in the consideration of renewable energy options for when additional electricity is required at full production.



Transportation efficiencies are also being evaluated to minimise the length of supply routes, the quantities of materials moved and the mode of transport.

The primary requirements for approval of the new EcoGraf™ Processing Facility are:

- A Works Approval provided by the Western Australian Department of Water and Environmental Regulation; and
- A Development Approval from the local City of Rockingham.

Due to the location within an established industrial area, none of these regulatory approvals are anticipated to impact the construction schedule and the Western Australian Government has appointed the Department of Jobs, Tourism, Science and Innovation to co-ordinate regulatory approvals for the development.

7. Construction and Operations

The contracting strategy for the new EcoGraf™ Processing Facility has been formulated on the principle that the responsibility for risk should reside with the party best able to control and manage those risks.

This is achieved using a contractor with an integrated design and construction organisation able to competently control design, procurement and construction activities to drive cost and time outcomes that correlate to the budget and schedule.

Accordingly, it is planned that GR Engineering will be engaged as EPC Contractor to engineer, procure and construct (EPC) the process plant and related infrastructure.

The EPC Contractor will carry the responsibility for the final cost, delivery schedule and process performance of the EcoGraf™ Processing Facility.

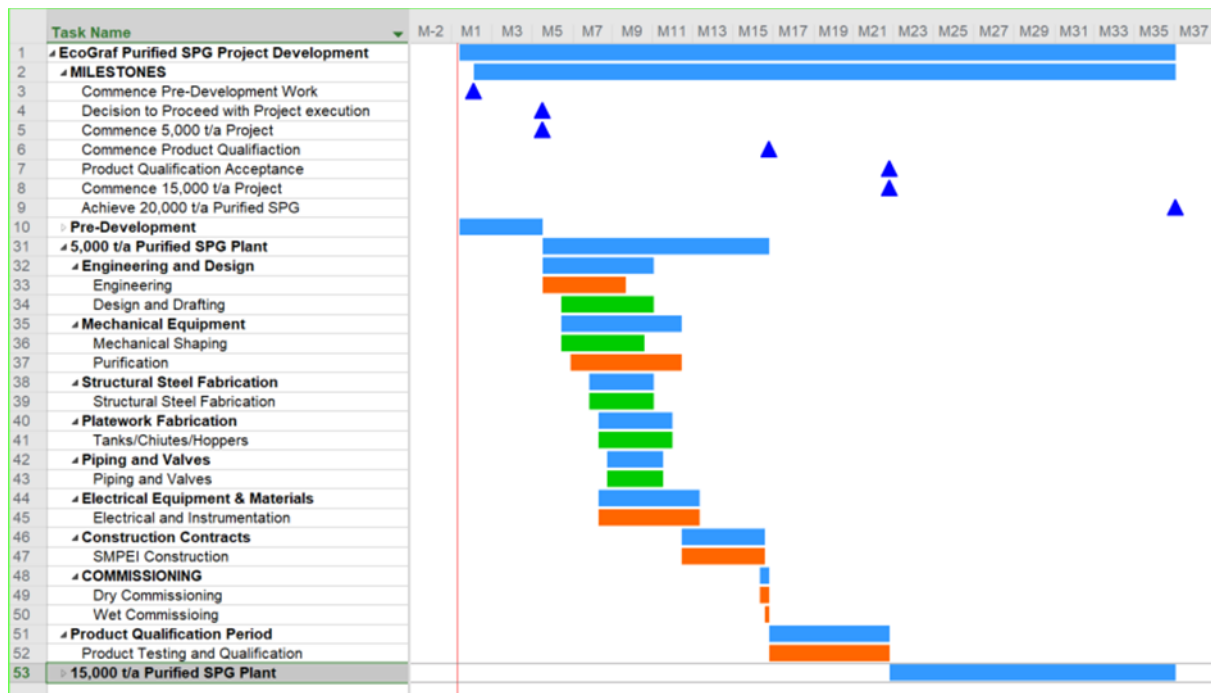
The scope of work of the EPC Contractor includes the detailed engineering and design, procurement, logistics, supply, manufacture/fabrication, construction, erection and commissioning of the civil, structural, mechanical, process, electrical, control and communications components of the facilities, based on the patented process design criteria and flowsheet developed by EcoGraf.

The EcoGraf™ Processing Facility will be developed in two construction phases. Construction phase 1 is to install an initial purified spherical graphite product capacity of 5,000 tonnes per annum. Construction phase 2 involves an expansion to achieve a spherical graphite product capacity of 20,000 tonnes per annum.

Following award and engagement of the EPC Contractor, the program involves a phase 1 design and construction period of 46 weeks from award to practical completion, of which 18 weeks is related to on-site construction. The expansion phase is expected to take up to 62 weeks to reach practical completion.



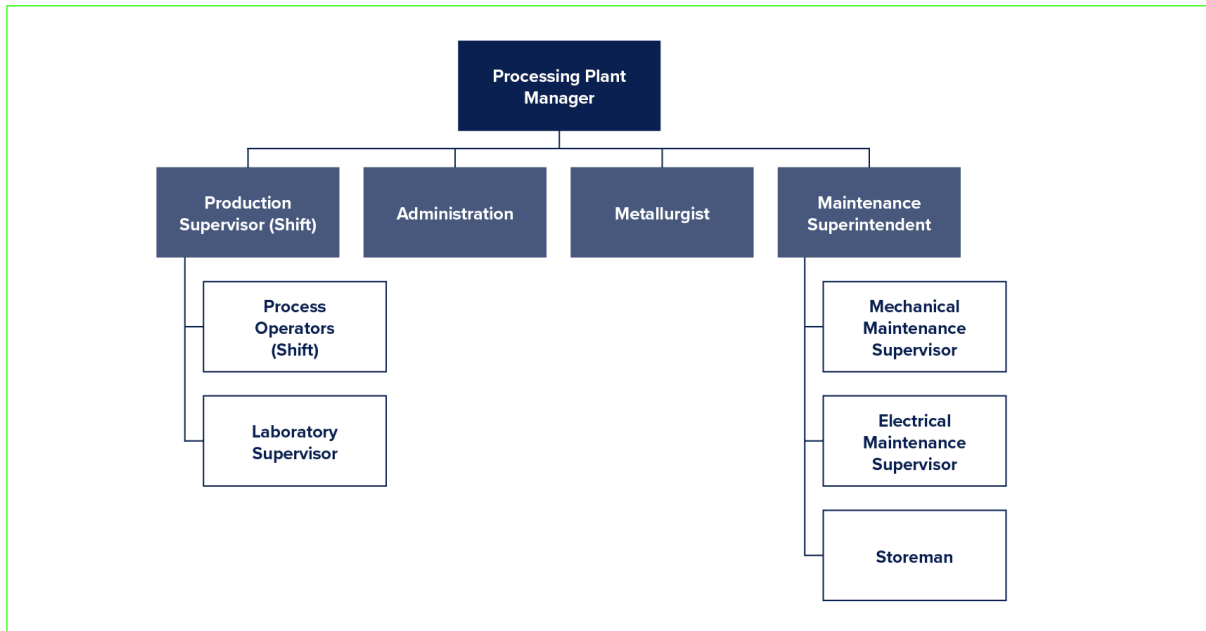
The phase 1 and phase 2 development schedule is summarised below.



The operational workforce comprises 61 persons, of which 37 will be employed prior to the initial commissioning phase, followed by a further 24 persons who will be employed during the expansion phase as the purified spherical graphite production rate is increased to 20,000 tonnes per annum.



The EcoGraf™ Processing Facility will operate continuously 24 hours per day, 365 days per year and the operational phase organisational structure is as follows:



Regular and effective training is an essential foundation for the safe and efficient performance of the EcoGraf™ Processing Facility.

A structured training program will be implemented to cover:

- General principles and processes;
- Standard operating procedures;
- Safe work procedures;
- Emergency procedures;
- First aid training; and
- Environmental awareness and statutory obligations.

Personnel will be employed on the following rosters:

- Management, technical and administrative staff will work on a 5 days on and 2 days off roster, with 4 weeks annual leave; and
- Shift rotation staff will work on an 8 days on and 6 days off roster, with 4 weeks annual leave.

The majority of the workforce will be recruited from the Kwinana-Rockingham region which is an established industrial centre with a large pool of skilled personnel.

Specialised roles will be sourced from the surrounding Perth region, which has a world class mineral processing sector and a depth of suitably experienced personnel.



8. De-risking and Future Opportunities

The extensive program of testing, evaluation, engineering and planning undertaken by EcoGraf over the last 5 years has significantly de-risked the development of the EcoGraf™ Processing Facility.

Project planning has benefitted from globally leading graphite expertise through the use of scientific skills in Australia and Europe, combined with on-going product testing and feedback from prospective customers in Asia, North America and Europe.

There is also strong Federal and State Government support for the establishment of a world class battery minerals processing centre in the Kwinana-Rockingham industrial area and technical cooperation with the Future Battery Industries Co-operative Research Centre provides an opportunity for Australia to develop skilled jobs and expertise in the new, high growth global lithium-ion battery market.

Risks

Key risks for the EcoGraf™ Processing Facility have been identified as market risk, processing risk and construction risk. Each of these risks has been addressed as follows:

Market risk

EcoGraf has commissioned Benchmark Mineral Intelligence to undertake a Graphite Market Study to guide its marketing strategy. The analysis presented in that report indicates a projected significant shortage of new battery graphite to satisfy the forecast 31.5% compound annual growth rate in demand over the decade to 2030 to support the global transition to electric vehicles.

As a result, new capacity will be required to fulfil this demand and anode, battery and electric vehicle manufacturers in Japan, Korea, Europe and North America are actively seeking to diversify their supply chains and reduce supply risks.

The EcoGraf™ competitive proposition is based on providing a responsibly produced, superior quality and cost competitive product for these customers.

Repeated testing and optimisation programs have confirmed that the EcoGraf™ purification process is very effective and by eliminating the use of toxic hydrofluoric acid, it provides an environmentally responsible alternative for customers. The process is also efficient in its reagent consumption, resulting in a production cost that is equivalent to existing suppliers and mitigating against price competition risk.



A combination of strong market demand for new producers, a demonstrated product quality that satisfies stringent customer requirements, an environmentally superior production process and a competitive production cost, provide EcoGraf with confidence that market risk will be effectively managed during the start-up and expansion of operations.

Confirmation of the product's competitive value is provided by the inaugural 10 year sales arrangement signed with German industrial and technology group thyssenrupp for approximately 50% of planned production.

Processing risk

The EcoGraf™ process comprises standard industrial process steps.

Mechanical shaping equipment for micronising and spheronising will be sourced from existing manufacturers in Asia and is used extensively in the industry. A pilot plant scale mechanical shaping plant has been used by EcoGraf in Germany since 2018 for process development and has provided extensive data to ensure mechanical shaping processes will be effective during operations to generate targeted yields, while preserving the important physical properties of particle size distribution, tap density and specific surface area.

The equipment is to be shipped to the Port of Fremantle and installed by the EPC Contractor under the supervision of engineers provided by the equipment vendors.

Effective operation of the EcoGraf™ purification process is critical to success and extensive work has been undertaken to develop, optimise and validate the purification process in Australia and Germany with prospective customers from Asia, Europe and North America. The purification equipment layout has been designed by GR Engineering and is based on accommodating the various steps required to meet the strict physical and chemical characteristics required by anode and battery manufacturers.

Processing risk is reduced because the unique EcoGraf™ purification process consists of a sequence of actions, each of which can be adjusted during operations to achieve the desired product specification.

The process utilises equipment already in use commercially and the EPC Contractor will source the equipment from reputable vendors who will supply mechanical and performance guarantees.



Construction risk

The selection of GR Engineering as EPC Contractor mitigates construction schedule and cost risk by leveraging their extensive experience in delivering a range of mineral processing facilities under an EPC model. GR Engineering has worked with EcoGraf for the last 6 years on studies for the both the Epanko Graphite Project and the EcoGraf™ Processing Facility.

GR Engineering is also headquartered in Western Australia and is familiar with construction and operations activities in the Kwinana-Rockingham industrial region.

This provides a readily available supply of skilled personal and specialist expertise to ensure the successful delivery of the project.

Opportunities

During the course of the technical studies, several high priority opportunities have emerged that will be further investigated as part of the development program.

Plant availability

A conservative 75-85% availability has been adopted for the processing equipment, based on advice provided by vendors and the requirement for robust performance guarantees.

In practice, an availability of 85-90% is expected by adopting a rigorous and proactive maintenance regime. As a result, plant efficiency can be significantly improved, leading to an increase in production rates, lower capital intensity and reduced unit operating costs.

Feedstock processing optimisation

The feedstock benchmarking program has provided EcoGraf with valuable data on flake graphite performance in the mechanical shaping and purification processes.

Once in operation, the EcoGraf™ Processing Facility will be optimised for specific feedstock origins, leading to savings through increased mechanical shaping yields and lower consumption of energy and chemical reagents.

Further efficiencies and cost savings can be realised through the establishment of a centralised mechanical shaping facility in Tanzania once the Epanko Graphite Mine is in operation. This reduces the volume of feedstock that is transported for chemical purification and provides a flexible feedstock supply chain for future EcoGraf™ Processing Facilities in Europe and North America.



Renewable energy

Energy comprises almost 15% of net operating costs per tonne of product and potential exists for cost and carbon impacts to be reduced through the use of renewable energy.

While Western Australia currently uses its vast reserves of natural gas to generate approximately half of its energy requirements, it also experiences abundant sunshine and wind for the generation of renewable energy, with approximately 30% of the population using rooftop solar to supplement residential energy use. The State Government has recently initiated a number of programs to accelerate the move to renewable energy, whilst preserving the stability of the electricity grid.

As a result, EcoGraf is partnering in several studies into the use of sustainable sources of energy, including solar and geothermal options. The outcomes of these studies will be incorporated into the consideration of renewable energy options for when the additional 11 MVA electricity is required at full production.

Recycling and high purity by-products

The EcoGraf™ purification process has been successfully applied to recover high purity natural and synthetic graphite from lithium-ion production waste and end-of-life batteries.

Given the forecast growth in battery production over the next decade, recycling will be essential for maximising battery manufacturer processing efficiency and for compliance with regulatory requirements on waste management.

EU Battery Directive 2006/66/EC requires European battery manufacturers (or third parties acting on their behalf) to finance the cost of collecting, treating and recycling waste batteries. Bloomberg™ forecasts this recycling market will be worth US\$18 billion by 2030 and the results from the EcoGraf™ recycling testwork have attracted interest from a range of electric vehicle and battery manufacturers.

Additional evaluation programs are on-going with potential customers and there is a significant market opportunity for the EcoGraf™ purification process to provide an environmentally superior and cost-effective graphite recovery solution for its customers.

The EcoGraf™ purification process has also been successfully applied to produce a number of high purity graphite products for two large European industrial groups, resulting in the successful qualification of EcoGraf™ high purity fines by-products (refer ASX announcement *High Purity Fines Qualified with European Customers* 12 May 2020).

This positive outcome presents an opportunity to purify the fines by-products for sale into higher value specialised industrial markets, for use in building cements, flame resistant coatings and thermal insulation. A follow-up program is being undertaken to evaluate market opportunities for the sale of these high purity fines by-products to building and industrial companies in Australia and Europe.



In addition to the high priority opportunities above, there are several other areas where processing efficiencies can be realised during the commissioning and operations phases.

Conclusion

The Development Report reinforces the robust business case for the new Western Australian EcoGraf™ Processing Facility and supports the project funding process announced earlier this year (refer ASX announcement *Australian Government Agency In-Principle Debt Funding Support for West Australian Battery Graphite Plant* 3 March 2020).

In parallel, EcoGraf is also receiving interest from potential strategic partners within the lithium-ion battery supply chain and also positive support from Federal and State Government agencies in relation to export market development opportunities in Asia and the completion of necessary regulatory approval processes for the commencement of site activities.

This announcement is authorised for release by Andrew Spinks, Managing Director.

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About EcoGraf

EcoGraf is building a vertically integrated business to produce high purity graphite for the lithium-ion battery market.

The new state-of-the-art processing facility in Western Australia will manufacture spherical graphite products for export to Asia, Europe and North America using a superior, environmentally responsible purification technology to provide customers with sustainably produced, high performance battery anode graphite. In time the battery graphite production base will be expanded to include additional facilities in Europe and North America to support the global transition to clean, renewable energy in the coming decade.

Use of the EcoGraf™ purification process to recover graphite from recycled batteries will also assist the lithium-ion battery industry to reduce waste and improve production efficiency.

To complement the battery graphite operations, EcoGraf is developing the TanzGraphite natural flake graphite business, commencing with the Epanko Graphite Project, which will supply additional feedstock for the spherical graphite processing facilities and provide customers with a long term supply of high quality graphite products for industrial applications such as refractories, recarburisers and lubricants.

EcoGraf, a unique vertically integrated graphite business, positioned for the future of clean energy.

A video fly-through of the new facility is available online at: <https://www.ecograf.com.au/#home-video>



Forward looking statements

Various statements in this announcement 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 this announcement 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 announcement 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.

Information in relation to the feasibility study conducted on the production of battery-grade graphite using the Company’s EcoGraf technology, including production targets and forecast financial information derived from the production targets, included in this announcement 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.

Competent persons

Any information in this announcement 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 announcement of the matters based on his information in the form and context in which it appears.

Information in this announcement 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 announcement 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, evaluation and 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, Minerals Resources and Ore Reserves”. Steve O’Grady consents to the inclusion in this announcement of the matters based on his information in the form and context in which it appears.

