Portugal Lithium Refinery Study Confirms Step-change Opex of ELi™ Technology

Highlights

- **Engineering Cost Study ("ECS") for Portuguese lithium chemical operation confirms potential industry-leading costs using proprietary ELi™ process;**
- **ECS co-funded under cooperation agreement with Portugal's largest chemical producer, Bondalti, to jointly develop a 25,000tpa lithium hydroxide operation in a 50:50 JV;**
- **ECS estimates indicate a lithium-brine conversion cost of €1,768 per tonne of battery-grade lithium hydroxide;**
- **Capital cost estimate of €405 million (including 15% contingency) indicates a capital intensity of €16,200 per production tonne.**

Emerging, sustainable battery materials producer, Neometals Ltd (ASX: NMT & AIM: NMT) ("**Neometals**" or "**the Company**"), is pleased to announce the results of the Engineering Cost Study for a lithium chloride Brine conversion operation using the proprietary ELi™ electrolysis process owned by Reed Advanced Materials Pty Ltd ("**RAM**") (70% Neometals, 30% Mineral Resources Ltd). The ECS is based on a plant with a production capacity of 25,000tpa of battery-grade lithium hydroxide monohydrate ("**LHM**"). ELi™ utilises conventional purification processes and chlor-alkali electrolysis cells.

The ECS was co-funded under a binding Co-operation Agreement ("ELi™ Co-operation") with Portugal's largest chemical producer, Bondalti Chemicals S.A. ("**Bondalti**"). The parties will co-fund pilot trial and evaluation studies to allow consideration of a decision to form a 50:50 incorporated joint venture ("**JVCo**"). JVCo would look to construct and operate a 25,000tpa lithium refinery at Bondalti's extensive chlor-alkali operations in Estarreja, Portugal ("**Estarreja Lithium Refinery**" or "**ELR**"). We expect the commissioning and commencement of operations for the plant to take place in Q1 2027.

Table 1 – Key Metrics

	ECS Metrics (100% ownership basis)
Annual Production	25,000tpa LHM
Annual Throughput	80,000 tpa Brine @ 6% Li
Average Operating Cost (±15%)**	€1,768/t (US$1,945/t) LHM
Total initial capital costs (±15%)***	€405M (US$446 M)
Capital Intensity****	€16,200/t (US$17,840/t) LHM capacity

See Table 2 for further information on ECS capital costs, includes direct and indirect costs
* Association for the Advancement of Cost Engineering
** from receipt of 6% Li brine concentrate to packaged high purity "battery grade" lithium hydroxide product, excluding by-product credits
*** Total of direct and indirect capex including 15% contingency, EPC fees and design post-Class 3
**** Based on total capex and 25,000tpa LHM capacity

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Neometals Managing Director Chris Reed said:

"Successful completion of the ECS has provided additional confidence in the operating and capital costs of the proposed Estarreja Lithium Refinery. The combination of Bondalti's operating experience with RAM's innovative Eli™ process for lithium brine concentrates can deliver a much needed domestic supply of lithium hydroxide in the EU. Furthermore, we are excited about the prospect of marketing a technology that can deliver a potential step-change in operating cost to developers of lithium brine sources. Lithium is the soft underbelly of the energy transition story, it is un-substitutable in EV batteries and the looming supply deficits appear permanent without innovation and government intervention. The US IRA and EU CRM Acts are evidence of the need to address this existential threat to car making in the West."

The ECS was completed with assistance from leading Australian engineering firm Primero Group ("**Primero**"). The ECS has been completed to a ±15% level of accuracy to the AACE* Class 3 standard and subjected to internal and external reviews. Capital and Operating cost estimates are denominated in US dollars using an exchange rate of 1 Euro: 1.1 US$.

Neometals, via RAM, is commercialising ELi™ to produce lithium hydroxide from lithium chloride solutions using electrolysis. A feasibility study in 2016 ("**Historical FS**") indicated the potential for ELi™ to significantly reduce the operating cost and carbon footprint associated with consumption and transport of carbon-intensive reagents used in conventional lithium refining processes. Neometals is encouraged by the results of the ECS, which confirms the potential for exceptionally low operating costs and competitive capital intensity. The operating cost is consistent with the 2016 Historical FS despite considerable industry cost escalation and the operating cost advantage over the conventional process has been maintained (see Figure 1). The ECS confirms the economic advantages of ELi™and Neometals expects the lifecycle assessment to confirm the low-carbon footprint of the process, which is just one of the associated environmental benefits that ELi™ has been designed to deliver to its users.

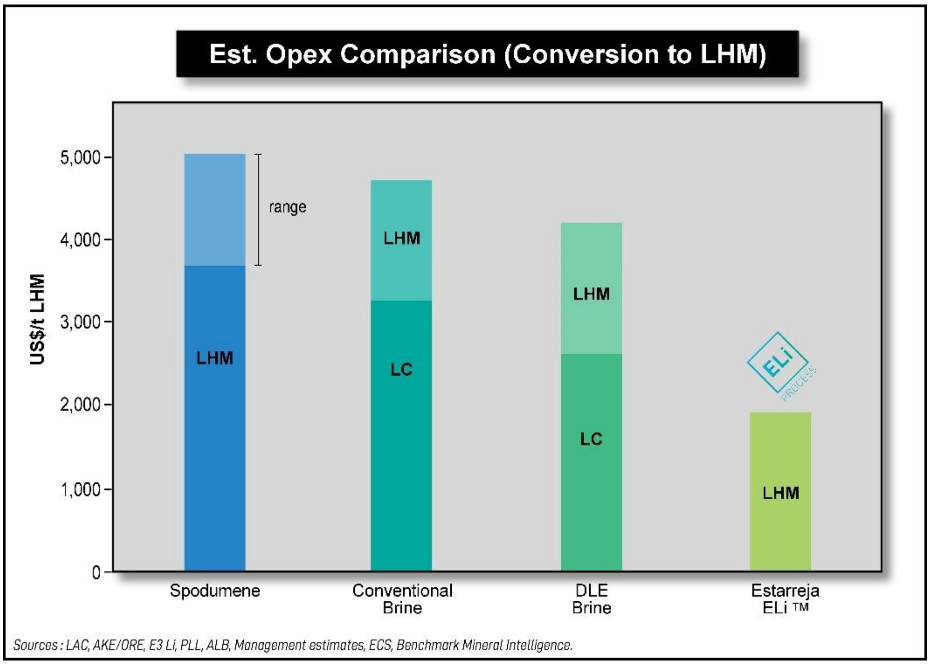


Figure 1: *Opex comparison showing significantly reduced operating costs to generate LHM when compared to conventional Brine and spodumene routes (noting that conventional Brine processing is a two-stage process with lithium carbonate ("LC") produced before additional processing into LHM.*

CAUTIONARY STATEMENT

The ECS referred to in this announcement has been undertaken to assess the potential technical feasibility and economic viability of ELR that is required for Neometals to consider investment decisions in relation to ELR. It is based on low-level technical and economic assessments that are not sufficient to provide definitive assurance of an economic development case, or to provide certainty that the conclusions of the ECS will be realised. Finalisation of the FS and further evaluation work will be required before Neometals will be in a position to determine the viability of ELR.

Given the uncertainties involved, all figures, costs, estimates quoted are approximate values and within the margin of error range expressed in the relevant sections throughout this announcement. Investors should not make any investment decisions based solely on the results of the ECS.

Background

RAM and Bondalti are evaluating the construction and operation of the ELR. The parties will consider entering into a 50:50 incorporated joint venture, JVCo, to develop the ELR adjacent to Bondalti's chlor-alkali production facility at Estarreja. The JVCo incorporation decision will be made after the ECS has been updated later in the DecQ 2023. The parties are jointly evaluating the merchant conversion of lithium-bearing Brine concentrates ("**Brine**"). Under the terms of the Cooperation Agreement, RAM would issue the JV with a commercial licence to ELi™ that is exclusive to the EU *(for further details see Neometals announcement titled "Cooperation Agreement with Bondalti to Commercialise Sustainable ELi™ Lithium Process dated 13th December 2021).*

All Brine-based lithium operations concentrate the natural Brine up to around 6% Li via solar evaporation or mechanical means (direct lithium extraction). Brines (6% Li) have been historically exported from Chile and Argentina to China for decades up until 2018. One tonne of 6% Li Brine contains the same amount of lithium as two tonnes of spodumene (6% Li_2O).

RAM has developed a proprietary hydrometallurgical processing method to recover lithium from salar Brines and from spodumene concentrates (from which a lithium chloride Brine is made) and directly produce LHM ("**ELi™ Technology**"). During the ECS, RAM and Bondalti completed a series of successful laboratory and bench tests.

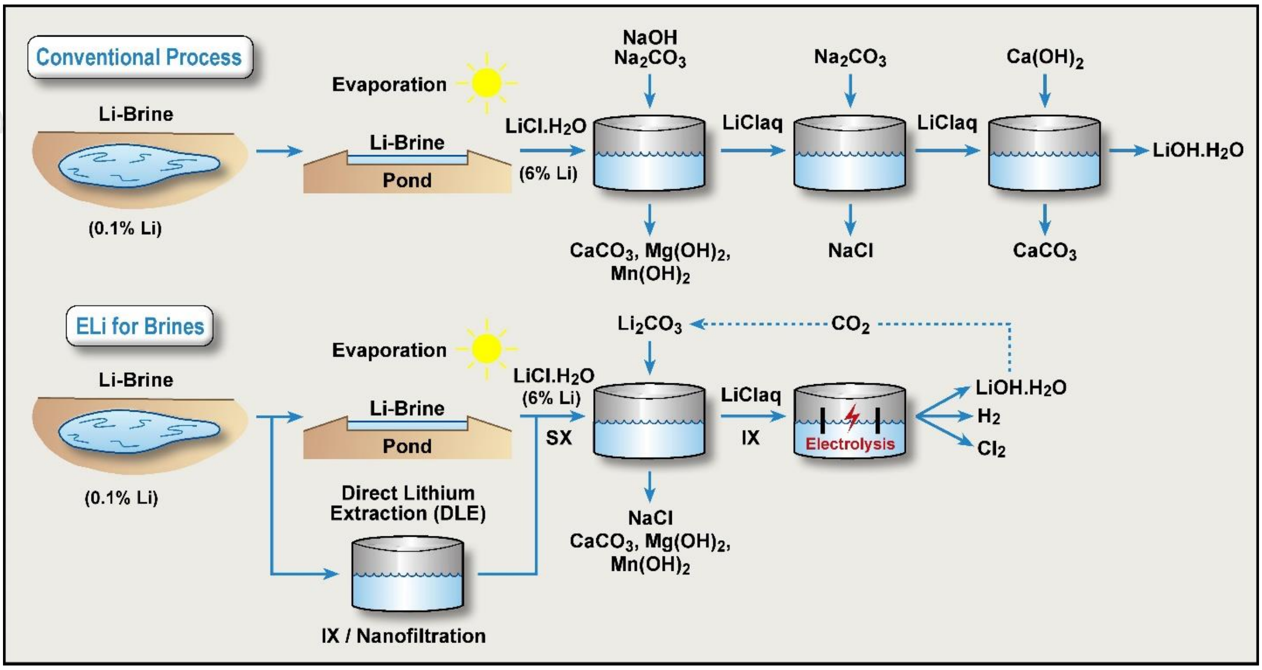


Figure 2: *Comparison of the conventional (indirect) and the ELi™ (direct) processes from salar to finished LHM product*

The ELi™ Technology utilises conventional, proven chlor-alkali equipment and consumes minimal bulk reagents. Pilot plant testing of the ELi™ flowsheet will be completed in Canada under supervision by RAM and Bondalti process engineers and will produce samples of product at purities for evaluation by users in the production of battery cathode. The information from the operation of the pilot plant will be utilised to update the ECS into AACE Class 3 Feasibility Study.

Bondalti Chemicals operates chlor-alkali production facilities at Estarreja that convert commercial bulk sodium chloride (common salt) into sodium hydroxide (caustic soda), chlorine and hydrogen. The operation is located in a chemical industrial park adjacent to consumers of its product. High purity, safety and quality assurance are all hallmarks of Bondalti's operation, attributes that are essential in the production of lithium hydroxide. Sodium hydroxide production using the chlor-alkali process has many things in common with the production of LHM using the fundamentally similar chlor-alkali process.

The ELR offers a compelling business case for refining lithium into high-purity LHM on the doorstep of major consumers in Europe which is underpinned by:

- Competitive operating costs, capital intensity (see table 1) and potentially robust economics;
- Proximity to the substantial Iberian Peninsula car manufacturing industry;
- A small greenhouse gas footprint associated with the use of renewable-source electricity and internally-generated reagents;
- Processing flowsheet utilising conventional equipment to reduce execution risk; and
- Synergies with Bondalti's deep operational experience in the field of chlor-alkali plant.

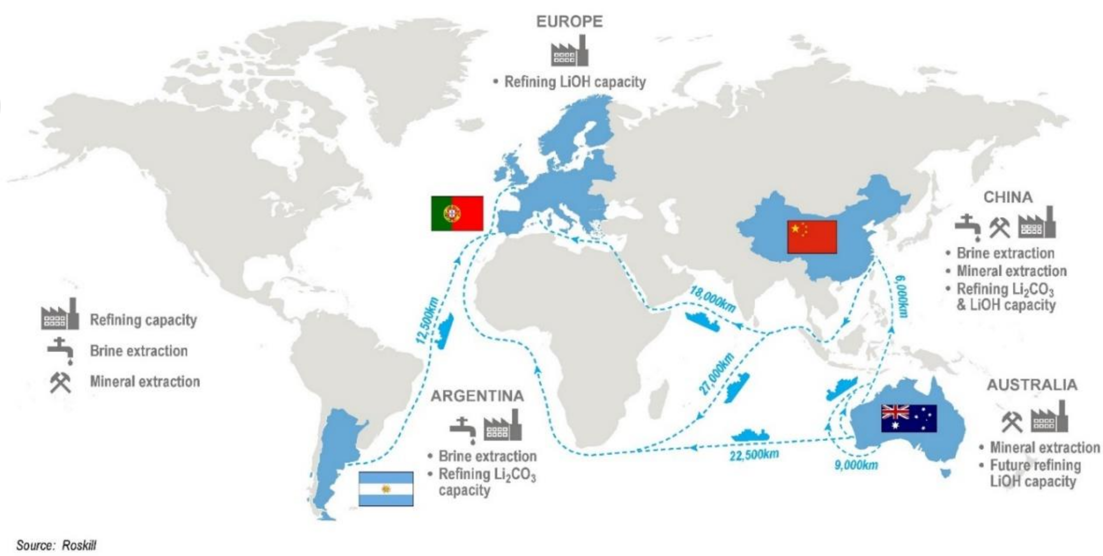


Figure 3: Proposed *Brine logistics and comparison with other trade routes for spodumene conversion and supply to Europe*

Development Scenario

The development scenario for this ECS is characterised by:

- brownfields development starting with a cleared industrial site at Estarreja, Portugal;
- plant with a throughput capacity of 80,000tpa of feed;
- feedstock comprising Brine with a nominal grade of 6% Li; and
- 90% average recovery of Li from feed based on results from bench testing.

Project Location

The ECS is based on establishing an operation at Estarreja in Portugal that is adjacent to existing Bondalti's chemical production operations, in an existing industrial park with available land that belongs to Bondalti (as shown below in Figure 4). This location has excellent infrastructure, including a nearby port, rail and road connections and reticulated power that is supplied mainly from renewable energy sources.

For the purpose of cost estimation, the Bondalti Chemicals site at Estarreja, Portugal is the selected location with shared services including plant offices, administration, ablutions facilities and a laboratory included in the scope. The ECS includes tie-ins for water, electricity, across the fence delivery of chlorine, hydrogen and HCl. Approx 2.5-hectares land will be leased from Bondalti Chemicals for the ELR.

The ELR will have road and rail connections with the port of Leixoes, which is the arrival port for the Brine, about 60 km from the refinery. The Brine logistics route between Argentina and Portugal is depicted in Figure 3. Leixoes is equipped for container, bulk and RORO cargo handling. Product will typically be delivered within Europe by combination of road, rail and container shipping through Leixoes, which has scheduled connections with major ports in Europe and overseas.

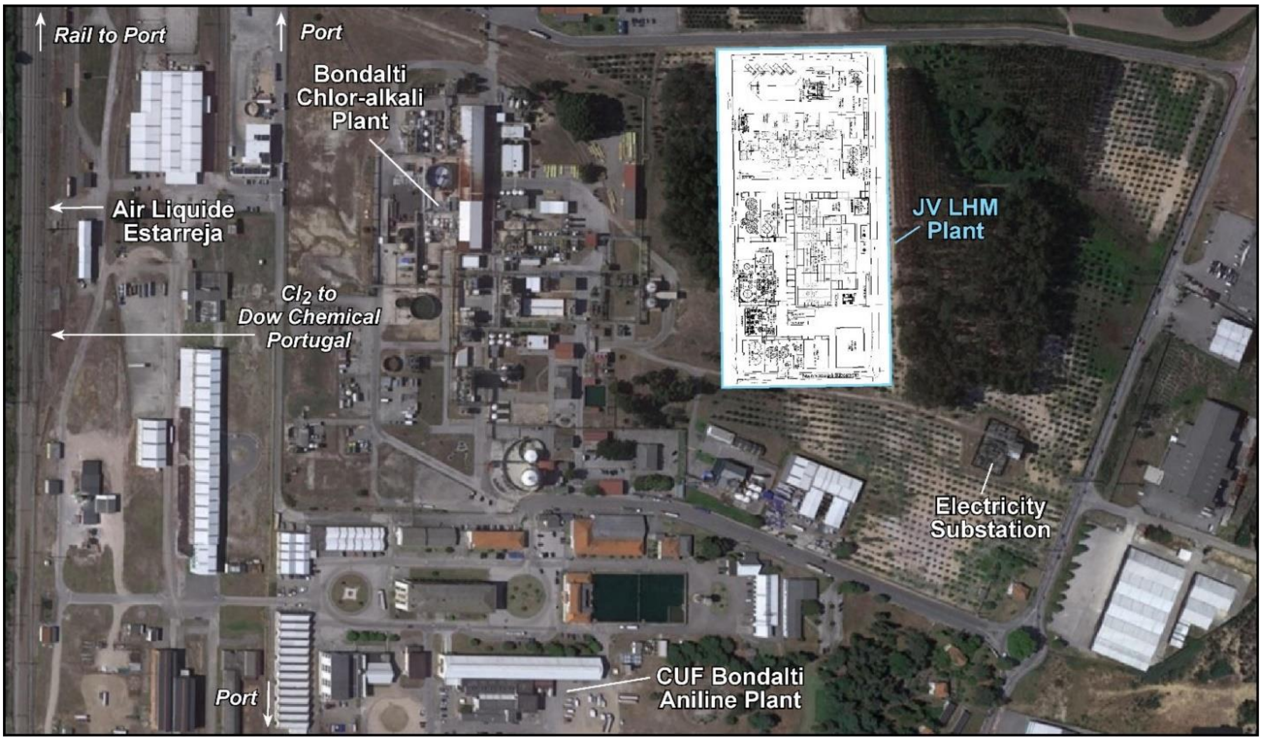


Figure 4: *Aerial schematic showing location for the proposed Estarreja Lithium Refinery Project processing plant at Estarreja, Portugal adjacent to the Bondalti Chlor-Alkali Plant*

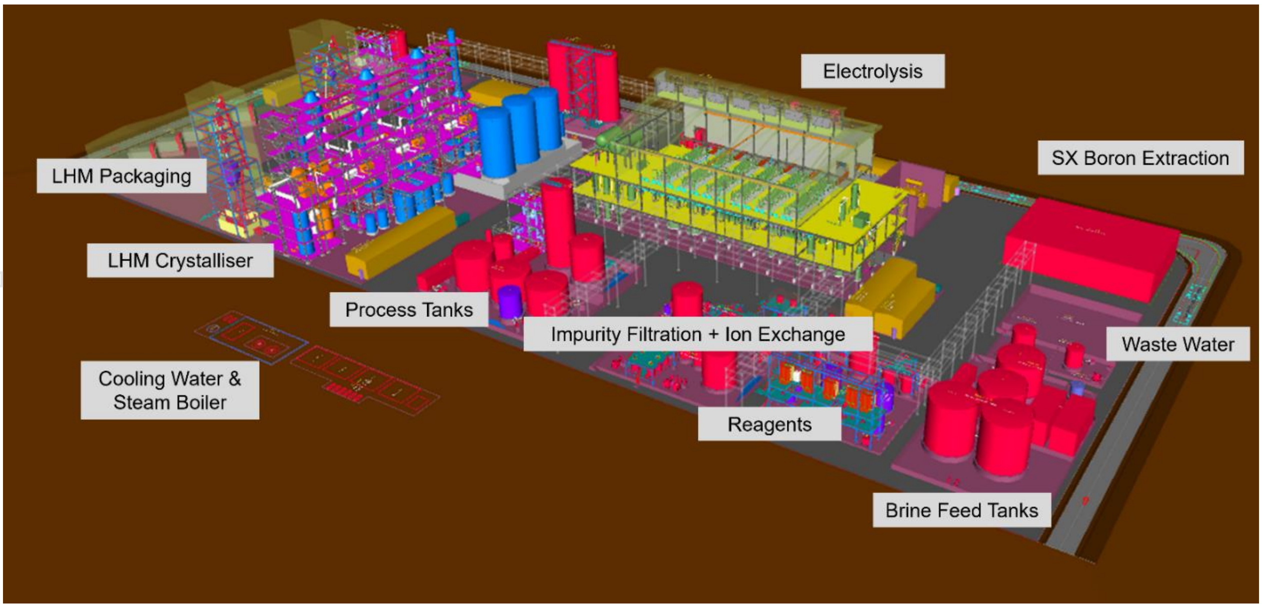


Figure 5: *ELR Layout*

Processing Flowsheet

The proprietary ELi™ Technology process flowsheet (see Figure 6) was developed by RAM with assistance from independent metallurgical laboratories and improved during the ECS. The process, for which provisional patents have been applied for in various jurisdictions (with several granted), makes use of conventional equipment and unit operations, employing novel chemistry, operating at atmospheric pressure and moderate temperatures.

Brine is purified through a series of precipitation and filtration processes that remove entrained solids and dissolved impurities including Silicon, Calcium, Magnesium, Boron and sulphates to produce a very high purity lithium chloride solution for electrolysis. The purified solution is processed in a continuous "chlor-alkali type" electrolysis unit to produce the LHM catholyte. The catholyte is evaporated and crystallised under very clean conditions to form the LHM product, which is packaged under conditions that prevent carbonation of the product. The chlorine and hydrogen by-products from the electrolysis are intended to be piped to the adjacent Bondalti customer facility.

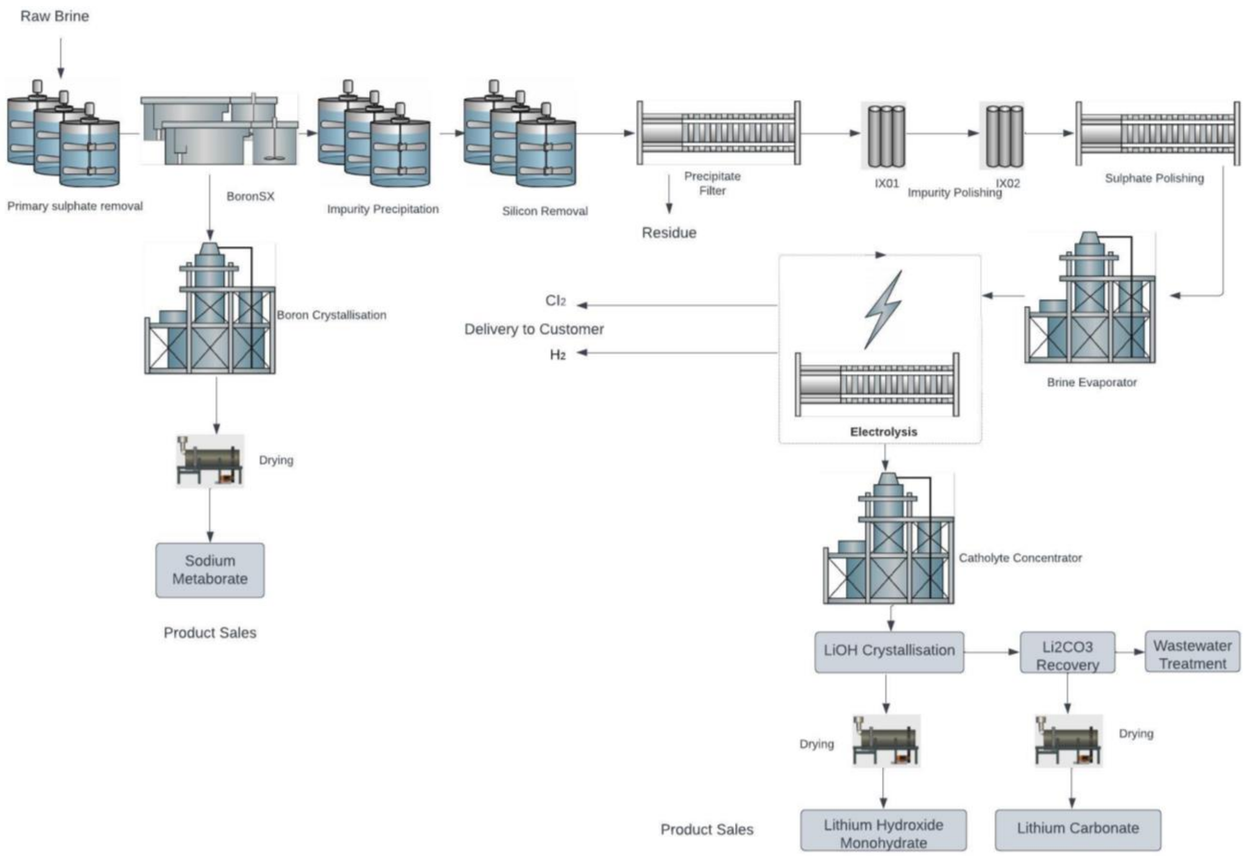


Figure 6: *Overview of Estarreja ELi™ Process Flowsheet*

Operating Cost Estimate

The ELR operating cost was estimated by major cost type and is considered an AACE Class 3 level estimate with a nominal accuracy level of ±15%. The estimated operating cost is on average €1,768/t (US$1,945/t) LHM produced. The operating cost breakdown is shown in Figure 7.

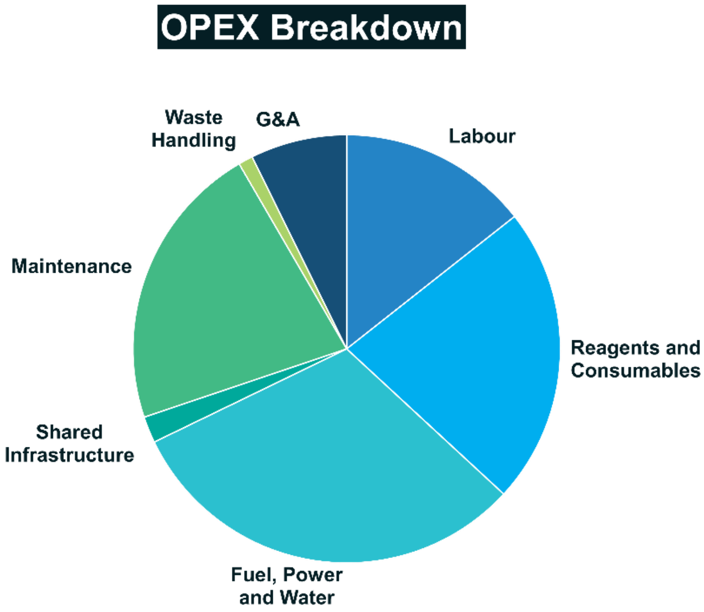


Figure 7: *Operating cost breakdown by key sectors*

Figure 1 highlights the competitive operating cost of the proposed Estarreja Refinery, in comparison with existing lithium hydroxide production methods. Lithium Brine contains lithium chloride that must be purified, converted into lithium carbonate by the addition of bulk soda ash followed by the addition of bulk lime to convert the lithium carbonate into lithium hydroxide (Figure 2) in the conventional process. Waste residues are generated (and must be disposed of at a cost) at the carbonating and the liming stages.

In contrast, the ELi™ process does not generate residues (other than small quantities from purification, therefore not incurring significant disposal costs) and converts the lithium chloride directly to LHM, not requiring the bulk reagent additions. Further, the ELi™ process generates saleable by-products. Due to the favourable co-location with by-product off-takers, these by-products will be delivered across the fence at Estarreja by metered pipeline.

The result is a superior ELi™ opex when compared with conventional Brine conversion to lithium hydroxide.

The ELi™ Technology also enables the production of valuable by products, such as Chlorine and Hydrogen.

Capital Cost Estimate

The proposed ELR schematic in Figure 5 shows the layout of plant from incoming Brine to packing, including the utilities.

The ECS capital cost estimate for the process plant and relevant infrastructure was developed to an AACE Class 3 level of accuracy of ±15% based on budget price estimates obtained from equipment suppliers and appropriate agreed factors. Table 2 below presents the summary of the project capital costs.

Table 2: Project Capital Cost Estimate (all figures expressed on a 100% ownership basis)

Capital	€M	US$M
Direct – Civils, Buildings and Process Plant	271.2	298.3
Indirect – EPCM, Design, Owner's Costs etc	83.4	91.7
Contingency (15%)	51.2	56.3
Total	**405.7**	**446.3**

Figure 8 depicts the breakdown of the €271M in Direct capital costs shown in Table 2.

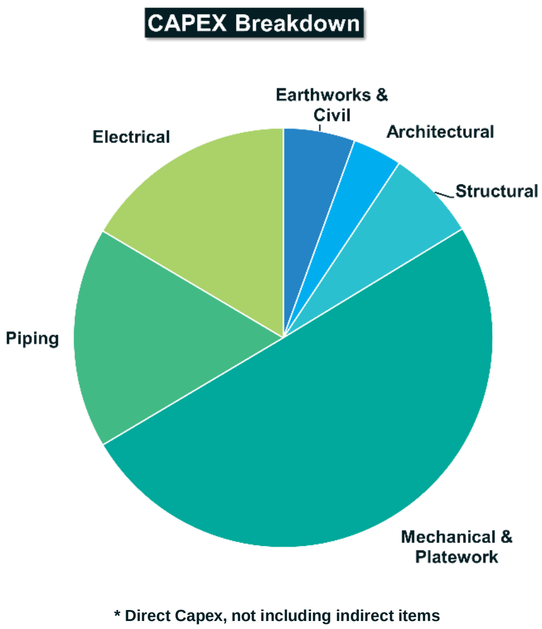


Figure 8: *Capital cost breakdown – direct costs*

Sustained, large-scale increases in global lithium production capacity are needed to satisfy the forecast demand from the EV industry. The capital intensity for lithium production plants is an important indicator of the ease and efficiency of funding new (greenfields) production facilities. The comparison of estimated capital intensity in Figure 9 between the Class 3 ECS estimated cost for the 25,000tpa LHM facility in Estarreja with contemporary estimates for LHM production from Brine and spodumene via conventional and new processes indicates a significant anticipated advantage to the ELR.

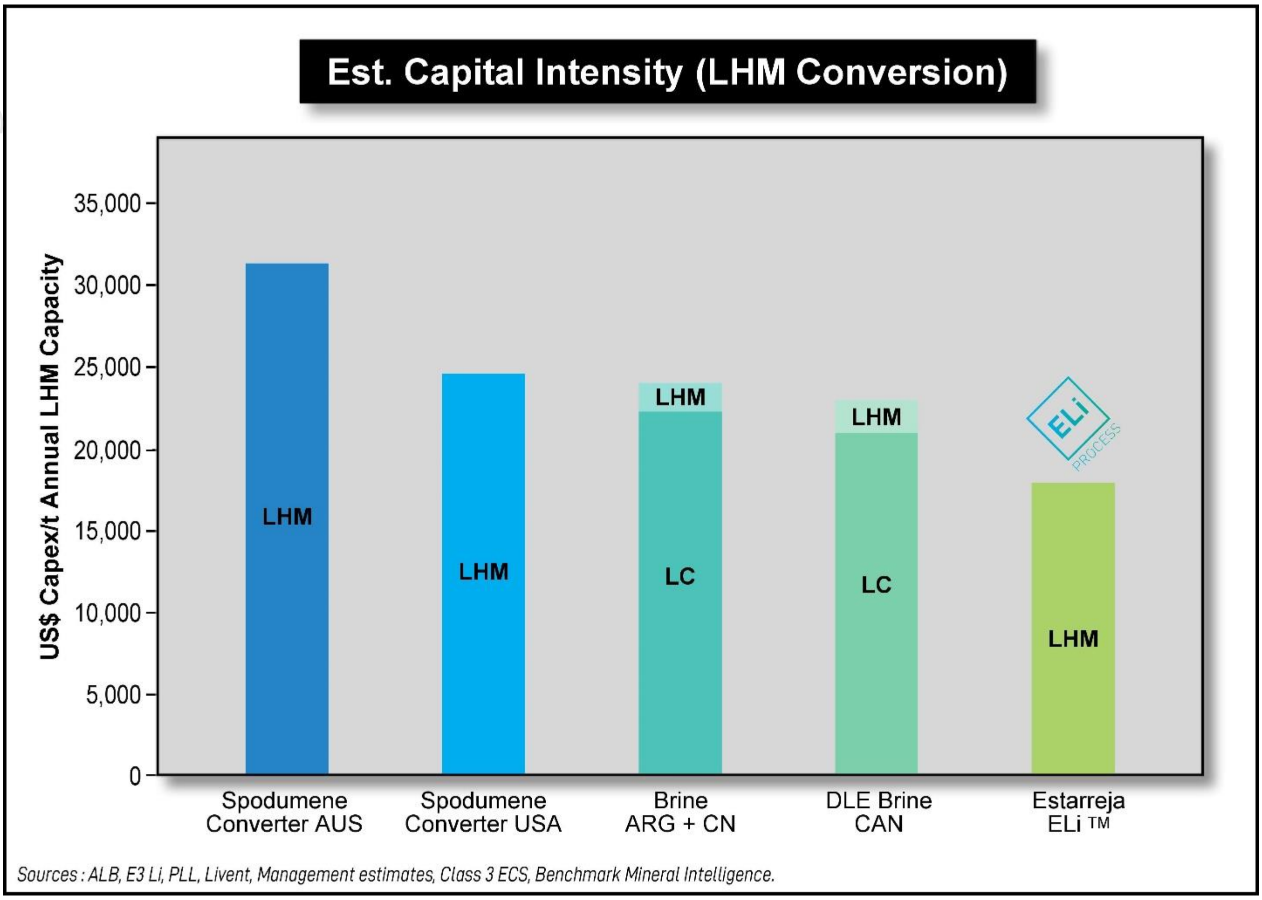


Figure 9*: Capital Intensity Comparison*

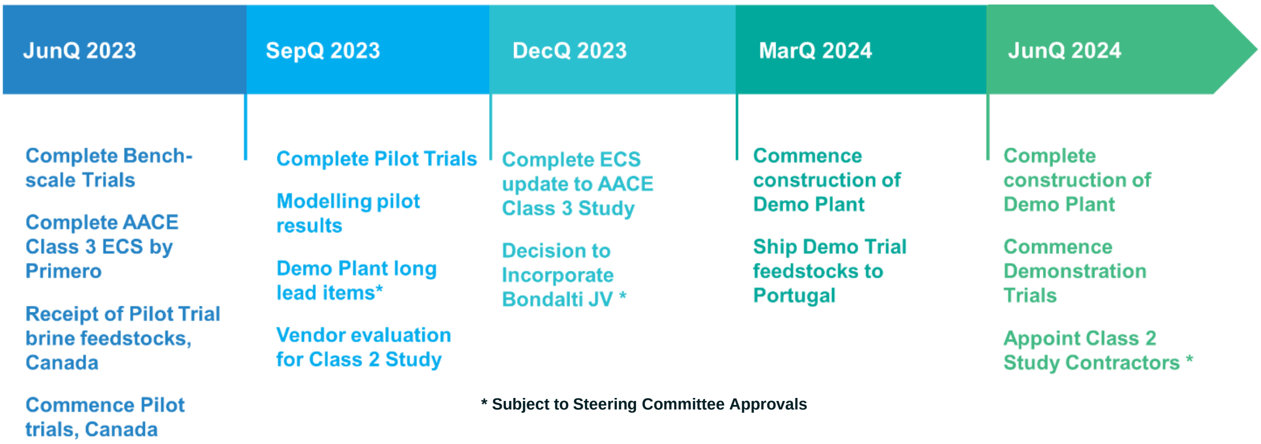
Key Competitive Advantages of the ELi™ Technology for the Electric Vehicle ("EV") Industry

The ELi™ Technology is compatible with the objectives of the EV industry of reducing the carbon footprint of the lithium in the EV batteries and increasing the supply of lithium hydroxide to the EU car battery supply chain to enable secure domestic production of the modern battery chemistries. It uses electrical energy as its key reagent for converting lithium chloride (LiCl) directly to lithium hydroxide (LiOH). The electricity supplied to Estarreja is majority sourced from renewable generation sources. The benefits of this approach are:

- Use of proven, readily available process equipment (purification, electrolysis)
- Minimise the use of bulk chemical reagents
  - Reducing transport carbon footprint by minimising movement of large volumes of materials over long distances.
  - Reducing production footprint of the reagents (which are typically carbon-intensive lime and soda ash in conventional production processes)
  - Reducing the cost associated with reagent consumption
- Allow consistent production of high-purity lithium hydroxide to battery chemistry requirements
- Minimise generation of waste, low value, unneeded by-products, emissions and effluent

Next Steps

Indicative timeline for the ELR:



Forward-looking Statements

This release contains "forward-looking information" that is based on the Company's expectations, estimates and projections as of the date on which the statements were made. This forward-looking information includes, among other things, statements with respect to studies, the Company's business strategy, plan, development, objectives, performance, outlook, growth, cash flow, projections, targets and expectations. Generally, this forward-looking information can be identified by the use of forward-looking terminology such as 'outlook', 'anticipate', 'project', 'target', 'likely',' believe', 'estimate', 'expect', 'intend', 'may', 'would', 'could', 'should', 'scheduled', 'will', 'plan', 'forecast', 'evolve' and similar expressions. Persons reading this news release are cautioned that such statements are only predictions, and that the Company's actual future results or performance may be materially different. Forward-looking information is subject to known and unknown risks, uncertainties and other factors that may cause the Company's actual results, level of activity, performance or achievements to be materially different from those expressed or implied by such forward-looking information.

Forward-looking information is developed based on assumptions about such risks, uncertainties and other factors set out herein, including but not limited to general business, economic, competitive, political and social uncertainties; the actual results of current development activities; conclusions of economic evaluations; changes in project parameters as plans continue to be refined; future prices of metals; failure of plant, equipment or processes to operate as anticipated; accident, labour disputes and other risks of the chemical industry; and delays in obtaining governmental approvals or financing or in the completion of development or construction activities. This list is not exhaustive of the factors that may affect our forward-looking information. These and other factors should be considered carefully, and readers should not place undue reliance on such forward-looking information.

Neither the Company, nor any other person, gives any representation, warranty, assurance or guarantee that the occurrence of the events expressed or implied in any forward-looking statement will actually occur. Except as required by law, and only to the extent so required, none of the Company, its subsidiaries or its or their directors, officers, employees, advisors or agents or any other person shall in any way be liable to any person or body for any loss, claim, demand, damages, costs or expenses of whatever nature arising in *any way out of, or in connection with, the information contained in this document. The Company disclaims any intent or obligations to or revise any forward-looking statements whether as a result of new information, estimates, or options, future events or results or otherwise, unless required to do so by law.*

Advice

Nothing in this document constitutes investment, legal or other advice. Investors should make their own independent investigation and assessment of the Company and obtain any professional advice required before making any investment decision based on your investment objectives and financial circumstances.

Authorised on behalf of Neometals by Christopher Reed, Managing Director

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About Neometals Ltd

Neometals is an emerging, sustainable battery materials producer. The Company has developed a suite of green battery materials processing technologies that reduce reliance on traditional mining and processing and support circular economic principles.

Neometals' three core battery materials businesses, listed below, are commercialising these proprietary, low-cost, low-carbon process technologies in incorporated joint ventures:

- **Lithium-ion Battery ("LIB") Recycling (50% equity) –** to produce nickel, cobalt and lithium from production scrap and end-of-life LIBs in an incorporated JV with leading global plant builder SMS group. The Primobius JV is operating a commercial disposal service at its 10tpd Shredding 'Spoke' in Germany and is the recycling technology partner to Mercedes Benz. Primobius' first 50tpd operation, in partnership with Stelco in Canada is expected to reach investment decision in Q3 2023;
- **Vanadium Recovery (72.5% equity) –** to produce high-purity vanadium pentoxide via processing of steelmaking by-product ("Slag"). Targeting a 300,000tpa operation in Pori, Finland, underpinned by a 10-year Slag supply agreement with leading Scandinavian steelmaker SSAB. Finnish project investment decision with JV partner, Critical Metals, expected Q2 2023. MOU with H2Green Steel for up to 4Mt of Slag underpins a potential second operation in Boden, Sweden; and
- **Lithium Chemicals (earning 35% equity) –** to produce battery quality lithium hydroxide from brine and/or hard-rock feedstocks using patented ELi® electrolysis process owned by RAM (70% NMT, 30% Mineral Resources Ltd). Co-funding pilot plant and evaluation studies on a 25,000tpa operation in Estarreja with Portugal's largest chemical producer, Bondalti Chemicals S.A.