

## ASX Release

February 22, 2021

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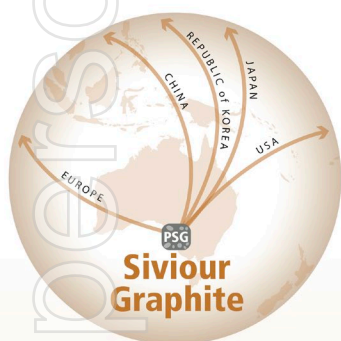
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## Critical minerals for a secure future



## Renascor's Eco-Friendly Graphite Purification Technology Achieves Outstanding Results

### Renascor's Purification Process Independently Validated in Germany, Producing Purified Graphite Exceeding Industry Standards

#### Highlights

- Advanced mineral processing trials undertaken by leading German independent battery mineral consultancy group Dorfner Anzaplan confirm suitability of Renascor's eco-friendly technology to purify graphite to battery anode grade, with results up to 99.98% Carbon (C) (versus anode industry standard of 99.95% C).
- The results follow over five years of mineral processing tests by Renascor that have led Renascor to adapt a proven technique that avoids the use of hydrofluoric (HF) acid to create an environmentally friendly and cost-effective method for purification of Renascor's Siviour natural flake graphite for use in lithium-ion battery anodes.
- Renascor's HF-free purification technique has already been used to produce Purified Spherical Graphite (PSG) from Siviour Graphite Concentrates that exceeds anode industry quality specifications, including having achieved first stage qualification with two world-class anode company offtakers that account for up to two-thirds of Renascor's stage one production<sup>1</sup>.
- **Renascor intends to use its HF-free purification technology to create a competitive advantage in the production of high-quality PSG with leading environmental, social and governance (ESG) credentials in the first integrated in-country mine and battery anode material operation outside of China.**
- The results of the current purification trials will be used for detailed engineering design for construction of Renascor's planned Stage 1, 28,000tpa PSG manufacturing facility in South Australia, as well as to support on-going offtake and finance discussions.

Renascor Resources Limited (ASX: RNU) (**Renascor**) is pleased to announce the results of independent mineral processing trials undertaken by leading German battery mineral consultancy group Dorfner Analysenzentrum und Anlagenplanungsgesellschaft mbH (**Dorfner Anzaplan**) that have confirmed the suitability of Renascor's HF-free technology to purify graphite to battery grade, with results up to 99.98% C (versus anode industry standard of 99.95% C).

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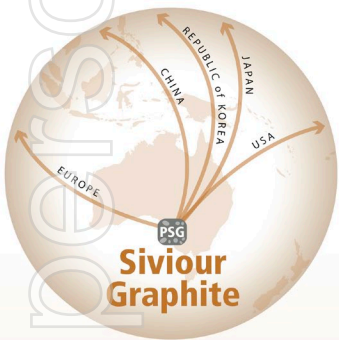
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Commenting on the results of the purification trials, Renascor Managing Director David Christensen stated:

*“The Renascor technical team has invested over five years in understanding the mineralogical properties of the Siviour graphite deposit and developing and adapting an environmentally-friendly and cost-effective technology to purify Siviour graphite to meet the demanding requirements of lithium-ion battery anode manufacturers.*

*The results of these recent trials offer strong support that we can use our HF-free purification technology to create a competitive advantage in the production of high-quality Siviour PSG with leading ESG credentials in the first integrated in-country mine and battery anode material operation outside of China.*

*We expect the results of the trials with Dorfner Anzaplan will not only support detailed engineering design for the construction of our planned Stage 1, 28,000tpa PSG manufacturing facility in South Australia, but will also assist in offtake and finance discussions by underscoring Renascor’s commitment to environmental and social standards in delivering mine to market supply chain assurance.”*

Background

Renascor’s Battery Anode Material Study<sup>2</sup> proposes a vertically integrated battery anode material operation in South Australia that combines a mining operation at Renascor’s 100%-owned Siviour Graphite Project with a downstream processing operation to produce PSG for use in lithium-ion battery anodes. See Figure 1.

Renascor’s Integrated Battery Anode Material Manufacturing Operation

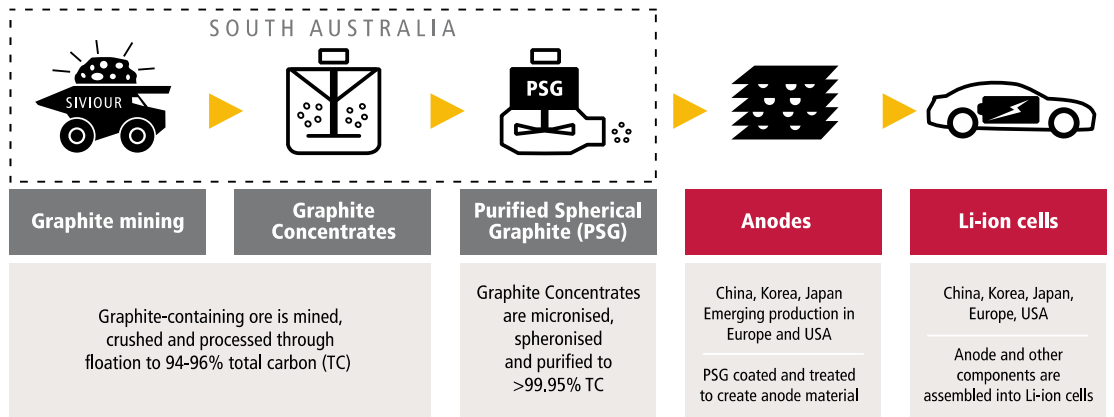


Figure 1. Graphite to anode supply chain, showing activities included in Renascor’s proposed integrated Battery Anode Material manufacturing operation

By leveraging off the comparatively low-cost of Siviour Graphite Concentrates as feedstock for PSG production, and co-locating the downstream operation in Australia, the Battery Anode Material Study shows a globally competitive gross operating cost of US\$1,989 per tonne of PSG.<sup>3</sup>

Renascor achieves a relatively low PSG unit operating cost in large part because the battery anode materials operation obtains the key raw material, Graphite Concentrates, at



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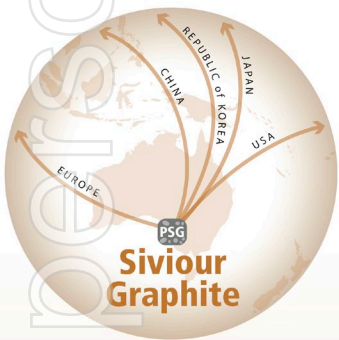
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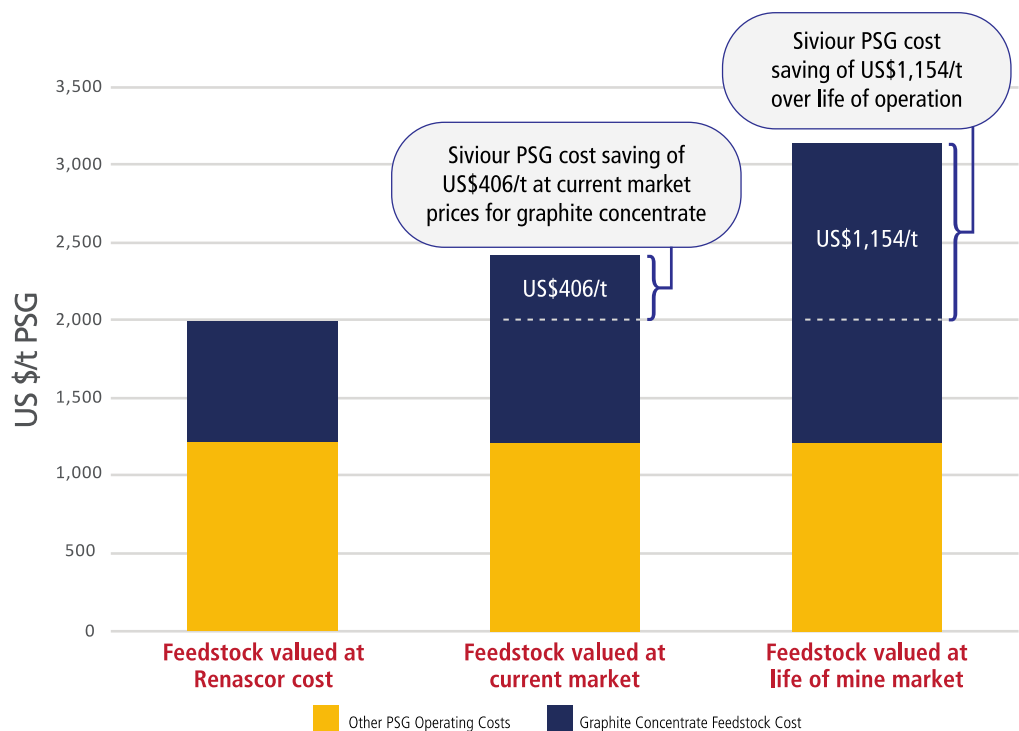
Renascor’s operating cost, rather than the market price that would be charged by third party suppliers.

Accordingly, Renascor’s cost for obtaining Graphite Concentrates for downstream processing into PSG is equal to Siviour’s projected life of mine unit operating cost of US\$355 per tonne.<sup>4</sup>

The current market value for Graphite Concentrates is approximately US\$550 per tonne,<sup>5</sup> and over the life of the battery anode material operation, the average market value of Graphite Concentrates is projected to be US\$898 per tonne.<sup>6</sup>

This price difference for Graphite Concentrate feedstock has an exaggerated impact on PSG operating costs primarily because only half of the Graphite Concentrates used as feedstock are spheronised to PSG during the milling process (i.e., a ~50% mass yield from Graphite Concentrate to PSG).<sup>7</sup> In other words, twice as much Graphite Concentrate feedstock is required compared to the resultant PSG production.<sup>8</sup>

As shown in Figure 2 below, the potential PSG unit operating cost savings attributable to using Siviour Graphite Concentrates is US\$406 per tonne based on current Graphite Concentrate prices. With Graphite Concentrate prices projected to grow over the life of the battery anode material operation,<sup>9</sup> the potential cost savings from sourcing Graphite Concentrate from Siviour grows to over US\$1,150 per tonne over the life of the operation.



**Figure 2. Impact of Graphite Concentrate feedstock cost on unit PSG operating costs**

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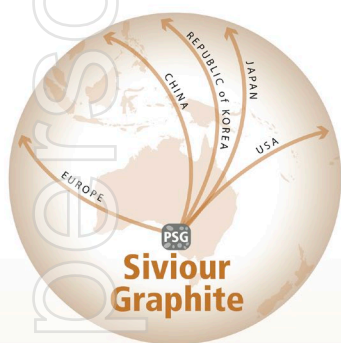
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## Purification trials

Over the past five years, Renascor has undertaken comprehensive mineral processing tests on Sivour graphite and has adapted an HF-free caustic roasting technique for use with Sivour graphite in order to upgrade Sivour Graphite Concentrates to +99.95% C, the minimum purity level generally accepted for incorporation of natural flake graphite into lithium-ion battery anodes.

Caustic roasting involves using a caustic solution before roasting at low temperature and leaching with hydrochloric acid. An important advantage of the caustic roasting process is that it offers a more environmentally friendly process to purify graphite to battery-grade than the purification technique generally used in China, which uses more environmentally harmful HF.

Since the completion of the Battery Anode Material Study in July 2020, Renascor has continued to develop and refine its HF-free purification technique through programs designed to optimise both the quality of the graphite produced through its use, as well as the projected cost at commercial scale<sup>10</sup>.

Recent tests have included purification trials undertaken by Dorfner Anzaplan, in collaboration with Renascor's external engineering advisors Wave International.

Dorfner Anzaplan is leading consultancy and engineering company with particular experience in battery minerals. Dorfner Anzaplan's graphite expertise includes testing, developing and adapting mineral processing parameters to purify Graphite Concentrates to lithium-ion battery grade levels of +99.95% C. Wave International is an Australian-based resource development and engineering consultancy with extensive experience in the battery minerals sector, including acting in the capacity of external study manager and supervising engineers of Renascor's Battery Anode Material Project<sup>11</sup>.

Renascor's program with Dorfner Anzaplan was designed to utilise Renascor's historical work and parameters for producing PSG from Sivour graphite concentrates, validate its suitability for producing battery-grade anode material and optimise its application for use at commercial scale.

The program, in its initial production trials, successfully produced high-purity, battery-grade PSG from Sivour graphite concentrates, with results up to 99.98% C, in excess of both the industry standard of 99.95% C and Renascor's previous work, which produced 99.97% C PSG<sup>12</sup>. Subsequent trials will include tests designed to optimise the process to minimise reagent consumption and capital equipment costs.

## Significance

The results of the recent trials are significant because they provide further validation of Renascor's eco-friendly purification technique and its suitability to produce HF-free battery-grade PSG for use by lithium-ion battery companies.



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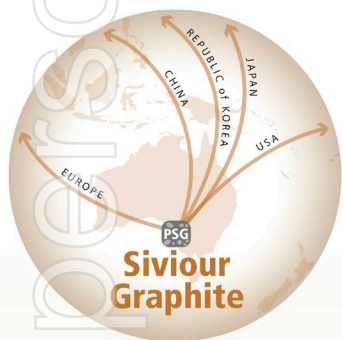
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Anode manufacturers are currently 100% dependent on Chinese producers of natural flake PSG, where the vast majority of processors use more environmentally harmful HF. Renascor's technology is HF-free and supports Renascor's strong ESG credentials in meeting high environmental and social standards in delivering mine to market supply chain assurance.

As Renascor continues to advance offtake and finance discussions, the use of Renascor's HF-free purification technology is an important asset in demonstrating sustainability standards.

The results, which returned the highest purity levels achieved to date, also offer further support for the efficiency of Renascor's purification technology and supports Renascor's plans to optimise the process to reduce reagent consumption and produce PSG at globally competitive costs.

### Next steps

The purification trials with Dorfner Anzaplan are expected to continue through March, with results to be used for detailed engineering design for construction of Renascor's planned Stage 1, 28,000tpa PSG manufacturing facility in South Australia.

This ASX announcement has been approved by Renascor's Board of Directors and authorised for release by Renascor's Managing Director David Christensen.

### For further information, please contact:

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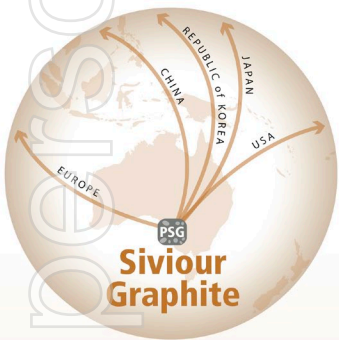
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**Lithium-ion Battery Anode Market**

As a result of growth in the electric vehicle and lithium-ion battery markets, the demand for lithium-ion battery anodes is also experiencing significant expansion. This has resulted in increased demand for PSG by anode manufacturers, with annual growth rates of up to 29% predicted through to 2030, leading to an increase in the market from approximately 200,000 tonnes in 2019 to 2.4 million tonnes by 2029<sup>13</sup> (Figure 3).

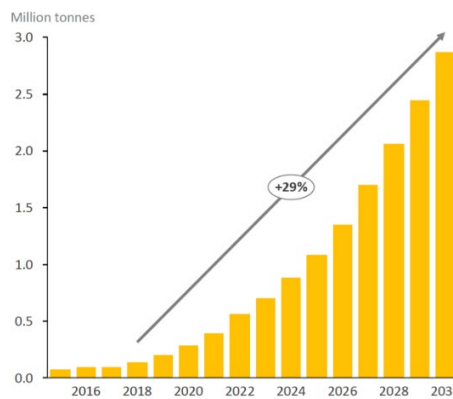


Figure 3. PSG demand forecast (Source: Benchmark Mineral Intelligence)

The production of lithium-ion battery anodes is largely concentrated in China, which accounts for approximately 85% (600,000tpa) of current lithium-ion battery anode capacity. The remaining 15% of lithium-ion battery anode capacity is centered in South Korea and Japan, with emerging anode production sources being developed in Europe and North America. China is also the highest growth market for lithium-ion battery anodes, with over 90% (560,000tpa) of new capacity currently under construction<sup>14</sup>. See Figure 4.

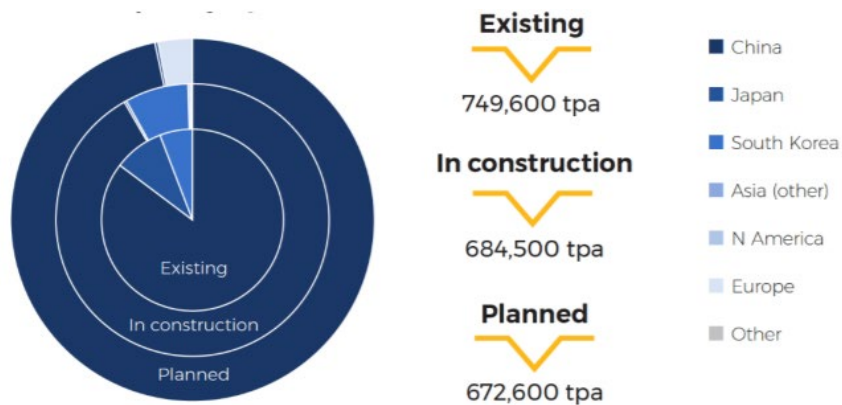


Figure 4. Global anode capacity (Source: Benchmark Mineral Intelligence)



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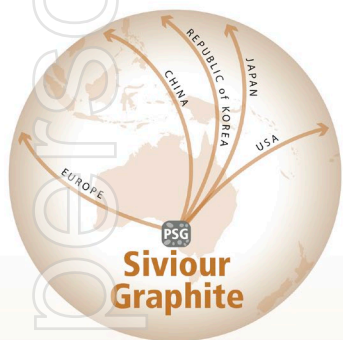
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## Bibliography

1. Renascor ASX announcement dated 11 November 2019, "Sivour Definitive Feasibility Study"
2. Renascor ASX announcement dated 1 July 2020, "Battery Anode Material Study"
3. Renascor ASX announcement dated 14 July 2020, "Independent Purification Tests Confirm Low-Cost Battery-Grade Purified Spherical Graphite from Sivour Graphite"
4. Renascor ASX announcement dated 29 September 2020, "MOU with One of China's Largest Battery Material Supplier Groups"
5. Renascor ASX announcement dated 12 January 2021, "Renascor Achieves First Stage Product Qualification with Offtake Partner Minguang New Material"
6. Renascor ASX announcement dated 27 January 2021, "Renascor Enters into Further Offtake MOU with Leading Battery Anode Manufacturer"
7. Renascor ASX announcement dated 11 February 2021, "Offtake for Two-Thirds of Production of Purified Spherical Graphite Has Rapidly Achieved First Stage Product Qualification"

## Disclaimer

Renascor confirms that it is not aware of any new information or data that materially affects the information included in the original market announcements and that all material assumptions and technical parameters underpinning the estimates in the relevant market announcement continue to apply and have not materially changed. Renascor confirms that the form and context in which the Competent Person's findings are presented have not been materially modified from the original market announcement.

This report may contain forward-looking statements. Any forward-looking statements reflect management's current beliefs based on information currently available to management and are based on what management believes to be reasonable assumptions. It should be noted that a number of factors could cause actual results, or expectations to differ materially from the results expressed or implied in the forward-looking statements.

<sup>1</sup> See Renascor ASX announcement dated 11 February 2021.

<sup>2</sup> See Renascor ASX announcement dated 1 July 2020.

<sup>3</sup> See Renascor ASX announcement dated 1 July 2020, pp 3-4.

<sup>4</sup> Source: Sivour Concentrate Definitive Feasibility Study (Sivour Concentrate DFS). Renascor ASX announcement dated 11 November 2019. The estimated LOM average operating cost of US\$355 per tonne of Graphite Concentrates consists of the following breakdown: (1) an average LOM cost of US\$361 per tonne of Graphite Concentrates Feedstock, and (2) average LOM cost of US\$349 per tonne of Graphite Concentrates sold to the market.

<sup>5</sup> Source: Benchmark Mineral Intelligence (January 2021).

<sup>6</sup> Source: Sivour Concentrate DFS. Fair market value of US\$898 per tonne is based on life of mine projected price forecast from Benchmark Mineral Intelligence for -100 mesh 94%-95% C Graphite Concentrate.

<sup>7</sup> The Battery Anode Material Study assumes that Graphite Concentrates that do not pass to the purification for sale as PSG are sold as a bi-product for sale into the recarburiser market. Renascor is also assessing opportunities for further processing for sale into the market for high purity fines and ultra-high purity fines.

<sup>8</sup> During the purification process, additional "losses" occur, as spheronised Graphite Concentrates are upgraded from purity levels of typically 94%-95% to +99.95% C.

<sup>9</sup> See Sivour Concentrate DFS, p. 28.

<sup>10</sup> See Renascor ASX announcements dated 14 July 2020 and 12 August 2020.

<sup>11</sup> See Renascor ASX announcement dated 1 July 2020.

<sup>12</sup> See Renascor ASX announcement dated 14 July 2020.

<sup>13</sup> Source: Benchmark Mineral Intelligence (2019).

<sup>14</sup> Source: Benchmark Mineral Intelligence, "Anode Market Assessment", January 2021.