

December 2023 Quarterly Activity Report

The following is a summary of the activities conducted by VRX Silica Limited (**VRX or Company**) during the December 2023 quarter at its silica sand projects at Arrowsmith (located 270 km north of Perth), Muchea (located 50 km from Perth) and Boyatup (located 100 km east of Esperance), all situated in Western Australia.

VRX Silica Sand Resources

VRX is a Western Australian based pure-play silica sand exploration and development company with five high-value, advanced, very long-term silica sand projects in Western Australia, a Tier 1 mining region.

The Company has multi-decade scale contiguous sand deposits on granted Mining Leases with secure tenure and a combined 1.4Bn tonne Mineral Resource¹ of 99.6% to 99.9% SiO₂ grade silica sand.

The Company and its management team is based in Western Australia, as are its five large scale, high-grade and low impurity silica sand projects. Each project can be run independently and supply high-grade silica sand to many diverse markets.



Figure 1: VRX Projects Locations

¹ See table on page 18

Applications of Silica Sand

Silica sand is the most-used commodity on the planet after air and water. It is the main ingredient in all types of **glassmaking**, including specialty solar panel and high-tech glass. The glass manufacturing industry demand is increasing at a rate of 5-6% per year, or about 8-10 million tonnes pa. Around 47% of the world's glass is manufactured in Asia.

Silica sand is an essential component of the **foundry** and casting industries. The largest foundry industry is in Korea where it dominates the industry particularly for large marine components. Arrowsmith North can produce three grades of sought after foundry sand. Large samples have been sent to Korean and Japanese foundry companies and foundry sand suppliers who have confirmed that the samples meet their rigorous requirements.

Silica sand is also the main ingredient in concrete and is the largest user of available supplies and a primary reason for depleted resources in Asia including silica sand reserves that may be beneficiated to glassmaking and foundry quality.

Silica sand is a finite resource that is rapidly being exhausted and the Asia-Pacific region is currently experiencing **increasing demand** at a time of a **global supply shortfall**.

Arrowsmith North

Update on Arrowsmith North Environmental Approvals Process

On 31 October 2023, VRX provided an update on its application for environmental approval at its Arrowsmith North Silica Sand Project (**Proposal**) located 270km north of Perth, Western Australia.

The Company announced on 9 June 2023 to ASX that the Environmental Review Document (**ERD**) for the Proposal had been accepted by the Department of Water and Environmental Regulation (**DWER**) for publication and a four-week Public Environmental Review (**PER**). The PER period closed on 16 July 2023.

On 7 September 2023 DWER provided the Company with a summary of the public submissions received during that period.

In a significant step forward, on 31 October 2023 the Company lodged its draft response to those public submissions for consideration by the Environmental Protection Authority of Western Australia (**EPA**).

To date, the EPA is still considering those responses and, subject to further consultation with the Company, will prepare an assessment report for the Western Australian Environment Minister in respect of the Proposal.

Environmental approval for Arrowsmith North is crucial and linked to VRX's ability to secure other necessary approvals for mining. This is a significant step in Arrowsmith North's approvals process.

VRX appreciates the interest the public has shown in the proposal and is pleased that it has now progressed to the next stage of the environmental approvals process for Arrowsmith North. The submissions received during the public review period were reflective of that interest.

The proposal has the potential to underpin a project lasting many decades and underscores the enormous economic contribution that could flow to the Irwin Shire in particular and Western Australia more broadly.

Background to the Proposal and Environmental Approvals Process

The Proposal includes the sequential block mining of silica sand, development of a mine feed plant, moveable surface conveyor, pipeline, processing plant, stockpiles, freshwater supply bore, access corridor, laydown, administration, water storage and associated infrastructure including a gas fired power station, communications equipment, offices, a workshop and additional laydown areas. Access to the site will be via an access road connecting the mine to Brand Highway. A freshwater supply bore, water pipeline and access road will be located within the Access Development Envelope (ADE). All other infrastructure will be located within the Mine Development Envelope (MDE).

The Proposal will result in clearing and rehabilitation of up to 353.8 ha of native vegetation, 14.5 ha of which will remain cleared for the life of the Proposal, and up to 339.3 ha of native vegetation that will be progressively rehabilitated via Vegetation Direct Transfer (VDT). The VDT methodology can be viewed at

<https://vrxsilica.com.au/miningandrehabilitationmethodology/>.

This process includes salvaging and translocating intact sods comprised of soil, sub soil and vegetation (mulched to a height) to already mined areas for planting. This approach results in minimal disturbance to plant roots and rapid recovery of native flora.

VRX has previously received confirmation from the Commonwealth Department of Climate Change, Energy, the Environment and Water for an accredited assessment under the *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (**EPBC Act**). Accredited assessment means the Commonwealth can rely on environmental assessments undertaken by the EPA for the purpose of its approval decisions under the EPBC Act on proposals that may have a significant impact on a matter of national environmental significance.

VRX has conducted extensive environmental studies on its silica sand projects over a number of seasons since 2017 in anticipation of requirements of the State and Commonwealth environmental regulation authorities to undertake approvals assessments. These surveys commenced shortly after the tenements were acquired and the number and extent of these surveys have expanded following further consultation with these authorities. The Company has initially concentrated on gaining approval for development of Arrowsmith North.

The Proposal was referred to the EPA for assessment under Part IV, Section 38 of the *Environmental Protection Act 1986* (WA) (**EP Act**) in March 2021. The referral was reviewed and in May 2021 the EPA determined that the Proposal would be assessed. The EPA set the level of assessment for the Proposal at 'Public Environmental Review' or PER, with a requirement for a proponent-prepared Environmental Scoping Document (**ESD**) and a four-week public review period for the ERD.

The Company submitted its ESD to the EPA for assessment in September 2021. The ESD was approved in March 2022.

In May 2022 VRX lodged with the EPA the first-draft ERD for the Proposal. The ERD was prepared according to the EPA's Administrative Procedures Manual and other guidance documents and amendments. The ERD is a comprehensive summary of the Proposal's environmental setting, the physical elements of the proposed mine and infrastructure, operational elements, the extent of impacts on the environment and the proposed rehabilitation and closure plan. VRX received a request from DWER for further information in early July 2022 and submitted its response later that month.

In November 2022, DWER requested additional information. The Company lodged a revised ERD and response table in December 2022. VRX then received a request for further information in April 2023 and provided a final ERD to DWER in May 2023, which was accepted by DWER on 8 June 2023 for publication and the PER.

The final ERD, which comprises a 341 page summary and 32 appendices detailing a comprehensive environmental impact assessment of the Proposal, was published by the EPA for a four-week PER period, commencing on 19 June 2023.

Following completion of the four-week PER period DWER compiled public submissions for the Company to review and these were provided to the Company on 7 September 2023. The Company lodged its draft response to those public submissions for consideration by the EPA 31 October 2023.

Subject to consultation and acceptance of the response to submissions, the EPA will prepare an assessment report that will include recommendations to the Western Australian Environment Minister on whether to approve the Proposal. If successful, the Minister will sign off on a Ministerial Statement that will serve as approval for the Proposal.

Muchea

Drilling

In April 2023 a Program of Works (**PoW**) to drill on existing tracks, south of the granted mining lease M70/1390, was approved by the Department of Energy, Mines, Industry Regulation and Safety (or DMIRS, as it was then known). This program was planned to infill a previous hand auger program that was completed as part of the due diligence process prior to the acquisition of the project². Vacuum drilling over 5 days in November 2023 completed 69 holes for 953.5 metres. Drilling was spaced typically 200m along the tracks infilling the original drilling.



Figure 2: Vacuum drilling at Muchea

² VRX: ASX announcement of 5 April 2018, "Muchea Silica Sand Project Drill Results"

As expected, the drilling intercepted high quality white sand, with holes being drilled to the full depth allowable. Assays are pending. A second stage of drilling has been approved and following completion of drilling the Mineral Resource Estimate will be updated.

The Company referred a Proposal to undertake further exploration drilling and trials of the Vegetation Direct Transfer rehabilitation methodology (VDT Trials) within M70/1390 to support the future development of Muchea to the Federal Department of Climate Change, Energy, the Environment and Water (**DCCEEW**) for an assessment under the EPBC Act. The Department determined that the proposal is not a controlled action and that the works may be carried out under certain conditions.

The Company plans to undertake the drilling and VDT trials in the second quarter 2024.

Dandaragan Geothermal Project

Farm-in and JV Agreement

On 3 November 2023 VRX announced it had entered into a Farm-In and Joint Venture Agreement (**Agreement**) with Hydro X Gen Pty Ltd (**HXG**) for the Company's granted Geothermal Exploration Permit 44 (**GEP 44**) at Dandaragan, 145km north of Perth, Western Australia. Further information on GEP 44 is set out below.

HXG is planning to conduct an initial public offering and list on the ASX as Steam Resources Limited (www.steamresources.com.au) in 2024 (**Steam**).

Geothermal technology has the potential to produce long term dispatchable renewable energy for the Mid-West region, including VRX's Arrowsmith silica sand projects.

The grant of GEP 44 to VRX was announced to ASX on 28 July 2023. It consists of 8 contiguous blocks and the area includes the Walyering gas field currently under development by the EP447 Joint Venture between Strike Energy (55%) and Talon Energy (45%). The project provides an opportunity to work with these gas companies and use extensive historical and current data to explore potential geothermal power options.

Under the terms of the Agreement, Steam can earn up to a 90% interest in GEP 44. Steam is required to complete an agreed exploration program and drilling campaign by 31 July 2026 to earn an initial 40% interest in the project and an additional 30% interest by completing a feasibility study assessing the economic viability of the production of energy from geothermal sources within the project area by that date. Steam may earn an additional 20% interest upon the production of energy from geothermal sources within the project area by 31 July 2029. VRX is not required to contribute funding for geothermal development of the project.

Steam has the requisite experience and expertise to explore and develop the project and is of the view that GEP 44 represents a unique development opportunity for geothermal energy production in Western Australia that will complement their other project areas in the Northern Territory and South Australia.

This geothermal exploration initiative was undertaken by VRX to support our silica sand projects and long-term ambitions for the production of glass in Western Australia. Geothermal energy is a reliable, long-term renewable energy source and an opportunity for a new renewable energy industry in the Mid West.

VRX will retain the rights to any minerals that may be encountered in the development of the geothermal project.

Effective 15 December 2023, GEP 44 was transferred by VRX to a 100% owned subsidiary VRX Geothermal Pty Ltd, and the Agreement has, accordingly, been novated to that entity.

GEP 44

In December 2021 VRX lodged an Acreage Release nomination with DMIRS for specified areas in the Mid-West to be included in a geothermal acreage release. In January 2022 DMIRS released 21 areas in Western Australia for applications for GEPs with a closing date for applications of 21 April 2022. GEPs are administered by the Department of Energy, Mines, Industry Regulation and Safety (**DEMIRS**) (as it is now known) under the Petroleum and Geothermal Energy Resources Act 1967 (**PGERA**) with areas released as a Discrete Area Release. Successful applications are determined through a competitive bidding system. VRX has made application for three GEPs, granted GEP 44, and has been notified the other two permits are progressing through a section 69A PGERA consultation phase. There is no timeline for this process. The GEP 44 has been denoted as the Dandaragan Geothermal Project, Figure 3 and Table 1 show its location and details.

GEP	Holders	Grant Date	Term	5' Blocks
44	VRX Geothermal Pty Ltd	27 July 2023	6 years	8

Table 1: VRX Geothermal Exploration Permits

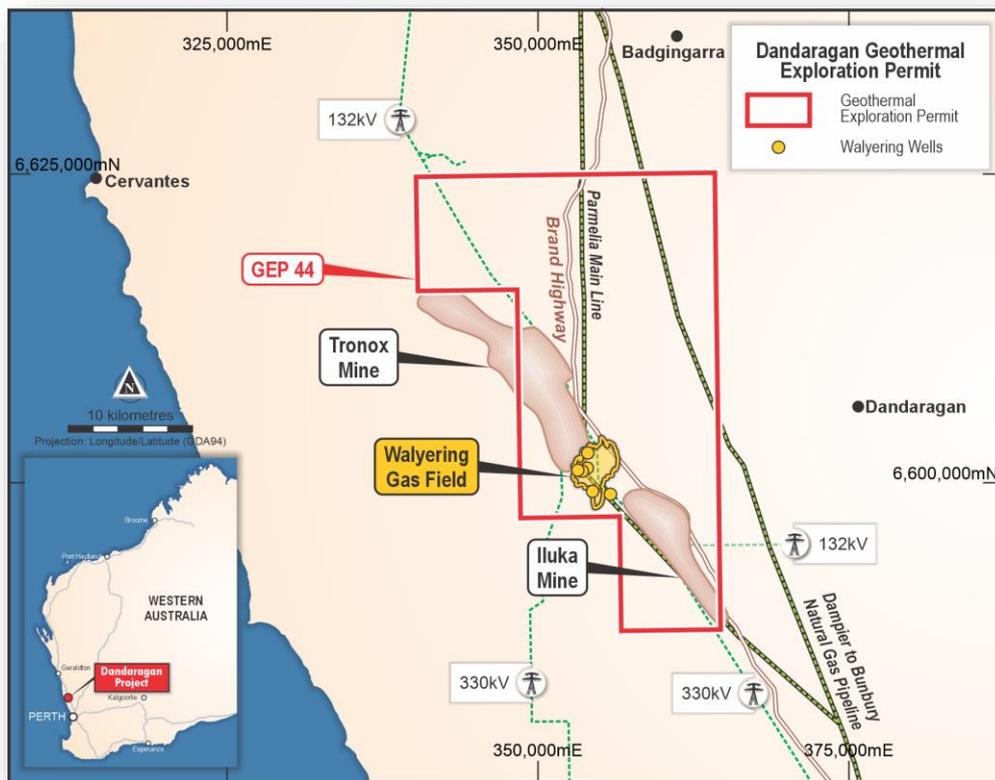


Figure 3: Dandaragan Geothermal Exploration Permit Location

Geothermal Exploration Concept

A geothermal energy source is an accumulation of extractable heat deep in the Earth’s subsurface. Heat (thermal energy) is directly proportional to temperature, and water (either liquid or vapor) is almost always the medium by which geothermal energy is brought to the Earth’s surface via boreholes. For geothermal energy to be extractable, water must be able to flow through hot rock from an injection well to a production well.

For ‘hot sedimentary aquifers’ (the principal target in the North Perth Basin), it is important to target the maximum temperature, volume and transmissivity of the reservoir rocks. The goal of a geothermal exploration program is to progressively build confidence in predictions of temperature, reservoir properties, and geometry (depth, extent, thickness) of target geothermal reservoirs, culminating in the drilling of one or two appraisal wells. Semi-independent work streams can investigate the three elements (temperature, reservoir properties, geometry) in parallel, with results integrated into one or more ‘conceptual models’ of the geothermal system(s).

GEP 44 is in an area of petroleum gas production development, providing an opportunity to work with the current gas companies to use extensive historical and current data to explore for potential geothermal power options. Not all petroleum well data will be ideal for the exploration of geothermal energy, however it will provide a good basis and guide on where to create new information.

Figure 4 shows a typical project cost and risk profile during the development of a geothermal energy project. The graph shows that the risks are high in the early stages of exploration but reduce significantly once the reservoir has been drilled and verified. The costs associated with the activities are inversely proportional to the risk and only increase significantly after the risk is reduced.

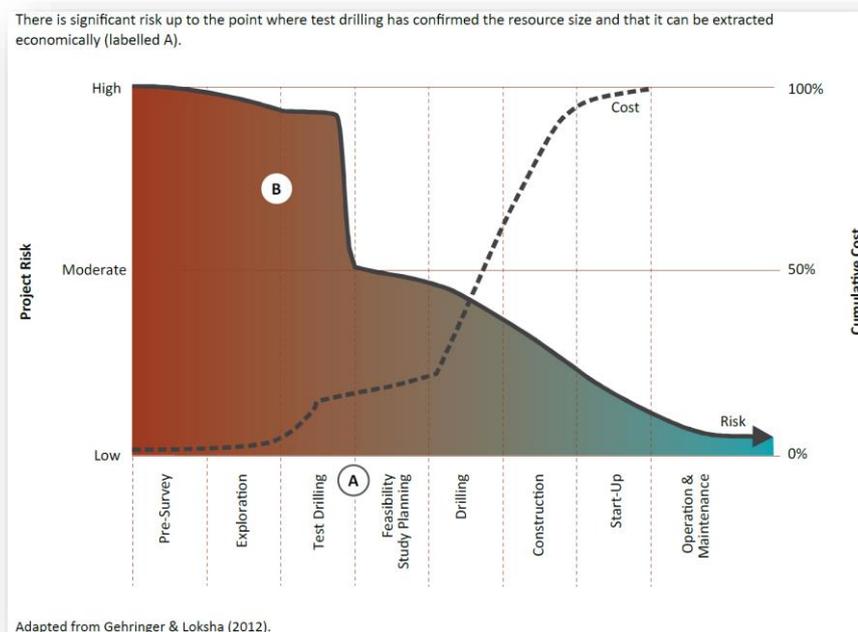


Figure 4: Project costs and risk profile through the development of a geothermal resources³

³ ARENA 2014 Report – “Looking Forward: Barriers, Risks and Rewards of the Australian Geothermal Sector 2020 and 2030”

Geothermal Exploration Program

The exploration program is expected to begin with the compilation and quality assurance of all relevant historical exploration and geoscientific data/information about the geothermal potential of the bid area. This will establish the baseline from which to carry out targeted exploration activities.

Existing data sets will be reprocessed and/or reinterpreted to focus on characterising 3D geometry and geothermal reservoir potential, with the initial assessment identifying key information gaps that can be addressed by the collection of new data. New data collection will take the form of geophysical surveys; surface, airborne, and/or borehole. All data will be compiled into a 3D geological model forming the basis for predictions of temperature and reservoir properties, which will be continually updated as new information becomes available.

An appraisal well will ultimately be drilled to test the most attractive target reservoir once near-surface exploration activities are no longer cost effective for reducing uncertainty in predictions of temperature, reservoir properties, and geometry. If results are promising, a production and injection doublet will be drilled to create a circulation loop to demonstrate heat recovery and power conversion.

What is Geothermal Energy?

Geothermal energy is a clean, virtually emissions-free, renewable energy resource produced from underground reservoirs of water naturally heated by Earth's internal heat. Steam and brine produced from these underground reservoirs can be used to turn turbines to produce electricity either directly or using "organic rankine cycle binary plants", see Figure 5.

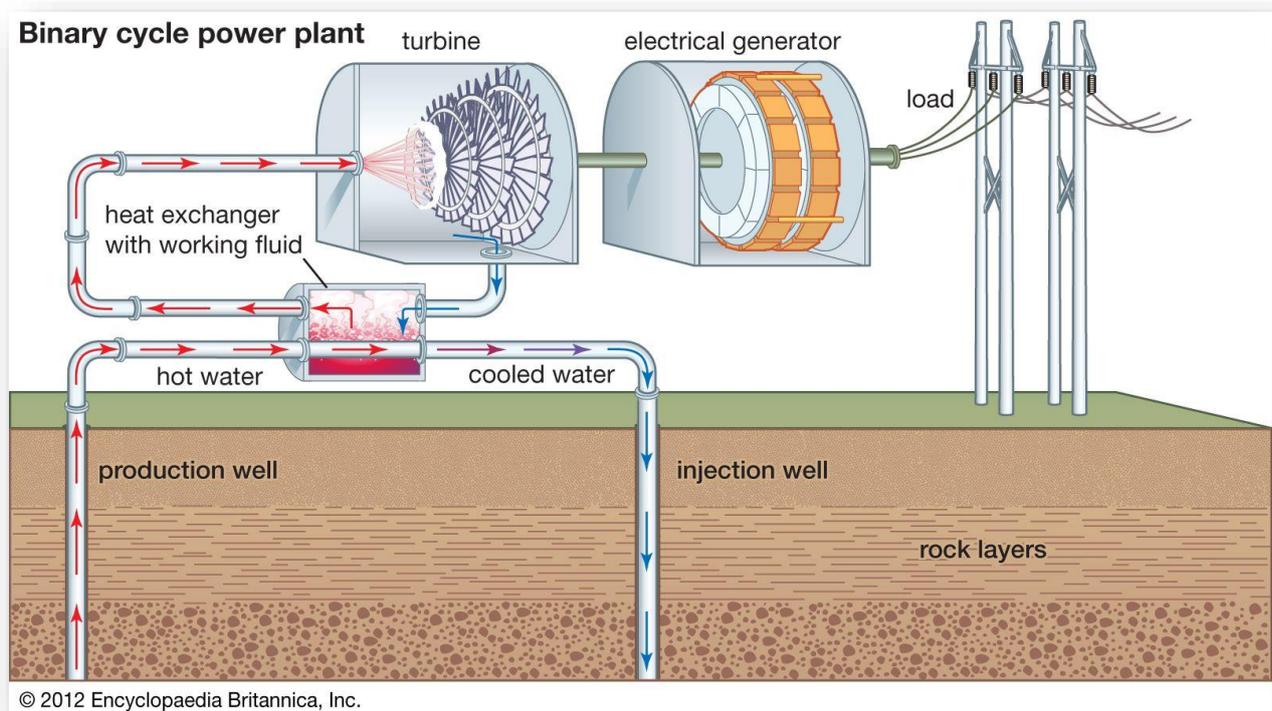


Figure 5: Typical Binary cycle geothermal power plant

Why Geothermal?

The Australian Renewable Energy Agency (**ARENA**) produced a report⁴ in 2014 to assess the barriers and opportunities for geothermal energy development in Australia. The report found that Australia does have a large geothermal potential to generate direct heat or electricity. It identified the strength of geothermal power generation to be a source of dispatchable power with a low environmental footprint. The report also states “*Geothermal-sourced electricity is among the cheapest in the United States ... and plays an important role in the dispatch of power to meet renewable portfolio standards. This is primarily because of its ability to provide base-load renewable generation to backstop variable renewable sources, such as wind and solar.*”

A subsequent ARENA report in 2018⁵ looked at comparing the cost of dispatchable renewable electricity options. This report identified, on a levelised basis, geothermal electricity generation as a cost effective solution for base load, 24 hour dispatchable power which easily competes with, or beats, all other renewable alternatives which are non-dispatchable, such as wind and solar PV.

The prospect to produce a renewable energy source in the Mid West is an opportunity to add to the growing reputation that the Mid West will become the central hub for renewable energy and downstream use in Western Australia.

There is a long term prospect to use renewable energy to produce hydrogen to use in “green” glass manufacturing. Technically it has been well established that hydrogen can be used as the energy source for heating required to produce glass.

Plant type	Capacity factor (%)	Levelised capital cost	Fixed O&M	Variable O&M (including fuel)	Transmission investment	Total system levelised cost
Dispatchable technologies						
Conventional coal	85	65.7	4.1	29.2	1.2	100.1
Advanced coal	85	84.4	6.8	30.7	1.2	123.0
Advanced coal with CCS	85	88.4	8.8	37.2	1.2	135.5
Natural gas-fired						
Conventional combined cycle	87	15.8	1.7	48.4	1.2	67.1
Advanced combined cycle	87	17.4	2.0	45.0	1.2	65.6
Advanced CC with CCS	87	34.0	4.1	54.1	1.2	93.4
Conventional combustion turbine	30	44.2	2.7	80.0	3.4	130.3
Advanced combustion turbine	30	30.4	2.6	68.2	3.4	104.6
Advanced nuclear	90	83.4	11.6	12.3	1.1	108.4
Geothermal	92	76.2	12.0	0.0	1.4	89.6
Biomass	83	53.2	14.3	42.3	1.2	111.0
Non-dispatchable technologies						
Wind	34	70.3	13.1	0.0	3.2	86.6
Wind offshore	37	193.4	55.4	0.0	5.7	221.5
Solar PV ¹	25	130.4	9.9	0.0	4.0	144.3
Solar thermal	20	214.2	41.4	0.0	5.9	261.5
Hydro ²	52	78.1	4.1	6.1	2.0	90.3

Table 2: Estimated US average levelised costs (2011\$/MWhr) for plants entering service in 2018, from US-EIA (2013)

⁴ ARENA 2014 Report – “Looking Forward: Barriers, Risks and Rewards of the Australian Geothermal Sector 2020 and 2030”

⁵ ARENA 2018 Report – “Comparison of Dispatchable Renewable Electricity Options – Technologies for an orderly transition”

Dispatchable v Non-Dispatchable Energy

Geothermal power provides a stable and constant source of energy. Unlike solar and wind power, which are intermittent and dependent on weather conditions, geothermal power plants operate consistently. They deliver electricity 24/7, regardless of the weather or time of day, providing a reliable and consistent energy supply.

Energy generation can be split into two different groups:

- **Dispatchable** – being energy sources which can be turned on and off within a short period of time, and the amount of energy they produce can also be turned up or down so that supply of electricity matches the amount demanded by users.
- **Non-dispatchable** – Renewable energy sources which are intermittent, the energy they produce varies from moment to moment, from day to day, and even from season to season. Supply is available when supply is available and if the demand is not there, then the energy can be wasted.

Geothermal is considered dispatchable as it is easily programmed on demand to produce steady reliable energy.

Capacity Factor

The Capacity Factor of a generating unit is the ratio of the electrical energy produced by the unit for the period of time to the electrical energy that could have been produced at continuous full power operation during the same period. Geothermal generation typically operates at a very high Capacity Factor, several times higher than intermittent renewable generators and higher even than conventional coal and gas generators.

Using the data in Table 2, above, Geothermal power plants have an average capacity factor of 92%, meaning that geothermal generators can be expected to reliably produce power for 92% of the time. Geothermal energy is more consistently delivered than both coal and gas generation, and is significantly more reliable than intermittent renewable generation, 170% more than Wind and 270% more than solar PV's. The Capacity Factor is a major factor in the Levelised Cost of Energy, by which measure Geothermal energy is one of the cheapest sources of energy, let alone renewable energy.

Levelised Cost of Energy

The Levelised Cost of Energy (**LCOE**) is expressed in \$/MWh and is defined as the time-discounted cost to generate energy over the expected lifetime of the generator, divided by the amount of energy generated over the lifetime of the generator, and can be expressed as a formula;

$$\mathbf{LCOE} = \frac{\sum_{t=1}^n \frac{I_t + M_t}{(1+r)^t}}{\sum_{t=1}^n \frac{E_t}{(1+r)^t}}$$

I_t : investment expenditures in the year t

M_t : operations and maintenance expenditures in the year t

E_t : electrical energy generated in the year t

r : discount rate

n : expected lifetime of system or power station

The key factor in favour of Geothermal energy is its very high capacity factor. A geothermal generator will produce on average 270% more electricity over a year than a solar PV plant of the same installed capacity. The graph in Figure 6 below, from ARENA⁶ shows that Hot Sedimentary Aquifer (HSA) Geothermal energy is amongst the lowest LCOE of any renewable energy option for 24-hour supply, lower in fact than stand-alone non-dispatchable wind and Utility PVs.

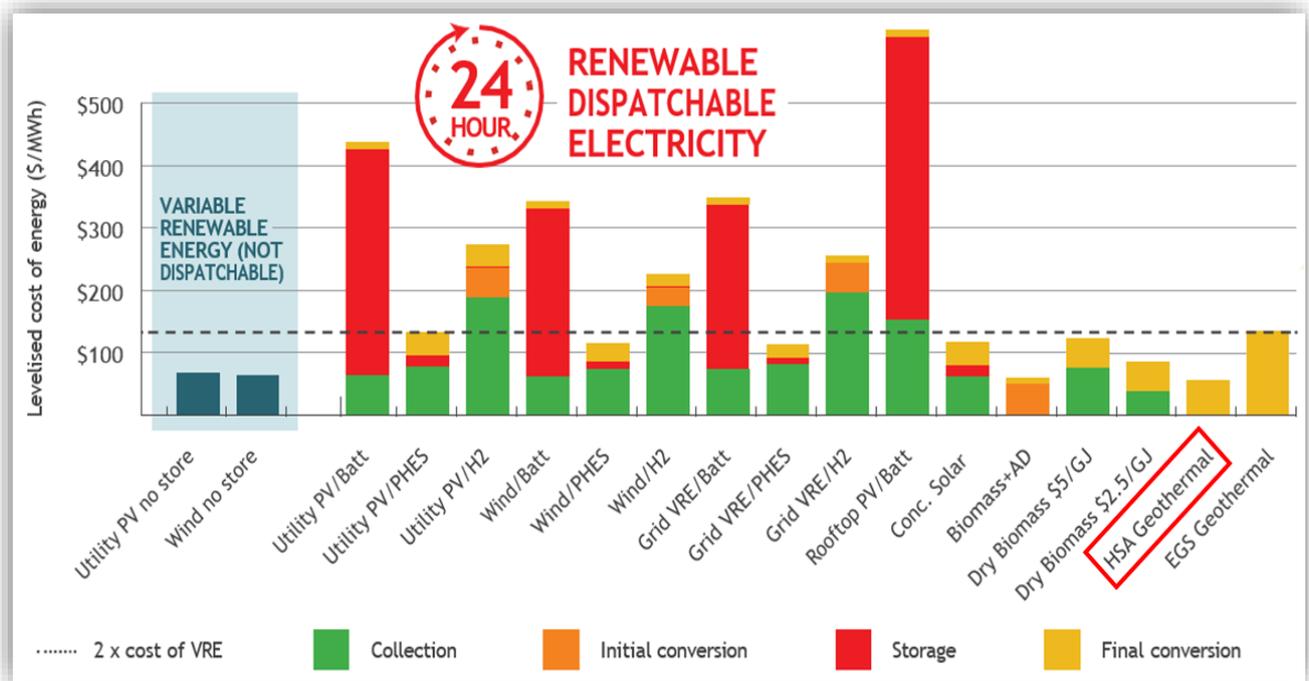


Figure 6: Levelised Cost of Energy for 24 hours duration delivery for systems at 100Mwe nominal capacity evaluated with a 6.5% weighted average cost of capital.

Environmental Impact

Geothermal power plants can be designed to “blend-in” to their surroundings, more so than many other types of electricity-producing facilities. Geothermal power has a very small footprint compared to other renewable energy sources and does not require significant alterations to the landscape. Figure 7, below, shows the land area required to generate 1GWh of energy⁷.

⁶ ARENA 2018 Report – “Comparison of Dispatchable Renewable Electricity Options – Technologies for an orderly transition”

⁷ A Guide to Geothermal Energy and the Environment - Alyssa Kagel, Diana Bates, & Karl Gawell, Geothermal Energy Association, April 2007.

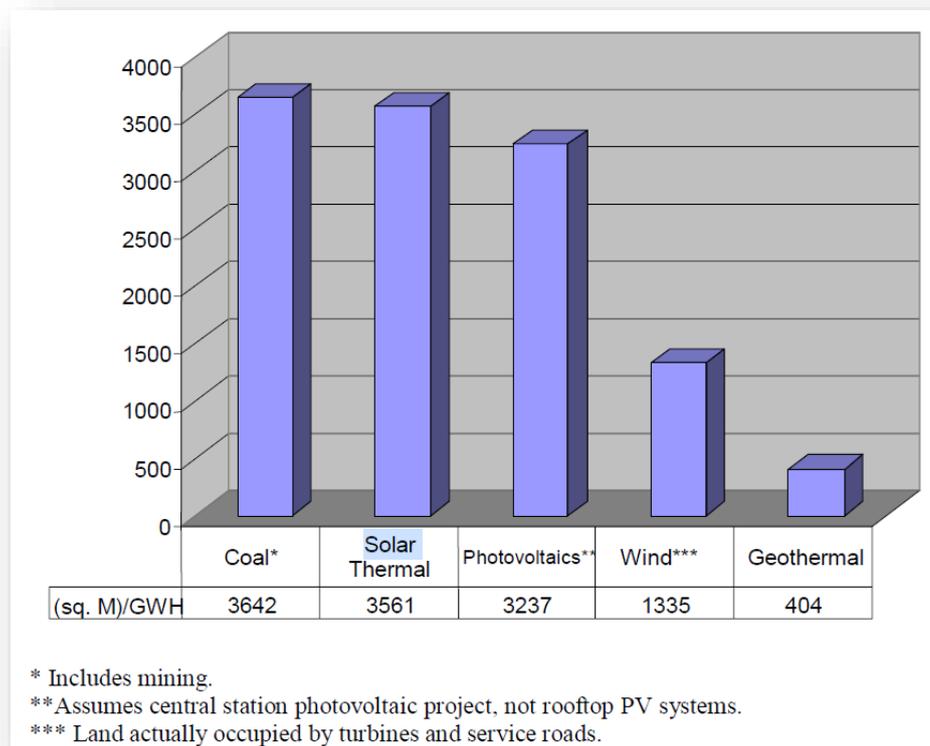


Figure 7: Land area required to generate 1GWh of energy.

Geothermal development poses only minimal impact to wildlife and vegetation in the surrounding area. Unlike solar PV, there is no ground shading, and geothermal avoids the risk to bird life posed by large scale wind farms.

Australian Industry Geothermal Projects

Geothermal energy projects in Australia have been largely confined to smaller scale localised heating projects such as hotel, aged care facilities, public swimming pools, aquaculture, space heating and spa resorts. Recently, however, there is a resurgence of interest in power generation. There are three ASX listed companies pursuing geothermal power generation as an energy source for an ultimate downstream processing goal. These are Vulcan Energy (**Vulcan**) (ASX:VUL), Controlled Thermal Resource (**CTR**) (not listed on ASX) and Strike Energy (**Strike**), (ASX:STX). Vulcan and CTR are both planning to produce geothermal power and recover lithium from hot brines in a carbon neutral process. The Vulcan project is in the Upper Rhine Valley in Bavaria and the CTR project is in the Salton Sea geothermal field in California, USA.

The Strike project is most relevant geographically and technically to this proposed VRX Geothermal Project. Strike is an ASX listed energy company with an approx. \$1bn market capitalisation, that has onshore gas reserves in the Perth Basin. Strike is currently developing a production facility at Walyering in 2023, followed by gas production at South and West Erregulla in 2024 and 2025. In addition to its gas assets Strike is investigating the potential production of Urea via the Project Haber site west of VRX's Arrowsmith North silica sand projects. Project Haber envisages using gas from the Erregulla gas field, potentially with geothermal energy to produce low carbon urea for the domestic and export market.

On 17 May 2021 Strike announced the completion of the acquisition of Mid West Geothermal Power Pty Ltd⁸, giving access to explore an area of ~4,000km² in the Dongara region for potential geothermal energy. In April 2022 Strike announced it had received a \$2 million grant from the WA Government - Clean Energy Future Fund⁹ to support the preparation and execution of a drill test hole. On 5 May 2022 Strike then announced an Inferred Resource for the Mid-West Geothermal Power Project¹⁰, Table 3, below, summarises the Inferred Resource.

Kingia Sandstones (30-year model)		P90 (low)	P50 (mid)	P10 (high)
GEP Application Area	Mapped Area (km ²)	1,826		
	Net Energy Resource (PJe)	69	203	422
	Equivalent Power Resource (MWe)	77	226	470

Table 3: STX – Geothermal Inferred Resource Statement

Strike’s inferred resource assessment predicts that if a hot sedimentary aquifer (brine) reservoir is verified there is a 50% likelihood it could support a commercial scale geothermal generating capacity of 226MW total generating capacity over a 30-year period. To put this potential in perspective against other renewable energy generation, an equivalent solar PV array would need to have 270% greater installed capacity to account for the difference in capacity factor. This would need the solar array to have an 840MW installed capacity, which would have a footprint of 590Ha compared to a 74Ha geothermal plant. The solar array would only produce power 25% of the time compared to 92% for the geothermal plant.

It should be noted that Vulcan and CTR are both looking at extracting significant value from the minerals contained within the hot sedimentary hosted brine. In both cases the final product is lithium, a high value battery mineral. VRX will assess the potential for secondary revenue streams from brine minerals, but Strike has not reported any such potential in its own fields to date.

Uses for Renewable Geothermal Energy

Baseload grid power

As shown on Figure 3, GEP 44 is traversed by 330KV and 132KV transmission lines that are connected to the South West Interconnected System (**SWIS**) and an associated substation. The presence of this infrastructure could allow for any excess electricity generated to be fed into the SWIS as base load grid power. In addition to this the immediate area has 2 long life mineral sands mines, Iluka Resources Cataby Mine and Tronox Inc. Cooljarloo Mine, both of which consume significant power.

Hydrogen injection in Gas Pipelines

The WA Government as part of its decarbonizing strategy has successfully completed studies confirming the technical feasibility of transmitting hydrogen via the existing gas

⁸ STX: ASX announcement of 17 May 2021, “Geothermal acquisition progresses to completion”

⁹ STX: ASX announcement of 8 April 2022, “Strike Awarded Clean Energy Future Fund Grant”

¹⁰ STX: ASX announcement of 5 May 2022, “Mid-West Geothermal Power Project Inferred Resource”

pipelines by either blending¹¹ with natural gas or 100% hydrogen¹². GEP44 has both the Parmelia and Dampier to Bunbury pipelines running through, or proximal to them, Figure 3.

Green Hydrogen

A potential use of the energy that could be generated from a Geothermal Plant is the production of green hydrogen. In March 2022 VRX announced¹³ an MOU with Xodus Group for potential supply to a glass manufacturing facility powered by hydrogen producing ultra-clear glass for solar panels from the high-grade silica sand produced from VRX's Muchea silica sand project. The MOU covered a possible future offtake of 9,000 tonnes to 11,000 tonnes of hydrogen per annum. If a geothermal resource is delineated leading to development of a commercial scale power generator, all or some of the power generated could be used to produce green hydrogen by the electrolysis of water. Recently Hysata, in Wollongong NSW, achieved a record-breaking reduction in the energy required to produce hydrogen by 20% to 41.4kWh/kg¹⁴. To put this potential in scale, a 100MW installed geothermal generator could potentially produce 20,000t of hydrogen per annum. Any green hydrogen produced could potentially be injected into the Gas Pipeline that runs through the Permit or potentially supplied to hydrogen vehicles travelling along the Brand Highway.

Sample Shipped for High Grade Silica Flour Testwork

On 15 November 2023 VRX announced it had despatched a 1,000kg sample of selected sand from its Muchea Silica Sand Project to a specialist laboratory in Germany.

The testwork will determine the potential yield, quality and power requirements to produce a suitable silica flour to be used for manufacturing of LCD glass.

As the market for LCDs is steadily increasing, so too is the requirement for suitable high quality silica flour used in their manufacturing.

Muchea silica sand has the potential to produce the grade and quality of sand that will provide the raw material for the production of such silica flour.

This is specialised testwork that will determine the parameters required to produce the quality required and the economic inputs to assess the viability of the process.

The Western Australian State Government is contributing to the testwork program and potentially the pilot plant required through the previously announced Investment Attraction Fund (IAF) grant.

This is a significant step towards determining the potential for further downstream processing from VRX's high grade Muchea Silica Sand Project and a new industry for Western Australia with commensurate additional jobs and royalties.

¹¹ <https://www.gtlaw.com.au/knowledge/only-pipe-dream-report-hydrogen-gas-blending-dbngp>

¹² <https://www.wa.gov.au/government/media-statements/McGowan-Labor-Government/Study-proves-feasibility-of-gas-to-hydrogen-pipeline-conversion-20230519>

¹³ ASX announcement of 9 March 2023, "Hydrogen Supply MOU with Xodus Group"

¹⁴ <https://hysata.com/news/hysata-delivers-the-step-change-needed-in-electrolysis/>

Detailed Information

On 18 July 2023, VRX announced¹⁵ it had secured \$2 million in matched funding for the construction of a pilot plant for High Purity Quartz (HPQ) flour, under the IAF, part of the Western Australian State Government’s Diversify WA initiative, a collaboration between government, industry and the community supporting the WA Government’s focus on creating secure, quality jobs, growing and diversifying the economy and attracting new investment.

The initial phase of this project is comminution testing of VRX’s selected Muchea sand to determine the yield and quality of silica flour that can be produced from the raw material. Silica flour is a high value low iron silica product that has a specific size specification and is primarily used in the production of LCD glass for display screens.

The demand for HPQ flour has steadily increased as has the price. Figure 8 shows the export price of silica flour from Taiwan¹⁶, over the last 3 years.

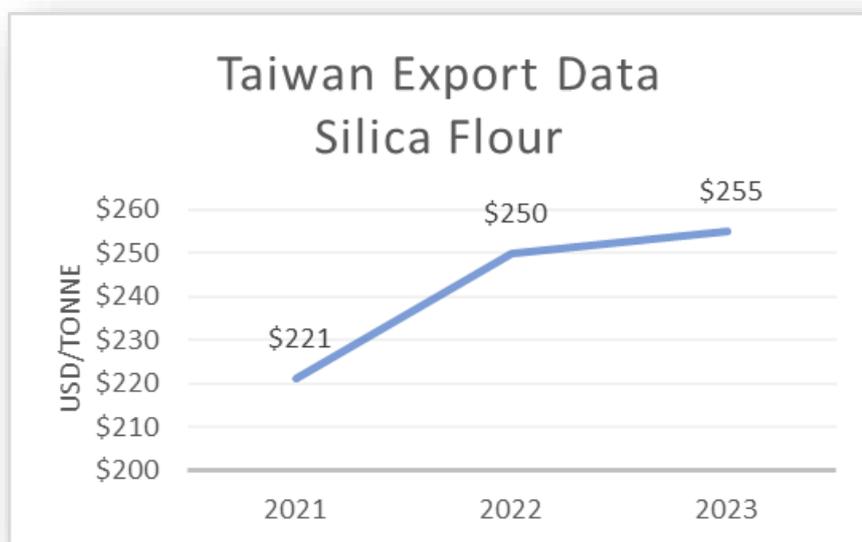


Figure 8: Taiwan Export Price – Silica Flour

Comminution and grinding tests will be completed by a specialist test facility in Germany. The test results will inform VRX with the equipment list and process design for a silica flour pilot plant. This plan is in line with the IAF Grant application.

The production of HPQ flour requires only grinding and classification of the silica sand raw material and no chemical processing. Closed circuit grinding undertaken with air classification provides the on-spec size fractions. The process can result in a portion of fines, termed “by-product”. This by-product is a lower value, but saleable product, that can be used in fiberglass applications, or if sufficiently high quality, it can be sold into higher value ceramic and paint filler markets. The key to a high margin silica flour processing operation is starting with the right raw material. The Company believes that the coarse material at Muchea is suitable and will produce a high yield of suitable silica flour.

Silica flour for LCD glass is one potential commercial outcome from the IAF funded grant program.

¹⁵ ASX announcement 18 July 2023, “\$2m Grant to Produce High Grade Silica Sand.”

¹⁶ Source: International Trade Administration Republic of China (Taiwan)

Further chemical processing of the silica flour may lead to suitable HPQ which is used in the production of silicon wafers used in photovoltaic cells for solar panels. Also, the production of silica gels requires high quality silica powders, these can be used in thermal protection for lithium ion batteries and many other applications. Thermal processing of silica flour and powders can produce other high value products such as Cristobalite and fumed silica.

These research and development activities, which start with the production of silica flour, will ultimately result in high value downstream processing opportunities that will maximise the value of VRX's world-class high-quality Muchea Silica Sand Project.

Corporate

There was no corporate activity during the quarter.

Events Subsequent to the End of the Quarter

High Grade Silica Flour Testwork Results

Subsequent to the end of the quarter, on 8 January 2024 VRX announced¹⁷ preliminary results of its specific high-grade silica flour comminution testwork on its Muchea Silica Sand Project products conducted at a specialist laboratory in Germany.

The testwork was to determine the potential yield, quality and power requirements to produce silica flour suitable for the manufacture of LCD glass.

The results of the testwork were largely in line with the Company's expectations and determined that Muchea silica sand is suitable for producing high grade silica flour for the rapidly expanding LCD glass market.

This testwork on Muchea silica sand has also determined the parameters required for an economic assessment into the viability of the potential for a new industry in WA which will follow the testwork program.

The testwork program has also provided a suitable quantity of samples to be forwarded to potential buyers which allows VRX to commence its marketing program for potential end users.

The testwork program followed a typical flow sheet of ball mill grinding followed by air classification and sizing to produce the specific particle size required by LCD glass manufacturers. The target specification, provided by VRX, conforms to the requirements of major producers of LCD screens in Asia.

The testing resulted in determining two critical outcomes; the bond work index (BWI) required to reduce the particle size of the Muchea sand feed to that required for the product specification, and the preferred product yield.

The BWI has been determined at 23.7kW/t, with a product yield of 44.1%. These figures are consistent with VRX expectations for this level of study. The BWI now allows VRX to determine a pilot plant scaled list of equipment. It is anticipated that OEM will provide equipment and basic layouts, and VRX will employ a local engineering company to design and construct the pilot plant. Once operational, the pilot plant will be fine-tuned to provide the required specification and an expectation of an increase in product yield.

¹⁷ ASX Announcement 8 January 2024 "High Grade Silica Flour Testwork Results."

All testing material and products are being returned to VRX for elemental testing to determine they conform to product specification for key elements, in particular iron. It is not expected that the precursor sand has been significantly changed as all media used in testing was ceramic. Samples of the final products will be sent to the major silica flour customers in Asia to confirm they conform to their specifications. The overground fines, or “by-product”, will also be marketed in Asia and in local industries such as fibreglass, paint and epoxy filler applications.

Once the products are received, VRX will consider other downstream processing options. These research and development activities, which start with the production of silica flour, will ultimately result in high value downstream processing opportunities that will maximise the value of VRX’s world-class high-quality Muchea Silica Sand Project.

ASX Listing Rule 5.3 Disclosures

Details of mining exploration activities:

Payments for exploration & evaluation under operating activities of \$196K related mainly to tenement rents and rates.

Payments for exploration & evaluation under investing activities of \$431K consists mainly of environmental surveys and approvals costs and metallurgical test work.

Details of tenement activities:

There were no changes to tenements during the quarter.

Details of related party payments:

The aggregate amount of payments to related parties and their associates of \$127K represents directors’ fees and salaries paid during the quarter.

There were no substantive mining production and development activities during the quarter.

Combined 1.4Bn tonne Mineral Resource

Mineral Resources - as at 09/05/2023

Project	Classification	Mt	SiO ₂ %	Al ₂ O ₃ %	Fe ₂ O ₃ %	TiO ₂ %	LOI %
Muchea	Indicated	29	99.6	0.1	0.0	0.1	0.2
	Inferred	179	99.6	0.1	0.0	0.1	0.2
	Total	208	99.6	0.1	0.0	0.1	0.2
Arrowsmith North	Measured	10	95.9	1.9	0.7	0.3	0.7
	Indicated	237	97.7	1.0	0.4	0.2	0.5
	Inferred	266	98.4	0.7	0.3	0.2	0.4
	Total	513	98.0	0.9	0.3	0.2	0.4
Arrowsmith Brand	Inferred	523	97.3	1.4	0.4	0.2	0.6
	Total	523	97.3	1.4	0.4	0.2	0.6
Arrowsmith Central	Indicated	28.2	96.6	1.7	0.4	0.2	0.7
	Inferred	48.3	96.9	1.5	0.4	0.2	0.7
	Total	76.5	96.8	1.5	0.4	0.2	0.7
Boyatup	Inferred	60	67.8	0.8	0.2	0.1	0.9
	Total	60	67.8	0.8	0.2	0.1	0.9

Total Mineral Resource 1,381 Million Tonnes

Ore Reserves - as at 09/05/2023

Project	Classification	Product	Mt	SiO ₂ %	Al ₂ O ₃ %	Fe ₂ O ₃ %	TiO ₂ %	LOI %	
Muchea	Probable	F80	10.2	99.9	0.02	0.008	0.03	0.1	
		F80C	4.25						
		F150	4.25	99.8	0.07	0.015	0.035	0.1	
Muchea Ore Reserve			18.7	Million Tonnes					
Arrowsmith North	Proved	AFS20	0.8	99.5	0.25	0.07	0.05	0.1	
		AFS35	3.9	99.5	0.5	0.06	0.05	0.1	
		AFS55	2.7	99.2	0.5	0.1	0.05	0.1	
		Local	1.8						
	Proved Ore Reserve			9.2	Million Tonnes				
	Probable	AFS20	24.2	99.5	0.25	0.07	0.05	0.1	
		AFS35	102.5	99.5	0.5	0.06	0.05	0.1	
		AFS55	51.1	99.2	0.5	0.1	0.05	0.1	
		Local	34.1						
	Probable Ore Reserve			212	Million Tonnes				
Arrowsmith North Ore Reserve			221	Million Tonnes					
Arrowsmith Central	Probable	CF400	4.2	99.6	0.25	0.04	0.03	0.1	
		C20	8.4						
		C40	4.2						
		High TiO ₂	2.2			<1%	2%		
Arrowsmith Central Ore Reserve			18.9	Million Tonnes					

Total Ore Reserve 259 Million Tonnes

Compliance Statement

The information in this document that relates to the estimation and reporting of the Mineral Resource and Ore Reserves for the Company's silica sands projects is extracted from releases to ASX on 28 August 2019 and 11 November 2022 (Arrowsmith North), 17 September 2019 (Arrowsmith Central), 9 May 2023 (Arrowsmith Brand), 18 October 2019 (Muchea) and Boyatup (18 August 2022). The Company confirms that it is not aware of any new information or data that materially affects the information included in this document and all material assumptions and technical parameters underpinning the estimates continue to apply and have not materially changed.

The information in this announcement that relates to the previous exploration results have been cross referenced to the original announcement. The Company is not aware of any new information or data that materially affects the previous exploration results.

This quarterly activities report has been approved for release by the Managing Director.

Interests in Mining Tenements (Western Australia)

Arrowsmith Project – Silica Sand

Tenement	Status	Interest at beginning of quarter	Interests relinquished, reduced or lapsed	Interests acquired or increased	Interest at end of quarter
E70/4986	Granted	100%	-	-	100%
E70/4987	Granted	100%	-	-	100%
E70/5027	Granted	100%	-	-	100%
E70/5109	Granted	100%	-	-	100%
E70/5197	Granted	100%	-	-	100%
E70/5817	Granted	100%	-	-	100%
M70/1389	Granted	100%	-	-	100%
M70/1392	Granted	100%	-	-	100%
M70/1418	Granted	100%	-	-	100%
L70/198	Granted	100%	-	-	100%
L70/199	Granted	100%	-	-	100%
L70/202	Granted	100%	-	-	100%
L70/203	Granted	100%	-	-	100%
L70/208	Granted	100%	-	-	100%
L70/229	Application	-	-	-	-
L70/230	Granted	100%	-	-	100%
G70/264	Granted	100%	-	-	100%
G70/265	Granted	100%	-	-	100%

Muceha Project – Silica Sand

Tenement	Status	Interest at beginning of quarter	Interests relinquished, reduced or lapsed	Interests acquired or increased	Interest at end of quarter
E70/4886	Granted	100%	-	-	100%
E70/5157	Granted	100%	-	-	100%
E70/5548	Granted	100%	-	-	100%
E70/5651	Application	-	-	-	-
M70/1390	Granted	100%	-	-	100%
M70/1414	Application	-	-	-	-
L70/200	Granted	100%	-	-	100%
L70/204	Granted	100%	-	-	100%
L70/205	Application	-	-	-	-
L70/206	Granted	100%	-	-	100%

Boyatup Project – Silica Sand

Tenement	Status	Interest at beginning of quarter	Interests relinquished, reduced or lapsed	Interests acquired or increased	Interest at end of quarter
E69/3560	Granted	100%	-	-	100%
E69/3668	Granted	100%	-	-	100%

Dandaragan Project

Tenement	Status	Interest at beginning of quarter	Interests relinquished, reduced or lapsed	Interests acquired or increased	Interest at end of quarter
E70/6501	Granted	100%	-	-	100%
E70/6502	Granted	100%	-	-	100%
E70/6503	Application	-	-	-	-
E70/6504	Application	-	-	-	-
E70/6505	Application	-	-	-	-

About VRX Silica Limited

VRX Silica Limited (ASX: VRX) is the most advanced pureplay silica sand company listed on the ASX, developing its 100% owned silica sand projects at Arrowsmith (North, Brand and Central), Muchea and Boyatup in Western Australia.

Silica sand is the most used commodity on the planet after air and water. It is the main ingredient in all types of glassmaking, including specialty solar panel and high-tech glass, and foundry casting. It is a finite resource that is running out, with the Asia-Pacific region experiencing an ever-growing supply shortfall that is driving up prices.

Arrowsmith is located 270km north of Perth. Arrowsmith North boasts a minimum 25-year mine life capable of producing more than 2Mt tonnes per year of high-grade (99.7% SiO₂)* silica sand for export to the foundry, container glass and flat glass markets in Asia, with permitting well advanced, and will lead production.

Muchea, located 50km north of Perth, is an ultra-high-grade (99.9% SiO₂)* silica sand project capable of producing sand required for ultra-clear glass for solar panels and other high-tech glass applications.

Boyatup, located 100km east of Esperance, is under development and capable of producing sand for the glass market.



**Information relating to grades are extracted from releases to ASX on 28 August 2019 and 11 November 2022 (Arrowsmith North) and 18 October 2019 (Muchea). The company is not aware of any new information or data that materially affects this information.*

Appendix 5B

Mining exploration entity or oil and gas exploration entity quarterly cash flow report

Name of entity

VRX SILICA LTD

ABN

59 142 014 873

Quarter ended ("current quarter")

31 December 2023

Consolidated statement of cash flows	Current quarter \$A'000	Year to date (6 months) \$A'000
1. Cash flows from operating activities		
1.1 Receipts from customers	-	-
1.2 Payments for		
(a) exploration & evaluation	(196)	(246)
(b) development	-	-
(c) production	-	-
(d) staff costs	(338)	(696)
(e) administration and corporate costs	(457)	(1,062)
1.3 Dividends received (see note 3)	-	-
1.4 Interest received	9	19
1.5 Interest and other costs of finance paid (on lease liability)	(7)	(14)
1.6 Income taxes paid	-	-
1.7 Government grants and tax incentives	50	731
1.8 Other (provide details if material)	-	-
1.9 Net cash from / (used in) operating activities	(939)	(1,268)
2. Cash flows from investing activities		
2.1 Payments to acquire or for:		
(a) entities	-	-
(b) tenements	-	-
(c) property, plant and equipment	(88)	(91)
(d) exploration & evaluation	(431)	(626)
(e) investments	-	-
(f) other non-current assets	-	-

Mining exploration entity or oil and gas exploration entity quarterly cash flow report

Consolidated statement of cash flows		Current quarter \$A'000	Year to date (6 months) \$A'000
2.2	Proceeds from the disposal of:		
	(a) entities	-	-
	(b) tenements	-	-
	(c) property, plant and equipment	-	-
	(d) investments	-	-
	(e) other non-current assets	-	-
2.3	Cash flows from loans to other entities	-	-
2.4	Dividends received (see note 3)	-	-
2.5	Other (bonds deposit)	-	-
2.6	Net cash from / (used in) investing activities	(519)	(717)

3.	Cash flows from financing activities		
3.1	Proceeds from issues of equity securities (excluding convertible debt securities)	-	2,750
3.2	Proceeds from issue of convertible debt securities	-	-
3.3	Proceeds from exercise of options	-	-
3.4	Transaction costs related to issues of equity securities or convertible debt securities	(66)	(140)
3.5	Proceeds from borrowings	-	-
3.6	Repayment of borrowings	-	-
3.7	Transaction costs related to loans and borrowings	-	-
3.8	Dividends paid	-	-
3.9	Other (repayment of lease liability)	(20)	(39)
3.10	Net cash from / (used in) financing activities	(86)	2,571

4.	Net increase / (decrease) in cash and cash equivalents for the period		
4.1	Cash and cash equivalents at beginning of period	3,712	1,582
4.2	Net cash from / (used in) operating activities (item 1.9 above)	(939)	(1,268)
4.3	Net cash from / (used in) investing activities (item 2.6 above)	(519)	(717)
4.4	Net cash from / (used in) financing activities (item 3.10 above)	(86)	2,571

Mining exploration entity or oil and gas exploration entity quarterly cash flow report

Consolidated statement of cash flows		Current quarter \$A'000	Year to date (6 months) \$A'000
4.5	Effect of movement in exchange rates on cash held	-	-
4.6	Cash and cash equivalents at end of period	2,168	2,168

5.	Reconciliation of cash and cash equivalents at the end of the quarter (as shown in the consolidated statement of cash flows) to the related items in the accounts	Current quarter \$A'000	Previous quarter \$A'000
5.1	Bank balances	2,168	3,712
5.2	Call deposits		
5.3	Bank overdrafts		
5.4	Other (provide details)		
5.5	Cash and cash equivalents at end of quarter (should equal item 4.6 above)	2,168	3,712

6.	Payments to related parties of the entity and their associates	Current quarter \$A'000
6.1	Aggregate amount of payments to related parties and their associates included in item 1	127
6.2	Aggregate amount of payments to related parties and their associates included in item 2	-

Note: if any amounts are shown in items 6.1 or 6.2, your quarterly activity report must include a description of, and an explanation for, such payments.

Mining exploration entity or oil and gas exploration entity quarterly cash flow report

7. Financing facilities	Total facility amount at quarter end \$A'000	Amount drawn at quarter end \$A'000
<i>Note: the term "facility" includes all forms of financing arrangements available to the entity. Add notes as necessary for an understanding of the sources of finance available to the entity.</i>		
7.1 Loan facilities	-	-
7.2 Credit standby arrangements	-	-
7.3 Other (please specify)	-	-
7.4 Total financing facilities	-	-
7.5 Unused financing facilities available at quarter end		-
7.6 Include in the box below a description of each facility above, including the lender, interest rate, maturity date and whether it is secured or unsecured. If any additional financing facilities have been entered into or are proposed to be entered into after quarter end, include a note providing details of those facilities as well.		

8. Estimated cash available for future operating activities	\$A'000
8.1 Net cash from / (used in) operating activities (item 1.9)	(939)
8.2 (Payments for exploration & evaluation classified as investing activities) (item 2.1(d))	(431)
8.3 Total relevant outgoings (item 8.1 + item 8.2)	(1,370)
8.4 Cash and cash equivalents at quarter end (item 4.6)	2,168
8.5 Unused finance facilities available at quarter end (item 7.5)	-
8.6 Total available funding (item 8.4 + item 8.5)	2,168
8.7 Estimated quarters of funding available (item 8.6 divided by item 8.3)	1.58
<i>Note: if the entity has reported positive relevant outgoings (ie a net cash inflow) in item 8.3, answer item 8.7 as "N/A". Otherwise, a figure for the estimated quarters of funding available must be included in item 8.7.</i>	
8.8 If item 8.7 is less than 2 quarters, please provide answers to the following questions:	
8.8.1 Does the entity expect that it will continue to have the current level of net operating cash flows for the time being and, if not, why not?	
<p>The entity expects the current level of net operating cash flows to reduce materially for the time being because:</p> <ul style="list-style-type: none"> - Payments for exploration and evaluation (item 1.2(a)) of \$196,000 included tenement rents and rates of \$179,000, reflecting that most of the total annual charge was incurred in this quarter; and - Payments for exploration & evaluation classified as investing activities (item 2.1(d) and item 8.2) of \$431,000 this quarter included non-recurring processing and test-work costs of \$122,000 relating to the potential production of suitable silica flour. 	

Mining exploration entity or oil and gas exploration entity quarterly cash flow report

8.8.2 Has the entity taken any steps, or does it propose to take any steps, to raise further cash to fund its operations and, if so, what are those steps and how likely does it believe that they will be successful?

No steps have been taken to raise additional funds at this stage. However, the entity in the ordinary course of its business monitors its cash position and considers sources and timing of potential financing options available to it in light of its cash position and expected expenditure, including equity and debt financing options.

8.8.3 Does the entity expect to be able to continue its operations and to meet its business objectives and, if so, on what basis?

Yes, based on the above the entity fully expects to be able to continue its operations and meet its business objectives.

Note: where item 8.7 is less than 2 quarters, all of questions 8.8.1, 8.8.2 and 8.8.3 above must be answered.

Compliance statement

- 1 This statement has been prepared in accordance with accounting standards and policies which comply with Listing Rule 19.11A.
- 2 This statement gives a true and fair view of the matters disclosed.

Date: .24 January 2024

Authorised by: The Board
(Name of body or officer authorising release – see note 4)

Notes

1. This quarterly cash flow report and the accompanying activity report provide a basis for informing the market about the entity's activities for the past quarter, how they have been financed and the effect this has had on its cash position. An entity that wishes to disclose additional information over and above the minimum required under the Listing Rules is encouraged to do so.
2. If this quarterly cash flow report has been prepared in accordance with Australian Accounting Standards, the definitions in, and provisions of, *AASB 6: Exploration for and Evaluation of Mineral Resources* and *AASB 107: Statement of Cash Flows* apply to this report. If this quarterly cash flow report has been prepared in accordance with other accounting standards agreed by ASX pursuant to Listing Rule 19.11A, the corresponding equivalent standards apply to this report.
3. Dividends received may be classified either as cash flows from operating activities or cash flows from investing activities, depending on the accounting policy of the entity.
4. If this report has been authorised for release to the market by your board of directors, you can insert here: "By the board". If it has been authorised for release to the market by a committee of your board of directors, you can insert here: "By the [name of board committee – eg Audit and Risk Committee]". If it has been authorised for release to the market by a disclosure committee, you can insert here: "By the Disclosure Committee".
5. If this report has been authorised for release to the market by your board of directors and you wish to hold yourself out as complying with recommendation 4.2 of the ASX Corporate Governance Council's *Corporate Governance Principles and Recommendations*, the board should have received a declaration from its CEO and CFO that, in their opinion, the financial records of the entity have been properly maintained, that this report complies with the appropriate accounting standards and gives a true and fair view of the cash flows of the entity, and that their opinion has been formed on the basis of a sound system of risk management and internal control which is operating effectively.