

Heavy Minerals - a promising new garnet company

Our markets digested the Federal election outcome without missing a beat. We saw a continuation of the same thematics from overseas with the prospect of further rises in interest rates still in the offing. There was increased talk about an emerging recession and China seems more likely to head south (economically) than progress in the short term due to continuing covid lockdowns. So, it was another uninspiring week as we move into the final month of the financial year and what is usually a down month.

Fund managers have to deal with redemptions

When markets fall for any continued period of time it happens in waves. First you have selling from individual investors as they step back from the market, but you also have substantial positions held by fund managers to consider. These fund managers can have sizeable holdings that they may want to keep, but their hands can be forced when the fund receives redemptions. They have no choice but to liquidate positions in order to satisfy the demand for cash. Often it is a matter of desperately selling what they can move according to liquidity, and this can be in better quality companies. It has a compounding effect on driving share prices lower.

So if you are a bargain hunter and you are looking to buy good stocks that have been sold down too far, just be aware that the selling may have come from a fund manager who will keep selling while there are buyers. You are likely to be filled in. The share price will not recover until these large positions are cleared, if at all.

Heavy Minerals - a prospective garnet producer

One of the more interesting companies we saw at the recent RIU conference in Sydney was Heavy Minerals Ltd (HVY), based on the prospectivity of a garnet and heavy minerals deposit 50 km north of Geraldton in WA. With a market capitalisation of around \$11m, it seems that the market is ignoring the upside potential.

Why is the share price so low? Maybe it is just another victim of the weak market we have been experiencing, or maybe the release of a small number of escrowed shares in the middle of the month resulted in some selling. Maybe the market doesn't know how to assess garnet projects.

The IPO in September 2021 raised \$5.5m

The shares started trading on 14/9/21, after raising \$5.5m in an IPO managed by Foster Stockbroking.

The main project is the Port Gregory Garnet Project which had an Exploration Target of 3.5-4.5 Mt of contained garnet, based on prior drilling by GMA of 52 holes within an area measuring 200m x 80-100m. Another heavy minerals project is held in Mozambique, which had an Inferred Mineral Resource of 51 Mt at 3.4% THM, but was recently upgraded to 90 Mt at 3% THM.

Immediately upon listing the Company commenced a 12,000m, 300 hole air core drilling program. In March 2022, the Company reported success on a number of fronts. There was a good correlation with historical drill results and the footprint of the mineralisation expanded the zone by 40%, enabling the calculation of a maiden JORC Indicated (65%) and Inferred (35%) Resource of 135 Mt at 4% THM with 4.9 Mt of contained garnet. The mineral assemblage contained 89% garnet, 4% ilmenite, 2% rutile and 0.6% zircon in the Indicated Resource.

Heavy Minerals has appointed IHC Mining to conduct a Scoping Study and a Preliminary Economic Assessment (PEA) with results anticipated to be available in Q3 of 2022, being a very short time frame.

Potential economics are attractive

The PEA will provide transparency of the potential earnings stream, so technically one might wait until then before saying too much, but there is no harm in speculating now. We can estimate that a 600 tph operation would involve capex of around \$60m. The Resource Development Group (RDG) operation in the same area has operating costs of about A\$185 pt fob, comprising \$68 pt on-site costs and logistics of \$117 pt. If HVY was to experience similar costs of say, \$200 pt, and sell for A\$500 pt, it could be looking at an operating margin of around \$32m p.a. That would mean a capex payback of around two years, which is as good as you can get for this type of project. Compare that with the market capitalisation of \$11m today and that looks attractive, even considering that there will be dilution involved in financing the project.

Some basic geology

The existing mines in the area are based on strand-line deposits derived from the weathering of crystalline igneous rocks with subsequent deposition of coastal sand deposits. These deposits have localised enrichment of heavy minerals, notably garnet (almandine type) and to a lesser extent ilmenite. Proximity of HVY's licences to GMA's operations enable its ground to be described as a brownfields opportunity, as opposed to the higher risk grass roots description.

Heavy Minerals has an aeolian deposit, with the high-grade frontal dunes complemented with moderate grade disseminated deposits located to the East of the main tenement.

The dunes have minimal calcrete cover of 0.5-1m in thickness, beneath which is a 20-25m layer of sand. The company would be focusing in the top 20m of material which is expected to be free digging.

Mining methodology

GMA's operation can give us guidance of what HVY should expect i.e. standard open pit sand mining methods using front-end loaders, excavators and dump trucks. A typical

mineral sands wet gravity separation plant will be needed comprising spirals and hydro-sizers to produce concentrates that will also include rutile and zircon. There is nothing intimidating in this well-proven recovery methodology.

Some history on the neighbouring project is useful

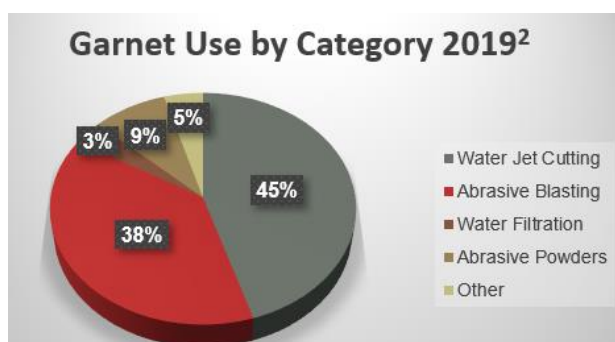
A large deposit of garnet sands was discovered at Port Gregory, Western Australia in the late 1970s. Subsequently, the largest garnet mine in the world was opened there in 1983, by Target Resources. The mine proved to be a great cash cow but the shares were very tightly held by the major shareholders, so it was almost like a closed shop. The company received a takeover bid from Hancock and Gore in 1990, but that was initially rejected. Subsequent negotiations led to Hancock acquiring the garnet operations under the banner of GMA.

Barton Mining Corporation, the largest garnet miner in the USA, acquired a 50% stake in the project and then in 2002, Hancock and Gore sold its interest to Garnet International Resources, a German company, for \$18m. Garnet International then bought out Barton’s interest to achieve 100% ownership.

Rumour has it that GMA is close to exhausting its high grade resource, meaning it falls back to resources grading about 4%. As it accounts for about 34% of global supply at present, the market will be looking for new sources. Heavy Minerals may be able to step up to the plate to help fill the gap in supply.

Garnet for water jet cutting and abrasive blasting

Garnets are used for industrial blast-cleaning, polishing, filtration and water jet cutting. A water jet cutter produces a high-pressure jet of water with garnet and other abrasive grains in it. When the jet is aimed at a piece of metal, ceramic, or stone, it cuts the material producing very little dust. Garnet is starting to replace silica in abrasives, because silica is dangerous to workers health. The pie chart below gives a breakdown of uses



¹USGS Minerals Handbook 2005-2021 and HVY internal calculations
²TZMI Garnet Market Data (Project 11759) Jan 2021

The following diagram provides the range of mesh and micron sizes that garnet products can be supplied to the market.

The garnet market

There is no open market for garnet. It is typically sold on long term contracts (3-5 years) on a take-or-pay basis. It can be sold as a concentrate or as a refined product, which carries a premium. The grain size (mesh) determines the

PARTICLES - MESH SIZES TO MICRONS			
Mesh Size	Particle Size*	Microns (µm)	Common Examples
20	●	841	Blasting
			Granulated Sugar
30	●	595	
40	●	400	Coffee
50	●	297	Black Pepper
60	●	250	Blasting
70	●	210	
80	●	177	Water Jet & Blasting
100	●	149	Water Jet
120	●	125	Water Jet
140	●	105	Powdered Sugar
170	●	88	Human Hair

end uses and the price, which can vary according to demand in various regions around the world.

The unrefined garnet price is currently about 25% higher than it was in 2016, at around US\$270 pt, but it is important to recognise that the price can vary significantly according to whether it is hard rock, alluvial or refined, and according to the size fraction. The GMA #80 product, from a mine near Geraldton, sells for US\$400 pt fob Fremantle.

According to QYR Research, the global garnet market is expected to be undersupplied for the foreseeable future. Demand is expected to grow to US\$605m by 2025, with CAGR growth rate of 6% p.a. Water jet cutting uses will be the biggest source of growth in demand.

The largest supplier to the market is GMA with a 34% market share. The net largest supplier, Rizhao Garnet, supplies only 5.8% of the market. Australia supplies around 30% of the market, China 22%, India 13.5% and the USA 9.6% (2019 figures - physical volumes).

The Bottom Line

There is no premium in the current share price for what could be a simple, long life project selling into a relatively stable market environment. While garnets don’t have the sex appeal of alternative energy stocks, there is much greater certainty in the market of the project economics than with exotic materials. It is the sort of company that you can buy now and sleep at night, knowing that there isn’t the

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risk of a bubble bursting. That has sound merit, in my opinion.

Greatcell is finding that graphene is significantly improving perovskite solar cell

Late last year we provided some research on Greatcell Energy, one of the leading companies pioneering the development of low light perovskite solar cells. This research is available on the Far East Capital website if you want to see it again.

We visited the operations in Wagga Wagga last week and were delighted to see that the use of First Graphene's graphene products were providing a substantial reduction in the cost of materials used in the manufacturing of perovskite solar cells, as well as improving the efficiency of the cells.

Specifically, the graphene can be used to replace a layer of gold that previously accounted for more than 90% of the material costs. The conductivity and the flexibility of graphene has proved itself. Importantly, graphene can be applied in a large scale roll-to-roll manufacturing technique once commercial scale operations are commissioned, probably in 2023.

The efficiency of graphene in this state of the art perovskite cell is the highlight, though there is a double edged sword for the graphene supplier. It is so efficient that very little is needed in each cell. Nevertheless, with the probability that Greatcell will be called upon to manufacture tens of millions of cells each year for only the first two potential customers with which it is dealing, it could provide useful revenue for First Graphene, perhaps in the tens of tonnes p.a. when the ball really gets rolling. It would be yet another positive outcome in the development of new applications for this wonder material.

Disclosure: Interests associated with the author own shares in First Graphene and the author is a director of FGR.

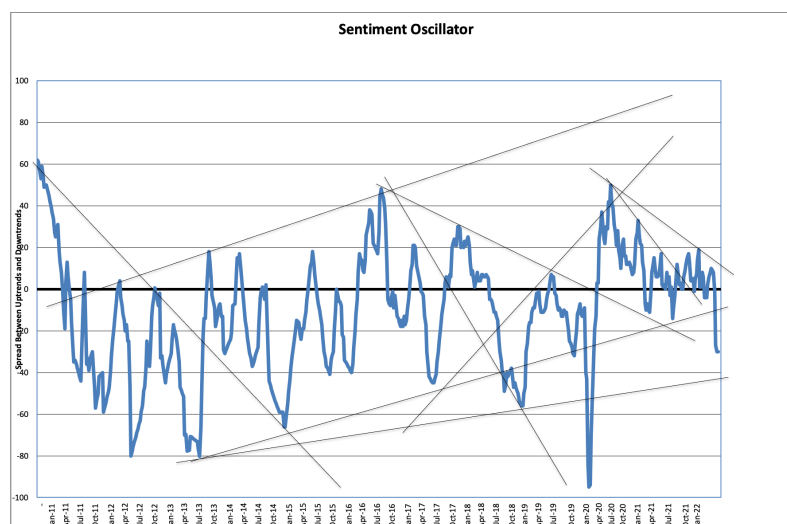
Lindian spiked on rare earth news

We have limited our previous commentary on Lindian to the high grade bauxite projects in Guinea but the announcement last week, of a resolution of the litigation concerning the Kangankunge rare earth deposit in Malawi, brings that project into focus.

While the ASX release says the litigation has been settled, there is now a 60 day period within which the parties can negotiate binding terms for the purchase of a 100% interest in Rift Valley Resource Developments Ltd. Note that the right to negotiate does not constitute an actual interest, yet. The settlement does refer to a proposed purchase price of US\$30m, payable in four tranches over four years.

The market obviously believes the project has value, judging by the share price spiking to 5.5c on Friday. It has been described to me as "a very sweet" rare earths project that deserves a premium. It would need to be good to justify a US\$30m purchase price. Let us wait and see if Lindian can close the deal.

Disclosure: Interests associated with the author own shares in Lindian Resources and capital raising fees have been received.



Sentiment Oscillator: Sentiment was steady. There were 22% (21%) of the charts in uptrend and 52% (48%) in downtrend on Friday's close.

Detailed Chart Comments

NB. Only the bold comments have been updated. Comments in grey type are from previous weeks and will be less relevant. Please note that this list is a cross section of the market. It IS NOT a list of recommendations.

Indices	Code	Trend Comment	
All Ordinaries	XAO	breaching steepest downtrend	
Metals and Mining	XMM	breaching steepest downtrend	
Energy	XEJ	correction	
Information Technology	XIJ	down	
Stocks	Code	Trend Comment (updated comments in bold)	Main Interest
Alpha HPA	A4N	bounced off support line	HPA
Adriatic Resources	ADT	shallower downtrend	zinc, polymetallic
Alkane Resources	ALK	breached uptrend	gold
Alicanto Minerals	AQI	down	base metals, silver, gold
Altech Chemical	ATC	down	HPA, anodes
Anteotech	ADO	back to lows	silicon anodes, biotech
Alto Metals	AME	sideways	gold exploration
American Rare Earths (was BPL)	ARR	off its highs	rare earths
Antilles Gold	AAU	still down	gold
Arafura Resources	ARU	off its highs	rare earths
Ardea Resources	ARL	heavy retracement	nickel
Aurelia Metals	AMI	breached support line	gold + base metals
Australian Potash	APC	risen to hit downtrend line	potash
Australian Rare Earths	AR3	down	rare earths
Auteco Minerals	AUT	new low	gold exploration
Arizona Lithium	AZL	uptrend	lithium
Azure Minerals	AZS	collapse	nickel exploration
BHP	BHP	slump out of uptrend	diversified, iron ore
Beach Energy	BPT	new uptrend confirmed	oil and gas
Bellevue Gold	BGL	slump	gold exploration
Benz Mining	BNZ	back to previous lows	gold
Blue Star Helium	BNL	down	gas, helium
BMG Resources	BMG	shallower downtrend	gold exploration
Boab Metals	BML	back above resistance line	silver/lead
Breaker Resources	BRB	on support line	gold exploration
Buru Energy	BRU	falling	oil
Calidus Resources	CAI	on support line	gold
Capricorn Metals	CMM	slump	gold
Caravel Minerals	CVV	rallied to meet resistance line	copper
Castile Resources	CST	good rise	gold/copper/cobalt
Celsius Resources	CLA	falling	copper
Chalice Mining	CHN	down	nickel, copper, PGMs, gold exploration
Chesser Resources	CHZ	rallied off lows	gold exploration
Cobalt Blue	COB	correcting lower	cobalt

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Cyprium Metals	CYM		surge out of downtrend	copper
Danakali	DNK		downtrend accelerating	potash
De Grey	DEG		falling	gold
E2 Metals	E2M		down	gold exploration
Ecograf	EGR		down	graphite
Element 25	E25		down	manganese
Emerald Resources	EMR		recovered to highs	gold
Empire Energy	EEG		down	gas
Euro Manganese	EMN		down	manganese
Evolution Mining	EVN		slump	gold
Firefinch	FFX		slump out of uptrend	gold
First Graphene	FGR		good rally	graphene
Fortescue Metals	FMG		rallying after heavy fall	iron ore
FYI Resources	FYI		down	HPA
Galena Mining	G1A		still down	lead
Galilee Energy	GLL		breaching downtrend	oil and gas, CBM
Genesis Minerals	GMD		collapse back to downtrend	gold
Genmin	GEN		new uptrend breached	iron ore
Gold Road	GOR		down	gold
Great Boulder Resources	GBR		down	gold exploration
Hastings Technology Metals	HAS		testing uptrend	rare earths
Hazer Group	HZR		heavy slump	hydrogen
Heavy Minerals	HVY		back to support line	garnet
Highfield Resources	HFR		breached support line	potash
Hillgrove Resources	HGO		long term uptrend	copper
Iluka Resources	ILU		down	mineral sands
Image Resources	IMA		new uptrend breached	mineral sands
ioneer (was Global Geoscience)	INR		down	lithium
Ionic Rare Earths (Oro Verde)	IXR		new high	rare earths
Jervois Mining	JVR		on support line	nickel/cobalt
Kingston Resources	KSN		down	gold
Krakatoa Resources	KTA		short term down	rare earths
Kingwest Resources	KWR		drifting lower	gold
Legend Mining	LEG		sideways	nickel exploration
Lepidico	LPD		breached uptrend	lithium
Lindian Resources	LIN		surged higher	bauxite
Lion One Metals	LLO		slump	gold
Los Cerros	LCL		new low	gold exploration
Lotus Resources	LOT		testing long term uptrend	uranium
Lucapa Diamond	LOM		back to lows	diamonds
Lynas Corp.	LYC		down	rare earths
Magnetic Resources	MAU		shallow downtrend	gold exploration
Mako Gold	MKG		sideways	gold exploration
Marmota	MEU		surge higher on REE news	gold exploration

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Marvel Gold	MVL		breached uptrend	gold exploration
Matador Mining	MZZ		new low	gold exploration
Mayur Resources	MRL		slump to new low	renewables, cement
Meeka Gold	MEK		breached downtrend	gold
Megado Gold	MEG		back to trend line	rare earths, gold exploration
Meteoritic Resources	MEI		sideways through downtrend line	gold exploration
MetalsX	MLX		heavy fall	tin, nickel
Metro Mining	MMI		holding support line	bauxite
Mincor Resources	MCR		down	gold/nickel
Mithril Resources	MTH		down	gold/silver
Musgrave Minerals	MGV		testing downtrend	gold exploration
Neometals	NMT		breached uptrend	lithium
Northern Minerals	NTU		down	REE
Northern Star Res.	NST		breached downtrend	gold
Nova Minerals	NVA		down again	gold exploration
Oceana Gold	OGC		rising	gold
Oklo Resources	OKU		spiked through downtrend	gold expl.
Orecorp	ORR		down	gold development
Oz Minerals	OZL		back into downtrend	copper
Pacific American	PAK		back to lows	coking coal
Pantoro	PNR		down	gold
Panoramic Res	PAN		testing uptrend	nickel
Peak Minerals	PUA		pullback	copper exploration
Peak Resources	PEK		down	rare earths
Peel Mining	PEX		sideways	copper
Peninsula Energy	PEN		breached uptrend	uranium
Poseidon Nickel	POS		drifting lower	nickel
Perseus Mining	PRU		near highs	gold
Provaris Energy	PV1		down - was Global Energy Ventures	hydrogen
PVW Resources	PVW		down heavily	rare earths
QMiner	QML		downtrend	copper
Queensland Pacific Metals	QPM		testing downtrend	nickel/cobalt/HPA
Red River Resources	RVR		testing uptrend	zinc
Regis Resources	RRL		down	gold
Reergen	RLT		breached uptrend	gas, helium
RIO	RIO		down	diversified, iron ore
Rumble Resources	RTR		good rally	gold exploration
S2 Resources	S2R		drifting lower	gold exploration
St Barbara	SBM		down	gold
Sandfire Resources	SFR		down	copper
Santos	STO		uptrend	oil/gas
Saturn Metals	STN		sideways	gold exploration
Silex Systems	SLX		holding support	uranium enrichment technology
Silver Mines	SVL		down	silver

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South Harz Potash	SHP		still holding long term uptrend	potash
Stanmore Coal	SMR		pullback	coal
Strandline Resources	STA		pullback	mineral sands
Sunstone Metals	STM		downtrend	exploration
Talga Resources	TLG		down	graphite
Technology Metals	TMT		down	vanadium
Tesoro Resources	TSO		down again	gold exploration
Theta Gold Mines	TGM		down	gold
Thor Mining	THR		correcting lower	gold exploration
Tietto Minerals	TIE		down	gold
Titan Minerals	TTM		down	gold
Turaco Gold	TCG		downtrend	gold exploration
Vanadium Resources	VR8		heavy correction	vanadium
West African Resources	WAF		holding uptrend	gold
Westgold Resources	WGX		down	gold
West Wits Mining	WWI		heavy fall	gold
Whitehaven Coal	WHC		secondary uptrend	coal
Wiluna Mining	WMC		heavy fall	gold
Yandal Resources	YRL		sideways	gold exploration
Zenith Minerals	ZNC		off its highs	gold exploration
Zinc Mines of Ireland	ZMI		sideways	zinc
Totals	22%	32	Uptrend	
	52%	74	Downtrend	
		143	Total	

Guides to Chart Interpretations

- Charts usually go pass from one trend (up or down) into the other via a period of indecision and uncertainty during which the trend can either recover or change. This period is signified by the orange colour. The orange represent both the greatest risk and greatest reward possibilities.
- Once a chart is in confirmed up or downtrends it is not uncommon for 10-20% of that trend to have already transpired.
- There are trends within trends. The focus of this chart review is the immediate trend that affects the sentiment i.e. it can be a downtrend within a long-term uptrend.
- Not every chart warrants a new comment every week. The new comments are in bold type. Grey type comments may be dated.
- Individual charts provide a single view. It is valuable to look at charts of other companies in similar commodities, and the overall sentiment is also very valuable. Not many stocks can swim against the tide.
- We periodically add or delete charts, some times for obscure reasons. If a chart consistent gives poor signals or is very erratic, we may delete it. Sometimes we add a chart because we want to see what all the fuss is about. We do have a preference for charting stocks that we cover in our research as well.
- Errors and omissions may occur from time to time, especially in fast moving markets.

Amber Lights in Tables: Just a reminder if when the amber light is used in the table – it is when the charts are ambiguous or when there is a change of trend taking place. If a chart is breaching a downtrend it can either be a positive sign or a trap. Only once it has done more work can it be confirmed as a new uptrend. Maybe it is a new uptrend (or conversely a new downtrend); the risk takers can decide to jump on board early (or sell). They will maximise their profits (or minimise their losses if indeed it is the start of the new uptrend (downtrend). More risk-averse investors should wait a little longer, being prepared to give up some of the gains in return for greater certainty.

Weightings of Sectors Represented in the Company Charts			
Sector	No. of Companies	Weighting	
Gold	31	21.7%	
Gold Exploration	23	16.1%	
Nickel	11	7.7%	
Copper	11	7.7%	
Rare Earths	11	7.7%	
Oil/Gas	7	4.9%	
Iron Ore/Manganese	6	4.2%	
Lithium	4	2.8%	
Potash/Phosphate	5	3.5%	
Graphite/graphene	4	2.8%	
Uranium	3	2.1%	
Zinc/Lead	4	2.8%	
Mineral Sands	3	2.1%	
Silver	3	2.1%	
Coal	3	2.1%	
Bauxite	2	1.4%	
Cobalt	1	0.7%	
Tin	1	0.7%	
Diamonds	1	0.7%	
Other	9		
Total	143		

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