

First Graphene signs an MoU with a US\$10bn company

FGR's most commercially significant release

During the week First Graphene made its most commercially significant release ever, in my opinion. After six months of negotiations it announced the signing of an MoU with Gerdau S.A. that promises to open up the American markets to PureGRAPH® products. The final joint venture agreement will take a little longer to sort out the details, but that is for the lawyers to fine tune.

Not many people in Australia know of Gerdau, but it is a serious company with a market capitalisation of around US\$10bn, listed on the New York, Sao Paulo and Madrid stock exchanges. It specialises in the production of steel using electric arc furnaces i.e. from scrap steel. The introduction came through the Graphene Engineering and Innovation Centre (GEIC) in Manchester, UK, of which FGR is a Tier 1 member. Gerdau was initially established by a German industrialist in the mid 1800s.

Basically, First Graphene and Gerdau will jointly work together to market PureGRAPH® products in the first instance, develop new applications and build a distribution network in the Americas. Joint production facilities are on the agenda. Gerdau has a vision of graphene being a major profit centre as a diversification beyond its steel business, with a view to being a leading player in this exciting and disruptive sector.

Having the endorsement of First Graphene by a company as powerful as Gerdau is very significant. It is a major step forward in taking the graphene sector from being an innovative curiosity to a commercial reality with a growth curve that will be very impressive over the next 20 years, and beyond. This is a major inflection point for FGR.

The bucket liners have exceeded expectations

One of the first products to utilise PureGRAPH® in an industrial application was the polymer liners on the bucket wheel reclaimers used by the iron ore industry. At the outset FGR would have been pleased if the liners were twice as good as those not enhanced with graphene. The actual result has been significantly better - 6x better to be precise.

This result will have every industry around the world wondering whether similar performance improvements can be achieved with their uses of polymers and similar materials. The evidence from the field is overwhelmingly positive such that even those who want to delay innovation have no grounds for refusal now.

Disclosure: Interests associated with the author own shares in First Graphene and the author is a director. Capital raising fees have been received.

Ardea offers a low cost entry to EV nickel products

Ardea Resources (ARL) looks like a low cost entry to the laterite nickel sector that has so far missed the attention given to competitors such as Australian Mines and Clean TeQ. All three companies have projects that were examined back in the days of Anaconda Nickel when that company inspired a laterite nickel boom, but at the time the only project that secured funding was Anaconda's Murrin Murrin Project.

You might be surprised to learn that Ardea says it has the largest undeveloped nickel deposit in the Western world, near Kalgoorlie, with 826 Mt at 0.7% Ni and 0.05% Co. Goongarrie is a subset of this grand figure with a high grade core of 60 Mt at 1% Ni and 0.07% Co. As a sweetener, it also suggests that it may have the largest scandium deposit in the world with 74 Mt at 35 ppm. Whenever a company comes out with such boastful comments I find it is necessary to check the veracity. The following notes confirm the punch line.

At the time of Murrin Murrin's development Anaconda went down the LME deliverable metal route but times are different now. Buyers are wanting intermediate products for use in the battery manufacturing business, so demand is coming from the EV market rather than the traditional stainless steel appetite. They want either high purity nickel sulphate or the more valuable Precursor Cathode Active Material (P-CAM), which is a nickel-cobalt-manganese oxide. The Goongarrie resource is already close to the ratio of NCM of 82:5:12, being 82% Ni, 5% Co and 12% Manganese, so this is a positive.

Now back to the claim of having the largest nickel resource. We note that Clean TeQ (CLQ) has announced a resource of 101 Mt at 0.6% Ni and 0.13% Co at the Sunrise Project. At Sconi, Australian Mines (AUZ) has declared 116 Mt at 0.6% Ni and 0.06% Co. So, Ardea's is definitely the largest resource of its type in Australia, on published figures.

As far as value is concerned, Ardea has a market enterprise value of A\$11/pt NiEq whereas Australian Mines and Clean TeQ have valuations of A\$116/pt and \$275/pt respectively. Maybe this is because these projects have had Definitive Studies completed, whereas Ardea's project is only at PreFeasibility status with that having been completed in 2018. A DFS for Ardea would probably cost \$30m, but the company doesn't want to undertake such a study until it has selected a strategic partner. Australian Mines has a market capitalisation of \$80m, Clean TeQ's is \$221m and Ardea sits at \$65m.

These three companies all face considerable capital expenditure hurdles. Australian Mines is looking at capex of US\$974m for a 2 Mtpa project, producing at a cash cost of US\$1.46/lb of nickel. Clean TeQ's Sunrise capex budget is US\$2bn for a 2.6 Mtpa plant with C1 cash costs of US\$4.42/lb, falling to US\$(1.86)/lb after by-product credits

(NB: the movements in the cobalt price will have a big impact on this cost figure). Ardea is looking at US\$918m for a 2.25 Mtpa expanded capacity, based on a scoping study level. Its cash costs would be US\$(0.34)/lb after by-product credits.

Ardea would use conventional HPAL technology, with the advantage that its goethite ore type doesn't need to be dried or screened before processing, and it expects low acid consumption. Important decisions are yet to be made, such as whether or not to produce P-CAM to achieve a 30% uplift in revenue. Selection of a suitable JV partner will be the most price sensitive news that we are looking for, as the quality of the partner will send a strong message. Maybe this can happen in 2021, but negotiations always take a long time.

Ardea has a number of other interesting exploration projects for sulphide nickel deposits and gold that add to the blue sky appeal. With a market capitalisation of \$65m the stock doesn't look expensive at all. Where the share price goes in the short term will depend upon the general EV and battery thematic that has been driving all stocks in this sector.

Next Hydrogen - innovation in Water Electrolysis

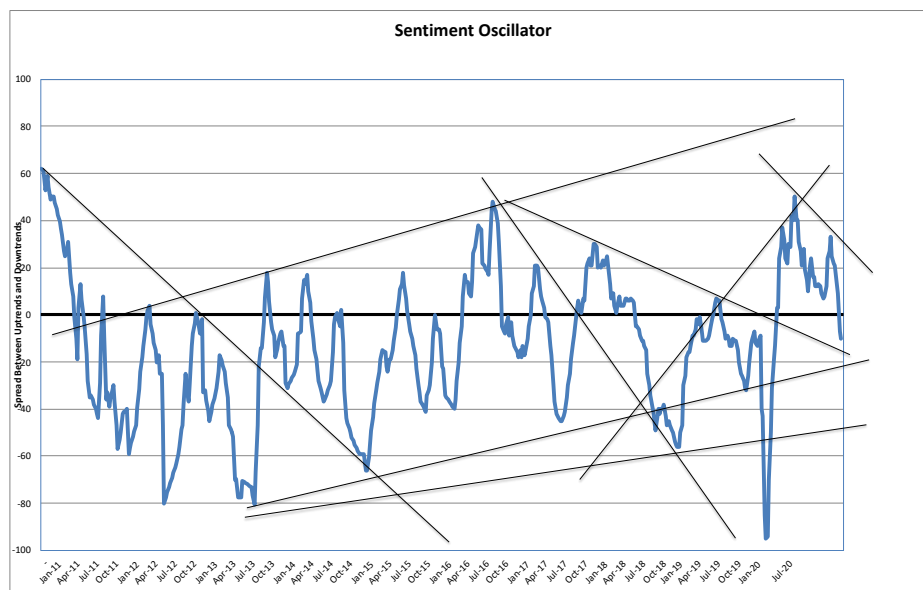
The more one looks into hydrogen the more we uncover different angles for getting involved in the sector. Making hydrogen is the starting point but then you have to

understand the issues involved with transporting it, whether it be in the compressed state, combined within another medium such as salts or some other method of which we are not yet aware. There is dirty hydrogen that doesn't address carbon waste issues and there is green hydrogen that captures carbon at the manufacturing stage.

The latest hydrogen presentation to land on my desk is a Canadian company named Next Hydrogen. It boasts a 12 year history and the development of an advanced electrolyser for those who want innovation in the PEM method of making hydrogen. Basically, it says that its design removed some limitations of existing technology and it delivers 2.5x the productivity of competitors i.e. it is much cheaper to operate. The net result is a 20% lower leveraged cost of hydrogen.

Interestingly, Next Hydrogen's presentation forecasts that the cost of renewable hydrogen will fall by 60% over the next decade due to lower costs of renewable energy generation and scaling up of electrolysed manufacturing.

The Company is saying that it is uniquely positioned to take advantage of the growing hydrogen market with a gross profit margin target of 30-35%, and it is raising C\$50m in pursuit of this objective. Maybe this company does have a competitive advantage that places it ahead of the pack but we make no recommendations on this stock. We just use it as an example of what you should expect to see more of.



































Sentiment Oscillator: Sentiment fell further into negative territory in the first three days of last week. There were 34% (36% (36%)) of the charts in uptrend and 44% (43%) 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		downtrend confirmed	
Metals and Mining	XMM		down	
Energy	XEJ		under resistance line	
Stocks	Code		Trend Comment (updated comments in bold)	Main Interest
Alpha HPA	A4N		new high	HPA
Adriatic Resources	ADT		down	zinc, polymetallic
Aeon Metals	AML		still in downtrend	copper + cobalt
Alkane Resources	ALK		breached uptrend, heading down	gold, zirconia
Alicanto Minerals	AQI		sideways	base metals, silver, gold
Allegiance Coal	AHQ		surge through downtrend, then pullback	coking coal
Alliance Resources	AGS		pullback	gold predevelopment
Alto Metals	AME		down	gold exploration
American Rare Earths (was BPL)	ARR		breached downtrend (COB holding)	rare earths
Apollo Consolidated	AOP		down	gold exploration
Arafura Resources	ARU		pullback	rare earths
Ardea Resources	ARD		uptrend, fallen back to support	nickel
Aurelia Metals	AMI		down	gold + base metals
Australian Potash	APC		holding shallower uptrend	potash
Auteco Minerals	AUT		down	gold exploration
BHP	BHP		pullback	diversified, iron ore
Base Resources	BSE		near highs	mineral sands
Beach Energy	BPT		LT downtrend continuing	oil and gas
Beacon Mining	BCN		sideways	gold production
Bellevue Gold	BGL		down on release of feasibility	gold exploration
Blue Star Helium	BNL		down	gas, helium
Boab Metals	BML		down	silver/lead
Breaker Resources	BRB		sideways	gold exploration
Buru Energy	BRU		breached support line	oil
Calidus Resources	CAI		down	gold
Capricorn Metals	CMM		down	gold
Caravel Minerals	CVV		in pullback phase	copper
Celsius Resources	CLA		down	uptrend
Central Petroleum	CTP		sideways	oil/gas
Chalice Gold	CHN		testing support line	nickel, copper, PGMs, gold exploration
Chase Mining	CML		back to lows	nickel/copper/PGE
Chesser Resources	CHZ		down now	gold exploration
Cobalt Blue	COB		pullback	cobalt
Cyprium Metals	CYM		back to support line	copper
Dacian Gold	DCN		back to support line	gold

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Danakali	DNK		steeply higher	potash
Davenport Resources	DAV		rising again	potash
De Grey	DEG		shallower downtrend	gold
E2 Metals	E2M		correcting lower, ST downtrend	gold exploration
Ecograp (was Kibaran)	EGR		heavy pullback	graphite
Element 25	E25		new high	manganese
Emerald Resources	EMR		coming back to support line	gold
Euro Manganese	EMN		down	manganese
Evolution Mining	EVN		down	gold
Firefinch	FFX		strongly higher	gold
First Graphene	FGR		consolidating	graphene
Fortescue Metals	FMG		pullback - uptrend breached	iron ore
Galaxy Resources	GXY		down	lithium
Galena Mining	G1A		at recent highs	lead
Galilee Energy	GLL		pullback	oil and gas, CBM
Genesis Minerals	GMD		down	gold
Gold Road	GOR		down	gold
Hastings Technology Metals	HAS		breached uptrend	rare earths
Hazer Group	HZR		down	hydrogen
Highfield Resources	HFR		rising	potash
Hillgrove Resources	HGO		breached downtrend	copper
Iluka Resources	ILU		testing uptrend	mineral sands
Image Resources	IMA		testing support	mineral sands
Independence Group	IGO		pullback	gold
ioneer (was Global Geoscience)	INR		new high	lithium
Ionic Rare Earths (Oro Verde)	IXR		new high	rare earths
Jervois Mining	JVR		rising again	nickel/cobalt
Jindalee Resources	JRL		correcting lower	lithium
Kin Mining	KIN		downtrend	gold
Kingston Resources	KSN		down	gold
Kingwest Resources	KWR		breached support line	gold
Legend Mining	LEG		turned down at resistance line	nickel exploration
Lepidico	LPD		back to long term support	lithium
Lindian Resources	LIN		softer	bauxite
Lithium Australia	LIT		pullback	lithium
Los Cerros	LCL		breached support line	gold exploration
Lotus Resources	LOT		new high	uranium
Lucapa Diamond	LOM		breaking downtrend	diamonds
Lynas Corp.	LYC		new high	rare earths
Mako Gold	MKG		down again	gold exploration
Manhattan Corp	MHC		down	gold exploration
Marmota	MEU		still down	gold exploration
Marvel Gold	MVL		off its lows	gold exploration
MetalTech	MTC		down	gold

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Meteoric Resources	MEI		testing uptrend	gold exploration
MetalsX	MLX		pullback	tin, nickel
Metro Mining	MMI		down again	bauxite
Mincor Resources	MCR		down	gold/nickel
Musgrave Minerals	MGV		down	gold exploration
Myanmar Minerals	MYL		breaching downtrend	lead, zinc, silver
Nelson Resources	NES		new high	gold exploration
Neometals	NMT		near high	lithium
Northern Minerals	NTU		breached support line	REE
Northern Star Res.	NST		down	gold
NTM Gold	NTM		new high	gold exploration
Oceana Gold	OGC		down	gold
Oklo Resources	OKU		down	gold expl.
OreCorp	ORR		down	gold development
Orocobre	ORE		down	lithium
Oz Minerals	OZL		new high	copper
Pacific American Holdings	PAK		breaching ST downtrend	coal
Pantoro	PNR		breached support line	gold
Panoramic Res	PAN		breaching uptrend	nickel
Peak Minerals	PUA		down	copper exploration
Peak Resources	PEK		new high	rare earths
Peel Mining	PEX		correcting lower	copper
Peninsula Energy	PEN		breached uptrend	uranium
Poseidon Nickel	POS		sideways	nickel
Perseus Mining	PRU		down	gold
Pilbara Minerals	PLS		pullback	lithium
Polarex	PXX		down	polymetallic exploration
Queensland Pacific Metals	QPM		new high	nickel/cobalt/HPA
Ramelius Resources	RMS		continuing down	gold production
Red5	RED		down	gold
Red River Resources	RVR		breached uptrend	zinc
Regis Resources	RRL		down	gold
Regergen	RLT		heavy pullback	gas, helium
Resolution Minerals	RML		new low	gold exploration
Resolute Mining	RSG		down	gold
RIO	RIO		heavy fall	diversified, iron ore
Rumble Resources	RTR		back in downtrend	gold exploration
Salt Lake Potash	SO4		down	potash
St Barbara	SBM		secondary downtrend	gold
Sandfire Resources	SFR		breached downtrend	copper
Santos	STO		strongly higher	oil/gas
Saturn Metals	STN		trying to form a base	gold exploration
Sheffield Resources	SFX		rising	mineral sands
Sky Metals	SKY		back in downtrend	gold exploration

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St George Mining	SGQ		down	nickel
Silex Systems	SLX		down	uranium enrichment technology
Silver Mines	SVL		down	silver
Sipa Resources	SRI		down	general exploration - Ni,Cu, Co, Au
Stanmore Coal	SMR		breached steepest downtrend	coal
Strandline Resources	STA		new high	mineral sands
Sunstone Metals	STM		down again	
Talga Resources	TLG		breached support line, down	graphite
Technology Metals	TMT		sideways	vanadium
Tesoro Resources	TSO		down	gold exploration
Theta Gold Mines	TGM		on support	gold
Thor Mining	THR		lower	gold exploration
Tietto Minerals	TIE		down again	gold
Titan Minerals	TTM		sideways	gold
Vango Mining	VAN		rallying	gold
Venturex	VXR		pullback	zinc
Vimy Resources	VMY		steeply higher	uranium
West African Resources	WAF		rallying	gold
Westgold Resources	WGX		testing downtrend	gold
West Wits Mining	WWI		off its highs	gold
Western Areas	WSA		down	nickel
Whitehaven Coal	WHC		on support line	coal
Wiluna Mining	WMX		down	gold
Yandal Resources	YRL		rising again	gold exploration
Zinc Mines of Ireland	ZMI		new uptrend commencing	zinc
Totals	34%	51	Uptrend	
	44%	65	Downtrend	
		148	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	36	24.3%	
Gold Exploration	25	16.9%	
Nickel	12	8.1%	
Copper	10	6.8%	
Oil/Gas	7	4.7%	
Lithium	8	5.4%	
Zinc/Lead	7	4.7%	
Rare Earths	7	4.7%	
Mineral Sands	5	3.4%	
Iron Ore/Manganese	5	3.4%	
Potash/Phosphate	5	3.4%	
Coal	4	2.7%	
Uranium	4	2.7%	
Graphite	2	1.4%	
Bauxite	2	1.4%	
Silver	2	1.4%	
Cobalt	1	0.7%	
Tin	1	0.7%	
Diamonds	1	0.7%	
Other	4		
Total	148		

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