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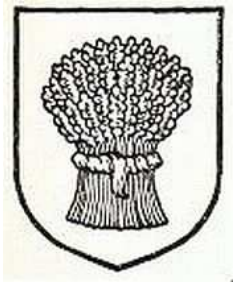


HALLGARTEN & COMPANY

Sector Review

Christopher Ecclestone
cecclestone@hallgartenco.com

Vanadium

Awaiting Energising

Company	Ticker	Currency	Price	Mkt Cap mn	Stage	Call
American Vanadium	**AVC.v**	**CAD**	**0.56**	**15.12**	**Exploration**	**Long**
Atlantic Ltd	**ATI.ax**	**AUD**	**0.60**	**80.22**	**Near-producer**	**Long**
Energizer Resources	**EGZ.to**	**CAD**	**0.34**	**49.71**	**Exploration**	**Neutral**
Largo Resources	LGO.v	CAD	0.26	120.90	Near-producer	N/A
Reed Resources	RDR.ax	AUD	0.20	52.94	Exploration	Long
Speewah Metals	SPM.ax	AUD	0.20	26.00	Exploration	Long
Argex Mining	RGX.v	CAD	0.82	72.74	Near-producer	Neutral

1

Vanadium

Awaiting Energising

+ Implementation of large scale electricity storage units would be a major kicker for an otherwise torpid Vanadium market
+ Chinese regulation changes in the wake of the Sichuan earthquake have called for a higher ratio of Vanadium in construction steels
+ The number of new projects in the Western World is not so great as to ruin a higher-price scenario.
+ The developed world has few primary Vanadium sources with the new generation of mines promising to remedy this situation
× The Vanadium price has not shown itself to be as robust as many other specialty metals. It has failed in recent years to boom like so many others and is thus regarded as a sort of lesser base metal rather than a go-go specialty metal
× Recycling plays a major part in satisfying demand in a way that only Lead can rival
× Steel usage remains in the post-2008 doldrums and V needs new applications for there to be a real surge in net new demand (over and above that served by recycled/by-product material)

Not the Word on Everyone's Lips

Specialty metals suffer, in many cases, from being either combined with other metals in small quantities to gain relevance or have stand-alone usages that seem obscure or humdrum. In the case of Vanadium the market is large but the sources are many, with recycling (the miner's worst enemy) being a major source. Curiously it is also a by-product of the petroleum industry, which is very novel. The main use is steel and the fate of that industry dictates how Vanadium demand evolves and thus prices also. Several major new uses threaten to make vanadium more sexy than it has hitherto been and that is why we want to focus at this point upon the small group of up and coming miners in the space.

Vanadium

Interestingly Vanadium has its scientific roots in Latin America as it was originally discovered by Andrés Manuel del Río, a Spanish-born Mexican mineralogist, in 1801. Del Río extracted the element from a sample of a Mexican "brown lead" ore, later named vanadinite. He found that its salts exhibit a wide variety of colors, and as a result he named the element panchromium (the Greek for "all colors").

This nomenclature did not last as, in 1831, the Swedish chemist Nils Gabriel Sefström rediscovered the element in a new oxide he found while working with iron ores. Rather strangely this scientist decided that the new element should use V (then unused in the chemical universe) as its symbol and thus called the element Vanadium after Old Norse Vanadís. A rather novel example of the desired symbol leading

the naming of the element, rather than the other way around.

Vanadium has the atomic number 23. It is a hard, silvery gray, ductile and malleable transition metal. The formation of an oxide layer stabilizes the metal against oxidation. The element is found only in chemically combined form in nature.

The isolation of vanadium metal proved difficult. Henry Enfield Roscoe eventually produced the metal in 1867 by reduction of vanadium(II) chloride, VCl_2, with hydrogen. In 1927, pure vanadium was produced by reducing vanadium pentoxide with calcium.

Usage

The first large scale industrial use of vanadium in steels was found in the chassis of the Ford Model T, inspired by French race cars. Vanadium steel allowed for reduced weight while simultaneously increasing tensile strength.

At the moment, Vanadium is used mainly as an alloy in a wide range of specialty steels and titanium alloys to provide greater strength, toughness, and wear-resistance.

Sources – Primary and otherwise

The element occurs naturally in about 65 different minerals and in fossil fuel deposits and is the 17th most common element in the earth's crust. The important thing to note is that, beyond recycling from steel slag) the sources of Vanadium are either mineral deposits or, rather uniquely, as an oil by-product.

Vanadium occurs in deposits of phosphate rock, titaniferous magnetite, and uraniferous sandstone and siltstone, in which it usually constitutes less than 2% of the host rock. Significant amounts are also present in bauxite and carboniferous materials, such as coal, crude oil, oil shale, and tar sands. Amongst the major deposits are the titaniferrous magnetites of China, Russia, South Africa, Western Australia and New Zealand, as well as the oil-related deposits of Venezuela, Alberta (Canada), the Middle East and Queensland (Australia), in addition to ore and clay deposits in the USA.

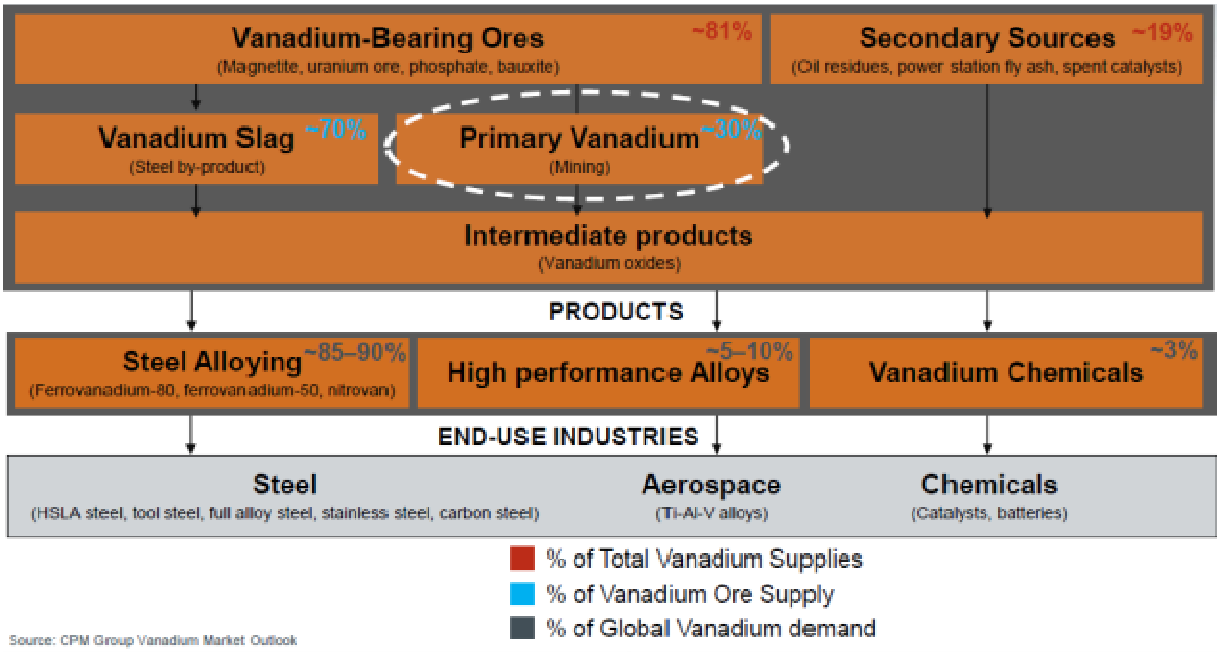
	Commercially Exploitable reserves (10.2mt)	Reserve Base (31.094mt)
	%	%
Australia	1.6	7.7
China	19.6	9.6
Russia	48.9	22.5
South Africa	29.4	40.2
U.S.A	-	12.9
Others	0.5	7.1

The table above shows the state of resources according to Vanitec, a Vanadium producer/user

association. We suspect it is somewhat outdated as several new sources (to be discussed later in this note) have become apparent over recent years. In particular the Australian share should be lifted and Brazil is worthy of being considered a potential player of consequence. The USGS in its latest survey on the metal said that world resources of vanadium exceed 63 million tons.

Dynamics

The dynamics of the Vanadium supply chain are very interesting. In some ways we might compare the metal's supply chain to that of Lead, where the chief source is recycling. The chart below (from the consultants CPM) shows that much of the current Western supply is sourced primarily from steel scrap, then mining followed by secondary sources (which are also recycling in nature).



It is produced in China and Russia from steel smelter slag; other countries produce it either from the flue dust of heavy oil, or as a byproduct of uranium mining. It is mainly used to produce specialty steel alloys such as high speed tool steels. The most important industrial vanadium compound, vanadium pentoxide, is used as a catalyst for the production of sulfuric acid.

Vanadium is recovered as V_20_5 contained in an intermediate slag which is formed between iron-making and steel-making in integrated steelworks (eg Panzhihua in China, Highveld in South Africa and Nzhny Tagil in Russia). At these steel plants the Vanadium contained in the iron ore is taken into solution in the iron during the ironmaking process. The hot metal is then oxidised and a slag, which contains between 10% and 25% V_20_5, is formed and removed before the hot metal is passed on for final steelmaking. The slag containing l0-25% V_20_5 is then treated in a roast/leach process, the end product of which is Vanadates or Vanadium oxides.

The relation between (some) uranium production and vanadium supplies is worth mentioning. Uranium

production from carnotite ores creates a vanadium-bearing waste solution that must be neutralized to have the heavy metals fixed before waste disposal. An alternative treatment is a circuit which extracts vanadium and produces V2O5. For example, Denison Mines' White Mesa uranium processing mill near Blanding, Utah processes feed from that company's mine properties on the Colorado Plateau as well as uranium/vanadium ores purchased from independent miners. For every 0.45 kg of U_3O_8 (triuranium octoxide concentrate - yellowcake) produced, White Mesa's vanadium co-product recovery circuit produced approximately 1.8 kg of vanadium in the form of V_2O_5. The implication of this is that if the mooted uranium production boom comes to pass (and it has a weighting towards carnotite-sourced metal) then there could be a Vanadium by-product, potentially, in greater quantity than the actual amount of uranium produced.

Many often forget that there are some metals that are interchangeable with others, particularly in alloying applications. It should be noted that from time to time there is competitive pressure from niobium, particularly in high-strength low-alloy steels (HSLA). According to Metals Pages, the additive amount of niobium in steel production is only one-half of that of vanadium, so every 3,000 t of ferroniobium can substitute as much as 7,000 t of 50% grade FeV. The substitution of ferroniobium however, is only economic at very high vanadium prices.

Strategically Speaking

As the bulk of Vanadium production is concentrated in China, Russia and South Africa, where supply disruptions have occurred, one cannot be entirely sanguine about Vanadium's future accessibility. Those three countries account for around 90% of global supplies. Despite this, the recent British Geological Survey Risk List on Criticality of Supply ranked it a lowly 33 out of 45 metals.

The most likely scenario for a tighter market might be the evolution of a cartel (unlikely if the Australian projects on the drawing board get going) or a situation where China flips from being a net exporter (and sometime price spoiler) to being a net importer. This scenario could come about due to the Chinese shifting to using a higher percentage of Vanadium in their steel production.

Speaking of US access to Vanadium the USGS commented, "While domestic resources and secondary recovery are adequate to supply a large portion of domestic needs, a substantial part of U.S. demand is currently met by foreign material".

New Applications - Worth Mentioning

The current state of the bulk of Vanadium demand is well-known with its strict correlation with steel consumption. New uses are potential X factor for the Vanadium space. While aerospace has been growing organically and increasing its share of the usage of the metal the area with the best potential for a quantum leap is in battery applications.

Chief amongst these is the Vanadium Redox (and redox flow) battery (VRB), which is a type of rechargeable flow battery that employs Vanadium ions in different oxidation states to store chemical potential energy. The present form (with sulfuric acid electrolytes) was patented by the University of New South Wales in Australia in 1986 where scientists carried out the first known successful demonstration and commercial development of the all-vanadium redox flow battery employing

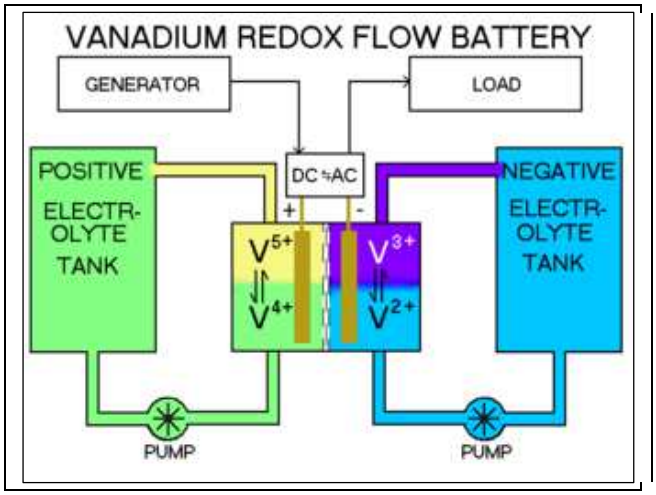
vanadium in a solution of sulfuric acid in each half in the 1980s. Although the use of vanadium in batteries had been suggested back in the 1970s by a number of scientists including some at NASA.

There are currently a number of suppliers and developers of these battery systems including Ashlawn Energy in the United States, Renewable Energy Dynamics (RED-T) in Ireland, Cellstrom GmbH in Austria, Cellennium in Thailand, and Prudent Energy in the United States and China. The vanadium redox battery results from over 25 years of research, development, testing and evaluation in Australia, Europe, North America and elsewhere.

The image that follows gives a good idea of one of the more practical applications of such batteries. In this case the solar panels collect energy during the day and store it in the battery for release during the period when the solar panels cannot access sunlight.

Source: Cellstrom GMBH

A vanadium redox battery consists of an assembly of power cells in which two vanadium-based electrolytes are separated by a proton exchange membrane. The battery exploits the ability of vanadium to exist in solution in four different oxidation states, and uses this property to make a battery that has just one electroactive element instead of two.



Source: Vanadiumsite.com

The main advantages of the vanadium redox battery are that it can offer almost unlimited capacity simply by using larger and larger storage tanks, it can be left completely discharged for long periods with no ill effects, it can be recharged simply by replacing the electrolyte if no power source is available to charge it, and if the electrolytes are accidentally mixed the battery suffers no permanent damage. The VRB has also been shown to have the least ecological impact of all energy storage technologies.

The main disadvantages with vanadium redox technology are a relatively poor energy-to-volume ratio, and the system complexity in comparison with standard storage batteries.

Another emerging technology is the use of lithium-vanadium phosphate or fluorophosphate cathodes and lithium-vanadium oxide anodes in rechargeable lithium batteries. These batteries exhibit greater safety compared with the more generic lithium-cobalt oxide type cathodes seen in cellular telephone or laptop batteries (which have higher operating voltages and higher rates of energy storage). The vanadium phosphate cathode material can support 20% more energy storage than the conventional cobalt oxide, as much as 26% more than iron phosphate, and 56% more than manganese oxide. However, in order for such a battery to be practical, the cost of the battery is critical.

Source: Subaru

Subaru has developed a prototype of its G4e electric car (pictured on the preceding page), powered by lithium-vanadium phosphate batteries. This concept car has a 200-km range that is provided by a relatively small vanadium phosphate battery pack, double what their earlier R1e concept car could achieve.

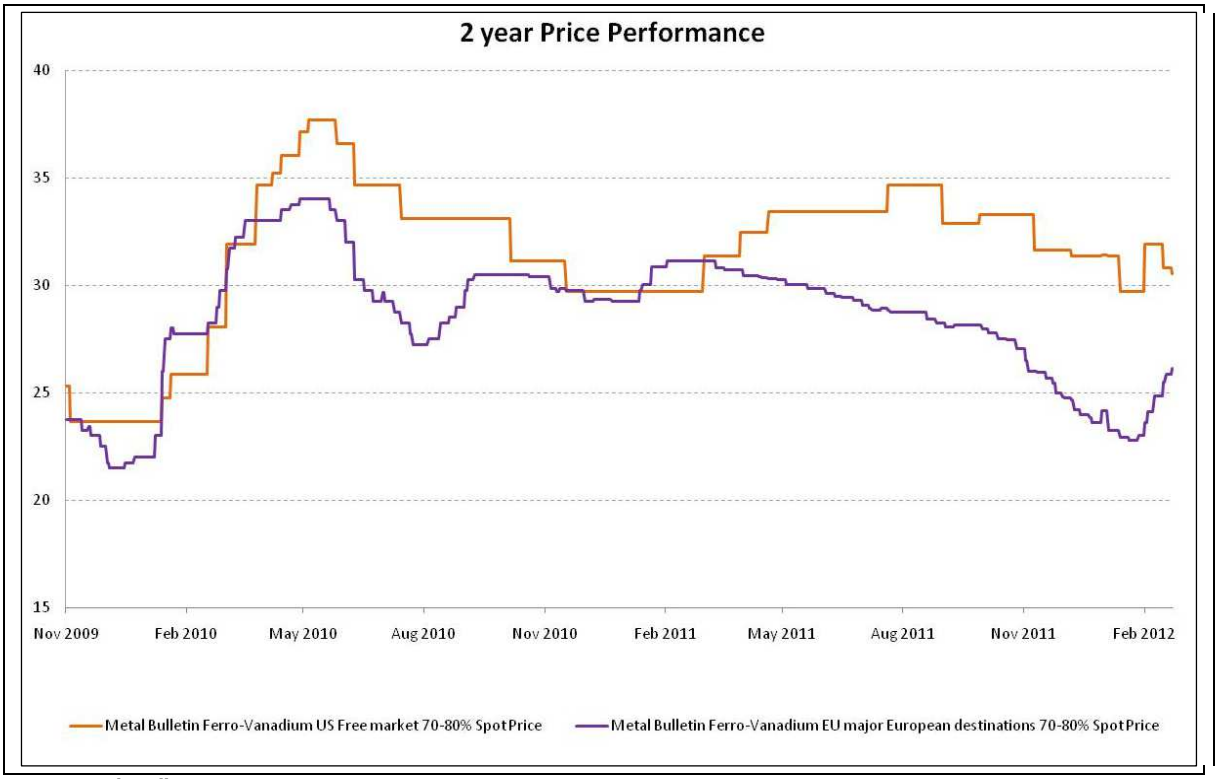
Pricing and Trends

Metals sector reflation, supply disruptions and above-trend demand growth earlier had pushed ferro-vanadium prices up from an annual average of US$7.73 per kg in 2002 to US$61.94 in 2008. The financial crisis and recession of 2008 and 2009 severely weakened global steel production and demand; in response to this vanadium prices fell to a monthly low of US$18.96 in May 2009. Since then, as global steel demand and output recovered, ferrovanadium prices have rebounded to an average of US$32.44, in March 2010.

Vanadium demand stands to benefit from the emerging recovery and restocking efforts in the steel sector. In addition to the cyclical economic shifts currently taking place, high-strength, low-weight metallurgical products are increasingly being demanded, as development projects require superior material performance in non-ideal environments. Increased utilization of alloyed steels and titanium alloys will likely have a bullish effect on the vanadium market over the coming decade. In addition, China uses comparatively low amounts of vanadium per tonne of steel produced and will need to dramatically increase its use of vanadium to match the steel quality of regions such as North America and Western Europe.

In a recent report, the metals consultancy, CPM Group, suggested that vanadium producers are likely to be operating at notably higher utilization rates through to 2019 to meet demand. This resulted in a conclusion that “if producer discipline remains intact, however, new projects will be needed to meet demand over the 10-year outlook”.

8



Source: Metals Bulletin

American Vanadium (AVC.to)

Key Metrics				2011	2012e	2013e
Price (CAD)	$	0.56	Consensus EPS		n/a	n/a
12-Month Target Price (CAD)	$	1.20	Hallgarten EPS		($0.12)	($0.18)
Upside to Target		114%	Actual EPS (CAD)	($0.16)		
12-mth High-low (CAD)	$0.66-	$1.95	P/E	n/a	n/a	n/a
Market Cap (CAD mn)	$	15.1				
Shares Outstanding (millions)		27.0	Dividend	n/a	n/a	n/a
Shares O/S Fully Diluted (mns)		32.0	Yield	0.0%	0.0%	0.0%

- \+ The Gibellini deposit comes up positive on many fronts, with relatively low capex, straightforward metallurgy, and easy accessibility
- \+ Strong offtake interest exists in Asia
- \+ Follow-on projects are strung out along the same system in close proximity
- ✘ The Life of Mine on the major mine is relatively short at this point
- ✘ The financing environment remains tough and it will require an offtaker stepping in to get this project to production

Runner-up… thus far

American Vanadium, in our view , is most likely the next cab off the rank after Atlantic, however, it remains a distant second as construction has not started, let alone financing for the construction. When it does get going though, the capex is relatively moderate, though mine life (of the first pit) is not long. The company has a string of other deposits (one of which is rather well understood) that could be the source of future feedstock.

The Back Story

In March 2006, American Vanadium acquired 100% ownership of the Gibellini Project, located in Eureka County, Nevada, about 25 miles south of the town of Eureka (see the map on the following page). The project is comprised of 232 unpatented lode claims and 7 placer claims totaling approximately 4,254 acres in U.S. state of Nevada, which is ranked among the world's top 10 mining jurisdictions.

The property is situated on the east flank of the Fish Creek Range in the Fish Creek Mining District, and is easily accessed by dirt road extending westward from U.S. Highway 50.

It is envisioned that the Gibellini project will be pursued via an open pit, heap leach operation. The company claims that this might be one of the lowest cost and most simple vanadium operations to be developed in the world.

10

Geology

The Gibellini vanadium properties occur within an allocthonous fault wedge of organic-rich siliceous mudstone, siltstone, and chert, which forms a northwest trending prominent ridge.

The property was once explored by Noranda, which described these rocks as thin bedded shales, very fissile and highly folded, distorted and fractured.

In general, the beds strike north-northwest and dip from 15 to 50 degrees to the west. Outcrops of the shale are scarce except along road cuts and trenches.

The black shale unit that hosts the vanadium resource is from 175 to over 300 feet thick and overlies gray mudstone. The shale has been oxidized to various hues of yellow and orange up to a depth of 100 feet.

Source:American Vanadium

Mineralization is tabular, conformable with bedding, and remarkably continuous in grade and thickness between drill holes. The top 100 to 120 feet of the Gibellini vanadium property is oxidized, producing various orange, pink, and purple vanadium oxide minerals. In the oxidized zone, complex vanadium oxides occur in fractures in the sedimentary rocks. Vanadium grades in the oxide zone are generally higher than in the unoxidized zone, but lower than in the transition zone.

Below the oxidized zone is the transition zone (mixed oxidized and unoxidized rocks), which typically contains the highest grades in the property. American Vanadium's geologists interpret this zone to have been upgraded by supergene processes. An unoxidized zone underlies the transition zone, and is typically lower in vanadium grade than the oxide and transition zones.

Historic & Current Exploration

Historic exploration activities on the project have included mapping, trenching, geochemical sampling, metallurgical testing and drilling dating back as far as the 1950s. In all, over 160 holes were drilled on the property by several operators including Atlas, Noranda and Union Carbide.

Mapping and sampling work, undertaken by Inter-Globe, in 1989 determined that the vanadium mineralization occurs in bedrock up to the base of overburden with only light overburden (the depth varying from 0.5 feet to 7.0 feet). In their opinion most mineralized beds are gently folded and dip at shallow angles

In March 2006, American Vanadium acquired the Gibellini Project, and immediately began exploration activities, including claim staking, geologic mapping and geochemical sampling.

Identification of prospective areas of vanadium mineralization south of the original claim block prompted additional exploration.

Among the company's exploration activities in 2010 were collecting trenching bulk samples, drilling of 19 RC drill holes, XRF surveying, and development of a new base map.

To support the feasibility study, a metallurgical testing program was conducted on the project. Environmental permitting is underway with biological, cultural and spring/riparian field studies having already been completed.

The Resource

The project's NI 43-101 compliant resource represents 131.369 million pounds of measured and indicated vanadium (i.e., vanadium pentoxide or V205) grading at 0.285%, and an additional 48.96 million pounds of inferred vanadium grading at 0.172% (more NI 43-101 details further below).

American Vanadium's commissioned NI 43-101 report on the Gibellini Project identified the following mineral reserve and resource:

Resource Class	Domain	Cut-off Grade (V_2O_5 %)	Tons (1,000's)	$V_2O_{5)}$ (%)	V_2O_5 (1,000 lbs)
Measured	Oxide	0.077	3,950	0.251	19,827
	Transition	0.066	3,946	0.379	29,876
Indicated	Oxide	0.077	8,009	0.219	35,046
	Transition	0.066	7,146	0.326	46,619
Total Measured and Indicated (inclusive of Reserves)		Various	23,050	0.285	131,369
Inferred	Oxide	0.077	162	0.170	551
	Transition	0.066	10	0.180	35
	Reduced	0.088	14,054	0.172	48,374
Total Inferred		various	14,226	0.172	48,960

Feasibility Study & Development Progress

The Gibellini Project has been a subject of a number of mine plans over recent years. A scoping study was completed by AMEC in October 2008 and a feasibility study was completed by AMEC in September 2011 has guided project development.

According to the feasibility study, American Vanadium could potentially become the lowest cost primary vanadium producer in the world with a very low strip ratio of 0.22 and a unit operating cost of US$4.10/lb.

The study's base case scenario projects production will average 11.4 million pounds of vanadium pentoxide per year. This also estimates the Gibellini Project's after tax IRR at 43%, and after tax NPV at US$170.1M at a 7% discount (more feasibility study details further below).

The price premises in the study originated from the noted consultants, Roskill Consulting. These were an average V_2O_5 selling price US$10.95 per pound. The main highlights/metrics of the study were:

- Internal Rate of Return (IRR) 43%
- Net present value US$170.1 million at 7% discount rate
- CapEx payback 2.4 years
- Average grade 0.302% V_2O_5)
- Low strip ratio 0.22 to 1
- Mining Operating Rate 3.5 million tons per year (ore and waste)
- Average V_2O_5 recovery 65.9%
- Average annual production 11.4 million pounds V2O5
- Operating cost US$4.10 per pound V2O5
- Capital cost US$95.5 million (incl. $10.7 million contingency) shown in the table at the right provided by the company.

CAPEX - Summary Costs	
	USD ($000s)
OPEN PIT MINE	
Open Pit Mine Development	1,285
Mobile Equipment	101
INFRASTRUCTURE-ON SITE	
Site Prep	2,213
Roads	1,266
Water Supply	1,827
Sanitary System	55
Electrical - On Site	1,867
Communications	150
Contact Water Ponds	158
Non-Process Facilities – Buildings	6,901
PROCESS FACILITIES	
Ore Handling	13,996
Heap Leach System	18,235
Process Plant	13,142
OFF-SITE INFRASTRUCTURE	
Water System	4,091
Electrical Supply System	2,936
First Fills	783
Total Direct Cost	69,007
Construction Indirect Costs	3,860
Sales Tax / OH&P	3,844
EPCM	8,058
Contingency	10,681
Total Project Cost	95,451

AMEC designed a conventional open pit mine at Gibellini utilizing a truck and shovel fleet comprised of 100-ton trucks and front-end loaders. Average mine production during the seven year mine life is 3.5 million tons of ore and waste per year.

Mining is expected to be undertaken by contractors with Gibellini mining staff overseeing the contract mine operation and performing the mine engineering and survey work. The proposed pit limits of the oval-shaped pit (shown on the following page) will be approximately 2,275 feet by 1,650 feet in the north–south and east–west directions, respectively. The maximum excavation depth is anticipated to be approximately 180 feet.

The processing method envisioned for Gibellini will be to feed ore from the mine via loader to a hopper that feeds the screening and crushing plant. The screen will send any material greater than a third-inch

and less than four inches in size to the cone crusher (plus four inch material will be sent to stockpile for further treating).

Source: American Vanadium

The crushed material will be transported to a stacker on the leach pad, which will stack the ore to a height of 15 feet. Once the material is stacked and sufficient material accumulated to distribute sprinklers onto the leached material, solution will be added to the leach heap. The solution will be collected in a pond and this pregnant leach solution (PLS) will be sent to the process building for metal recovery.

Now a rather complex chemistry experiment-like process takes place with the PLS treated with iron to convert all of the vanadium in solution from the vanadate (VO_3 -) form to the vandyl (VO+2) form. Solvent extraction mixers/settlers will be used to recover the vanadium and produce a vanadium-depleted aqueous solution (raffinate). The raffinate will then be returned to the leach pad to continue to leach the vanadium remaining in the heap material. The loaded organic phase from the extraction will then be contacted in a separate set of mixer-settlers called the strip circuit. The stripped organic will then be returned to the extraction circuit where it will be re-loaded with vanadium. The stripped vanadium solution will then be oxidized to vanadate with sodium chlorate and ammonia will be used to form ammonium metavanadate (AMV). Sulfuric acid will be added to the AMV and a precipitate will be formed. This precipitate will be settled in a thickener and the thickened material will be sent to a centrifuge. The thickener overflow will be recycled back to the strip circuit where it will be loaded with vanadium again.

Approximately 79.5 million pounds of V_2O_5 will be produced from Gibellini leaching operations at an average recovery of 66% (column leach tests, performed to simulate heap leaching results, indicated

life-of-mine average recoveries are 60% for Oxide material and 70% for Transition material). Metal produced from leaching operations will generally increase from the first quarter of Year One to Year Five as lower grade and lower recovery oxide ores are supplanted by higher grade and higher recovery transition ores. Following Year Five, the overall deposit grade drops; consequently, metal production likewise drops. The majority of the metal will be produced within the same reporting period as it is placed on the leach pad.

Total mining costs, inclusive of both contract and owner's costs, are estimated at US$2.42 per ton mined (US$2.94 per ton leached). Process costs are estimated at US$12.51 per ton of leached ore. Mining costs are exceedingly low due to the great advantage given by the almost non-existent strip ratio.

When in production the Gibellini mine would make American Vanadium the only primary vanadium mine in the U.S. The company believes that its will create opportunities for offtake agreements with the steel industry. Furthermore, since the process would yield vanadium in sulfuric acid in an intermediary step to producing vanadium pentoxide, this might be pulled from the process and used directly as an electrolyte for grid scale energy storage. American Vanadium proposes to ship a bagged product to a conversion company for conversion into a saleable product.

Earnings Model

AMEC commissioned a market survey by the Roskill Consulting (on behalf of American Vanadium) to determine an appropriate vanadium price forecast for use in the Feasibility Study. As a result of the market survey, AMEC utilized Roskill's Real (using 2010 US$) V2O5 price forecast to support project economics. The realized selling price over the life of the project was US$10.95 per pound of V2O5 sold. We have used our estimates though in the earnings model. These are shown in the bottom line of the spreadsheet and are considerably higher than the consultant's numbers. The dynamic we envision is softening prices in the first few years due to enhanced Western production from Gibellini and Windimurra with an eventual gradual upturn in global demand just as Gibellini starts to trend down in its output.

The earnings model we have created for the company can be seen below:

American Vanadium - Earnings Model							
In Millions of USD (except for per share items)	**Year 7**	**Year 6**	**Year 5**	**Year 4**	**Year 3**	**Year 2**	**Year 1**
Total Revenue	**102.24**	**119.67**	**145.39**	**118.03**	**141.01**	**158.80**	**123.29**
Mining Cost	5.15	7.26	7.26	7.26	7.26	7.26	6.87
Process cost	18.65	26.27	26.27	26.27	26.27	26.27	24.87
Gross Profit	**78.44**	**86.14**	**111.86**	**84.50**	**107.47**	**125.27**	**91.55**
Selling/General/Admin. Expenses	3.20	3.10	3.05	2.90	2.70	2.50	2.60
Research & Development	0.40	0.40	0.40	0.40	0.50	0.60	0.50
Depreciation/Amortization	8.00	8.00	8.00	8.00	8.00	8.00	8.00
Royalty	2.20	2.50	3.00	2.30	2.30	2.60	1.80
Operating Income	**64.64**	**72.14**	**97.41**	**70.90**	**93.97**	**111.57**	**78.65**
Net Interest (expense)	1.00	3.00	3.00	4.00	5.00	6.00	7.00
Other Net	-14.60	0.00	0.00	0.00	0.00	0.00	0.00
Income Before Tax	**51.04**	**75.14**	**100.41**	**74.90**	**98.97**	**117.57**	**85.65**
Tax (credit)	-17.35	-25.55	-34.14	-25.47	-33.65	-39.97	-29.12
Net Income	**33.68**	**49.59**	**66.27**	**49.43**	**65.32**	**77.60**	**56.53**
Diluted Weighted Average Shares	32.00	32.00	32.00	32.00	32.00	32.00	32.00
Diluted EPS	1.05	1.55	2.07	1.54	2.04	2.42	1.77
Tonnes Mined (mn t)	2.13	3.00	3.00	3.00	3.00	3.00	2.84
V_2O_5 Kgs Produced (mn)	5.53	7.04	9.09	7.87	8.29	9.93	6.85
V_2O_5 Pounds Produced (mn)	12.20	15.54	20.06	17.37	18.31	21.91	15.12
V_2O_5 Price per lb projection	18.50	17.00	16.00	15.00	17.00	16.00	18.00

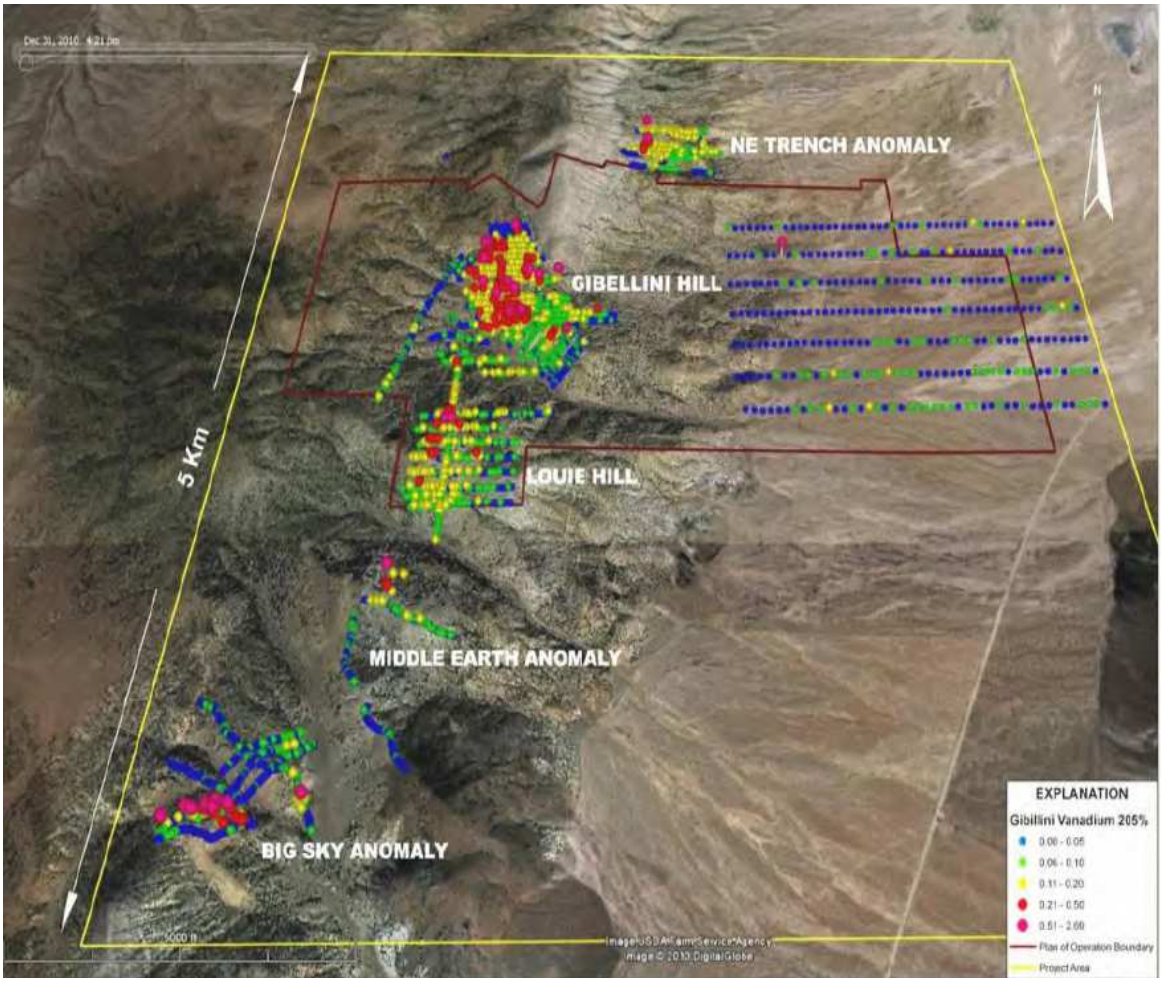
Source: Hallgarten & Company

The result of our model is a very robust revenue scenario indeed. This could come undone however if prices end up being significantly weaker than our expectations. Even at halved prices though the project would be immensely profitable due to the low process and mining costs per tonne.

Future prospects

The map below shows the system of which Gibellini is only a part. The company plans on moving along the ridge and exploiting the chain of deposits, however, up until now work has only been done on Louie Hill.

The Louie Hill Deposit lies approximately 500 meters south of the Gibellini Hill Deposit, being separated from the latter by a prominent drainage. Mineralization at Louie Hill is hosted by organic-rich siliceous mudstone, siltstone and chert of the Gibellini facies of the Devonian Woodruff Formation and probably represents a dissected piece of the same allochthonous fault wedge containing Gibellini Hill.



Source: American Vanadium

Mineralized beds cropping out on Louie Hill are often contorted and shattered but in general strike in a north–south direction, and dip to the west 0 to 40º. Rocks underlying the Louie Hill Deposit consist of mudstone, siltstone and fine-grained sandstone probably of Mississippian age (Webb and/or Chainman Formations). Oxidation of the mineralized rocks has produced light-colored material with local red and yellow bands of concentrated vanadium minerals.

The aforementioned NI 43-101 prepared by AMEC also included a resource estimate (shown below) for the Louie Hill deposit:

Inferred Louie Hill Mineral Resource Estimate*

Mark Hertel, SME Registered Member

Effective May 20, 2011

Cut-off V_2O_5%	Tons (Mt)	V_2O_5%	V_2O_5 (Mlb)
0.077	7.67	0.27	41.87

Source: American Vanadium

The drill hole database used in developing the mineral resource estimate totaled 7,665 feet in 58 drill holes. Historic work by Union Carbide contributed 49 drill holes to the database (with a total of 706 V_20_5 assays). Nine drill holes drilled by American Vanadium with a total of 547 V_20_5 assays were also included.

Louie Hill is thus significantly smaller than the main deposit and shall only add a year or two to overall mine-life. However, work beyond the two main deposits has been limited so further exploration work may add to both the existing deposit's resources (particularly Louie Hill) or add wholly new deposits to the outlook.

Tie-ups

American Vanadium sees itself as an integrated player and wants to keep some of the downstream value-added for the company rather than let it go to end-users getting the benefit of the capex and know-how of the miner at relatively knock-down prices for the metal. To this end the company is looking to form a liaison of some sort with Chinese wind turbine and mass-storage battery makers to penetrate the US market. It seems, from the company's talks, that Chinese wind turbine manufacturers see mass storage devices as a key add on to their vertical integration so they can store electricity for release at periods of peak load. For solar panel manufacturers they can also offer storage during daylight hours for release in the night hours. So the Chinese strategy makes sense.

Thus the company sees that being part of an integrated structured linked to mass storage makers and users gets it out of dependence on the ups and downs of the steel complex. Talks, in our view, would appear to be quite advanced on this venture but as with everything involving the Chinese and policy on this delicate subject of alternative energy there can always be slip-ups on the way.

One might compare American Vanadium's approach to that of Molycorp with its "mines to magnets" mantra. Clearly at a certain scale Vanadium can be a profitable enterprise but like Rare Earths, the real margin is in the value-added. Just how far one is prepared to go up the value chain (and the capex required to do so) is the issue. We have noted before that we thought a new (old) age was going to dawn in which industrial users would once again have to buy into mining to ensure sources of supply. We are seeing this in all sorts of specialty metals so far (e.g. Tungsten, Flourspar, Lithium and Rare Earths). There is no reason why that should not be repeated in Vanadium. This company though is giving the added spin that it is diversifying out into the value added (like Molycorp) rather than having an industrial entity diversifying into mining (such as has happened at Malaga in the Tungsten space).

Conclusion

American Vanadium's approach of storming towards production is definitely refreshing compared to those perpetual drillers in the mining space. It is interesting to muse on why this might be. Gold and copper explorers have found there is a tolerance for eternal drilling campaigns whereas, we believe investors in specialty metals are far less of the short-term attitude and instead understand the need to build it in the lean times to have it in the fat years.

Once permitting is in place, financing remains the main hurdle and an off-take agreement with a battery manufacturer (which might in fact just be a wind- or solar- generator with their other hat on) would do a lot to rebrand American Vanadium as cutting edge in alternative energy rather than a mere camp

18

follower in the steel alloy space.

We are putting a **Long** call on American Vanadium with a 12-month target price of CAD $1.20.

Atlantic Ltd (ATI.ax)

Key Metrics				2011	2012e	2013e
Price (AUD)	$	0.60	Consensus EPS		n/a	n/a
12-Month Target Price (AUD)	$	1.00	Hallgarten EPS		($0.14)	$0.27
Upside to Target		67%	Actual EPS (AUD)	$0.13		
12-mth High-low (AUD)	$0.46-	$2.20	P/E	4.76	n/a	n/a
Market Cap (AUD mn)	$	80.2				
Shares Outstanding (millions)		133.7	Dividend	n/a	n/a	n/a
			Yield	0.0%	0.0%	0.0%

+ Atlantic looks like it might be first into production in the Vanadium space
+ Most of the capex has already been expended by defunct predecessors making the revival of production a much cheaper exercise
+ All the energy infrastructure is in place with the State government having provisioned this for a previous owner
✘ The project has a long and checkered history with many stops and starts and a few bankruptcies along the way for other aspirants We think the company needs a name-change to reflect its activities and help in promotion
✘ The market continues to feel that money will run out before commercial production is reached and only concrete evidence of commercial viability will dispel these fears. This is a chicken-and-egg dilemma.

Ahead of the Pack

The thankless task of being a prophet of an unsung metal was the fate of the many shareholders who backed the previous entrepreneurs trying to bring this project to production. In the process their financial martyrdom built (by attrition) the Windimurra complex which is now on the verge of commercial production, and as such, is ahead of the pack in being the newest Vanadium mine in the world meeting around 7% of world demand.

Atlantic (a former pearl marketing company) is the latest owner in a string of Vanadium bulls who have ventured their all on this project and lost their shirts. The cumulative effect however has been that each one has moved the task further forward leaving less work to be done for their successor and presumably derisking the project by sheer attrition.

Windimurra

The Windimurra mine, one of the world's largest known vanadium deposits, is 600kms northeast of Perth and 80 kilometres by road from Mount Magnet in Western Australia. It is close to existing infrastructure. It has a long and checkered history of parties trying to move it forward without success.

As the map that follows shows, it enjoys crucial access to natural gas supplies for beneficiation, via the network of pipelines from the massive gas reserves off the north-west coast of Australia. While 600kms from Perth seems a long way, in the scale of things in Western Australia it is a relatively short distance.

Source: AtlanticLtd

Australian vanadium can be sold to end-users in the US without duty under a Free Trade Agreement, while vanadium producers from China, South Africa and Russia are subject to anti-dumping duties of between 3.5% and 100% on their exports to that market.

History – ambitions thwarted

The deposit was initially discovered in the 1960s, however it wasn't until Precious Metals Australia Ltd (since renamed Windimurra Vanadium Ltd) commissioned a bankable feasibility study in 1988 that the potential of the project became known. This BFS lead to PMA and Xstrata entering into a joint venture agreement to develop the mine.

A vanadium processing plant, mine and infrastructure were constructed at a cost of AU$115 million in 1998-1999. The project was linked to the then-new Midwest gas pipeline and an on-site power station, representing a further AU$70 million investment from the state government.

Operations commenced in November 1999 and Xstrata operated the mine until April 2003 when it was placed on care-and-maintenance. During operations the project had processed approximately 7.2 million tonnes of ore, producing 13,000 tonnes of high quality vanadium pentoxide.

The mine was closed in 2004 and PMA regained ownership of the mine in 2005. PMA then went into receivership (a form of bankruptcy) in early 2009 and remains in that state. The mine ownership was restructured with 90% held by Windimurra and 10% by the Singapore based trader, Noble Group (NOBL.sgx,) via the operating company, MidWest Vanadium Pty Ltd. Windimurra entered into a life of mine take or pay sales and marketing agreement for 100% of the mine's production with Noble Group.

Windimurra was in the process of re-developing the mine when it fell into a financial hole. The plan was that, once operational, the mine would produce approximately 5,700 tonnes of vanadium as ferrovanadium per annum. In early April 2010, Mineral Resources Ltd and Atlantic Ltd announced that they were seeking up to AU$100 million in Joint Venture to revive the stalled vanadium project. Mineral Resources said that the partners would acquire, complete construction and commissioning, and subsequently manage the project.

The companies had agreed with the secured lenders to Midwest Vanadium Pty Ltd, to acquire a 90% stake in Midwest. Following completion of the transaction, Atlantic would have held 62.5% of MVPL and Mineral Resources would hold 27.5% with the existing lenders being granted a 10% interest in the project. However, in the end, Atlantic acquired 100% of the Windimurra Vanadium Project in 2010.

Geology of the deposit

The deposit lies within the eastern flank of the large (greater than 2,000km^2) Windimurra intruded layered gabbro complex, which is part of the regional Murchison granite-greenstone province.

Exploration has had a varied history in the region, with several companies undertaking low level reconnaissance surveys (Hawkstone Minerals and Ferrovanadium Corp in the 1970's and early 1980's; an Alcoa Australia and BHP Minerals Joint Venture in the mid 1980's and Precious Metals Australia in 1989). All exploration and resource development works were undertaken within the northern six kilometre strike length that now forms the Windimurra Vanadium mine.

The Windimurra project consists of 100%-owned mining and exploration tenements covering a total strike length of 27 kilometres of prospective ground for titano-vanadium, and magnetite based iron ore-style mineralization. The current mineral resource base on which the Windimurra Vanadium mine and processing facility is being commissioned is located on the aforementioned six kilometre corridor within this. Of this six kilometre strike that has been drilled, the current open-pit mine design extracts an inner 4.2 kilometres. This leaves an extensive 21 kilometre strike package unexplored to the south.

The inherited mineral resource, was based on a mineral resource estimate from that six kilometre

identified strike length and was reported in December 2008. The total resource was 176.59 million tonnes at 0.46% V_2O_5, using a lower cut-off of 0.275% V_2O_5.

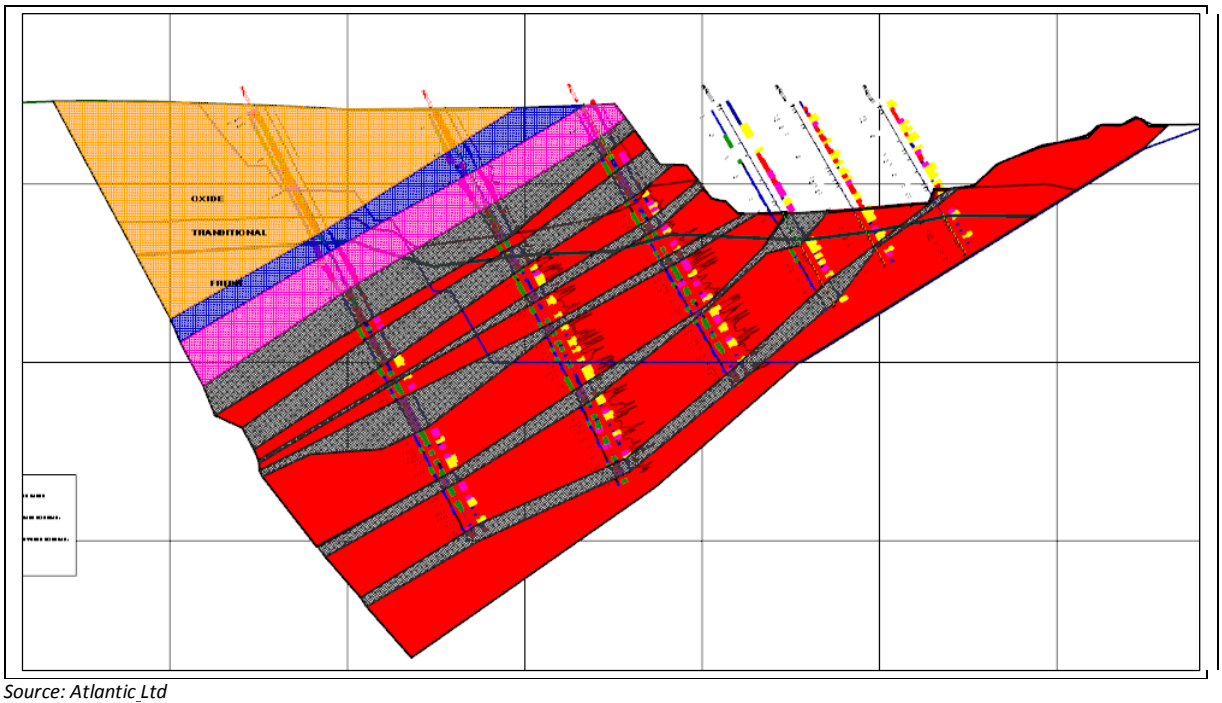
The resource (with a cut-off of 0.275% V2O5) was revised upward in April 2012 and is as follows:

	February 2011				April 2012			
	Tonnes	V2O5	Tonnes	Grade	Tonnes	V2O5	Tonnes	Grade
Resource	MT	%	(V)	V%	MT	%	(V)	V%
Measured	49.9	0.46	124,700	0.25	49.7	0.48	132,500	0.27
Indicated	100.3	0.47	260,700	0.26	142.1	0.49	390,100	0.27
Inferred	59.3	0.48	161,400	0.27	50.8	0.46	130,000	0.25
Total	**210**	**0.47**	**546,800**	**0.26**	**242.6**	**0.48**	**652,600**	**0.27**
	Cut-off of 0.275% V2O5							

Source: Atlantic

The resource expansion above was the result of further drilling and surveying in the interim. This consisted of a 3,518 metre reverse circulation and 823 metre diamond core drilling programme in Windimurra's southern mine area, comprising the southern 1.7 kilometre strike length of the 4.9 kilometre current pit design.

The cross-section below shows the nature of the deposit with the existing pit from historical mining shown to the right. The bands of oxide, transitional and "fresh" ore can be noted.



Source: Atlantic Ltd

The JORC-compliant global mineral resource for the Windimurra project increased by 33 million tonnes to 243 million tonnes at 0.48% V2O5, a 16% increase on the previous global mineral resource. Meanwhile the grade of the global mineral resource increased to 0.48% V2O5 from 0.47% V2O5 across the larger resource tonnage, with a significant increase in average grade to 0.50% V2O5 in the southern mine area of the deposit.

23

Reactivation

The mineralisation of the ore body is split into bands of softer, less magnetized oxide ore at the surface, a band of transitional ore and finally at depth, a band of fresh ore which is more magnetically susceptible. As a result, based on the current life of mine plan, it is planned that ore will be blended on the run of mine stockpile from separate stockpiles of ore, segregated on the basis of the degree of oxidation.

The project once operating is expected to produce some 6 300 t/y of vanadium over a potential mine life of 28 years (based on a four million tonnes per annum feed rate). The strip ratio is expected to be a low 0.7:1.

During the MVPL phase, that owner completed the acquisition of the existing accommodation camp at the project site. Then it engaged PinC Group (a project management and project services group), to work with MVPL to oversee all aspects of construction completion, including developing MVPL's contracting strategy and monitoring the work of individual construction contractors.

Key construction contracts are defined into three distinct work streams:

- Structural, mechanical and piping
- Electrical and instrumentation
- Civil work

The aerial view below shows the site plan:

24

Source: AtlanticLtd

After achieving first production in January 2012, Atlantic is moving towards full production of 6,300 tonnes per annum of contained vanadium in the first calendar quarter of 2013. The expected head grade is 0.51% V2O5. The revised pit design comprises up to seven stages, over a strike length of 4.3 kilometres. The pit designs extend to a maximum depth

25

of 155 metres where viable, and have been sequenced to ensure optimal selectively mined grades were supplied to the plant in priority of grade distributions.

In December the company's Managing Director commented that the early phase of commissioning had been slower than expectations with a consequent delay in the onset of first revenues. However he also noted that a fund raising would enable the plant to achieve full production capacity in line with the original schedule.

In early April the company reported that the plant's ramp-up was back on track with the crushing, milling and beneficiation (CMB) circuit achieving daily production rates of magnetite concentrate in the second half of March in line with the March production schedule targets.

Source: AtlanticLtd

Vanadium from the magnetite concentrate is now being processed through the vanadium refinery, pictured above). Primero Group has now mobilised to site and begun modification work to the milling and beneficiation components of the CMB circuit at Windimurra.

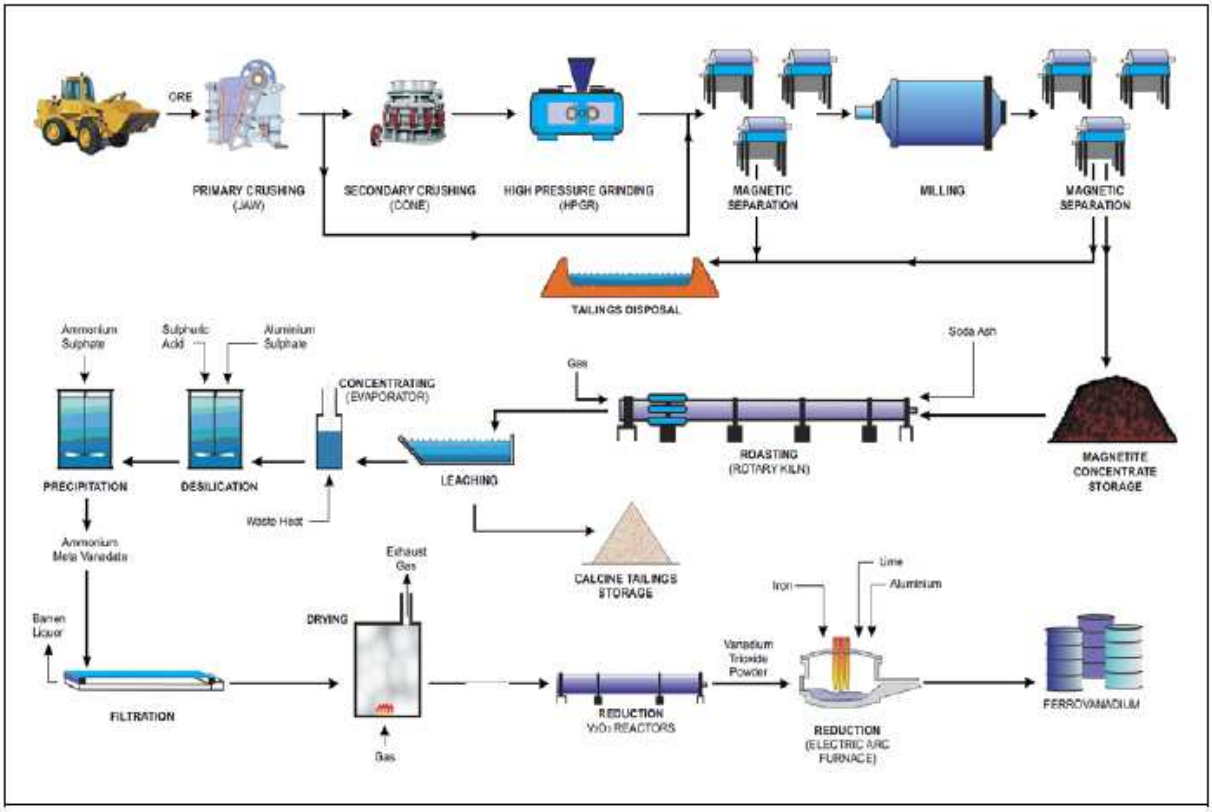
The bulk of this work is to be completed by the end of June in line with Windimurra's production ramp-up schedule of attaining 65% of CMB circuit production capacity by the end of the second quarter of 2012.

Process

The processing of FeV from vanadiferous magnetite involves:

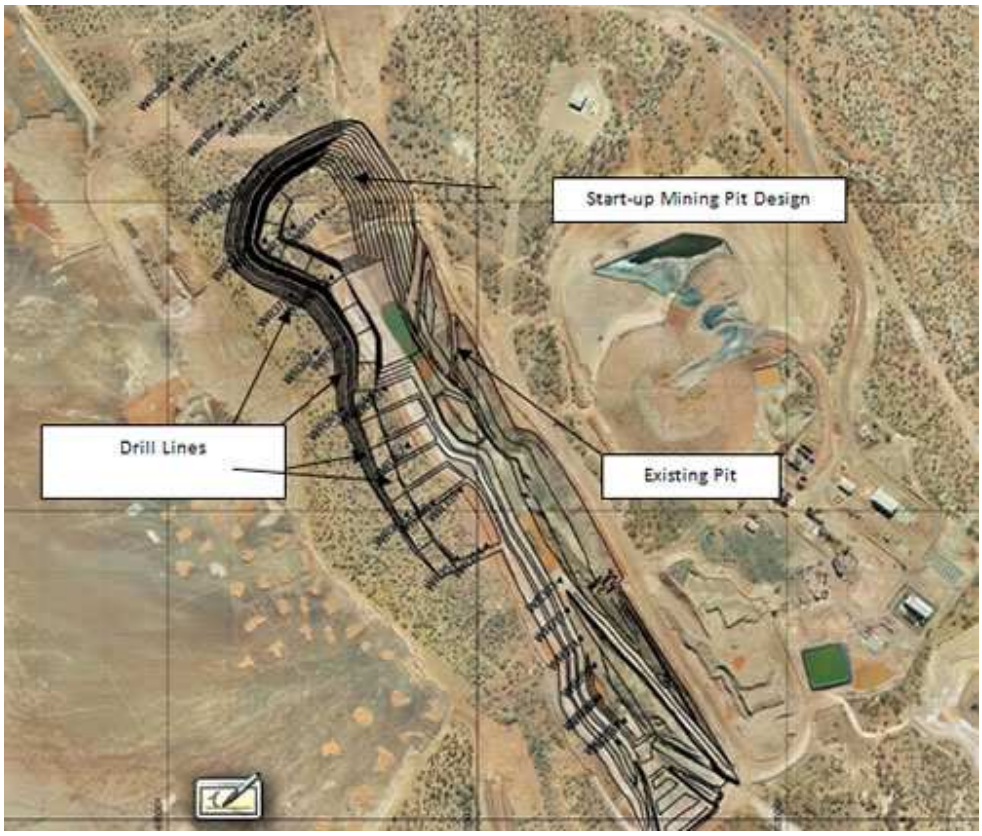
- ✓ Production of a magnetite concentrate via primary and secondary crushing, grinding and magnetic separation;
- ✓ Roasting of this concentrate with sodium carbonate (a source of CO2 and sodium) in a rotary kiln to convert the vanadium to water soluble sodium vanadate;
- ✓ Leaching of the vanadium with water;
- ✓ Desilification of the pregnant solution using sulphuric acid and aluminium sulphate;
- ✓ Precipitation of ammonium metavanadate using ammonium sulphate; and
- ✓ Conversion of ammonium metavanadate to vanadium trioxide (V2O3) to FeV.

The flowchart below gives an idea of the phases that the ore goes through on the way to a sellable V2O5 product.



Source: AtlanticLtd

Source: AtlanticLtd



Source: AtlanticLtd

Further Exploration

Under the previous owners, a high resolution aero-magnetic response survey was undertaken over the ground in 2007, with further detailed fill-in lines undertaken in 2008. The responses showed that the high magnetic gabbros associated with the lower layered sequence of Shepherd's Discordant Zone, which hosts the titano-vanadium horizon at Windimurra, extends through the acquired southerly tenement holdings.

Atlantic initiated the first exploration on this greenfields ground in January 2011, via 5 traverse lines of reverse circulation drilling, 5 kilometres apart, across the high magnetic signature. This scout drill program was not designed nor intended to return a quantifiable mineral resource, but to be used as a tool in confirming the overall geological setting and weathering states, and to return an understanding into the broad V205, Fe and TiO2 grade distributions within the belt. As such, it was designed as a preliminary stepping stone in the development of a future targeted strategy for these tenements.

The scout program was successful in confirming the continuous presence of the main vanadium-magneto horizon as expressed in the Shepherd's Discordant Zone (SDZ) at Windimurra, for the strike

length of the southerly tenement holdings. Widths of mineralization and grades of vanadium bearing units were comparable to Windimurra for the first nine kilometres south of the proposed current life of mine pit design, and then reduced to approximately half the width by the southern extent was reached, whilst the vanadium grade was maintained. A second peripheral vanadium-magneto horizon was located some 400 metres west of the main SDZ. This unit had an average of 7 metres and an identified strike length of 4.7 kilometres, in the southern section of the tenement holdings.

An Iron Ore Side-benefit

The production of FeV in this process produces a haematite ore (as a fines product) that once removed from the leach vats is deposited in the calcine tailings storage area. There is an existing stockpile of this haematite fines material on site which was produced when the plant was operational between 1999 and 2003.

Atlantic intends to monetise the stockpile of haematite at Windimurra and the approximately 1.5 million tonnes per annum of haematite (and other iron by-products) produced by the project once it is operational.

Recent Financing

In early December 2011, Atlantic announced that it planned to raise some AUD$25 mn through a share placement to finance improvements and modifications at the Windimurra project. This was launched into a very tough financing market indeed in Australia at that time.

Atlantic would place more than 20.83-million fully paid ordinary shares, at a fixed price of AU$1.20 a share, comprised of an unconditional component to raise around AU$18.18-million through the placement of more than 15.15-million shares, and a conditional component to raise an additional AU$6.81-million, through the placement of more than 5.6-million shares, subject to shareholder approval.

Atlantic received the final AU$10 million installment of the convertible bond funding package from Droxford International, bringing the total received to AU$30 million, on 30 March 2012.

The final component of the AU$41.7 million funding package announced on 6 March 2012, a AU$10 million placement in new Atlantic shares, is subject to shareholder approval at an EGM scheduled for late April 2012.

Economics

The well-known consultants, CPM, prepared a survey of the project showing:

- that the mine is expected to be a lowest quartile cash cost (US$15/kg incl. by-product credits) vanadium producer
- as a result of the work undertaken previously by Midwest Vanadium Pty Ltd (MVPL) the new operator gained a benefit of over US$500 million of prior capital expenditure for a net present value of AU$68 million of retained debt

- the acquisition of the crushing and beneficiation plant that will deliver material long-term cost savings
- that the haematite by-product revenue stream opportunity would release significant further cash credits for the project

Atlantic Limited - Earnings Model							
In Millions of USD	**2020**	**2018**	**2017**	**2016**	**2015**	**2014**	**2013**
(except for per share items)							
Vanadium Pentoxide sales	86.70	84.80	81.00	93.50	88.00	104.40	81.70
Iron fines	40.00	41.00	42.00	43.00	46.00	60.00	63.00
Total Revenue	**126.70**	**125.80**	**123.00**	**136.50**	**134.00**	**164.40**	**144.70**
Mining Cost	35.70	37.10	37.80	38.50	38.50	40.60	30.10
Process cost	66.30	68.90	70.20	71.50	71.50	75.40	55.90
Gross Profit	**24.70**	**19.80**	**15.00**	**26.50**	**24.00**	**48.40**	**58.70**
Selling/General/Admin. Expenses	3.20	3.10	3.05	2.90	2.70	2.50	2.60
Research & Development	0.40	0.40	0.40	0.40	0.40	0.40	0.40
Depreciation/Amortization	6.00	6.00	6.50	7.00	7.50	8.00	9.00
Operating Income	**15.10**	**10.30**	**5.05**	**16.20**	**13.40**	**37.50**	**46.70**
Net Interest (expense)	1.00	3.00	3.00	4.00	5.00	6.00	7.00
Other Net	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Income Before Tax	**16.10**	**13.30**	**8.05**	**20.20**	**18.40**	**43.50**	**53.70**
Tax (credit)	-5.47	-4.52	-2.74	-6.87	-6.26	-14.79	-18.26
Net Income	**10.63**	**8.78**	**5.31**	**13.33**	**12.14**	**28.71**	**35.44**
Diluted Weighted Average Shares	133.70	133.70	133.70	133.70	133.70	133.70	133.70
Diluted EPS	0.08	0.07	0.04	0.10	0.09	0.21	0.27
Tonnes Mined (mn t)	4.40	4.70	5.20	5.80	8.30	4.30	4.20
V_2O_5 Kgs Produced (mn)	5.10	5.30	5.40	5.50	5.50	5.80	4.30
V_2O_5 Price per kg projection	17.00	16.00	15.00	17.00	16.00	18.00	19.00

Source: Hallgarten

Above can be seen our earnings model for Windimurra. We based this partly on the project update that the company published in early 2011. They advised us in recent weeks that this should be viewed in the light of subsequent events which they categorized as:

- increase in vanadium resources and reserves
- increase in plant output capacity from 5,700 tpa to 6,300 tpa of contained vanadium on the back of an increase in ore head grade
- increase in by-product (calcined iron fines) volume and an additional by-product (high titano magnetite)
- potential improvement in cash costs
- ramp-up schedule to 65% by end of Q2 calendar year 2012 and 100% capacity by the end of December 2012

- modification works to the milling and beneficiation components of our crushing, milling and beneficiation (CMB) plant to cost A$15 million.

However wishing to err on the side of caution and in light of the higher Australian dollar (though we use AUD/USD parity in our model), the history of things not playing out exactly as planned at this project and our perception that the original Vanadium price employed in the early 2011 update appeared too high, we preferred to adopt and adapt the original model components (including the ore throughput) and make some allowances for not quite reaching these targets. We would like to be pleasantly surprised by an outperformance on the production front.

Ownership

It might be worth noting that the Salim Group, via Droxford International, holds the largest stake in the company at 19.9% of the common shares. The Salim Group is one of Indonesia's leading business groups and, through companies controlled by the Salim Group, a leader in food processing and distribution in Indonesia, Singapore, the Philippines and Malaysia. Its participation in a Vanadium play is seemingly a breakout from its main business lines.

Conclusion

Some of the more bullish pundits expect global demand growth will require the equivalent of a "new Windimurra" to come on stream almost every year. But those expectations are based upon a bullish steel scenario and the uncertain pace of battery expansion. In our opinion a new Windimurra will be needed every few years, without ruining the metal price for all concerned.

Windimurra should have the advantage of being one of the world's low cost vanadium producers, which means if demand does trail off then we would expect it to be left as one of those standing. The first task though will be for the project to make it into commercial production. A second priority should be to jazz up the image of the company, the company is currently burdened with a name that neither gives an idea of its activities, metal focus or location.

The project though has been dogged by technical and financial problems for over five years and these problems have buried more than a few would-be operators. This history has prompted naysayers to try and bury this latest reincarnation before it has even managed a heartbeat. Nevertheless, trial production has begun, further financing is in hand and it is likely that the company will get to the starting post.

At current valuations, we regard Atlantic as a Long with a twelve-month target price of $1.

32

Source:ASX

Energizer Resources (EGZ.to)

Key Metrics				2011	2012e	2013e
Price (CAD)	$	0.34	Consensus EPS		n/a	n/a
12-Month Target Price (CAD)		n/a	Hallgarten EPS		n/a	n/a
Upside to Target		n/a	Actual EPS (CAD)	($0.04)		
12-mth High-low (CAD)	$0.15 -	$0.475	P/E	n/a	n/a	n/a
Market Cap (CAD mn)	$	49.7				
Shares Outstanding (millions)		146.2	Dividend	n/a	n/a	n/a
Shares O/S Fully Diluted (mns)		209.9	Yield	0.0%	0.0%	0.0%

+ A sizeable deposit in the up and coming mining nation of Madagascar
+ A secondary focus on graphite, a mineral with a lot of focus lately
+ Infrastructure is prospective with the construction of neighbouring mining projects
× Madagascar has had troubled politics in recent years
× Distracted by the lure of the graphite boomlet
× Being left behind by other players in the Vanadium space making it less likely that its potential output will be required by a market that may find its need satiated by others

Multiple Foci

Energizer Resources Inc. was called Uranium Star Corp. when we were first introduced to it a couple of years ago. Its prime focus is the exploration and development of its 100%-owned Green Giant Project located in the extreme south of the island nation of Madagascar off the east coast of Africa. The company's strategy is to aim production towards an end-product suitable for the Vanadium Radox battery market. Currently Energizer is targeting production by the end of 2014.

In recent months though, the lagging fortunes of the stock have been energized (excuse the pun) by its secondary project, which is in the go-go mineral du jour, graphite, which is also located in Madagascar. If the rising interest in graphite also lifts the vanadium boat then all the better.

Green Giant

This Vanadium deposit is a sedimentary-hosted deposit located 145 km SE of the city of Toliara in the Tulear Region. The company's land position consists of 36 licenses covering around 225 km².

The property is located in an area that has good access via a network of seasonal secondary roads from the village of Fotadrevo, which in turn has access to a regional road system that leads to the regional capital of Toliara. Unlike the typical image of Madagascar as lush jungle the part of the the island where the property is located in the rain-shadow and thus a dry semi-desert climate subjected to seasonal cyclonic rainfall characterizes the region.

The rocks in the region are oxidized to a shallow depth, usually less than 10 m. The chief contrast here is that, unlike most vanadium deposits which are magnetite hosted, the sedimentary nature of this deposit calls for a metallurgical process that is different from that used by other vanadium producers.

In the opinion of the company, the characteristics of the Green Giant vanadium would allow the company to produce a high-purity V_2O_5, which is required in battery power and in battery storage for both automotive and large-scale applications. Like Atlantic, a byproduct would be FeV, which is the usual end product from magnetite-hosted deposits, and can only be used for steel applications.

Source: EnergizerResources

Geology & Exploration

The region around the Green Giant property has primarily been explored historically for base metal-type occurrences although colonial geologic services highlighted a wide range of mineral potential in the region. The Besakoa base metal mineral occurrence, located 9 km north of the Green Giant property hosts the Besakoa polymetallic prospect, which was discovered by BRGM (the State Mining Bureau) .

The property is underlain by highly metamorphosed and sheared quarto-feldspathic ± biotite ± garnet gneisses, metasedimentary rocks (marble, chert, quartzite, and iron formation), hornblende biotite gneiss and minor amphibolite, graphitic schist, and granitoid generally striking 010°. Two main directions of faulting occur on the property, parallel to foliation and 320°. There are no known historic mineral occurrences on the property.

Since acquiring the property in August 2007, Energizer has spent over US$10 million on exploration and developing the project.

An extensive exploration program has been conducted on the property. This work has included:

- ✓ 131 diamond drill holes (21,957 metres)
- ✓ 140 trenches (17,105 metres)
- ✓ 11,035 soil samples
- ✓ airborne - 7,843 line kilometres flown
- ✓ ground geophysics

- ✓ 281 line kilometres of EM surveys
- ✓ 589 line kilometres of MAG surveys

Based on these exploration efforts, a 21 km continuous Vanadium trend has been identified, of which only 25% has been drilled.

The Resource

The vanadium deposits on the Green Giant property are categorized as oxide and primary. The mineral deposits on this property have been divided into three separate zones, totaling approximately 5.3km in strike length. These are referred to as the Jaky, Manga, and Mainty deposits. The mineral resource estimate utilized approximately 18,832 m of diamond drill hole data from the 2008, 2009, and 2010 drill program and was supplemented by approximately 5,928 m of trench data from the 2008 and 2009 exploration programs. No additional work was carried out on the Jaky deposit; therefore, the resources are merely re-stated from the NI43-101 report from June 2010.

The resource, dating from November 2010, was prepared by the consulting firm, AGP. The Jaky, Manga, and Mainty resource estimate is comprised of Indicated and Inferred resources reported as vanadium pentoxide mineralization at a base case cutoff grade of 0.5% V_2O_5. Within the oxide and primary zones of the Jaky, Manga, and Mainty deposits, the total Indicated resource is 49.5 Mt at 0.693% V2O5, containing 756.3 Mlb of vanadium pentoxide. The total Inferred resource is 9.7 Mt at a grade of 0.632% V_2O_5, containing 134.5 Mlb of vanadium pentoxide.

Classification (at 0.5% V_2O_5 cut-off)	Tonnage (million tonnes)	V_2O_5 (million pounds)	Grade (%V_2O_5)
Indicated	49.5	756.3	0.693
Inferred	9.7	134.5	0.632

Source: EnergizerResources

Production outlook

The current status of the project is that a preliminary economic assessment (PEA) has been initiated with DRA Mineral Projects.

Madagascar is a country with a number of world-sized mining projects under way but little else in mining (at least until now). As a result infrastructure is very thin in many parts of the country. The semi-arid south-west corner of the country where the Green Giant Project is located is currently infrastructure poor. Thus the move to production will require the upgrading of existing roads, ports, and water supply routes and the importation of diesel power.

One big plus is the relative proximity to the Sakoa coal project (located only 30 kms away), which is under development and raises the possibility of infrastructure-sharing opportunities for the two projects. To this end, Energizer has initiated discussions with Asia-Thai Mining, one of the owners of the Sakoa coal project as well as the mine construction company retained to develop the coal project, to identify potential infrastructure sharing opportunities and other synergies. A coal project implies a rail connection (more important for bringing fuel in than taking ore out in EGZ's case). In addition, a coal

source nearby raises the likelihood of the construction of coal-fired electricity generation facilities and high tension power to the Green Giant site.

As the Green Giant vanadium is sediment-hosted, and not magnetite-hosted like the majority of other known Vanadium deposits, the vanadium will be processed differently than the magnetite-hosted deposits. A proven process, called alkaline press leaching, will be utilized to process the vanadium and it is expected to naturally produce a battery-grade form of V2O5 (99.5%+ in purity) directly from the process. Advanced metallurgical test work is ongoing at SGS Lakefield to optimize the process flow sheet. Energizer expects to produce a clean liquor requiring less processing to produce the high purity (99.5%), battery-grade vanadium.

The Graphite Potential

Curiously we had been presented with a graphite project in Madagascar several years back and thus we were not especially surprised to see that Energizer claimed to have discovered that its project contained a viable grade of graphite. The identification of graphite as a potential credit to the company's vanadium resource led its geologists to conduct a reconnaissance exploration program in September 2011, with the goal of delineating new graphitic trends, and comparing them to those associated with the vanadium mineralization. In the course of this exploration, graphitic trends were identified, which were visually determined to be of both higher carbon content, and larger flake size than those associated with the vanadium mineralization.

The company signed a Joint Venture Agreement in mid-December 2011 with an Australian company, Malagasy Minerals Ltd (MGY.ax) for the exploration and development of industrial minerals. EGZ holds 75% of the JV, and MGY holds the balance. MGY owns 7.5mn shares of EGZ. This deal prompted an additional reconnaissance exploration program in December. The purpose of this program was to ascertain the industrial mineral potential of the JV property, in addition to further drill testing of graphitic trends. During the course of this reconnaissance exploration, vanadium trends were confirmed to extend off of the Green Giant Property, and multiple graphitic trends were identified. In total, 19 diamond drill holes (totaling 2,701 metres) were completed during the course of this exploration.

Mintek provided analytical results of these samples to Energizer in December 2010 and January 2011. The QEMSCAN analysis of these head samples quantified a graphite composition of 4.09%, while the head chemical analysis quantified a graphitic carbon content of 3.87%.

Graphite is all the rage these days though we could remember only two years ago when Northern Graphite in its pre-listing state was like a voice crying in the wilderness. The mineral concerned is a naturally formed polymer of carbon that is an excellent conductor of heat and electricity and has the highest natural strength and stiffness of any material. It maintains its strength and stability to temperatures in excess of 3,600°C and is very resistant to chemical attack. At the same time it is one of the lightest of all reinforcing agents and has high natural lubricity.

Graphite is considered a critical strategic mineral with the British Geological Survey ranking it 11th in its Risk List 2011. Its traditional demand is largely tied to the steel industry where it is used as a liner for ladles and crucibles, as a component in bricks which line refractory furnaces, and as an agent to increase the carbon content of steel. In the automotive industry it is used in brake linings, gaskets and clutch

materials. Graphite is also used in lubricants, fire retardants, consumer electronics and reinforcements in plastics.

Another primary use of graphite, that is becoming increasingly important, is its role in batteries. Graphite is used in virtually all batteries as a cathode and/or anode material. As the commercialization of electric vehicles approaches, graphite demand is expected to increase significantly since it is a major component in lithium-ion batteries. There is approximately 11 times more graphite in a lithium-ion battery than there is lithium.

However, there has been a rush of graphite plays in recent months to satisfy investor demand more than end-user demand. We are positive on graphite's prospects just not on the prospects of most of the players. There is a need for not much more than a handful of producers and a couple of up and coming explorers behind them. If one can count more than 10 graphite wannabes then the space is going to be in trouble pretty soon.

While graphite might be a sexy story of the moment, we have our doubts that Energiser is going to be one of the finishers in this race. Maybe the promotion of this aspect is a useful means at least of getting the stock up and raising some money for the main game, Vanadium.

The Dynamics of Madagascar

From the political background Madagascar has been having a worse time of it recently after a long period of relative quietude. The current President came to power in April 2002 after a hotly contested election. Things were relatively quiet until the end of 2008.

There were riots starting in January of 2009 in the capital that left around 170 dead. After losing support of the military and under intense pressure from the mayor of the capital Andry Rajoelina, Ravalomanana resigned as President on the 17 March 2009. Ravalomanana assigned his powers to a military council loyal to himself. Other parts of the military called the move by Ravalomanana a "ploy" and said that it would support Rajoelina as leader. Rajoelina had already declared himself the new leader a month earlier and assumed the role of acting President. The European Union, amongst other international entities, refused to recognize the new government, due to it being installed by force. The African Union, suspended Madagascar's membership however Rajoelina remains president at this time.

The country has not appeared on the radar screen of most mining investors but there are a few major developments, such as Sherritt's Amabartovy nickel/cobalt project, the coal project at Sakoa of Pan-African Mining (PAF.v) and Rio Tinto's mineral sands project near Fort-Dauphin at the south-east tip of Madagascar. QIT Madagascar Minerals, which is 80% owned by Rio Tinto and 20% owned by the Government of Madagascar, intends to extract ilmenite and zircon from heavy mineral sands over an area of about 6,000 hectares along the coast over the next 40 years.

Conclusion

The Green Giant project must inevitably take a third place to the other two deposits highlighted in this review as its owner is neither as resourced nor as advanced with its project as the other two. As a result of this Energiser is now vigorously promoting graphite over its main asset in vanadium. The pursuit of

fads is frowned upon by us in the wake of the Rare Earth debacle, however in a tough financing environment one can use whatever bucket one has at hand to catch the rain.

It may very well be that Energizer becomes more financeable by appealing to investors baser instincts and reaping the graphite whirlwind to get the Vanadium project into some form of productive state. However that makes it look like the graphite tail is wagging the Vanadium dog. Such expediency raises a red flag for us and thus we have decided to put a **Neutral** rating on the stock for the time being.

Other Vanadium-related Stocks

Largo Resources (LGO.v) – burdened by association

As we noted in our recent Tungsten report in December 2011, Largo Resources, is on the verge of reactivating a former Tungsten tailings processing operation in Brazil. However the Tungsten is a sideline to its major focus which is the Maracas Vanadium project. As we noted in that previous research, due to the company being regarded as a Forbes & Manhattan group company we had no intention in covering or promoting the company. However, in the interests of giving investors an idea of the full gamut of the Vanadium space, we include here some skeletal details.

The Maracas deposit consists of a 270 sq km property located 813 kilometres northeast of Brasilia, the capital of Brazil, and 250 kilometres southwest of Salvador, the capital of Bahia State. The vanadium deposit is hosted within the Jacare River mafic-ultramafic intrusion.

The Maracas deposit is hosted within gabbros and pyroxenites of the Jacare River mafic-ultramafic intrusion. This sheetlike linear intrusion extends for 70 kilometres along a north-south strike averaging about 1.2 kilometres in width. There are a number of similarities to the Great Dyke including age, rock types, platinum and palladium ratio and style of intrusion as well as the host rock that it intrudes. The PGMs are associated with fine disseminated sulphides hosted within vanadium-rich titaniferous magnetite massive layers. This large titaniferous magnetite mineralization at Maracas ranges from 2m to 100m in thickness with an average true width of 40m.

The NI 43-101 Measured & Indicated Mineral Resource was estimated at 23.2mn tonnes grading 1.27% V_20_5 while the Mineral Reserve is estimated at 13.1mn tonnes grading 1.34% V_20_5.

The Definitive Feasibility Study (DFS), prepared by Aker Solutions, was released in August 2008, an inauspicious moment if there ever was one for releasing any news. The study projected that the grade would be highest during first 8 years of production when the mill feed would average 1.94% V_20_5 . The study envisages:

- 138 Million lbs of vanadium contained in FeV
- Estimated payback of 1.9 years; after tax cash flows of US$1.329 billion
- 23 year production plan
- IRR 43.9%,
- NPV US$489 Million (@ 10% discount)

An Environmental Impact Study (EIS) was completed as part of the DFS, with the key Location License (LL) having been granted in May 2009. The company has secured a six year off-take agreement with Glencore. The company is targeting production from 2013 with an average annual production of 5,000 tonnes (10mn Lbs) of FeV.

Reed Resources (RDR.ax) – undecided on its Barrambie Project

Another potential producer of Vanadium in Western Australia is the Barrambie project owned by Reed Resources. In some ways the progress of Windimurra may well effect Barrambie's outlook.

This Vanadium project is 100% held by Reed Resources, a long-time constituent in the Model Mining Portfolio and is really, like so many other of these projects, a Ti-Fe-V deposit. Despite no longer being the forerunner in Reed's portfolio, the Barrambie Vanadium project continues to be a focus although the lingering effects of the global financial crisis continue to restrict access to previously available funding for a project of this nature. Reed is currently balancing various (some would say too many) project development alternatives and strategies.

A key point to note is that while the tonnage at Barrambie is a fraction of that at Windimurra the grade at Barrambie is a multiple of that at the larger deposit, naturally implying less ore needed to be mined to produce the same output of V2O5.

The current resource at Barrambie is:

- Initial mining reserve of 39.7 mn tonnes of ore at a grade of 0.82% V2O5.
- Indicated and Inferred Resource of 65 mn tonnes of vanadium ore at a grade of 0.82% V2O5

Reed has gone as far as a Definitive Feasibility Study on Barrambie, which was released in May 2009 and contained the following principal findings:

- Average EBITDA per annum of AU$105 million using an average ferrovanadium price of US$30/kg and an exchange rate of AUD$1=USD$0.60 (though it is currently around US$1.04)
- Operating costs of less than USD$20/kg of vanadium.
- Minimum of 12 years mine life at throughput of 3.2Mt per annum.
- Capital cost estimated at AU$628.9 million.

The company revealed back in 2009 that a MOU had been entered into for the sale and marketing of the entire annual vanadium production with Glencore for the first ten years of production, at not less than Metal Bulletin's low price.

A Public Environmental Review (PER) document was lodged in June quarter 2010.

In addition, in December 2009, Reed concluded the acquisition of two exploration licences (E57/769, E57/770) that contain magnetite bearing formations along strike and to the west of the Barrambie deposit. The total consideration for these was AU$2 million dollars and 600,000 ordinary shares.

The issue here is not the attractiveness of the project vis-à-vis Windimurra, it is the capex that at over AU$620mn is a mighty amount of money to raise either by debt, equity or a mixture thereof. The breakdown of the budget is:

Barrambie Mine Development Capex in AU$	
Site Establishment and Construction Costs	$9.5mn
Beneficiation Plant	$108.3mn
Roasting and Leaching	$109.7mn
Refinery	$22.7mn
Reagents	$39.8mn

Plant Services	$57.5mn
Infrastructure	$68.9mn
Ferro Vanadium	$39.8mn
Total Direct Construction Cost	**$456.2mn**
Pre commissioning, owner's costs, and EPCM	**$172.7mn**
Total Construction and Development Cost	**$628.9mn**

Source: Reed Resources

In our conversations with the company they noted in response to our concern at the size of this budget that this capex budget was quoted at the height of the last boom and that Reed expects to make substantial reductions, in light of the fact that the crushing and beneficiation plants, infrastructure and plant services (i.e. pipeline and power station) can all be put in on a BOO basis. At the time of the cost estimation the company said that it "…wanted to know the ugly number and used SKM (Australia's second largest engineer) to get it. It's the Rolls-Royce of plants we may opt for a Lexus".

Barrambie's Eastern Band is also the world's second highest grade Titanium (Ti) deposit after Rio's Lac Tio. According to the company its Fe/Ti ratio is 2:1 whilst those of Argex is 4:1, TNG (TNG.ax) is 5:1 and Speewah is 6:1. Iron is essentially the costliest element to remove while Ti is 75% of revenue while V is 25%. The process for doing so was pioneered at McGill University, after which the inventors split. The technology is now the property of Canadian Titanium Ltd (CTL) which is half owned by Argex (discussed later), and being used by Speewah (also discussed later), while Nevado and Reed are using the Neomet technology. The advent of these technologies is the most significant change in Ti processing since the Kroll process and thus is regarded by Titanium mavens as a game changer.

Reed has a DFS on both the high-grade Vanadium Central Band and the high-grade Titanum Eastern Band. Environmental approvals are expected in this current quarter. Reed hopes to have a mini-pilot plant working in SepQ2012.

Having a solid off-take agreement would be a start if the company goes the debt-financing route but at current vanadium prices more equity than debt would be required to avoid the problems that brought down Windimurra's developer in 2009. Reed is close to the party (Mineral Resources) that owned the comminution and beneficiation facilities at Windimurra, which had led us, at the time, to speculate on the possibilities of sharing facilities between Windimurra and Barrambie as the two facilities are within trucking distance of each other. Such a combination of Windimurra's more advanced stage of construction and Barrambie's juiced up grades would make a certain logic.

Reed's take on Vanadium prices is rather close to ours, looking for flat at best in the near to medium term. The company also posits that massive substitution with ferro-niobium courtesy of expansions at CBMM (the dominant Niobium producer in Brazil) financed at first by the

Japanese/Korean steel makers and then Chinese steelmakers (Ansteel, Baosteel, Shougang) have boosted Nb supplies and those of alternatives. There has also been massive build-up of slag processing capacity by China's Panzhizhua complex. The majority of vanadium pentoxide produced in China is not suitable for chemical or energy storage applications. Hence this is why Reed elected to not proceed with NFC fixed price EPC/debt package as Reed feels that being a standalone primary producer is too energy intensive in this high energy cost environment.

Speewah – Big by Any Measure

This sector review is probably starting to give the impression that Western Australia is the epicenter of Vanadium action. There are good reasons for this, amongst which are the heavy weathering of the continent that gives Australia the name the "oldest continent". This weathering has exposed the iron ore, vanadium and manganese deposits making them much easier to identify and mine than in say Africa or South America. Thus our third Australian offering is a very large Ferro-titano-vanadium deposit (the iron component being hematite) owned by the ASX-listed junior Speewah Metals. Despite being a junior it has a group of substantial London investors on its register, holding a total of 25% of the company.

The company is, in theory, aiming at the development of one of the largest deposits of its kind in the world (this seems a common claim in Western Australia). The tenements are located approximately 110 kilometres southwest of Kununurra and 100 kilometres south of the port of Wyndham in the Kimberley region of Western Australia. The property is accessed via 30 kilometres of unsealed tracks from the sealed Great Northern Highway.

The deposit has a JORC resource (dated January 2012) totalling 3.566 bn tonnes at 0.30% V_2O_5 and 2% Ti (at 0.23% V_2O_5 lower cutoff grade. The Resource incorporates the three areas: Central, Red Hill and Buckman. The Resource includes:

- Measured Resource of 201 Million tonnes at 0.33% V2O5 and 2.1% Ti;
- Indicated Resource of 826 Million tonnes at 0.30% V2O5 and 2% Ti;
- Inferred Resource of 2.539 Billion tonnes at 0.30% V2O5 and 2% Ti.

The resource also confirmed high grade Titanium and Vanadium in the magnetite host of 2.48% and 14.8% in concentrate.

We met with the company in recent weeks. Though the company is making all the motions associated with preparing a BFS and seemingly moving to some sort of production (which would cost northwards of AUD$600mn), they indicated that they are actually more partial to selling out to the Chinese. The deposit offers, in the company's opinion, the possibility for a mine life of more than 100 years.

As part of the scoping process a metallurgical test program was completed in February 2012, that demonstrated > 90% recoveries for each of Titanium, Vanadium and Iron through mixed chloride acid leach on the magnetite concentrate process flowsheet. The patented mixed chloride technology delivered very high-value end products through the indicative high grades of each of the end products including Titanium Dioxide (+99% TiO2), Vanadium Pentoxide (+99% V2O5), Hematite (+99% Fe203)

The company's objectives in the short-term are:

- Scoping level CAPEX and OPEX study to be completed February 2012;
- Construction and completion of a pilot plant processing facility in 2012 to demonstrate Titanium/Vanadium /Hematite flowsheet and produce marketing sample to attract off-take and investment / strategic partners;
- Achieving Reserve status on Titanium / Vanadium in magnetite Resource;
- Financial modelling and valuation of Titanium / Vanadium / Hematite project;
- Mining Lease;
- Mining Agreement with landholders;
- Environmental Assessment;
- Commencement of definitive feasibility studies on Titanium / Vanadium / Hematite project.

The latter four items on the wish-list are expected to be in hand by the end of 2012. The company already has an Aboriginal Heritage Survey completed.

Speewah thinks it is ripe fodder for a Chinese investor to snap up. Frankly we think the Fluorspar aspect of the deposit is one of its most appealing aspects and despite our exhortations to consider separating and monetizing that asset, Speewah persists in talking about Fluorspar as a "sweetener" for a buyer of the whole asset (well do we remember Rudy Fronk describing Courageous Lake likewise in his becalmed Seabridge Gold vehicle). Speewah nevertheless remains one to watch.

Argex Mining (RGX.v) – a technology-driven approach

Finally mention should be made of a very low-key company that might be styled the Quiet Achiever. Argex (RGX.v) might also be called an insider's stock as only people in the Vanadium space seem to know about it but they talk fairly constantly about what it is up to. The company has recently transitioned from a mining exploration company to a near-term producer of Titanium Dioxide (TiO_2), Iron and Vanadium Pentoxide. With a primary goal of advancing rapidly towards production, Argex has adopted what it claims is a simple and low risk strategy for the scale-up of its proprietary process that allows it to produce high purity TiO_2 directly from its 100%-owned deposit, the La Blache Fe-Ti-V property in Quebec. This may be easier said than done though in a tough financing environment.

The market seems more enthused by the company's technology than its property. The process is more titanium-oriented though than Vanadium focused at this time. When the V price was steadily appreciating from 2004-08 there was no way to recover Ti. Reed Resources claim that they were pioneers (or at least funded development) of the first two stages of TIVAN, now being used by TNG Ltd (TNG.ax), who owns the Mt Peake project in Australia's Northern Territory. However Argex took it further by getting the Ti into solution by adding MgCl to a HCl solution. Removing iron is the first step and regenerating acid with the stripping out of Ti and V is being relatively uncomplicated.

Argex might be slightly ahead on testwork but Reed has finished a DFS on the beneficiation circuit and Vanadium refinery (though that is now made obsolete). Reed claims to have core/bulk samples and be nearly permitted. Meanwhile at Argex the company claims that its process is running continuously at the

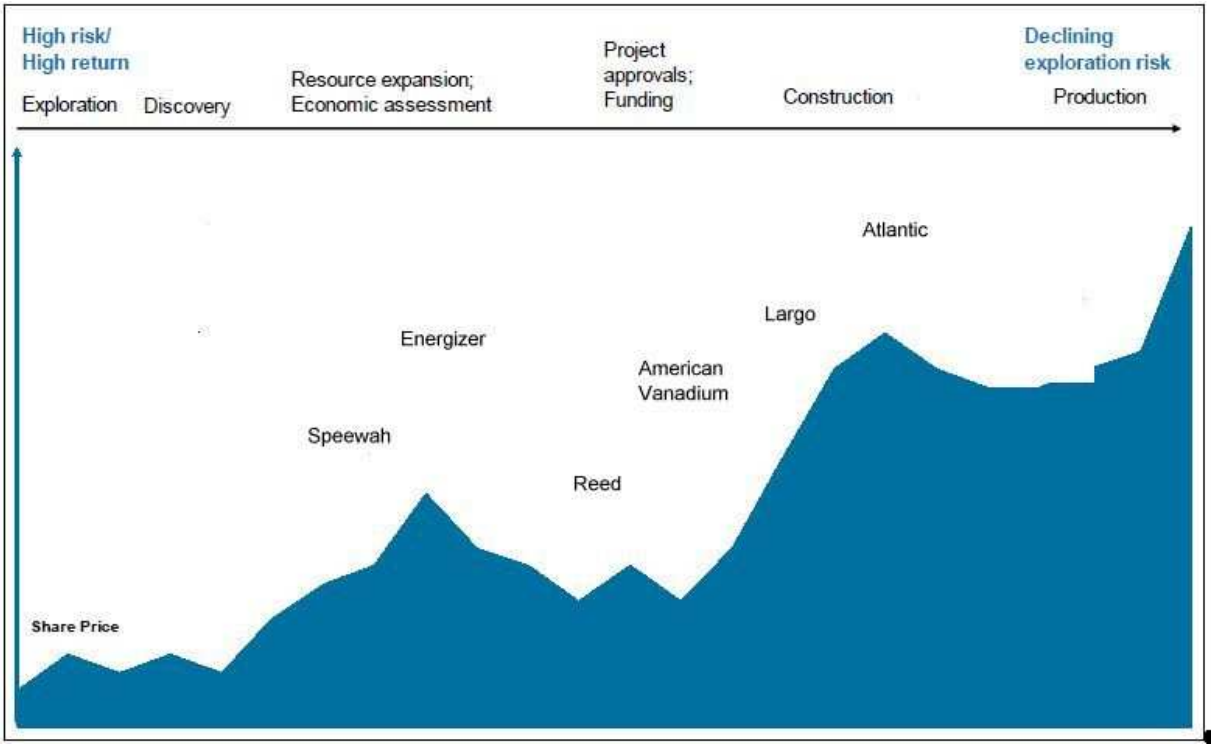
company's mini-plant in Mississauga, Ontario. The closed-loop process is environmentally friendly and produces minimal inert tailings.

The La Blache property covers 40.3 km² and includes three massive titaniferous magnetite lenses named Hervieux West, Hervieux East and Lac Schmoo which contains significant iron, titanium and vanadium mineralisation. The combined initial NI 43-101 compliant mineral resource estimate for Hervieux East and West deposits totals 30.88 Mt grading 18.78% TiO2, 63.29% Fe2O3 and 0.45% V2O5 in the measured and indicated categories with an additional 2.87 Mt grading 18.67% TiO2, 63.06% Fe2O3 and 0.43% V2O5 in the inferred category.

Beyond its specialty metal activities, Argex owns 100% of the Mouchalagane property, which is a large Labrador Trough iron ore property.

The Vanadium Lifecycle Chart

Our all-purpose Lifecycle chart serves particularly well, in the case of Vanadium, to show the state of progress of the various players vis-à-vis each other on the exploration-production continuum (not that some players, irrespective of which metal, imagine themselves production-bound).



Source: Hallgarten

Risks

The risks for the above mentioned companies, whether they be environmental or financial are touched upon in discussions of each company covered. However over and above these are the risks for the

Vanadium space in general. These are:

- An ongoing flaccid price trend for Vanadium
- Failure of the market to grab onto the Vanadium story
- Difficult financing conditions and rather massive capex requirements involved in the processing of these ores
- Weakened global industrial demand (particularly in steel) that would prolong soft prices and volumes
- China entering the market in some way that could skew prices and trade patterns

Most of these risks are different sides of the same price prism, with the exception of the market's perception/ disinterest in Vanadium.

Conclusion

This is one of those metals that, up until now, has been dependent upon the fortunes of another (i.e. the steel complex) for its momentum. And that driver has not served it well with most Western economies never being able to regain their momentum post-2008. Steel will eventually recover but China may have gone off the boil then so we find it hard to muster up price scenarios for Vanadium that are substantially higher than where they are currently. The swing factor is the great unknown of usage by new battery applications. This remains such an unknown that to make an investment decision based upon the "might be" of that factor would be daring indeed.

It seems all the current players have taken this static state price situation into account. While they wish the price to rise they know the projects have to work with the current price constraints. This, in itself acts as a rein upon future production heading into a glut situation. Windimurra might get into production, however if it does not, that leaves the way clear for Gibbelini to move forward faster. A stumble by Atlantic at Windimurra would severely damage the prospects of Reed's project as the fear would be out there that such Vanadium projects were technically challenged. However, we believe that whatever the problems are at Windimurra they are isolated to the project itself.

Thus the prospect is for two or three new projects to come on stream within the next three years, which should dampen down any tendency for V_2O_5 prices to rise, except in the context of a rollicking global recovery or a quantum leap in usage of mass storage battery applications. As always in the mining sector, one lives in hope of higher prices and stronger metals demand so the latter scenario adds spice to the story of the handful of Vanadium players out there and gives good reason why investors should persist in watching the space.

Important disclosures

I, Christopher Ecclestone, hereby certify that the views expressed in this research report accurately reflect my personal views about the subject securities and issuers. I also certify that no part of my compensation was, is, or will be, directly or indirectly, related to the specific recommendations or view expressed in this research report.

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60 Madison Ave, 6th Floor, New York, NY, 10010