

## ASX Release

November 18, 2019

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## ASX CODE

RNU

### Developing Australia's Largest Graphite Deposit



## Battery-Grade Graphite Produced from Siviour Concentrates via Low-Cost Purification

- Purification tests on Siviour graphite concentrates using a potentially low-cost purification technique have produced battery-grade graphite, with purities of up to 99.98% total carbon (TC).
- The purification tests were undertaken by Urbix Resources (**Urbix**), using Urbix's low-temperature, non-oxidative purification technique, which has the potential to reduce reagent and energy costs in comparison to other graphite purification techniques.
- The test results offer further support for the marketability of Siviour graphite concentrates into the growing lithium-ion battery market by demonstrating that Siviour ore is amenable to purification via multiple techniques<sup>1</sup> to achieve battery-grade purity specifications of over 99.95% TC.
- The results also offer the potential to achieve further cost-savings in Renascor's proposed downstream spherical graphite operation, following the completion of the Siviour Spherical Graphite Pre-Feasibility Study (**Spherical PFS**) earlier this year. See Renascor ASX announcement dated 21 February 2019.

Renascor Resources Limited (ASX: RNU) is pleased to announce the results of purification tests using a potentially low-cost purification technique that has produced battery-grade graphite, with purities of up to 99.98% total carbon (TC).

Commenting on the test results, Renascor Managing Director David Christensen stated:

*"Our recently concluded definitive feasibility study has demonstrated that Siviour is uniquely advantaged in its ability to produce graphite concentrates - from the low sovereign risk jurisdiction of Australia - at amongst the lowest cost of any graphite development globally.*

*The results announced today offer further support for Renascor's strategy to leverage off of the low cost and geographic advantage of Siviour by establishing a vertically integrated graphite concentrate and downstream spherical graphite operation utilising the best available graphite purification technologies.*

*With nearly all spherical graphite used in lithium-ion battery anodes currently sourced from China, these results demonstrate Siviour's potential to offer strategic diversification of supply of this globally important commodity at a competitive cost."*

<sup>1</sup> Renascor has previously produced over 99.95% TC, battery-grade graphite from Siviour ore using a caustic roasting technique in which Siviour graphite concentrates are combined with a caustic solution and then roasted at low temperature before being leached with hydrochloric acid (see Renascor ASX announcement dated 12 August 2019), and through hydrofluoric acid purification, the technique generally used in China (See Renascor ASX announcements dated 25 January 2018 and 15 February 2018).

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**Overview**

**Spherical PFS**

Earlier this year, Renascor completed the Spherical PFS, which confirmed the opportunity to unlock further value from Renascor's 100%-owned Siviour Graphite Project through Australia's first integrated graphite concentrate and spherical graphite operation.

The Spherical PFS concluded that Siviour could produce purified spherical graphite at a projected gross cash operating cost of US\$1,962 per tonne.<sup>2</sup> Currently, nearly all purified natural flake graphite is produced in China, with costs estimated at between US\$2,000 and US\$2,700 per tonne.

**Spherical graphite market**

Renascor considers the market for spherical graphite, which is used in lithium-ion battery anodes, to offer high potential for significant returns due to the projected growth of the lithium-ion battery market.

The projected increased demand in lithium-ion batteries has the potential to significantly increase the demand for spherical graphite, with projected compounded annual growth rates of up to 26% between 2015 and 2030. See Figure 1.

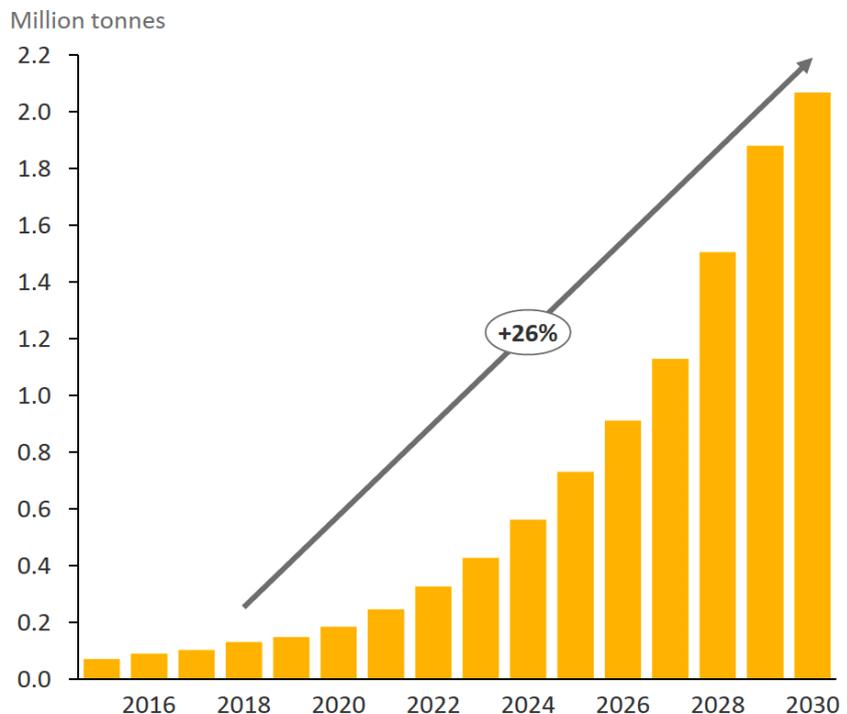


Figure 1. Uncoated spherical graphite demand forecast (2015 to 2030) (Source: Benchmark Mineral Intelligence)

<sup>2</sup> See RNU ASX announcement dated 21 February 2019, pp 2-3 and 20. The Spherical PFS projected total gross operating costs of US\$1,962 per tonne, which could be reduced to a net cost of US\$1,412 per tonne through the sale of a recarburiser bi-product at a projected cost US\$550 per tonne.

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### Description of Urbix test work

Urbix is a US-based graphite processing specialist active in the development of technologies to improve the graphite value chain.

Urbix has developed a proprietary purification process, which has not previously been commercially used in the graphite sector, that uses a low-temperature (80°C), non-oxidative purification technique to produce battery-grade graphite from graphite concentrates. The Urbix technique offers the potential for cost savings in purification by lowering reagent and energy costs in comparison to other graphite purification techniques.

To assess the suitability of the Urbix purification technique for Siviour, Renascor provided Urbix with Siviour graphite concentrates for testing at Urbix's laboratory in Mesa, Arizona (USA).

Testing was performed on sample PO976, a sample of Siviour graphite concentrate with a purity of approximately 96% TC. Utilising Urbix's proprietary purification technique, the sample was successfully purified to battery grade graphite, with Urbix concluding that: *"All data indicates that Siviour graphite can be economically upgraded to graphite with 99.96% total graphitic carbon."*

A summary of key results is provided below:

Sample	Trial	Sample status	%TC
PO976	Purified, trial 1, batch 1	Composite sample	99.97%
PO976	Purified, trial 1, batch 2	Composite sample	99.98%

### Significance

The results of the Urbix purification tests are significant for Renascor because they offer further support for the marketability of Siviour graphite concentrates into the growing lithium-ion battery market by demonstrating that Siviour ore is amenable to purification via multiple techniques to achieve battery-grade purity specifications of over 99.95% TC.

Renascor's previous spherical graphite purification testing included tests involving both caustic roasting, as well as hydrofluoric acid purification. In both cases, Renascor successfully produced over 99.95% TC, battery-grade anode material from Siviour graphite concentrates. See Renascor ASX announcement dated 21 February 2019, page 10 and Renascor ASX announcement dated 12 August 2019 pages 3 to 5.

The results from the Urbix test work now offer a further purification technique to meet battery-grade specifications.

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The results also offer the potential to achieve further cost-savings in Renascor's proposed downstream spherical graphite operation through the adoption of Urbix's purification technique.

#### Next steps

Renascor's next steps in the development of its spherical graphite operation are expected to include advanced discussions with potential offtake and strategic partners and qualification testing of Siviour spherical graphite.

Concurrently, Renascor is preparing for more advanced feasibility studies for the production of spherical graphite to build on the results of the Spherical PFS. As part of this preparation, Renascor will continue with optimisation process design test work programs, including additional purification tests, as well as milling and battery test programs.

#### Bibliography

1. Renascor ASX announcement dated 11 November 2019, "Siviour Definitive Feasibility Study"
2. Renascor ASX announcement dated 12 August 2019, "Positive Results from Spherical Graphite Tests"
3. Renascor ASX announcement dated 21 February 2019, "Spherical PFS Demonstrates Increased Returns for Siviour"
4. Renascor ASX announcement dated 31 October 2018, "Successful Pilot Plant Concentrate Production"
5. Renascor ASX Announcement dated 31 August 2018, " Successful Locked-Cycle Tests & Bulk Concentrate Production"
6. Renascor ASX Announcement dated 15 February 2018, "99.99% Spherical Graphite Produced from Siviour"
7. Renascor ASX Announcement dated 25 January 2018, "Battery Grade Spherical Graphite Produced from Siviour"

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.

#### For further information, please contact:

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