

October 30, 2023

## Verde Announces Life Cycle Assessment Results in Accordance with ISO Standards

**Singapore. Verde AgriTech Ltd** (TSX: "NPK") ("**Verde**" or the "**Company**") is pleased to announce the results of its first Life Cycle Analysis ("**LCA**")<sup>1</sup>, completed by LCA Design Corporation, a leading Canadian consultancy firm.<sup>2</sup> The LCA determines the climate impacts associated with the production of Verde's potassium fertilizer K Forte® (the "**Product**") from cradle-to-grave.<sup>3</sup> The LCA was conducted according to ISO 14040/44:2006 Standard<sup>4</sup> and Puro Earth Enhanced Rock Weathering ("**ERW**") Methodology.<sup>5</sup>

The Product's potential of carbon removal through ERW, determined as carbon dioxide removal certificates ("**CORCs**")<sup>6</sup>, can reach up to 112.56 kilograms of carbon dioxide equivalent per ton of Product ("**CO<sub>2</sub>e / t**").<sup>7</sup>

The Company assessed several scenarios, encompassing historical production, current production, and planned production capacity ramp-up. The potential for CORCs generation determined by the LCA was assessed based on the following assumptions:

1. **Production capacity:** 3 million tons per year ("**Mtpy**"). This capacity can be achieved by utilizing Verde's currently installed Plant 1 and Plant 2, both operating at full capacity.
2. **Product distribution:** The CO<sub>2</sub>e emissions vary depending on the product shipment distance from Verde's production facilities. The greater the shipping distance increases the diesel consumption and, consequently, the carbon footprint.
3. **Transportation mode:** The CO<sub>2</sub>e emissions were calculated with the assumption that the Product transportation would be exclusively done by road. Nevertheless, Verde has an ongoing transition

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<sup>1</sup> Life-cycle assessment is a process of evaluating the effects that a product has on the environment over the entire period of its life thereby increasing resource-use efficiency and decreasing liabilities. The LCA is a standardized, scientific method that can be used to study the environmental impact of either a product or the function the product is designed to perform. Source: [European Environment Agency](#). The terms "assessment" and "analysis" are used interchangeably by different companies, but with the same objective.

<sup>2</sup> For further information, please see: <https://lcadesign.ca/>

<sup>3</sup> 'Cradle-to-grave' assessment considers impacts at each stage of a product's life-cycle, from the time natural resources are extracted from the ground and processed through each subsequent stage of manufacturing, transportation, product use, and ultimately, disposal. Source: [European Environment Agency](#).

<sup>4</sup> ISO (2006b), ISO 14040:2006, Environmental management – Life cycle assessment – Principles and framework. ISO (2006c), ISO 14044: 2006, Environmental management – Life cycle assessment – Requirements and guidelines.

<sup>5</sup> Puro Earth ERW Methodology (2022). Puro Standard Edition 2022 V2.

<sup>6</sup> CO<sub>2</sub> Removal Certificate (CORC) is an electronic document, which records the Attributes of CO<sub>2</sub> Removal from registered Production Facilities. Each CORC represents a Net Carbon Dioxide Removal (CDR) volume of 1 ton of Long-Term CO<sub>2</sub> Removal, equivalent to 1 carbon credit. Source: Puro Earth, [Puro Standard General Rules](#), V3.1.

<sup>7</sup> The term CO<sub>2</sub>e is used to compare the emissions from various greenhouse gases based upon their global warming potential, normalized to the equivalent amount of CO<sub>2</sub>. Source: [UN-REDD Programme](#).

plan for railway transportation, with the objective of constructing a railway branch line that will connect its production facilities to a major freight route in Brazil.<sup>8</sup> The implementation of railway transportation is expected to contribute to a reduction in the CO<sub>2</sub> footprint compared to road transportation.<sup>9</sup>

## CALCULATION METHODOLOGY

The climate impact assessed in the LCA is quantified in terms of kilograms of CO<sub>2</sub>e and encompasses all greenhouse gases directly and indirectly associated with the process. This includes:

1. **Mining:** This stage encompasses all activities related to raw material extraction, as well as its transportation to Verde's production facilities, including emissions from fuel, vehicles, and infrastructure.
2. **Processing:** This stage encompasses all processes involved in transforming Verde's raw material into K Forte®, as well as the Product handling on-site (including transportation or conveying within the production facility).
3. **Transport to application site:** This stage involves the transportation of the Product to the farms where it will be applied. It encompasses emissions related to fuel consumption, vehicles, and infrastructure.
4. **Application to site:** This stage involves the actual application and use of the Product. It assumes that the Product is applied to the soil using agricultural equipment powered by diesel fuel.
5. **Weathering phase:** This stage occurs after the application of Product and involves carbon capture through the ERW process.
6. **Carbon fate in environment:** This stage considers the potential risk of remission of sequestered carbon into the environment.

Carbon Offset Removal Credits represent the net amount of CO<sub>2</sub>e removed by the applied rock weathering within a specified time frame, equivalent to 1 ton of CO<sub>2</sub>e, according to Puro Earth's ERW Methodology. CORC values are presented in kilograms of CO<sub>2</sub>e in the LCA.<sup>10</sup>

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<sup>8</sup> See: "Railway to freight up to 50Mtpy of Verde's Product granted construction permit".

<sup>9</sup> The CO<sub>2</sub> emission rate per kilometer for products transported by rail stands at 0.0220 kg of CO<sub>2</sub> per ton, significantly lower than the 0.0497 kg of CO<sub>2</sub> emitted per ton of products transported via road. Sources: CO<sub>2</sub> emission standard per kilometer for train transport (Sphera Professional Database). CO<sub>2</sub> emission standard per kilometer for truck transport (EcoInvent Database, Brazil Dataset).

<sup>10</sup> 1,000kg of CO<sub>2</sub> is equivalent to 1 CORC.

The overall equation for calculating CORCs generated by ERW activity is as follows:

$$\text{CORCs} = (\text{CO}_2 \text{ Stored}) - (\text{CO}_2 \text{ Supply Chain Footprint})$$

- CO<sub>2</sub> Stored (kg of CO<sub>2</sub>e):** The amount of CO<sub>2</sub> captured via ERW is determined by the weathering of the Product after being applied to soil. This process involves the generation of carbonate or bicarbonate ions and has the potential for the precipitation of solid carbonate minerals. *CO<sub>2</sub> Stored* is the amount of CO<sub>2</sub> that is sequestered from the atmosphere as a result of the weathering process. The Product's *CO<sub>2</sub> Stored* is equivalent to 120 kg CO<sub>2</sub>e per ton of K Forte®. The *CO<sub>2</sub> Stored* calculation was provided by Dr. Manning, determined through an independent study conducted at Newcastle University.<sup>11</sup>
- CO<sub>2</sub> Supply Chain Footprint (kg of CO<sub>2</sub>e):** includes all greenhouse gas emissions that occur throughout the entire supply chain process, from mining activities and processing to transportation to the application site, the actual application to the soil using agricultural machinery, as well as monitoring, sampling, and testing activities during the weathering phase. The *CO<sub>2</sub> Supply Chain Footprint* reflects the greenhouse gas emissions associated with the entire life cycle of the Product. The *CO<sub>2</sub> Supply Chain Footprint* was calculated in the LCA.

In summary, CORCs represent the net CO<sub>2</sub>e removed by the Product's weathering through ERW activities.

## LCA RESULTS

Firstly, the table below displays the CORCs derived from the cradle-to-gate<sup>12</sup> life cycle assessment of K Forte®. This assessment covers activities from raw material extraction to production completion, taking into account the potential for carbon capture through ERW.

### Net carbon sequestration for K Forte®'s cradle-to-gate LCA

CORCs (kg CO <sub>2</sub> e / t)		CO <sub>2</sub> Stored (kg CO <sub>2</sub> e / t)		CO <sub>2</sub> Supply Chain Footprint (kg CO <sub>2</sub> e / t)
112.56	=	120.00	-	7.44

<sup>11</sup> See "Verde's Products Remove Carbon Dioxide From the Air".

<sup>12</sup> Cradle-to-gate is the assessment of a product's life cycle from raw material extraction (cradle) to its production facility gate. It does not include the carbon footprint associated with product transportation to the final customer. Source: <https://circularecology.com/glossary-of-terms-and-definitions.html>

The greenhouse gas emissions associated with the cradle-to-gate cycle of K Forte® are relatively low, less than 10% of the amount of carbon captured by the Product. This can be attributed to Verde's sustainable production process, which is characterized by:

- **100% renewable power supply:** Our operations use 100% renewable energy sources from hydropower.
- **Negligible water demand:** Our production process consumes significantly less water compared to that of other mining or fertilizer production companies.
- **Lower-impact mining:** The area where we extract our raw materials primarily consists of degraded pastureland, deforested decades ago by local landowners for cattle breeding, minimizing environmental interventions
- **No toxic contaminants:** Our product does not contain concerning amounts of the toxic contaminants associated with basalt or olivine, namely nickel and chromium, unlike many other ERW projects.
- **Zero tailing dams:** Our mineral processing does not require generate tailings nor does require any dams.

When considering the cradle-to-grave assessment of the Product, the shipping distance between Verde's production facilities and the application site of the Product significantly impacts the range of greenhouse gas emissions within Verde's supply chain.

The table below shows the CORCs derived from the cradle-to-grave life cycle assessment and market size for K Forte®, according to the distance radius for the Product's shipment from Verde's production facilities.

**Net carbon sequestration for K Forte®'s cradle-to-grave LCA and market size, according to shipment distance**

Distance from Verde's production facilities (km)	Potash Market Size (tons K <sub>2</sub> O) <sup>13</sup>	Product's Market Size (tons K Forte®)	CO <sub>2</sub> Stored (kg CO <sub>2</sub> e / t)	CO <sub>2</sub> Supply Chain Footprint (kg CO <sub>2</sub> e / t)	CORCs (kg CO <sub>2</sub> e / t)
100	1,350	13,500	120.00	12.41	107.59
200	59,720	597,200	120.00	17.38	102.62
300	129,200	1,292,000	120.00	22.35	97.65
400	301,460	3,014,600	120.00	27.32	92.68

<sup>13</sup> The potash market size was determined based on the potential demand for K<sub>2</sub>O. This calculation was derived from the total planted areas in Brazil in 2021 (Source: IBGE, 2022), considering the typical dosages of potash fertilizers for the main crops: Cotton = 100 kg of K<sub>2</sub>O/ha; Coffee = 200 kg of K<sub>2</sub>O/ha; Soybean/Maize System = 150 kg of K<sub>2</sub>O/ha; Other Crops = 100 kg of K<sub>2</sub>O/ha.

It is important to note that the LCA was carried out using 33-ton trucks for product shipping, while the standard truck capacity in Brazil is 74 tons. This resulted in a significant overestimation of transport emissions, as trucks with higher capacity offer improved fuel consumption efficiency by reducing the overall number of vehicles needed, thereby reducing total emissions.

## VERDE'S ERW CARBON CAPTURE POTENTIAL

Scalable and cost-effective ERW carbon capture projects depend on farmers' willingness to apply minerals on a large scale over their farmland. In that sense, Verde's has multiple advantages in ERW:

1. The Product has a fast dissolution rate, as evidenced by agronomic trials and potassium release.
2. The Product is a source of essential macronutrients for plants, which creates significant motivation for farmers to adopt them in place of traditional chemical fertilizers;
3. The Product has NI 43-101 certified<sup>14</sup> mineral reserves proving reliably consistency in its mineralogy, carbon capture effectiveness and absence of deleterious elements;
4. The Product is certified organic by several governmental and non-governmental organizations, including some of the most stringent global standards such as the Washington State Fertilizer Registration and the California Department of Food & Agriculture;
5. The Product undergo meticulous particle size control when of its manufacturing process, guaranteeing a consistent particle size distribution. This is advantageous because particle size is essential for optimal carbon capture and its calculation.

Few carbon capture projects based on ERW showcase all, if any, of the above advantages which are consistently delivered by Verde.

## ABOUT VERDE AGRITECH

Verde is an agricultural technology Company that produces potash fertilizers. Our purpose is to improve the health of all people and the planet. Rooting our solutions in nature, we make agriculture healthier, more productive, and profitable.

Verde is a fully integrated Company: it mines and processes its main feedstock from its 100% owned mineral properties, then sells and distributes the Product.

Verde's focus on research and development has resulted in one patent and eight patents pending. Among its proprietary technologies are Cambridge Tech, 3D Alliance, MicroS Technology, N Keeper, and Bio Revolution.<sup>15</sup> Currently, the Company is fully licensed to produce up to 2.8 million tons per year of its multinutrient potassium fertilizers K Forte® and BAKS®, sold internationally as Super Greensand®. In 2022, it became Brazil's largest potash producer by capacity. Verde has a combined measured and

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<sup>14</sup> National Instrument 43-101 Standards of Disclosure for Mineral Projects within Canada.

<sup>15</sup> Learn more about our technologies: <https://verde.docsend.com/view/yvthnpuv8jx6g4r9>

indicated mineral resource of 1.47 billion tons at 9.28% K<sub>2</sub>O and an inferred mineral resource of 1.85 billion tons at 8.60% K<sub>2</sub>O (using a 7.5% K<sub>2</sub>O cut-off grade).<sup>16</sup> This amounts to 295.70 million tons of potash in K<sub>2</sub>O. For context, in 2021 Brazil's total consumption of potash in K<sub>2</sub>O was 6.57 million<sup>17</sup>.

Brazil ranks second in global potash demand and is its single largest importer, currently depending on external sources for over 97% of its potash needs. In 2022, potash accounted for approximately 3% of all Brazilian imports by dollar value.<sup>18</sup>

## CORPORATE PRESENTATION

For further information on the Company, please view shareholders' deck:

<https://verde.docsend.com/view/kxdp27m8xprnhy9b>

## INVESTORS NEWSLETTER

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The last edition of the newsletter can be accessed at:

## CAUTIONARY LANGUAGE AND FORWARD-LOOKING STATEMENTS

All Mineral Reserve and Mineral Resources estimates reported by the Company were estimated in accordance with the Canadian National Instrument 43-101 and the Canadian Institute of Mining, Metallurgy, and Petroleum Definition Standards (May 10, 2014). These standards differ significantly from the requirements of the U.S. Securities and Exchange Commission. Mineral Resources which are not Mineral Reserves do not have demonstrated economic viability.

This document contains "forward-looking information" within the meaning of Canadian securities legislation and "forward-looking statements" within the meaning of the United States Private Securities Litigation Reform Act of 1995. This information and these statements, referred to herein as "forward-looking statements" are made as of the date of this document. Forward-looking statements relate to future events or future performance and reflect current estimates, predictions, expectations or beliefs regarding future events and include, but are not limited to, statements with respect to:

- (i) the estimated amount and grade of Mineral Resources and Mineral Reserves;
- (ii) the estimated amount of CO<sub>2</sub> removal per tonne of rock;

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<sup>16</sup> As per the National Instrument 43-101 Standards of Disclosure for Mineral Projects within Canada ("NI 43 -101"), filed on SEDAR in 2017. See the Pre-Feasibility Study at: <https://investor.verde.ag/wp-content/uploads/2021/01/NI-43-101-Pre-Feasibility-Technical-Report-Cerrado-Verde-Project.pdf>

<sup>17</sup> Source: Brazilian Fertilizer Mixers Association (from "Associação Misturadores de Adubo do Brasil", in Portuguese).

<sup>18</sup> Source: Brazilian Comex Stat, available at: <http://comexstat.mdic.gov.br/en/geral>

- (iii) the PFS representing a viable development option for the Project;
- (iv) estimates of the capital costs of constructing mine facilities and bringing a mine into production, of sustaining capital and the duration of financing payback periods;
- (v) the estimated amount of future production, both produced and sold;
- (vi) timing of disclosure for the PFS and recommendations from the Special Committee;
- (vii) the Company's competitive position in Brazil and demand for potash; and,
- (viii) estimates of operating costs and total costs, net cash flow, net present value and economic returns from an operating mine.

Any statements that express or involve discussions with respect to predictions, expectations, beliefs, plans, projections, objectives or future events or performance (often, but not always, using words or phrases such as "expects", "anticipates", "plans", "projects", "estimates", "envisages", "assumes", "intends", "strategy", "goals", "objectives" or variations thereof or stating that certain actions, events or results "may", "could", "would", "might" or "will" be taken, occur or be achieved, or the negative of any of these terms and similar expressions) are not statements of historical fact and may be forward-looking statements.

All forward-looking statements are based on Verde's or its consultants' current beliefs as well as various assumptions made by them and information currently available to them. The most significant assumptions are set forth above, but generally these assumptions include, but are not limited to:

- (i) the presence of and continuity of resources and reserves at the Project at estimated grades;
- (ii) the estimation of CO<sub>2</sub> removal based on the chemical and mineralogical composition of assumed resources and reserves;
- (iii) the geotechnical and metallurgical characteristics of rock conforming to sampled results; including the quantities of water and the quality of the water that must be diverted or treated during mining operations;
- (iv) the capacities and durability of various machinery and equipment;
- (v) the availability of personnel, machinery and equipment at estimated prices and within the estimated delivery times;
- (vi) currency exchange rates;
- (vii) Super Greensand® and K Forte® sales prices, market size and exchange rate assumed;
- (viii) appropriate discount rates applied to the cash flows in the economic analysis;
- (ix) tax rates and royalty rates applicable to the proposed mining operation;
- (x) the availability of acceptable financing under assumed structure and costs;

- (xi) anticipated mining losses and dilution;
- (xii) reasonable contingency requirements;
- (xiii) success in realizing proposed operations;
- (xiv) receipt of permits and other regulatory approvals on acceptable terms; and
- (xv) the fulfilment of environmental assessment commitments and arrangements with local communities.

Although management considers these assumptions to be reasonable based on information currently available to it, they may prove to be incorrect. Many forward-looking statements are made assuming the correctness of other forward looking statements, such as statements of net present value and internal rates of return, which are based on most of the other forward-looking statements and assumptions herein. The cost information is also prepared using current values, but the time for incurring the costs will be in the future and it is assumed costs will remain stable over the relevant period.

By their very nature, forward-looking statements involve inherent risks and uncertainties, both general and specific, and risks exist that estimates, forecasts, projections and other forward-looking statements will not be achieved or that assumptions do not reflect future experience. We caution readers not to place undue reliance on these forward-looking statements as a number of important factors could cause the actual outcomes to differ materially from the beliefs, plans, objectives, expectations, anticipations, estimates assumptions and intentions expressed in such forward-looking statements. These risk factors may be generally stated as the risk that the assumptions and estimates expressed above do not occur as forecast, but specifically include, without limitation: risks relating to variations in the mineral content within the material identified as Mineral Resources and Mineral Reserves from that predicted; variations in rates of recovery and extraction; the geotechnical characteristics of the rock mined or through which infrastructure is built differing from that predicted, the quantity of water that will need to be diverted or treated during mining operations being different from what is expected to be encountered during mining operations or post closure, or the rate of flow of the water being different; developments in world metals markets; risks relating to fluctuations in the Brazilian Real relative to the Canadian dollar; increases in the estimated capital and operating costs or unanticipated costs; difficulties attracting the necessary work force; increases in financing costs or adverse changes to the terms of available financing, if any; tax rates or royalties being greater than assumed; changes in development or mining plans due to changes in logistical, technical or other factors; changes in project parameters as plans continue to be refined; risks relating to receipt of regulatory approvals; delays in stakeholder negotiations; changes in regulations applying to the development, operation, and closure of mining operations from what currently exists; the effects of competition in the markets in which Verde operates; operational and infrastructure risks and the additional risks described in Verde's Annual Information Form filed with SEDAR in Canada (available at [www.sedar.com](http://www.sedar.com)) for the year ended December 31, 2021. Verde cautions that the foregoing list of factors that may affect future results is



not exhaustive.

When relying on our forward-looking statements to make decisions with respect to Verde, investors and others should carefully consider the foregoing factors and other uncertainties and potential events. Verde does not undertake to update any forward-looking statement, whether written or oral, that may be made from time to time by Verde or on our behalf, except as required by law.

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