

## GREENVALE EXPANDS GEOTHERMAL FOOTPRINT IN QUEENSLAND WITH NEW EPG APPLICATIONS

Three new geothermal applications in the exciting Millungera Basin region in North-West Queensland further strengthens Greenvale's geothermal portfolio

### Highlights:

- Applications lodged over three prospective geothermal areas in the newly discovered, sparsely explored Millungera Basin of NW Queensland.
- The Millungera Basin exceeds maximum heat flow averages through all established geothermal fields determined in Australia to date.
- The proximity of the area where the applications have been lodged to Queensland's North-West Mineral Province provides significant opportunities for wholesale power supply to major new resource projects.
- New application areas set to benefit from the \$1.7bn CopperString 2.0 Project, which will see the construction of 1,000km of open access transmission lines, connecting Mount Isa to existing power infrastructure in Townsville.

Greenvale Mining Limited (ASX: **GRV**, "**Greenvale**" or "the **Company**") is pleased to advise that it has further expanded its potential geothermal portfolio in Queensland after lodging applications for several new highly prospective geothermal tenements in the newly-discovered Millungera Basin region in North-Western Queensland.

The new applications are located approximately 120km east of Mount Isa within the North-West Minerals Province and lie within the catchment of the \$1.7 billion CopperString 2.0 project, which will connect remote parts of north-western Queensland to existing power infrastructure in Townsville.

Together with the geothermal application areas that are held by Within Energy Pty Ltd (a company subject to a conditional purchase by GRV as announced on 1 June 2022), these represent some of the most geologically and economically significant geothermal tenures available in Queensland.

Not only is the Millungera Basin one of the most highly prospective areas geologically in Australia for the discovery of a potential geothermal resource but the area is also of considerable strategic and economic importance given the proximity to emerging infrastructure and the North-West Minerals Province.

Noteworthy projects in the area include the CopperString 2.0 high-voltage transmission line project, Multicom Resources Ltd's proposed St. Elmo Vanadium Project, and the Richmond Vanadium Project.

Greenvale has also applied for the corresponding mineral tenements over the new proposed project areas and will assess the geothermal brines for a full suite of metals, including as a potential source of lithium.

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## MILLUNGERA BASIN

Deep seismic reflection surveys in north Queensland that were collected in 2006 and 2007 discovered a previously unknown sedimentary basin, now named the Millungera Basin<sup>1</sup>. The Millungera Basin lies within a region of high heat flow, which also encompasses the Mount Isa Inlier.



**Figure 1:** Simplified map of northwest Queensland showing the interpreted subsurface distribution of the Millungera Basin. Also shown are Geoscience Australia and industry seismic lines, as well as key historic drillholes<sup>1</sup>.

Seismic profiling has been used to characterise the basin, as limited drilling has penetrated the sequence as evidenced by Figure 1. The Millungera succession has been divided into three seismically distinct packages comprising a highly reflective upper unit (Sequence 3), a predominantly non-reflective middle unit (Sequence 2), and a lower unit with multiple strong reflectors (Sequence 1).

1. Korsch Russell, Struckmeyer Heike, Kirkby Alison, Hutton Laurie, Carr Lidena, Hoffmann Kinta, Chopping Richard, Roy Indrajit, Fitzell Melanie, Totterdell Jennifer, Nicoll Malcolm, Talebi Benham (2011) Energy potential of the Millungera Basin: a newly discovered basin in north Queensland. *The APPEA Journal* 51, 295-332

Precision down-hole temperature logging shows elevated bottom-hole temperatures in the Millungera Basin region.

The targeted heat source for the Millungera Basin is high heat producing intrusives underlying the basin. Granitic bodies have been inferred from geophysical data to underlie the Millungera Basin and are possible Williams Supersuite equivalents. The plutons of the Williams Supersuite exhibit a high response on ternary radiometric images, and geochemical analysis has shown them to be enriched in Uranium, Thorium and Potassium<sup>1</sup>.

Currently in Australia, there are six major regions of geothermal activity: the Cooper Basin, South Australian Heat Flow Anomaly (SAHFA), the Otway Basin, the Gippsland Basin, the Tasmania Basin and the northern Perth Basin, as summarised below in Table 1. The heat flow value of  $113.0 \pm 2.9 \text{ mW/m}^2$  from the Millungera Basin exceeds maximum heat flow averages through all established geothermal fields determined in Australia to date<sup>1</sup>.

**Table 1:** Heat flow values calculated for Australian geothermal fields (Global Heat Flow Database)<sup>2</sup>

Prospective Area	Avg. Heat Flow (mW/m <sup>2</sup> )	Standard Deviation	Minimum Value	Maximum Value	Count
Cooper Basin	102	13	67	140	40
SAHFA	102	43	50	275	39
Otway Basin	73	17	50	123	31
Gippsland Basin	103	-	-	-	1
Eastern Tasmania	85	14	48	118	40
Northern Perth Basin	57	12	47	73	5

Source: University of North Dakota, 2011

Greenvale has applied for areas covering the majority of the sparsely explored Millungera Basin and from the existing available geological information, a potential geothermal resource could lie no deeper than 2km below surface with projected temperatures between 100°C - 120°C.

The geological profile of the Millungera Basin fits with the Company's geothermal strategy to exploit shallower, lower temperature sources utilising Binary Cycle technology. Binary Cycle systems have the ability to generate geothermal power at lower temperatures via the use of a heat exchange process operating a turbine in a closed loop.

1. Korsch et al. (2011)

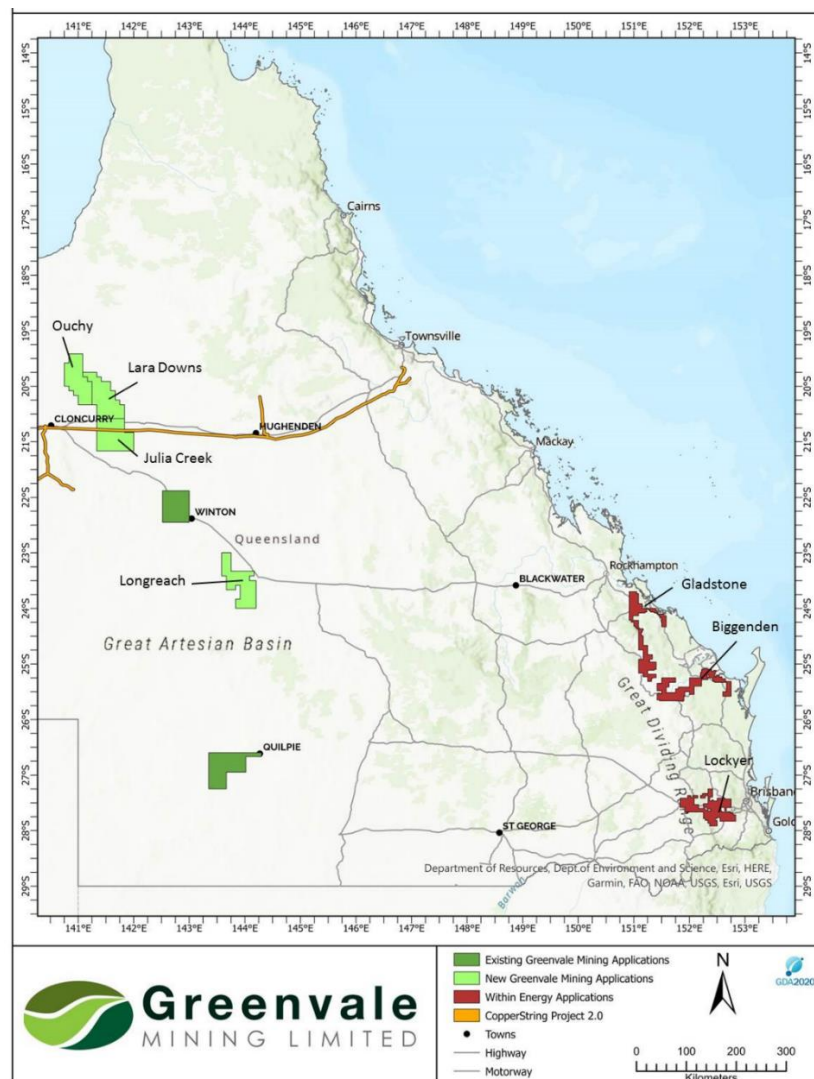
2. UNIVERSITY OF NORTH DAKOTA, 2011: GLOBAL HEAT FLOW DATABASE of the International Heat Flow Commission, accessed 10 June 2022, <<http://www.heatflow.und.edu/index2.html>>

## COPPERSTRING 2.0

The CopperString 2.0 Project will connect Mount Isa and the North-West Minerals Province to the National Electricity Grid near Townsville through the construction of approximately 1,000km of open-access high-voltage AC transmission lines (see **Figure 2: Greenvale Mining & Within Energy Geothermal Tenement Applications**Figure 22). Construction is expected to take approximately three years with an estimated project cost of \$1.7 billion<sup>1</sup>.

The CopperString Project will play a key role in unlocking approximately A\$740 billion<sup>1</sup> in remaining resource value in the prolific North-West Minerals Province of Queensland. Additionally, the CopperString Project is expected to result in significantly reduced power prices for those living and working in North-Western Queensland, with many customers reportedly paying more than \$200 a megawatt-hour for electricity currently.

The CopperString corridor between Townsville and Mount Isa cuts through the heart of the best renewable resources in Queensland. CopperString's development will fuel significant investment in renewable energy projects that will now have an economically viable means to distribute power generated in the region.



**Figure 2: Greenvale Mining & Within Energy Geothermal Tenement Applications**

1. *CopperString 2.0 Project 2022*, CuString Pty Ltd, accessed 10 June 2022, < <https://copperstring2.com.au/>>

**Table 2: Full list of all tenement applications**

EPG No.	Name	Type	Status	Owner	Area (Blocks)
EPG 2022	Quilpie	Geothermal	Application	Alpha Resources	1,250
EPG 2021	Winton	Geothermal	Application	Alpha Resources	986
Revised	Longreach	Geothermal	Application	Greenvale Mining	Pending
EPG 2023	Julia Creek	Geothermal	Application	Greenvale Mining	1,250
EPG 2024	Lara Downs	Geothermal	Application	Greenvale Mining	1,200
EPG 2025	Ouchy	Geothermal	Application	Greenvale Mining	1,100
EPG 2026	Lockyer	Geothermal	Application	Within Energy	1,049
EPG 2027	Biggenden	Geothermal	Application	Within Energy	1,007
EPG 2028	Gladstone	Geothermal	Application	Within Energy	1,009

EPM No.	Name	Type	Status	Owner	Area (Blocks)
EPM 28266	Quilpie	Mineral	Application	Alpha Resources	90
EPM 28265	Winton	Mineral	Application	Alpha Resources	87
EPM 28487	Julia Creek	Mineral	Application	Greenvale Mining	71
EPM 28488	Longreach	Mineral	Application	Greenvale Mining	73
EPM 28489	Ouchy	Mineral	Application	Greenvale Mining	78

**MANAGEMENT COMMENT:**

Greenvale Mining Managing Director, Neil Biddle, commented: *“This represents another exciting development in our geothermal strategy, following hard on the heels of the Within Energy acquisition announced earlier this month. These new applications cover one of the most prospective new geothermal provinces in Australia in the Millungera Basin, opening up an exciting opportunity for our team to explore for geothermal energy sources on the doorstep of the North-West Mineral Province in Queensland.*

*“The cost and availability of power is a huge issue in Australia right now, and nowhere more than North-West Queensland. The Millungera Basin represents one of the most attractive regions geologically to target economically exploitable geothermal energy, with the Basin having the potential to exceed the maximum heat flow averages through all the six established geothermal fields identified.*

*“The significance of the opportunity is further enhanced by the \$1.7 billion CopperString 2.0 Project, a massive investment in power infrastructure which will see the construction of over 1,000km of open-access transmission lines connecting Mount Isa to existing power infrastructure. This further leverages the huge opportunity for our shareholders.”*

**Authorised for Release**

This announcement has been approved by the Board for release.

Alan Boys  
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