

Mining Sector  
Core activities: Exploration  
Core area of activity: Madagascar  
Listing: TSX Venture (EGZ)

## Energizer Resources Inc.



*Energizer Resources is developing one of the world's largest vanadium projects in Madagascar. With new uses in battery technologies, it is widely expected that demand for vanadium will increase very substantially. The potential scale of Energizer's project offers the chance for it to be a significant player in this market.*

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# Initiation Report

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## Key Points

9 Dec 2010  
Price: C\$0.34

*Energizer Resources is a Canadian based exploration company with a potentially world class vanadium project in Madagascar. With growth in vanadium steel usage and new CleanTech battery applications, the demand for vanadium is likely to grow significantly.*

- **The Green Giant Project is Energizer's sole focus**

Energizer now holds a 100 percent interest in the 3,600 km<sup>2</sup> Green Giant property in southern Madagascar. The unique character of the significant vanadium deposits on the Green Giant property occur as oxide and primary mineralisation. At a 0.5% V<sub>2</sub>O<sub>5</sub> cut-off the oxide and primary zones of the Jaky and Manga deposits hold a total indicated resource of 49.5 Mt at 0.693% V<sub>2</sub>O<sub>5</sub>, containing 756.3 Mlb of vanadium pentoxide and a total inferred resource of 9.7 Mt at a grade of 0.632% V<sub>2</sub>O<sub>5</sub>, containing 134.5 Mlb of vanadium pentoxide. These indicated and inferred resources are based on drilling only 25% of the vanadium trend which extends across 21 kilometres of Energizer's property.

- **Energizer is poised to capitalise on forecast growth in vanadium demand**

Developing Green Giant will enable Energizer to capitalise on the expected significant growth in demand for vanadium metal and become a leading, high-volume producer. The future market will be based on 1) steadily increasing demand from the steel sector over the medium term linked to construction industry needs in developing countries and 2) the potential for rapid growth in adoption of Vanadium Redox Battery (VRB) technology to provide power storage capacity in the developed economies.

- **Vanadium has properties essential for enabling new battery technologies**

The redox storage battery is entirely dependent on the properties of vanadium. Energizer's management also expects strong stepped demand growth from the 'Electric Revolution', which development of this long term, high capacity storage battery technology is creating. Vanadium/lithium batteries have been proven to provide the optimum solution for long range automotive applications. Other transformational technologies also herald increasing demand for vanadium.

- **A significant vanadium market development**

With the expected commercialisation of vanadium redox energy storage systems, vanadium industry experts predict a shortage of the high purity vanadium supply required for VRBs. The potential of this technology was underlined by the recent majority-stake acquisition of VRB manufacturer, Cellstrom GmbH, by the renewable energy subsidiary of the German conglomerate Gildemeister. Gildemeister manufactures a range of redox batteries for use in power grid storage and smoothing applications for emergency supply during power cuts. Demand is expected to rise quickly from industrial and private users in areas with unreliable power supply systems as the advantages of Redox power storage become more well known.

- **Increasing vanadium demand cannot be met by existing suppliers**

The vanadium market needs new sources of supply, even to meet the forecast demand for vanadium steel. The annual increase in demand of circa 5,000 t V per year until 2015 can only be met by bringing new mine capacity into play. The scale of Energizer's deposit appears to be ideal for low cost mining and processing and could meet much of the anticipated increase in demand beyond 2015.

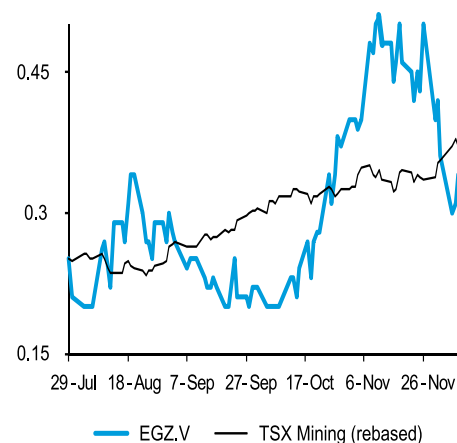
- **The Energizer project may be strategic to future vanadium supply and vanadium economics**

A low production and process cost should place Energizer low on the vanadium cost curve giving it strong leverage in future vanadium markets.

- **Our assessment yields a core base-case valuation of C\$0.52**

We assess Energizer's current value at C\$0.52 per share, with significant potential for appreciation with development success. Continued development suggests valuations as high as C\$2.65 per share in the post-permitting environment under more optimistic scenarios.

### Price chart (C\$)



### Current fair value of equity

Expected value	US\$56.6m
<b>Value per share</b>	<b>US\$0.51</b>
<b>Value per share</b>	<b>C\$0.52</b>

### Derisked upside potential\*

Our core scenario	C\$1.25
Our optimistic scenario	C\$2.65
Our pessimistic scenario	C\$(0.06)
Maximum potential	C\$5.99

\*potential assuming projects reach permitting

### Company details

#### Quote

Shares	
- TSX-V	EGZ
- Frankfurt	YE5
- OTCBB	URST
Hi-Lo last 12-mos. (C\$)	0.50 - 0.15
Shares issued (m)	110.5
Fully diluted (m)	156.5
Market Cap'n (C\$m)	37.6
Website:	<a href="http://www.energizerresources.com">www.energizerresources.com</a>

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## Overview

Energizer, known as Uranium Star Corp until December 2009, is a Canadian based exploration company listed on the TSX Venture Exchange (TSX-V) in Canada and on the OTCBB and Frankfurt exchanges. As its previous name suggests, Energizer was focused on exploration for uranium in northern Quebec until late 2008, when work on a suspected volcanogenic massive sulphide target in Madagascar began yielding promising assays of vanadium. The Green Giant vanadium project is now the priority for Energizer, given the positive results of its exploration to date.

### **The Green Giant Project is the sole focus for Energizer**

Energizer now holds a 100-percent interest in the 3,600 km<sup>2</sup> Green Giant property in southern Madagascar, approximately 145 kilometres southeast of the port of Toliara.

The Green Giant property lies in close proximity to base metals exploration projects and Energizer initially expected its target to be polymetallic volcanogenic massive sulphide mineralisation. In 2007 anomalous grab samples were collected and in 2008, a 31 hole drill programme intersected significant values of vanadium. Assays from 13 holes averaged just under 0.4% of V<sub>2</sub>O<sub>5</sub> over significant widths, averaging almost 44 metres. Assays from 13 of the holes drilled in 2009 also produced significant values of vanadium, averaging just under 0.4% V<sub>2</sub>O<sub>5</sub> over significant widths, averaging almost 44 metres.

The Company recently released an updated NI 43-101 resource estimate for its Green Giant property which increased the previously reported indicated resource estimate to 49.5 million tonnes of V<sub>2</sub>O<sub>5</sub> at a grade of 0.693%, and the inferred resource estimate to 9.7 million tonnes of V<sub>2</sub>O<sub>5</sub> at a grade of 0.632%.

### **Green Giant is one of the world's largest vanadium deposits**

Energizer has now traced its vanadium showings over approximately 21 kilometres of strike length, and the drilling between 2008 and 2010 has produced substantial widths. The Company has now identified over 59 million tonnes of vanadium mineralisation, averaging 0.68% vanadium. The Company has previously said such values could support a large mine running at 7,500 tonnes per day over a 20-year period.

Any large scale mining operation would require the development of power and water infrastructure. Furthermore, transport links to the port of Toliara must be significantly upgraded. The company's management believes it may be possible to extend the transport, power and water infrastructure, which may be developed in conjunction with the Sakoa Coal Project, to a future mine at Green Giant. To take advantage of this option development of Green Giant would have to be undertaken either following or concurrently with development of the Sakoa project.

While the near-surface nature of at least a portion of the Green Giant Project offers the potential for low-cost mining, the cost and timing of infrastructural development could be key factors in determining the profitability of the project. Until the future of the Sakoa development is determined, the opportunity to share infrastructure will be uncertain. It may be possible for Energizer to negotiate an infrastructure sharing deal with the backers of the Sakoa project at the feasibility stage but the company cannot necessarily depend on this. Consequently, at this stage Energizer's feasibility studies must consider the economics as a standalone project.

### **Green Giant is a large vanadium occurrence**

The mineralisation lies along an extensive stratigraphic zone that hosts the majority of vanadium defined to date. This is also confirmed by an airborne geophysical survey flown in 2007. The mineralised zone is interpreted to pinch and swell along its entire strike length of over 21 kilometres, as well as up and down dip.

### **Growing market demand**

Some future widespread applications of vanadium are now in late stage development and early stage production. Alternative energy, clean technologies and sophisticated metal alloys will contribute to a surge in demand for vanadium over the coming decade. Apart from growth in its use in steel alloys the new applications will include:

- The growth in demand for vanadium redox batteries used to store large amounts of electricity. These batteries are already functioning as storage and load levelling devices at wind farms, solar panel arrays and small hydropower installations.
- Test redox batteries to evaluate their performance for provision of demand surge protection in conventional power grid systems. This capability is seen as essential for future 'smart grid' development.
- Vanadium is used as a cathode material in rechargeable lithium batteries now being manufactured for automotive applications. Vanadium used in conjunction with lithium is reported to increase the range of cars using lithium batteries five fold.<sup>1</sup>

### **Further, increased consumption of vanadium for existing uses is likely:**

- Vanadium is being alloyed with titanium and aluminium to produce high-strength lightweight metals for the aviation, defence and space industries.
- Vanadium as a catalyst in the production of sulphuric acid and maleic anhydride.
- Vanadium as an oxidiser and additive in the ceramics industry.

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<sup>1</sup> Subaru, a car manufacturer, is to launch an electric car in 2011-2012, which is powered with a vanadium lithium ion battery.

DBM Energy have equipped an Audi EV with its vanadium lithium polymer battery and set a new long distance record for a regular electric car on a single charge of 603 km in test conditions.

- Vanadium as a special coating on glass to reflect infrared heat.
- Vanadium as an anti-corrosion agent in magnets made from rare earths.

Global production of vanadium metal was about 60,000 tonnes in 2007, nearly all from China, South Africa and Russia. Since 2007 demand has remained fairly steady, except for a forecast recessionary drop in 2009 at about 5,000 tonnes for the year. A recent report has indicated that because of future increased demand for vanadium steel, automotive batteries and redox batteries, demand will increase at an average rate of 11.39 percent per annum for the five years after 2009. Given the potential competition from non-vanadium automotive battery developers annual demand growth is more likely to be in the range of 6%-8%.

Changes in demand are likely to be stepped and dependent on the growth of the markets described above. The two with largest potential and now showing real uptake are grid power storage applications and the early growth in demand for hybrid and fully electric automotive vehicles.

Furthermore, other new technologies have taken significantly longer to be commercially viable, such as the fuel cell, now over forty years in development. In many cases the products are used only for more exotic projects such as powering the international space station. Thus caution must be exercised in assessing the rate of take up for both lithium-vanadium-phosphate and lithium-vanadium-iron batteries in developing applications.

### **Future pricing**

Near the end of the commodities boom in 2008  $V_2O_5$  was priced at US\$18.00 per pound but after a sharp decline to less than US\$4 per pound the price has risen slightly to settle at around US\$7 per pound over the past 12 months. As more vanadium mine capacity comes on stream after 2010, prices could become more volatile as additional mine production capacity rises to meet demand. Through the period of increasing demand to 2015 there may be times when demand outstrips supply and vice versa and this will cause price fluctuations. Once the additional mine production consistently matches demand it is likely that the vanadium price will stabilise. It is clear that with its potential scale, Energizer's project would have an influence on future pricing.

### **Energizer holds a uranium - gold project in Quebec**

The Sagar uranium-gold project in northern Quebec, 100 kilometres north-northwest of Schefferville is centred on a boulder field spanning an area 500 metres by 250 metres. During previous exploration, samples of this material and seventy boulders yielded assays averaging 1.3 percent uranium and 64.9 grams of gold per tonne. Energizer also found significant showings elsewhere on the property but as the company shifted its entire focus to Green Giant, work on this project has been stopped.

### **Energizer's management has both financial and geological experience**

Energizer has a management team with considerable experience in the resource sector, including management, financing and exploration. The company is one of four junior resource companies in a stable headed by Energizer's chairman and chief executive officer, Kirk McKinnon. The three other companies in Mr McKinnon's group are MacDonald Mines Exploration Ltd, a metals exploration company focused on the McFaulds Lake region of Ontario; Red Pine Exploration Inc, a gold exploration company focused on Ontario; and HoneyBadger Exploration Inc, a copper and gold exploration company focused on Nevada.

Management believes that running four companies creates synergies that allow them to employ larger numbers of staff, with greater experience than would normally be the case with a single entity.

In addition to Mr McKinnon, Energizer's management team is led by President and Chief Operating Officer, Julie Lee Hars, who has extensive international corporate experience in the mining sector. Most recently, she was Senior Vice President, General Counsel and Corporate Secretary of Sherritt International Corporation, previous to which she was Associate General Counsel and Assistant Secretary of Inco Limited (now Vale Inco). Craig Scherba, P.Geol. is Vice-President Exploration who leads the Green Giant project, and Richard Schler, Energizer's Chief Financial Officer and Brent Nykolation, Vice-President, Business Development.

# Valuation

## Our valuation approach

We have valued Energizer based on assessing the economic potential of the company's primary focus, the Green Giant vanadium project in Madagascar. In so doing we have accounted for: the likelihood that a significantly larger economic resource than currently delineated will ultimately be proven; the likelihood that feasibility will be established after considering metallurgical, social and permit issues etc; and the likely economics if actual mining were to occur, considering parameters such as tax, operating costs, revenues etc.

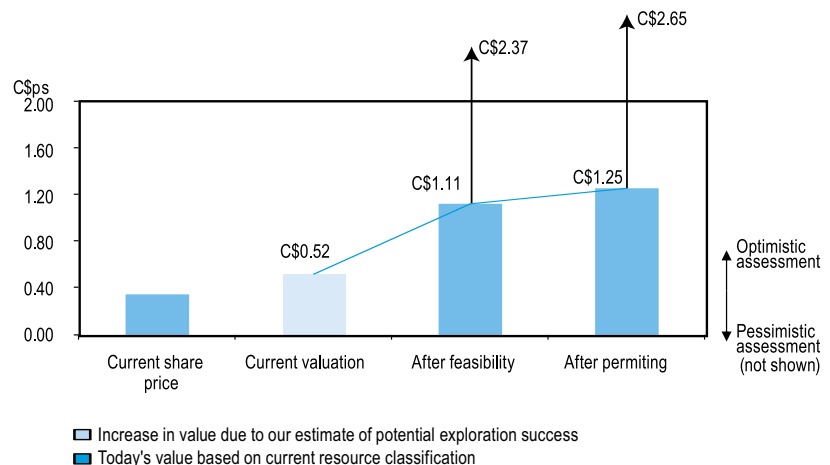
One of the key issues that any mining analysis must consider is the problem posed by the dependence of our assessment on commodity prices. This issue takes two forms – what will be the price environment when mining eventually occurs; and the operating dynamics in response to changing mining prices.

From a valuation perspective, the aspect of operational dynamics that is of interest is the ability to “mothball” operations during periods when the commodity price is below the marginal cost of extraction. This creates what is frequently referred to as “optionality” – something that traditional net present value (NPV) fails to capture. Intuitively this can most easily be understood by thinking of NPV as assuming that positive and negative deviations from our base-case have a similar likelihood of occurring and hence balance each other – however, in mining, the downside is capped at the cost of “mothballing” the site.

We capture these aspects by valuing each year's production as an option assuming that prices revert to mean over the long run – that is, the mine will only operate if the commodity price is above the extraction cost. In essence, rather than valuing that year's production as we would in an NPV model as the discounted value of the cash flow estimated using the base case for the commodity price we value the probability that the price is above the extraction cost.

In valuing the economic potential of resource projects, we assume that while commodity prices are volatile they return to an inflation-adjusted, long-run mean. For example,  $V_2O_5$ , has historically traded at approximately US\$7.40 per pound in current dollars since the early 1950s, with deviations from mean normally correcting over 2.3 years with a volatility of 45%.

## What Energizer Resources Inc could be worth - now and in the future



Source: Objective Capital



## Fair value summary (US\$m)

Scenario	Base	Pessimistic	Optimistic
Property portfolio			
- Green Giant	72.1	(9.2)	173.4
- other	2.0	2.0	2.0
Total	74.1	(7.2)	175.4
Less: overhead	5.9	5.9	5.9
<b>Expected value of portfolio</b>	<b>68.1</b>	<b>(13.1)</b>	<b>169.5</b>
Add: other investments	0.0	0.0	0.0
Add: starting cash + new funds	1.3	1.3	1.3
Total current value for firm	69.4	(11.8)	170.8
Less: bank & other debt	0.0	0.0	0.0
Total value to equity claims	69.4	(11.8)	170.8
Less: warrants	12.8	0.0	40.9
Ordinary equity holders	56.6	(11.8)	129.8
Value per share (US\$)	<b>0.51</b>	<b>(0.11)</b>	<b>1.17</b>
Value per share (C\$)	<b>0.52</b>	<b>(0.11)</b>	<b>1.18</b>

## Expected fair value of Energer Resources Inc

Scenario	Risked mineable resources (m tonnes)	Green Giant property value (US\$m)	Energizer Valuation (US\$m)	Value per share (US\$)	Value per share (C\$)
<b>Base case outlook</b>	<b>37.3</b>	<b>72.1</b>	<b>56.6</b>	<b>0.51</b>	<b>0.52</b>
<b>Value for scenarios of further exploration success</b>					
Full proved up	50.5	416.1	301.9	2.73	2.75
Optimistic outlook	46.2	173.4	129.8	1.17	1.18
Pessimistic outlook	24.7	(9.2)	(11.8)	(0.11)	(0.11)
<b>Value with no further exploration success</b>					
Current resource estimate	20.6	(26.0)	(28.7)	(0.26)	(0.26)

### Notes:

- 'fully proven up' scenario assumes that current mineable resource estimates are upgraded to 'Proven' status
- for further details see Green Giant property section

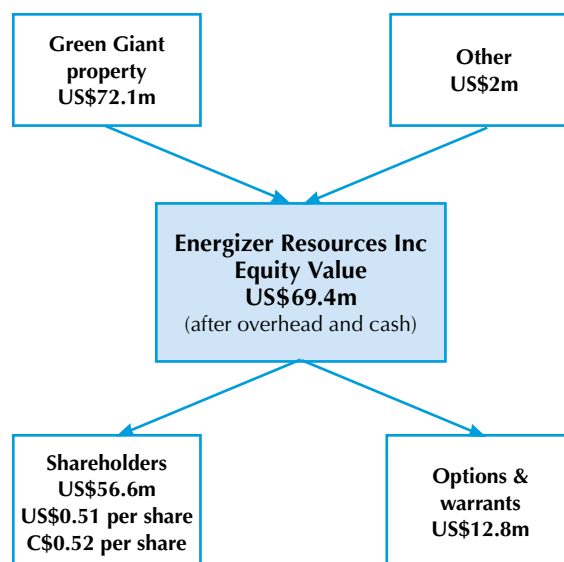
## Sensitivities to market assumptions on ...

Long run real vanadium price (US\$/lb)	3.40	5.40	<b>7.40</b>	9.40	11.40	
Value (C\$/share)	-0.26	-0.12	<b>0.52</b>	1.06	1.59	
Change in value (%)	-151%	-123%		+105%	+208%	
Time for vanadium price to revert to mean (years)		0	1	2	3	4
Value (C\$/share)		0.37	0.45	<b>0.52</b>	0.58	0.64
Change in value (%)		-27%	-13%		+12%	+24%
Volatility of vanadium price (%)	40%	<b>45%</b>	50%	55%	60%	
Value (C\$/share)	0.48	<b>0.52</b>	0.56	0.60	0.65	
Change in value (%)	-7%		+8%	+17%	+27%	
Interest rate (%)	2.4%	2.5%	<b>2.6%</b>	2.7%	2.8%	
Value (C\$/share)	0.55	0.53	<b>0.52</b>	0.50	0.49	
Change in value (%)	+6%	+3%		-3%	-6%	
Sovereign risk premium (years)	0.0%	2.5%	<b>5.0%</b>	7.5%	10.0%	
Value (C\$/share)	1.60	0.95	<b>0.52</b>	0.21	-0.04	
Change in value (%)	+210%	+85%		-60%	-107%	

## Sensitivities to assumptions on ...

Change in vanadium recovery rate (%)	76%	78%	<b>80%</b>	82%	84%
Value (C\$/share)	0.41	0.46	<b>0.52</b>	0.57	0.62
Change in value (%)	-20%	-10%		+10%	+20%
Operating Costs (US per milled tonne)	30.88	<b>32.50</b>	34.13	35.75	37.38
Value (C\$/share)	0.55	<b>0.52</b>	0.48	0.45	0.41
Change in value (%)	+7%		-7%	-13%	-20%
Increase in Capital Cost (%)	<b>-10%</b>	+0%	+10%	+20%	+30%
Value (C\$/share)	<b>0.59</b>	0.52	0.44	0.37	0.29
Change in value (%)	+14%		-14%	-29%	-44%

## Components of Energer Resources Inc's entity value



## Green Giant valuation (US\$m)

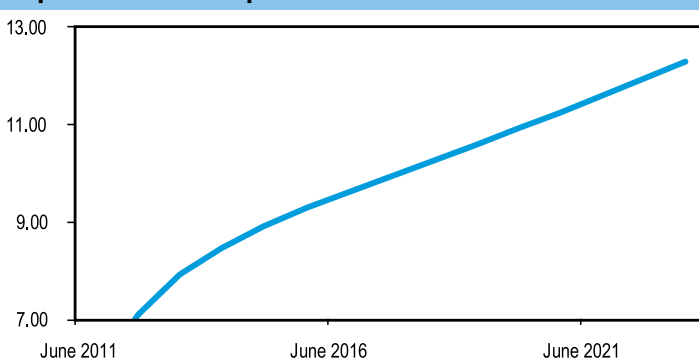
Scenarios for exploration success	Base	Optimistic	Pessimistic
<b>Net value of production</b>	<b>1,299.7</b>	1,299.7	1,299.7
Expected mining success*	<b>33%</b>	50%	20%
<b>Expected net value of production</b>	<b>434.5</b>	651.1	260.9
Add: tax shield on depreciation charge	<b>29.8</b>	29.8	29.8
Less: development & operational capex	<b>254.7</b>	254.7	254.7
<b>Value of mining operations</b>	<b>209.6</b>	426.2	36.0
Probability of reaching mine development	<b>47%</b>	47%	47%
<b>Expected value of deposit</b>	<b>98.1</b>	199.5	16.8
Less:			
- expect pre-development costs**	<b>3.6</b>	3.6	3.6
- further exploration costs ***	<b>22.5</b>	22.5	22.5
Expected value of project	<b>72.1</b>	173.4	(9.2)
effective risk haircut	<b>91%</b>	81%	98%
Ownership	<b>100%</b>	100%	100%
Energizer Resources Inc's share	<b>72.1</b>	173.4	(9.2)

- \* portion of reserve/resource expected to be converted to a mineable resource, probability-weighted for our confidence they will be proven-up
- \*\* shown as expected value of being incurred after allowing for likelihood of reaching each development stage
- \*\*\* present value

## Commodity market assumptions

Vanadium prices are mean reverting	
Long run level	7.40 US\$/lb
Avg time to revert	2.3 years
Volatility	45%
Inflationary price growth	2.5%

## Expected vanadium price (US\$/lb)



## Our key assumptions

We have modelled Energizer's Green Giant Project based on the following key assumptions:

- The property contains a currently delineated indicated and inferred resource totalling 59.2 million tonnes, averaging 0.683% V<sub>2</sub>O<sub>5</sub>. In addition we hypothesise an additional total of 11 million tonnes of vanadium mineralisation, averaging 0.6% V<sub>2</sub>O<sub>5</sub>, will be added to this resource. Our analysis assumes that further exploration will convert this combined amount to a mineable resource of some 56.2 million tonnes or, after allowing for the confidence level of each resource category, 37.9 million tonnes on a risk adjusted basis.
- Assuming continued project development, we have modelled that mining will commence in the third quarter of calendar 2014 with a milling capacity of 7,500 tonnes per day. We assume capital expenditures will begin in late 2012, with a total capital cost of approximately US\$350m over the following 21 months.
- We assume the mine development will be a standalone operation. There is significant upside potential to reduce capital costs significantly by sharing certain infrastructure costs – notably power generation – with the Sakoa coal mine. In this case, the timing of the Sakoa project would then have a strong bearing on the timing of the Green Giant Project. For now, we have adopted the higher, conservative value for our model, pending word of development at Sakoa.
- We assume initial operating costs of US\$32.50 per tonne, escalating at a nominal rate of inflation thereafter. We assume a tax rate of 24%.
- Energizer's exploration of Green Giant is nearing completion but appropriate feasibility studies have not yet been undertaken. We have assumed typical success probabilities of 65%, 80% and 90% at the pre-feasibility, feasibility and permitting stages respectively.

## Our results

After allowing for likely economics, exploration potential and development risk our analysis suggests an expected value of US\$72.1m for the Green Giant vanadium project. We ascribe current nominal book values of US\$2.0m for the Sagar uranium property in Quebec.

After allowing for corporate overhead and outstanding warrants, our assessment of Energizer's ordinary equity results in a base case current valuation of US\$56.6m, or C\$0.52 per share, with an optimistic current valuation of C\$1.18 per share, assuming higher probabilities of development success. Our analysis suggests that Energizer's current value is based largely on the potential for further resource delineation and mine development at Green Giant. Should there be no further, or limited success, then the current level of risked resources may not be sufficient to justify extraction. Alternately, if all available potential resources in the company's Green Giant Project were ultimately proven, they could yield up to C\$5.99 per share.

Our base-case and optimistic outlooks, assuming success at all stages through permitting, result in valuations of C\$1.25 and C\$2.65 per share respectively. Delineation of additional resources beyond our hypothesised estimates could add significantly to these estimates.

Energizer's Green Giant vanadium project in Madagascar offers good potential for exploration and development success as the project advances. The preliminary formal resource calculation is very promising and it may be possible to complete a pre-feasibility study following completion of the 2010 exploration programme. As a result, much of the company's value will depend on the ability of Energizer to delineate large quantities of mineralisation with sufficient grade to support the calculation of a mineral resource to NI 43-101 standards, and then to demonstrate economic viability through formal economic assessment.

### **Energizer's success depends on ...**

#### **... the company delineating a sufficient resource to support mining at Green Giant**

Energizer has identified vanadium mineralisation over a significant strike length at Green Giant, but the company has only delineated a formal resource to NI 43-101 standards on a portion of the deposit. The present exploration is aimed at discovering the mineralisation as it extends to the north and south of the deposit already delineated. The known indicated and inferred deposit lies on approximately 25% of the strike length occurring on the property and 75% of the strike length has yet to be trenched, drilled and evaluated. We base our valuation of Energizer on the reasonable assumption that the company will successfully delineate a significant tonnage at Green Giant, and on the likelihood that its assays will show a grade of ore amenable to economic treatment. Failure to achieve minimum tonnage, grade targets and an economic processing method could render the deposit uneconomic.

#### **... the vanadium and steel markets recovering from the global recession**

The price of vanadium pentoxide has experienced a number of sharp increases over the past 50 years, followed by equally sudden corrections. The price is currently recovering from the latest of these violent cycles. Although the potential use of vanadium in batteries offers significant upside price potential, the price of vanadium remains strongly correlated with demand for steel. As a result, the future price of vanadium will depend heavily upon recovery from the global recession and the continuation of significant rates of growth in Asia, notably China and India.

#### **... step change in vanadium demand dependent on emerging technologies**

A step change in the size of the vanadium market is dependent on how quickly emerging technologies are adopted and in particular those related to battery technologies. The potential scale of Energizer's project, and the number of other projects on the horizon, mean that the growth in the electric car market and the take-up of lithium-vanadium battery technology critically underpins there being sufficient demand.

#### **... the company's ability to work effectively in a politically uncertain area**

The Green Giant Project will be subject to an uncertain political and economic climate in Madagascar. Although conditions have been improving, foreign companies investing large sums on capital projects continue to face significant risk.

#### **... the company's ability to demonstrate economic potential**

Energizer faces infrastructure issues with its Green Giant Project, and it could incur capital or operating costs in excess of our modelled values, should additional infrastructure be required.

#### **... the company's ability to raise further funds for exploration and development**

Energizer is a junior exploration company with limited access to capital and will need increasing and significant amounts of cash to fund its exploration programmes. In the longer term, the company may need capital to cover development costs at Green Giant, given continued exploration success. The need for further private placements of Energizer shares could result in significant dilution to shareholders.

### The early stages

Energizer is a developing mineral exploration corporation with a focus on the Green Giant vanadium project in Madagascar, which it hopes to develop over the next four years. The company has several other properties that have lesser priorities.

In the spring of 2006 the management of the company, led by Kirk McKinnon, gained control of an OTC Bulletin Board company, Yukon Resources Corp. At the time, the company was active exploring for gold and uranium in Northern Quebec, with uranium prospects in Arizona and Finland as well.

Given the uranium focus at the time, the management renamed the company Uranium Star early in 2007. Later that year, the company acquired the Green Giant property in Madagascar, which it believed favourable for hosting volcanogenic massive sulphide deposits. Energizer commenced drilling on the property in 2008. This work produced noteworthy assays of vanadium, prompting the change of focus and a new name as Energizer Resources.

The company initially acquired a 75-percent interest in late 2007 from Madagascar Minerals and Resources, for US\$0.76m, 1.25 million shares and 500,000 share-purchase warrants, exercisable at C\$1 per share. In August 2009, Energizer acquired the remaining 25-percent interest for US\$100,000.

### **Energizer Resources in summer 2010**

In September 2009, Energizer formally applied for listing to the TSX Venture Exchange in Canada, and on 10 May 2010 it received approval, listing as 'EGZ'. Energizer maintains its OTCBB listing as 'ENZR', as well as its listing on the Frankfurt Exchange in Germany as 'YE5'.

As of 30 June 2010, Energizer has 110,511,024 shares issued and outstanding. As of 30 June 2010, Energizer had 13.6 million share purchase options outstanding, exercisable at between US\$0.15 and US\$0.40. As of 30 June 2010, the company had 31.9 million share purchase warrants outstanding, exercisable at prices between US\$0.10 and US\$0.58.

As of 30 June 2010, Energizer had US\$2.85m in current assets and US\$413,121 in current liabilities, for working capital of US\$2.42m.

## Characteristics and occurrence

Vanadium, named after the Norse goddess of fertility, is a soft, ductile, silvery-grey metal that displays good resistance to corrosion. A strategic metal with many applications, it is quite stable against sulphuric and hydrochloric acids, and against alkalis. Vanadium oxidises in air, but the formation of a surface oxidised coating protects the metal against further oxidation. The oxidation process is most pronounced at temperatures above 650C, but surface oxidation will occur even at room temperatures.

Pure vanadium metal has a density of 6.0 grams per cubic centimetre and melts at 1,910C. Vanadium occurs naturally in at least 60 minerals, and in fossil-fuel deposits, but the metallic form does not occur naturally in nature. Vanadium-bearing magnetite, which occurs in ultramafic gabbro bodies, is the most common economic source of vanadium.

Vanadium requires special precautions when handling the metal and its compounds.

## Traditional demand

Until recently, approximately 87 percent of the available vanadium has been used to produce steel and other metal alloys. This 'traditional' demand is expected to grow at about 6% to 7% per year.

## Future demand – Vanadium Batteries are leading the charge

The demand for vanadium is forecast to increase significantly during the decade 2010 – 2019 as vanadium also has an electro-chemical use. The most important of these is in batteries where it has several advantages over lithium and other materials.

Much of the future use of vanadium will be in Vanadium Redox flow batteries which operate on an electrochemical couple based on two different reactions of vanadium ions in acidic aqueous solution. This is made possible because vanadium ions are stable in an unusually high number of valence states: vanadium can be found in +2, +3, +4, and +5 valence states. All four of these valence states are used in vanadium redox batteries. This property is unique to vanadium.

Vanadium Redox flow batteries have an advantage over other flow batteries because the positive and negative electrolytes, in their discharged states, are identical. This makes shipment and storage simple and inexpensive, and greatly simplifies electrolyte management during operation. Further, since the active species in both electrolytes are the same, there is no question of ions from one electrolyte diffusing into and contaminating the other.

Vanadium batteries self-discharge at lower rates than do lithium batteries and have a potential lifespan an order of magnitude longer than lithium batteries. Their disadvantage lies in their size but for purposes such as storage of power from solar panels and windmills and use in power levelling in 'smart grid' applications they are ideal. The capability of these batteries to achieve full load discharge within milliseconds is a key advantage in these applications.

**Fact:** The US Department of Energy (DOE) is funding tests for the Painesville, Ohio, Municipal Power Vanadium Redox Battery Demonstration Program to demonstrate a 1 MW vanadium redox battery (VRB) storage system at the 32 MW municipal coal fired power plant in Painesville. The project will provide operating data and experience to help the plant maintain its daily power output requirement more efficiently while reducing its carbon footprint. The value of this project is US\$7.487m.

Evidence of vanadium's future in the electric revolution is clear. The largest of these storage batteries currently being manufactured in Germany by Gildemeister, a company which recently bought Austrian manufacturer Cellstrom, requires 5 tonnes of vanadium metal for the production of electrolyte. Its CellCube series of batteries presently ranges in capacity from 10 to 200Kw.

Cellstrom is one of several manufacturers in Europe, North America (Prudent<sup>2</sup>, Ashlawn Energy), Australia (VFuel Pty. Ltd.), Japan (Sumitomo), Thailand (Cellennium), and China (Prudent – Qingdao Wuxiao – GEFC), tooling up for production of redox batteries to meet market demand for flow battery grid applications.

A research institute in Germany is also developing redox batteries to power electric vehicles. These will offer the facility to change discharged liquid vanadium electrolyte with charged vanadium electrolyte simply by draining and refilling the battery in the same way as refuelling a vehicle with gasoline. This application will remove the need for electric vehicles to be off road for several hours of battery recharging.

Vanadium used as a cathode material in lithium batteries extends the storage capacity of the battery by between three and four times. In automotive applications this means the range of a car's travel may be extended from the present range of about 50km to possibly as high as 600km<sup>3</sup> before recharge is required.

CPM, a research consultancy, has conservatively projected that in Europe and North America one-quarter of all vanadium production will soon be required for chemical applications, almost entirely for the manufacture of battery electrolyte and cathodes. This would represent a doubling of vanadium demand within the chemical industry.

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<sup>2</sup> Prudent was recently awarded a Global Cleantech 100 award for their VRFB technology

<sup>3</sup> DBM Energy have equipped an Audi EV with its vanadium lithium polymer battery and set a new long distance record for a regular electric car on a single charge of 603 km in test conditions.

Demand Potential (tonnes)								
Demand	2007	2008	2009	2010	2011	2012	2013	2014
Conventional	59,100	60,784	56,063	60,590	64,046	67,703	71,571	75,664
Automotive	0	0	0	236	4,637	7,303	10,492	14,369
Grid	0	0	0	303	707	1,515	3,030	6,060
<b>Total</b>	<b>59,100</b>	<b>60,784</b>	<b>56,063</b>	<b>61,128</b>	<b>69,390</b>	<b>76,520</b>	<b>85,093</b>	<b>96,094</b>
% increase			-7.76	9.03	13.52	10.27	11.2	12.92

Source: Vanadium, the supercharger. A Byron Capital Markets report.

According to CPM Strategies, annual demand for vanadium grew from 42,000 tonnes in 2001 to in excess of 65,000 tonnes in 2008. It anticipates a compound annual growth rate in demand of nearly 8 percent, through the combination of increased demand from the steel industry and growth in the battery sector.

### Vanadium and the electric car revolution

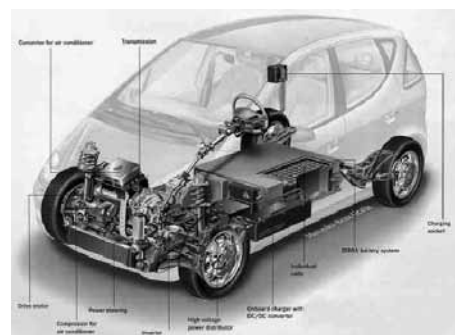
By 2020 the world population of cars is expected to number 1,100 million. In China, Japan, North America and Europe, the anticipated yearly sales of fully electric cars (Battery Electric Vehicles or BEVs) into these markets are projected to be 1.5m vehicles per annum. Other hybrid electric cars, including extended range vehicles and Hybrid BEVs are expected to have sales in the order of 11m units in 2020.

The vanadium/lithium car battery is known to provide the best range of all electric car batteries presently available. It should be noted that an electric car battery is composed of a cluster of smaller, linked batteries. Between 10 – 15 kg (22 - 33 lbs) of vanadium is required for each electric car's battery configuration.

If all the BEV's made in 2020 are powered by vanadium lithium batteries with an average of 12.5 kg per car the requirement for vanadium for BEV car battery manufacture will be in the order of 19,000 tonnes. However, hybrid cars also have batteries and it is also likely that a proportion of these cars will use vanadium lithium batteries. If only 10% (a modest estimate) of these cars use vanadium/lithium batteries, about 21,000 tonnes more vanadium will be required to manufacture these batteries.

Potentially this means that between 2014, when Energizer's vanadium operation is projected to start production, and 2020 the vanadium requirement for car battery manufacture could increase from 10,000tpa to over 40,000tpa. This does not take into account improvements in the redox battery system which may be made in vehicle applications. These would significantly increase the demand for vanadium.

### Concept of electric car



### The Dodge Zeo



### The Nissan programme

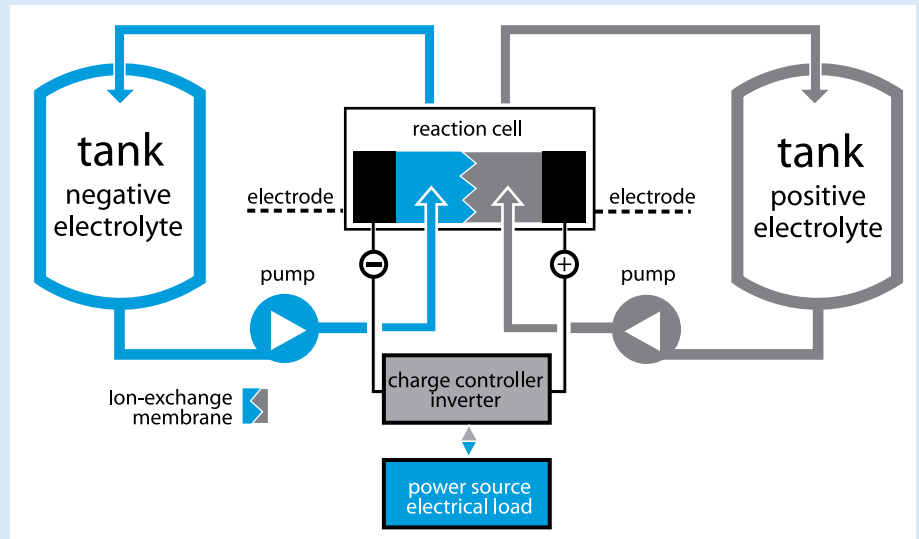


### Nissan's leaf



## The redox battery explained

### Schematic representation of a vanadium flow battery



A vanadium redox flow battery is a type of rechargeable battery in which the energy is stored chemically in liquid electrolytes. Unlike conventional batteries, that store all of their reactive materials within the cells, a flow battery stores the electrolytes in tanks. The electrolytes are pumped through the cells and back into the tanks when the battery is active.

The advantages of the redox system are:

1. **Scalability:** By increasing the number of single cells and the electrode area, you can increase the vanadium battery power. In a commercial demonstration in the US a vanadium battery has reached six megawatts.
2. **Large capacity:** By increasing the volume of electrolyte, an increase in the battery power up to gigawatt hours or more is achievable. Battery power can also be increased by increasing the concentration of electrolyte.
3. **Efficiency is high:** Vanadium battery charge and discharge energy conversion efficiency is up to 75% or more, far higher than the 45% of conventional batteries.
4. **Long life:** In Canada, VRB Power Systems, the longest running commercial demonstration of a vanadium battery module, has been running a system for more than 9 years with a charge-discharge cycle life of more than 18,000 times.
5. **Response speed:** The vanadium battery electrolyte can be switched instantaneously and the process of charging and discharging requires only 0.02 seconds to switch with a response time of 1 ms.
6. **High security:** Vanadium batteries have potentially no risk of explosion or fire.



## Supply

Vanadium production has been increasingly controlled by integrated steel conglomerates and diversified mining companies, but several new primary mining projects are forecast to contribute to the supply picture in the coming years. These companies are developing properties in countries traditionally overlooked by the vanadium market.

South Africa, China, and Russia are expected to expand their vanadium production capacities and China is expected to become the top producing country as medium-term concerns about electricity have impacted supply from South Africa, currently the largest vanadium-producing country. Some new mine and slag supply capacity is expected to start coming into production during 2011, which should mitigate the supply shortfalls and price volatility which the vanadium market has seen since 2003.

As the demand for quality steel in emerging economies increases, the need for vanadium is forecast to rise. Most demand for vanadium comes from the steel industry, where ferro-vanadium is alloyed with other elements to create multifunctional steels with strength, toughness, and wear resistance. These properties are especially important in high-strength, low-alloy (HSLA) steels, which are demanded by the energy, transport, and construction industries which need to maximise strength while minimising the weight of steel products. There is potential for growth in vanadium's other end-use industries including aerospace applications. Vanadium is also finding applications in battery manufacture, including its use in large capacity redox batteries.

It is likely that the outlook for vanadium prices is positive. With improved supply fewer shortfalls in supply are expected and this should correct prices from the record levels seen recently. After 2011 prices are likely to be volatile until 2015 as new mine production capacity for  $V_2O_5$  is brought on line at several planned mines.

Known world resources of vanadium exceed 60 million tonnes. Vanadium occurs in deposits of titaniferous magnetite, phosphate rock, and uraniferous sandstone and siltstone, in which it constitutes less than 2 percent of the host rock. Significant amounts are also present in bauxite and carboniferous materials, such as crude oil, coal, oil shale, and tar sands. Because vanadium is usually recovered as a by-product or co-product, demonstrated world resources of the element are not fully indicative of available supplies.

Just over one-half of the annual vanadium supply derives as a by-product from slag. Mining, either as a primary or secondary product, accounts for just under one-third of the annual supply, while recovery of vanadium from fly-ash and oil residue accounts for the remaining one-sixth of annual supply.

All of the vanadium produced from slag goes to the steel industry, as the product cannot be used in either titanium alloys, or in the manufacture of batteries. As a result, mined vanadium may become an increasingly important source of the metal in the future.

In 2008, China surpassed South Africa as the top source of vanadium and now supplies some 35 percent of global demand. This is mainly derived from the processing of slags. The world's second-largest producer of vanadium is Panzhihua New Steel and Vanadium (PNSV), a subsidiary of state-owned Panzhihua Iron and Steel Group, or Pangang, of Panzhihua. PNSV produces about 9,000 tonnes per year as a by-product from its steel making operations.

Vanadium in South Africa occurs in the Bushveld complex, which is the largest layered mafic intrusion in South Africa. In 2006 about 40 percent of total world vanadium production was mined from the Bushveld complex. The economically important Main Magnetite layer of the Bushveld varies from 1.0 to 2.5 metres in thickness and covers a strike length of 200 kilometres in the western section of the complex and 120 kilometres in the eastern Bushveld.

The Rhovan mine of Xstrata Alloys was the primary vanadium producer situated on the western lobe of the Bushveld complex, 35 kilometres east-northeast of Rustenburg, South Africa. This mine is now owned by Evraz of Russia. The vanadium mineral resource and ore reserve of Rhovan was reported by Xstrata Alloys in September 2007 as a reserve of 50 million tonnes of 0.51% vanadium pentoxide.

The mine produces about 10,000 tonnes of vanadium pentoxide per annum, along with 6,000 tonnes of ferrovanadium. In 2004/2005 the previous owner, Xstrata, increased production at Rhovan and Evraz is apparently continuing with plans to increase production by an additional 4,100 tonnes per year. This increase should be achieved by 2011.

Vantech Vanadium Products bought some of the assets of Highveld Steel and Vanadium, including the Highveld Vanchem plant. This plant was at capacity for the project, roughly 8,000 tonnes per year of vanadium pentoxide.

Russia remains a leading producer of vanadium-bearing agglomerates, vanadium slag, vanadium pentoxide and ferrovanadium. Russian facilities recover vanadium from magnetite iron ores. There are four large facilities which produce the following:

- vanadium-bearing iron ore concentrate, pellets, and sinter - the Kachkanar Mining-Concentration Combine;
- vanadium pig iron and vanadium slag - Nizhny Tagil Metallurgical Combine;
- vanadium pig iron, vanadium slag, vanadium pentoxide, and ferrovanadium - Chusovoi Metallurgical Plant;
- vanadium oxide, ferrovanadium - the company Vanadium-Tulachermet.

Smaller production facilities are located at five different plants. The LSE quoted Russian owned Evraz company has now also bought mine capacity at Rhovan in South Africa.

Evraz Group claim to supply about 34 percent of the world's vanadium. With operations in the US, South Africa, Russia, the Czech Republic and Switzerland, it produces and markets 26,700 tonnes of vanadium metal equivalent per year which is about 50 percent of current demand.

## **Energizer – the one to watch**

The size of Energizer's deposit with its surface-proximate mineralisation will allow fast development of an operating mine. Metallurgical scoping work was completed in the fourth quarter of 2010 which will allow the company to start work on its feasibility studies. The objective will be to have a mine and treatment plant in operation by 2014. Energizer is not alone in its recognition of the opportunities for vanadium but is well placed with the potential scale of its deposit to be a strategic player in the market.

Energizer's product will be high quality vanadium pentoxide which is readily processed into battery electrolyte. There are other projects in progress but these will produce the 'traditional' ferrovandium, best suited for production of vanadium steels.

In Australia there are three ferrovandium projects. A past producer, Windimurra, is under consideration to be reopened in Western Australia. It could produce an estimated 5,700 tonnes of ferrovandium per year. Windimurra expects the vanadium market to grow at only 7.8 percent per annum, compounded between now and 2015.

Reed Mining's Barrambie magnetite mine near Port Headland will produce an estimated 7,700 tonnes of ferrovandium per year. Aurox's Balla Balla mine in Western Australia will produce 4,700 tonnes of ferrovandium per year. Both Reed and Aurox have take-off agreements in place with Chinese companies. These three projects are likely to come into production in 2011 and 2012. When all are producing they may together put a further 18,000 tonnes of ferrovandium into the market on an annual basis.

## **Pricing**

The price of vanadium is typically quoted in US\$ per pound for vanadium pentoxide. Although some sources quote prices in US\$ per metric tonne, the two prices are comparable, given that one metric tonne of vanadium derives from 3,950 pounds of vanadium pentoxide.

The long-term price chart for vanadium displays a classic spike-crash cycle. One pound of vanadium pentoxide sold for US\$1.30 in 2001, but spiked as high as US\$26.25 in March 2005. Early in 2009, the price collapsed below US\$4 per pound, but it has since recovered to US\$7 per pound.

Although the 2008 spike has been the greatest in real terms, other noteworthy spikes occurred in 1971, when the inflation-adjusted price averaged US\$15 per pound, and in 1989, when it topped US\$10 per pound in current dollars. Another noteworthy crash occurred in 1993, when the price averaged US\$2 per pound in current dollars.

We model the price of vanadium pentoxide over a 50-year period as averaging US\$7.40 per pound, with a volatility of 40 percent and a mean time to revert of 2.30 years. As a result, the projected price beyond the immediate short term is heavily influenced by the long-term, inflation-adjusted price.

Although high prices trigger increases in supply, resulting in rapid returns to lower prices, a significant amount of the available supply requires vanadium pentoxide prices above the US\$6 to US\$8 range. As a result, there is considerable support for the long-term real price average of US\$7.40 per pound. Further, there could be significant upside potential should the use of vanadium in batteries increase as projected.

If uses in new technologies do lead to a step change in vanadium demand there is the potential that we may see a structural change in the way the vanadium market operates. We would anticipate that this will be in both customers' sensitivity to price levels and security of supply. Such a change might lead to the long term average price being different from previous periods.

We have modelled this by considering two alternative scenarios for the medium term outlook for the market:

### **Scenario 1: Significant step change in demand due to “new” uses**

In this Scenario, we hypothesise that there is a rapid take-up of electric cars and other new technologies using vanadium leading to a significant step change in the size of the market. This would necessitate both increased supply but also lower and more stable prices. We would expect this environment to lead to new mines entering production and industry to seek security by making off-take agreements directly with mine operators.

We expect this to lead to a “maturing” of the market characterised by long run average prices at the lower end of the historic range but with considerably lower volatility. However, this would allow a considerable increase in the production rate that could be accommodated at Energizer’s project.

### **Scenario 2: Strong demand from “new” uses**

In this Scenario, we hypothesise that there is a strong increase in demand for vanadium from new technologies. However, it is not sufficient to crystallise a structural change in the supply side and the market is characterised by even greater price instability but higher long run prices.

There is a real possibility that the price of vanadium could drop to US\$5.00 per pound. At this price, the project would be unlikely to go forward given the risks involved in progressing from its current state of development.

#### **Vanadium market assumptions by scenario:**

<b>Scenario</b>	<b>Production Tonnes per day</b>	<b>Price US\$</b>	<b>Volatility %</b>	<b>Time to revert years</b>	<b>Valuation</b>
Base case	7,500	7.40	45	2.3	C\$0.52 ps
1. Step change in market size	25,000	5.00	20	2.3	C\$0.40 ps
2. Significant niche new technology uses	7,500	10.00	50	3.0	C\$1.34 ps

## Vanadium – a growing list of emerging vanadium exploration and mining projects:

**Energizer Resources Inc. (formerly Uranium Star Corp.) (TSX-V: EGZ, OTCBB: ENZR, FRANKFURT: YE5).** Energizer has completed and filed a NI 43-101-compliant technical report for the explored portion of its Green Giant Vanadium Project in Madagascar. This confirms that the exploration programmes completed in 2008 and 2009 established that at least two large-scale, vanadium deposits exist on the Green Giant Property. Energizer is now conducting an aggressive resource definition exploration programme consisting of exploratory and infill diamond drilling over vanadium-bearing zones. A 2010 drilling programme planned to start in May will focus on expanding the Manga zone over a strike length of 3,000 metres.

**Argex Silver Capital Inc. (TSX-V: RGX).** Argex is exploring the large La Blanche Titanium-Vanadium deposit. This is a near surface occurrence amenable to open pit mining and has an historic (non NI 43-101 compliant as numbers predate current rules) tonnage of 20.5% Titanium dioxide, 48% Fe, 0.36% Vanadium. Drilling is underway to determine a compliant resource and tonnage. The company is also building a pilot small-scale processing facility to be completed later in 2010 to test the metallurgical technology.

**Reed Resources (ASX: RDR).** Reed has completed a Definitive Feasibility Study of the Barrambie vanadium deposit which is located 80 km north of Sandstone, Western Australia. The study was prepared during the past two years and cost some A\$15 million, including 55,000 metres of drilling. A high grade resource of 0.82%  $V_2O_5$  has been confirmed with Indicated and Inferred Resources of 65Mt of vanadium ore. A minimum of 12 years mine life at throughput of 3.2 Mt per annum is projected at a capital cost estimated at A\$628.9 million and a total operating cost of less than US\$20/kg vanadium. Reed is currently assessing project financing options for the project.

**Quest Minerals (ASX: QNL).** Quest has a 100% interest in the Victory Bore, an early stage exploration magnetite-vanadium project, south of Sandstone, in Western Australia's mid west region.

The company has been successful in delineating a series of magnetite lenses within a layered metagabbro intrusive at the deposit. This type of host is similar to the deposits at Balla Balla and Windimurra. The vanadium mineralisation at Victory Bore includes a drilling result of 66m at 0.57%  $V_2O_5$ . Historic and recent drilling data, and an independent aeromagnetic interpretation, have indicated the presence of an Exploration Target of 200 million tonnes to 250 million tonnes of magnetite bearing iron ore with grades ranging from 22% to 30% Fe, 0.4% to 0.7%  $V_2O_5$  and 6% to 8%  $TiO_2$ .

**Aurox Resources Limited (ASX: AXO).** The company is a Perth-based junior explorer and has negotiated an option to buy the Balla Balla vanadium-titanium-iron ore project located less than 10 kilometres from roads, gas and power supplies midway between Karratha and Port Hedland in the North West of Western Australia. The project, which has inferred resources of 117m tonnes grading around 0.7% vanadium-pentoxide, has the potential to readily produce 6,800 tonnes of ferro-vanadium (FeV) per annum over a 20 year mine life. The project is planned to be developed during the next three years.

**Mineral Resources Ltd (ASX: MRL).** On April 9th 2010 MRL finalised an agreement with Atlantic Ltd (ASX: ATI) in which the two companies will work together as a consortium to acquire, complete construction and commission the Windimurra vanadium project in the southern Murchison mineral field of Western Australia. Windimurra, a remote Western Australian vanadium project, is located 600km north-east of Perth. After a series of corporate ownership changes it is now appears on track for production. Capital of between A\$90-A\$100 million will be required to complete construction and commissioning. The site is close to the gold mining centre of Mount Magnet and is reputed to be one of the world's largest vanadium deposits. The mineral data base group Intierra Resource Intelligence says Windimurra has a proven and probable 97.8 million tonnes grading 0.47%  $V_2O_5$  and a measured and indicated 78.7 Mt @ 0.453%  $V_2O_5$ .

**Largo Resources (TSX-V: LGO).** Largo is developing the world-class Maracas Vanadium-PGM deposit in Brazil. The company is at an advanced stage of project development with initial production targeted for Q1 2011. The deposit contains 22.5 MT of ore grading 1.26%  $V_2O_5$  (a NI 43-101 Measured & Indicated Resource) and 13.1 MT grading 1.34%  $V_2O_5$  (a NI 43-101 Proven & Probable Mineral Reserve). The first 8 years of production will provide a mill feed average of 1.94%  $V_2O_5$ . The deposit represents 155 Million lbs of potential FeV (circa US\$5 billion in gross metal value). Projected mine life is 23 years.

**Appella Resources Inc. (TSX-V: APA).** Based in Canada, Appella has two advanced stage exploration projects underway in Quebec. The indicative resource of the Lac Dore project located on the Bell River Complex a, large layered Achaean intrusion, is now being prepared although some issues related to the staking of claims on the property remain to be resolved. Drilling on the property has shown grades of  $V_2O_5$  varying from 0.2% to 1.0%. A second property, Iron T is still undergoing very early stage exploration.

## **Mining in Madagascar**

The Republic of Madagascar is an island nation off the south-eastern coast of Africa, previously known as the Malagasy Republic. A colony of France, Madagascar experienced a violent uprising in 1947 in which nearly 100,000 people died. The country achieved full independence from France in 1960.

Like most of Africa, Madagascar has had its share of political turmoil over the past 50 years. A coup followed an assassination in 1975 and Madagascar cut all ties with France and moved toward a communist economy. That move failed miserably and a decade later, the country began a gradual return to a market economy.

Madagascar has continued to move toward a freer market economy in recent years, although not without continuing political strife, including an attempted coup in 2006. Early in 2009, the army forced the resignation of Madagascar's president, installing an opposition leader in his place. The European Union and most other countries have refused to recognise the move, as it came about by violent means.

Madagascar is a poor country, with a per-capita gross domestic product of just under US\$1,000 according to the International Monetary Fund, in 2008. This ranked Madagascar behind Guinea, Rwanda and Mali, and just ahead of Ethiopia, Mozambique and Malawi.

Agriculture is the most important sector economically, accounting for over one-third of the country's GDP. Mining has accounted for just a small fraction of Madagascar's economy, primarily because of the country's erratic commitment to a free-market economy and economic reforms.

Nevertheless, the impact of mining and mineral exploration is growing. Mining of ilmenite contributes to the economy, and several development projects are under way. Projects include a coal development at Sakoa, a nickel project at Tamatave, and several petroleum developments.

Several mining majors are making substantial investments in Madagascar. Rio Tinto plc has spent US\$850m on its Mineral Sands project and commenced shipping titanium earlier this year. Sherritt International Corp, Sumitomo Corp and Korea Resources Corp are committed to spending US\$4.5bn on their Ambatovy nickel project. Mechanical completion is now expected to be achieved during Q1 2011.

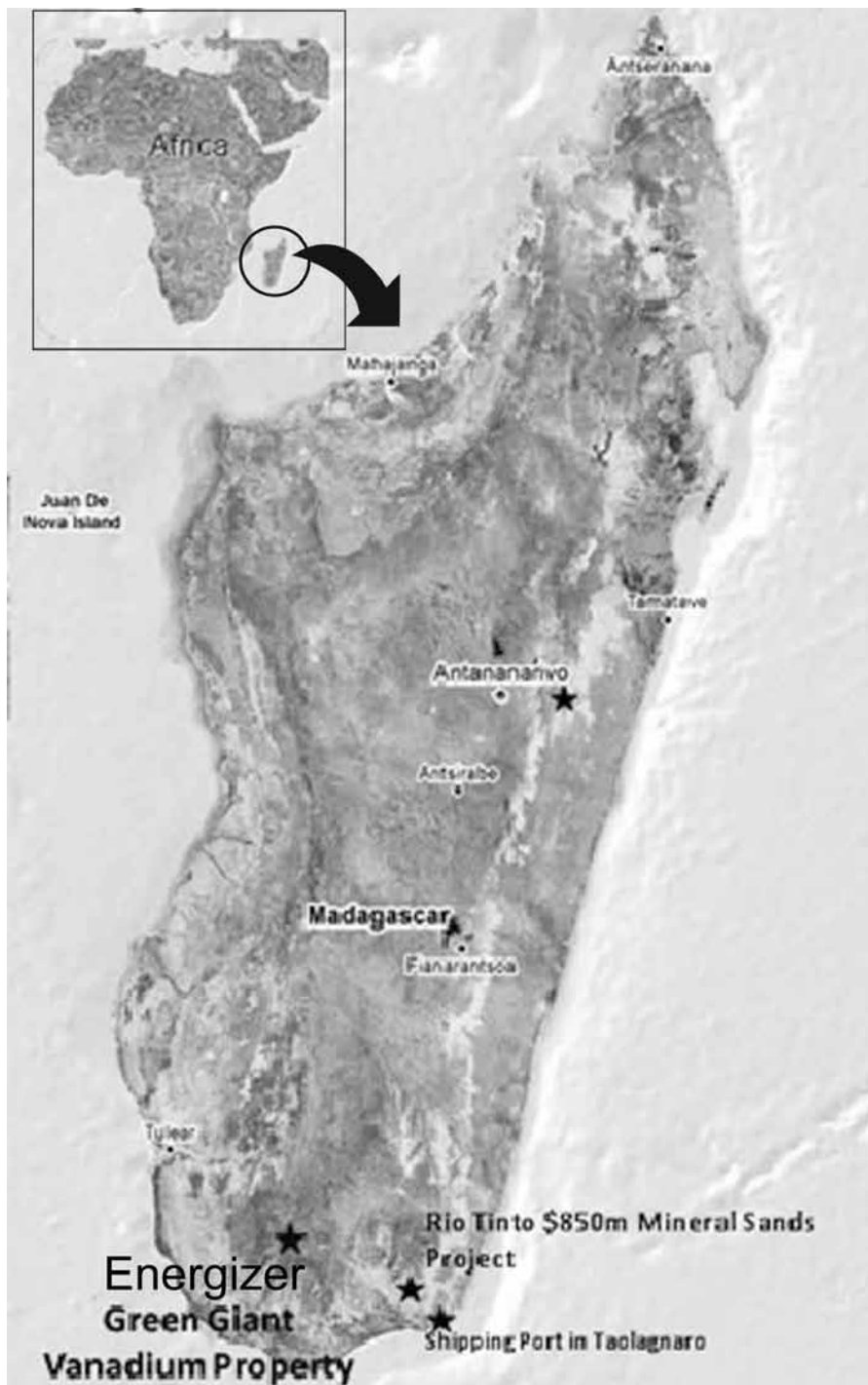
Foreign investment by junior exploration companies has increased significantly over the past decade. Canadian-listed companies exploring in Madagascar include Sunridge Gold Corp, Niko Resources Ltd, Candax Energy Inc, and Tantalus Rare Earths AG of Germany.

Until recently mining in Madagascar was largely confined to artisanal operations focused on the recovery of alluvial gemstones and gold. This continues but is unlikely to affect the Green Giant Project.

In south-central Madagascar, Energizer has interests in two properties, located in the Tulear region. The first is the Green Giant property, on which the company's Green Giant vanadium prospect is located. The second is the Ianapera property, not far from Green Giant, which has coal, gold and base metals prospectivity.

In Quebec the company has the Sagar property, 190 kilometres north-northwest of Schefferville in Nunavik, and the Federber property located 175 kilometres north-northwest of Schefferville, also in the Nunavik region. Both of these properties are prospective for uranium, gold, copper, unconformity polymetallic uranium, and IOCG deposits.

### Location of Green Giant property, Madagascar



Source: Energizer Resources

The corporation is currently focused on bringing forward the Green Giant Project in Madagascar where a large vanadium trend has been quantified.

### **Green Giant project, Madagascar**

The Green Giant Project is located 145 kilometres southeast of the city of Toliara, in the Tulear region. The property comprises an area of 3,600km<sup>2</sup>, situated in two separate blocks. The coordinates are 24.01° South, 45.05° East, on map sheets H59 and H60.

#### **Property location and access**

The property is located in an area which has good access via a network of secondary seasonal roads radiating outward from the village of Fotadrevo. Fotadrevo in turn has access to a regional road system that leads to the regional capital of Toliara. The region and the property is characterised by a dry semi-desert climate subjected to seasonal cyclonic rainfall.

The Green Giant property's topography is ideal for mineral exploration. The area is covered by sparse vegetation with scattered termite mounds, especially over the Fotadrevo plateau. Grass cover is widespread and trees are sparse. The outcrop is fairly extensive and in areas of lower relief the alluvial cover is generally shallow with bedrock and float easily observable. The plateau of Fotadrevo composed of shallow iron-rich clay, overlays the east-central portion of the property. Elevations range between 500 and 550 metres above sea level.

The savanna-like terrain offers easy access using the seasonal roads. A licensed one-kilometre-long airstrip on the property can handle heavy aircraft. The Green Giant base camp, located in a low-density populated area just outside the village of Fotarevo, provides quarters, washrooms, showers and generated power for up to thirty people, allowing the Company's exploration team to remain comfortably on site for extended periods.

#### **Topography and climate**

Madagascar is divided into five climatic zones. The Green Giant property is in the South zone which is semi-desert, with elevated temperatures year round, peaking in the hot season at an average of 30C. The climate is dominated by south-eastern trade winds from the Indian Ocean anticyclone. Madagascar has two seasons: a hot, rainy season from December to March or April, and a cooler dry season from April or May through November. Total rainfall is sparse on the property, ranging from 30 to 50 centimetres per year. The rain causes difficulty in travel off the main highways.

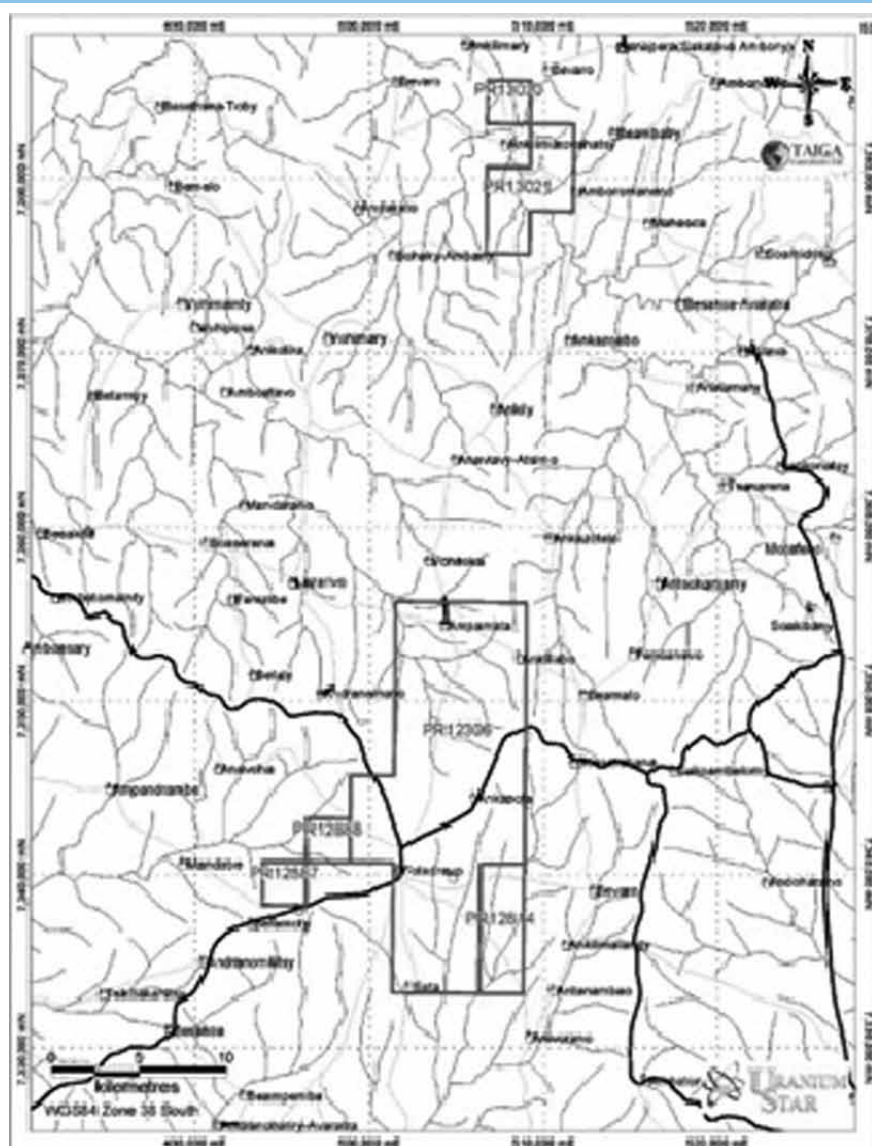


## Discovery

In September 2007, Energizer signed an agreement with Madagascar Minerals & Resources, a private land-holding company, to acquire a 75 percent interest in its 19,380-hectare Green Giant property in Madagascar, for payment of US\$765,000, 1.25 million shares and 500,000 share purchase warrants, exercisable at C\$1 per share for a period of 24 months from date of issuance. In 2009, Energizer acquired the remaining 3,120 hectares of the property and now holds 3,600km<sup>2</sup>.

Prior to the exploration work completed by Energizer Resources in 2007, there is no record of any previous mining or significant exploration activity within the Green Giant Project area. There is local evidence of minor, recent artisanal works and of small exploratory pits for gems and gold made by the local population.

### Green Giant property, Madagascar



Source: Energizer Resources

Immediately following the purchase, Energizer contracted an airborne electromagnetic-magnetometer survey on both Madagascar properties to obtain results before the end of 2007. A Taiga Consultants field team conducted geological mapping and geochemical work on several extensive outcrops of gossan mineralisation on the property. In 2008, Taiga confirmed the ground was very prospective for VMS deposits hosting gold, suggesting a trenching and drilling programme budgeted at US\$2.6m.

Detailed geologic mapping, prospecting and extensive soil and stream sediment geochemical surveys were conducted during the 2008 exploration programmes over targets identified from the 2007 airborne geophysical and reconnaissance geochemical surveys. Drill targets were established by examining a compiled data set for all geophysical, geochemical, and geological data.

Analytical results indicated geochemical associations common to VMS mineralisation, but when targets were drill tested, no significant VMS mineralisation was encountered. The high degree of ductile strain found over the Green Giant property is believed to have sheared any VMS mineralisation into long thin bodies of little significance. Geological mapping supports this conjecture, as trends interpreted as being associated with VMS mineralisation are related to narrow discontinuous gossans, or very narrow mineral enriched shears sub-parallel to lithological units.

The serendipitous discovery of potentially economic vanadium mineralisation on the property changed the course of the 2008 diamond drilling programme. Through a combination of prospecting and ground and airborne geophysics, five extensive vanadium-bearing trends were identified over the course of the 2008 exploration programme. The tenor of vanadium encountered in drill core coupled with the areal extent of vanadium-bearing trends, indicated the green Giant Property has the potential to host a significant vanadium deposit.

The vanadiferous trends on Green Giant are believed to have formed syngenetically in a paleo-roll-front environment, subsequently upgraded by early low temperature hydrothermal processes before being subjected to regional granulite facies metamorphism.

In late November 2008 the company announced the discovery of a second zone of potentially economic vanadium mineralisation within the southernmost portion of the property, 18 kilometres from the vanadium mineralisation occurring on the northern part of the property. The sample results from the southern area were similar to those in the north and indicated the presence of a second zone with strike length of 1,900 metres. Samples from this zone were sent for analysis.

By mid-December 2008, the company had identified a 21 kilometre main trend hosting significant amounts of vanadium on the property, and a second shorter vanadium trend located one kilometre west of the initial northern area of discovery. The 21-kilometre main trend was identified as a feature from land satellite imagery. Colour-depicted alteration trends using various spectral bands also indicated that the anomalous vanadium trend could be traced over the whole 21 kilometre length of the property. The airborne electromagnetic (AEM) survey flown in late 2007 displayed an obvious zone of low resistivity that was also extrapolated along the entire length of the property. Within this zone, the AEM survey defined dozens of high quality electromagnetic anomalies which were interpreted to be caused by graphite. The AEM survey was also able to clearly penetrate through a thin laterite cap located over a 2.5 kilometre extent of the vanadium trend in the west central portion of the property.

Drilling and subsequent X-ray fluorescence (XRF) analysis of selected core samples defined a third zone of potential mineralisation, located parallel to and approximately one kilometre west of the initial northern vanadium trend discovery.

Airborne radiometric data obtained from the Madagascar government using 500-metre line spacing indicated that the three vanadium trends have a well defined coincident, low level, radiometric signature. Ground radiometric surveys further confirmed and detailed the airborne anomalies. As with the northern area, field analysis indicated the presence of significant values of vanadium.

The vanadium mineralisation at Green Giant is hosted by graphitic quartzofeldspathic gneiss. Some of the better surface exposures are gossanous. Worldwide, few if any other vanadium occurrences show any analogy to the Green Giant deposits. Therefore, it is possible that Energizer has discovered a new variety of vanadium deposit. During the rainy season late in 2008, a short period when exploration is generally not possible, the company completed assay, mineralogical and preliminary metallurgical studies on the 2008 drill samples. Once the vanadium mineralisation was better understood, preliminary metallurgical work indicated that it was feasible to make potentially economic vanadium recoveries from the mineralisation and so obtained the encouragement to conduct further exploration on this rare style of vanadium deposit. During this down time the company imported more capable diamond drill equipment to conduct a more extensive and detailed exploration drilling campaign in 2009 once the rains ceased.

During the phase one exploration programme in Q2 2009, the company completed more geophysical and geochemical assessment, along with mechanical trenching over known areas of vanadium enrichment, and some new areas, defined by the soil XRF survey. The trenching programme tested the surficial extent of

the vanadium enriched trends delineated on the Green Giant property. The work completed consisted of a total of 8,168 metres of trenching, in 55 trenches crossing the strike of the known vanadium trends.

Currently Energizer's interpretation of the mineralisation is that of a series of lenses or "boudins" (French word for sausage) strung out along the full extent of the 21 km long main vanadium trend. The boudins are known to be up to a kilometre in length and have highly variable width from metre scale up to 100 metres. In essence, the mineralisation pinches and swells at a variety of scales. Each boudin constitutes a separate high grade vanadium occurrence separated from other boudins by lower grade intervening mineralisation. Some of these mineralised bodies are of sufficient size to represent individual, potentially, economic scale deposits. The boudins plunge in a variety of directions including south and north. The boudins may represent a series of plunging fold noses however not enough investigative work has been done to completely define their geologic structure. Of the two main deposits studied so far each boudin presents as a relatively uncomplicated mass of higher grade material that tails off to lower grade in the wall rock. There are no sharp cut off boundaries to mineralisation. At this time the bodies are defined by grade cut offs and typically form coherent cores which extend out to lower grade shells down to the 0.1 and 0.2% vanadium pentoxide level i.e. well beyond the level of apparent economic interest. Beyond these limits the bodies dissolve into scattered envelopes and wisps of lower grade material that have not yet been modelled. From a mining point of view this situation is ideal as any potential tonnage contribution from wallrock dilution would likely be at nearly a mining grade and hence such dilution would have little effect on the overall average grade.

The company has named the recently defined mineralised zones as follows: The **Jaky Zone**, the original vanadium deposit identified on the property, is located at the extreme south end of the main vanadium trend south of the village of Fotadrevo – adjacent to Energizer's exploration camp.

The Jaky target was traced in cross trenches over a strike length of 600 metres, with significant results, such as: 1.35% vanadium pentoxide over 24 metres, 0.96% vanadium pentoxide over 32 metres, 0.84% vanadium pentoxide over 60 metres and 0.83% vanadium pentoxide over 34 metres.

A total of 30 diamond drill holes totalling 4,509.2 metres were drilled at the Jaky target along 100-metre spaced section lines. Holes were spaced 70 metres apart, thus giving a 50 metre separation between drill hole traces. The drilling investigated an 800-metre strike length of the target. However, the western property limit of the Green Giant property restricted the complete investigation of the southern portion of the target.

The **Manga Zone** lies 10km north of Fotadrevo and immediately north of the laterite plateau which bisects the property.

The Manga target was traced in a series of cross trenches over a strike length of 4.6 kilometres and consists of a zone of variable grade and widths of mineralisation, with up to 0.706% vanadium pentoxide over the exposed width of 64 metres. During the subsequent diamond drilling the subsurface results were found to be considerably higher grade than those seen on the surface in trenching indicating that other modest targets located in other sections of the main vanadium trend may also have good potential.

A total of 70 diamond drill holes totalling 13,374 metres were drilled at the Manga target between 2008 and the end of the 2010 season. In 2010 drilling focused on evaluating the northward and southward extensions of the Manga Zone. (See the adjacent map.) Even with the further 2010 drilling the zone still remains open in the north and south along strike and at depth.

The Manga mineralisation appears to be a large funnel shaped lens dipping at 60-to-65 degrees west, plunging to the north, extending to at least 175 metres. The mineralised body has a central high grade core exceeding 0.8 percent vanadium pentoxide, surrounded by an envelope of lower grade material.

Drilling has confirmed there is an extensive stratified zone hosting the majority of the vanadium mineralisation on the property and that this zone is interpreted to pinch and swell along the entire strike length as well as up and down dip. The Jaky and the Manga Zones are the only targets which have to date been diamond drill tested in detail for vanadium.

In 2010 some XRF and field prospecting also revealed that a significant vanadium anomaly lies to the west of the present zones.

The **Mainty Zone** is two kilometres north of the Manga zone along the main vanadium trend. Significant vanadium was identified in trenches and in four drill holes completed in 2008. The Mainty target was traced in the summer of 2009 over a strike length of 1.2 kilometres in a series of cross trenches. The vanadium mineralisation at the Mainty target is quite variable, returning values up to 0.53 percent vanadium pentoxide over 62 metres, with narrow high grade zones up to 2.39 percent vanadium pentoxide over four metres.

One trench was dug across the main vanadium trend between the Manga and Mainty targets. The trench exposed vanadium mineralisation which graded 0.68 percent vanadium pentoxide over 18 metres. The Company believes this may indicate that additional vanadium mineralised boudins might occur along trend in areas not yet drilled.

The **Maitso Zone** is located about two kilometres west of the Manga deposit and is part of a second vanadium trend unrelated to the main trend. This zone has not been trenched or drilled but indications are that it is vanadiferous.

## Zones



Source: Energizer Resources

The **Fondrana Zone** is located at the extreme northwest corner of the property west of the main vanadium trend. At the Fondrana target graphite-rich sediment is prominent, and appears in a stratigraphic level unrelated to that of the main vanadium trend.

Two trenches at this target indicated possible encouraging results after XRF soil analysis but results from trench samples were disappointing. The Fondrana target appears to be a small lens with graphitic bands elevated in vanadium. The target will be examined in more detail later.

The September to December 2009 trenching programme consisted of:

**Plateaux:** One trench TR-09-056 (162 metres) investigated the southern possible strike extension of the vanadium mineralisation on the southern edge of the plateaux. There were no anomalous XRF values recorded and therefore there were no channel samples collected.

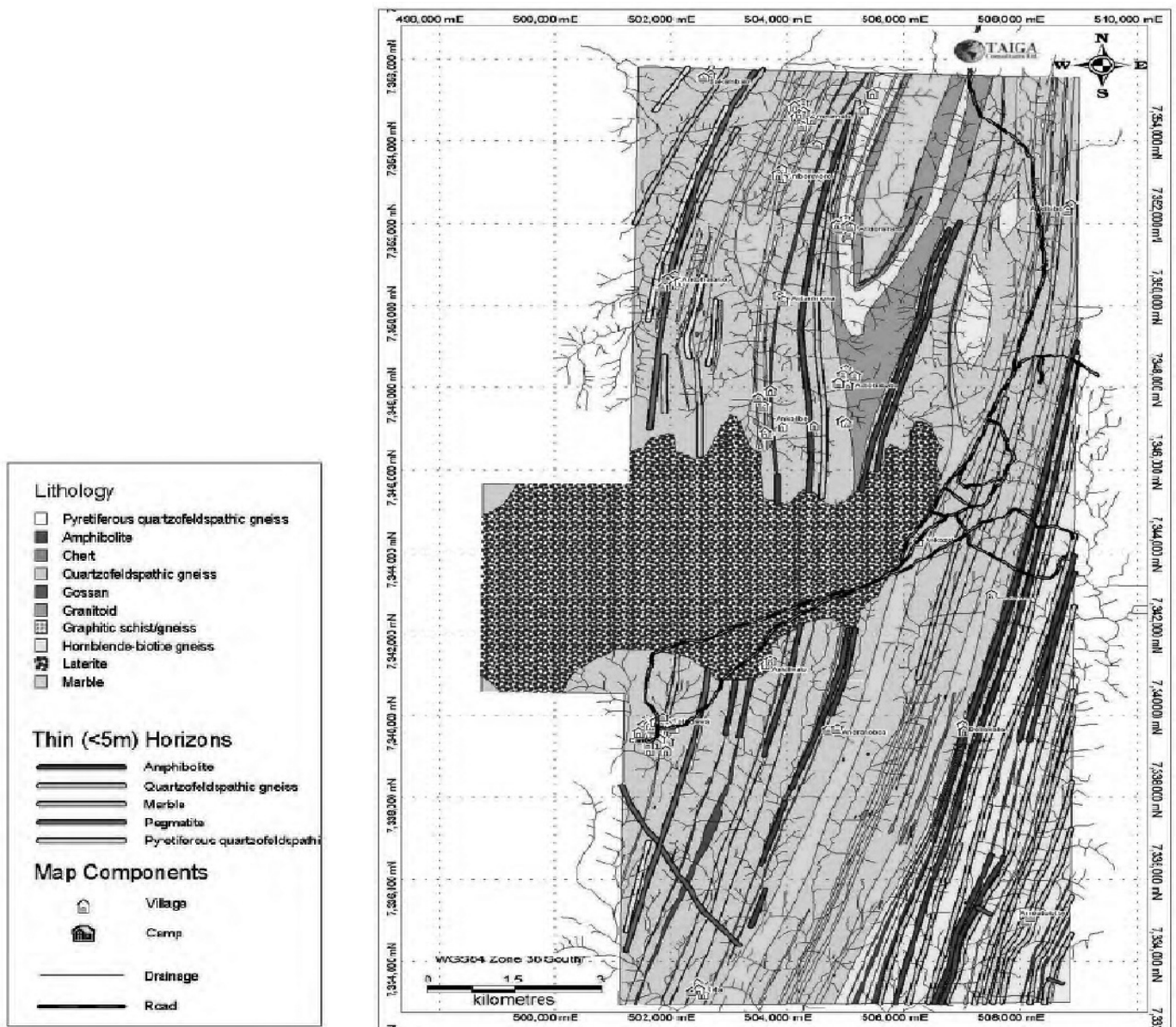
**Manga in-fill:** The southern portion of the Manga trend extending across the northern part of the plateau was investigated in early 2009 by one kilometre spaced trenches. Subsequently in-fill 200 metre spaced trenches (TR-09-057 to TR-09-064) were excavated over 1383 metres, tracing the Manga mineralisation southward across the central laterite plateaux as part of the September to December trenching programme. The vanadium mineralisation intersected by the trenching returned values up to 0.70%  $V_2O_5$  over 12 metres. The Manga mineralisation is quite variable in width and grade as the zone is traced southward. The Manga target remains open to the south, the southernmost trench returning an analytical value of 0.42%  $V_2O_5$  over 18 metres.

**EM airborne anomaly immediately East of the Manga Zone:** A strong EM anomaly paralleling the Manga zone was investigated by trenches TR-09-065 to TR-09-074 (776 metres). Elevated XRF values were recorded from only one trench, as a consequent only this trench was sampled (TR-09-068). Analytical results from the samples collected from this trench did not return any vanadium mineralisation. There is no further work recommended on this target.

**Radiometric anomaly immediately West and parallel to the Manga target:**

Trenches TR-09-075 to TR-09-078, TR-09-088 to TR-09-091, TR-09-101 to TR-09-103 and TR-113 to TR-09-117 were excavated along the trend of this radiometric anomaly (2124 metres). XRF surveying returned scattered spot XRF vanadium highs (best value 0.583%  $V_2O_5$  over 8 metres), with corresponding low grade  $V_2O_5$  analytical results. There is no further work recommended in this area.

**Maitso:** Trenches TR-09-079 to TR-09-087, TR-09-092 to TR-09-100 and TR-09-104 to TR-09-112 were excavated along the strike of this radiometric anomaly (3436 metres). The Maitso mineralisation is quite variable in width and grade, consisting apparently of several en echelon boudins (XRF values up to 0.77%  $V_2O_5$  over 50 metres). Analytical results were significantly lower. The southern part of the target appears to consist of at least three parallel mineralised structures, the central vanadium rich zone traceable from UTM 7,348,000 to UTM 7,351,400.



Source: Energizer Resources

## Geology

The property is underlain by supracrustal and plutonic rocks of Late Neoproterozoic age that are metamorphosed at upper amphibolite facies conditions and deformed into upright NNE trending structures. The vanadium mineralisation is found primarily in the western two thirds of the property in supracrustal rocks which include primarily migmatitic (biotite, garnet) quartzofeldspathic gneiss, thin bands of marble, chert, quartzite. Amphibolite gneiss in the eastern half of the property likely represents an original mafic volcanic pile. Plutonic rocks are present in limited quantity within the property and include migmatitic (hornblende/diopside, biotite, garnet) feldspathic gneiss of monzodioritic to syenitic composition, biotite granodiorite and leucogranite.

Structurally the rocks appear to relate to the lithotectonic domains identified by Collins (2006) as the Androyen and Vohibory lithostructural units respectively,

which are separated by a shear zone system. Most rock types form relatively narrow, alternating, rectilinear bands which trend north northeast and dip steeply to the west-northwest, parallel to the regional gneissosity and foliation. Isoclinal folding of compositional/gneissic layering (S0-S1) observed in some supracrustal units (amphibolitic gneiss, quartzite) implies that the regional north northeast trending lithological structure and parallel foliation represents a second structural event (S2). In general the region is the locus of high strain which has had the effect of dismembering the earlier VMS type mineralised horizons. The VMS related gossans occur within (1) composite marble/chert bands, (2) quartzite, (3) quartzofeldspathic gneiss and (4) feldspathic gneiss. It is unknown what the effect of such strain has had on the vanadium mineralisation on the property and in fact the precise timing of the emplacement of vanadium mineralisation is somewhat enigmatic.

### **Mineralogy and Metallurgy**

The company has received the results of metallurgical work to determine what recoveries can be obtained from this unique style of vanadium discovery. A scanning electron microprobe analysis has also been completed on a suite of core and rock samples to specifically identify the vanadium mineralogy. Vanadium was found to occur in a variety of minerals, with most of the vanadium found associated with silicate and oxide receptor minerals.

Early metallurgical testing of core samples indicated the potential for minimum recoveries between 70 and 80 percent. Subsequent laboratory metallurgical tests have confirmed that high vanadium recovery can be achieved.

Energizer recently completed its metallurgical testing programme of composite samples from Green Giant at SGS Minerals Services' laboratory. Batch pressure leach tests, consisting of an oxidising pre-roast, followed by an alkaline pressure leach, extracted up to 82% vanadium into a leach solution with minimal deleterious elements that would be suitable for upgrading by solvent extraction.

### **Environmental considerations**

Energizer is working with the Madagascar government to ensure that all necessary permitting is in place and up to date, and that all regulations applied to the project are understood and complied with.



The project underwent an initial base line environmental impact assessment (EIA) before work commenced. The physical setting of the property is savannah in nature, not rainforest. The company is aware of environmental concerns with respect to local flora and fauna and operates with caution in this respect. At this time, management believes there are no critical environmental issues that could materially impact the project.

### **Permits**

The area of the claims now held by Energizer spans 22,500 hectares in six permits, composed of 36 old style squares granted in 2004 and 2005 under Decret No. 2000-170 of the Code Minier 1999 (law 99-022). The claims have granted dates of 9 November 2004 and 1 January 2005.

Permitting for the current exploration programme is in place and current.

The company works closely with the Madagascar government to ensure that all necessary permitting is in place and that reporting and payment requirements are met. The company has stated that all regulations applicable to the project are understood and complied with.

### **Mining and processing**

It is economic to mine for vanadium when grades reach a minimum threshold in a range between 0.3 percent and 0.5 percent vanadium pentoxide, or between 6.6 and 11 pounds of vanadium per tonne. Assay grades identified in the 2008 drilling programme are at and beyond the higher end of that range. As the deposit outcrops and is also near surface it is likely that initial mining could be accomplished using conventional overburden strip, drill, blast, load and dump mining systems in an open pit. However, only after the completion of feasibility studies will it be possible to define a mine plan and method.

Using an open pit mine production rate of 25,000 tonnes per day at an 85 percent recovery rate at an on-site acid plant, and a minimum 200 million-tonne targeted deposit, consulting engineers hypothesise the Green Giant Project could pay back capital costs of about US\$450 million in a little over two years, and continue to provide Energizer a substantial profit over a 20-year mine life.

At this stage, with more drilling to be done to collect data at depth and subsequent completion of pre-feasibility and feasibility studies there is considerable margin for error in these assumptions.

The initial leach test results of both oxide and primary vanadium mineralisation indicate that it should be possible to recover vanadium using a direct acid leach process without any prior roasting. The preliminary metallurgical test work is nearly complete, whilst economic and logistic studies will need to be carried out to evaluate the large scale application and economics of this project.

The company's management believes it may be possible to extend the transport, power and water infrastructure, which may be developed in conjunction with the Sakoa Coal Project, a coal project near to the Green Giant project. This option would clearly make development of Green Giant dependent upon prior or concurrent development at the Sakoa project.

Regarding Sakoa, on 23 March 2009 Straits Resources Ltd (SRL) and PTT Group formed a strategic alliance to establish a global coal venture at Sakoa. This alliance planned to start a feasibility study at Sakoa in 2009 and to start production within four years. This option would clearly make development of Green Giant dependent upon prior or concurrent development at the Sakoa project.

Any future mines on the Sakoa coal field are likely to feed a captive coal fired power generation facility, which in turn may be obliged to operate a carbon dioxide sequestration facility. In a country such as Madagascar we believe, based on the time to complete other developments in Africa, that it is likely to take between three and five years to develop a coal mine from conception through commissioning of the mine and its associated infrastructure. This timeframe is similar to that projected by Energizer for the development of its project by 2014.

## Riskied mineable resource assumptions

Reserves		Probability	Tonnes (m)
Proven		90%	0.0
Probable		50%	0.0
<b>Total</b>		<b>0%</b>	<b>0.0</b>
Resources	Conversion	Probability	Tonnes (m)
Measured	90%	90%	0.0
Indicated	80%	50%	49.5
Inferred	80%	10%	9.7
Hypothesised	80%	0%	11.0
<b>Total</b>	<b>80%</b>	<b>17%</b>	<b>70.2</b>
Mineable resource			Tonnes (m)
<b>Mineable resource</b>			<b>56.2</b>
Riskied mineable resource			Tonnes (m)
Current classification			20.6
<i>Scenarios for exploration success</i>			
- base case			37.3
- optimistic case			46.2
- pessimistic case			24.7

### Notes:

- mineable resource have been estimated as reserves plus the portion of resources that would be expected to convert to reserves considering deposit type and likely grade variability
- riskied mineable resource refers to the various classes of resource/reserve weighted by their assumed confidence level

Source: Objective Capital

## Proforma Green Giant operation profit and loss

Proforma P&L (US\$m)	Year ending June							
	'13	'14	'15	'16	'17	'18	'19	'20
<b>Gross revenues</b>	<b>0.0</b>	<b>0.0</b>	<b>273.1</b>	<b>284.4</b>	<b>294.8</b>	<b>304.7</b>	<b>314.5</b>	<b>324.4</b>
Operating costs	0.0	0.0	27.6	27.8	28.0	28.2	28.4	28.6
<b>Operating profit</b>	<b>0.0</b>	<b>0.0</b>	<b>245.5</b>	<b>256.6</b>	<b>266.7</b>	<b>276.5</b>	<b>286.1</b>	<b>295.8</b>
Depreciation	0.0	0.0	22.1	22.1	22.1	22.1	22.1	22.1
Administrative costs	0.0	0.0	73.9	94.6	97.0	99.4	101.9	104.5
<b>EBIT</b>	<b>0.0</b>	<b>0.0</b>	<b>341.5</b>	<b>373.3</b>	<b>385.9</b>	<b>398.0</b>	<b>410.1</b>	<b>422.4</b>
<i>Assumptions</i>								
Capital costs (C\$m)	140.0	210.0	0.0	0.0	0.0	0.0	0.0	0.0
Tonnes ore processed (millions)	0.0	0.0	2.6	2.6	2.6	2.6	2.6	2.6
Vanadium pentoxide (m lbs)	0.0	0.0	30.7	30.7	30.7	30.7	30.7	30.7
Operating cost (US\$/t)	32.50	33.31	34.15	35.00	35.87	36.77	37.69	38.63

### Other assumptions

NSR royalty 2%; recovery 80%

Source: Objective Capital

**Location map, Energizer Resources, Sagar property, Quebec, Canada.**



Source: Energizer Resources

### **Sagar Project**

The Sagar property is located 190 kilometres north-northwest of Schefferville in the Nunavik region of Quebec. The property includes 258 claims that span an area of 9,400 hectares.

The property is situated on an intersection between the Romanet fault, on the eastern edge of the horst, and reducing lithologies such as those of the Dunphy and Lace Lake formations, as well as on an unconformity contact with the Archean basement.

Energizer has targeted this property for uranium, gold, and copper, including unconformity polymetallic uranium and IOCG deposits.

Sagar's potential is based on findings in the Mistamisk boulder field, where an area of 500 metres by 250 metres contained many radioactive gold bearing boulders. Seventy of these averaged 64.9 grams of gold per tonne and 1.3 percent uranium. The source has not been discovered to date.

There are also many uranium and copper showings along the eastern margin of the horst. Between June 2007 and July 2008 the company completed preparatory work on this property, including the construction of an airstrip and a 20-man camp at the site, with the intent to carry out geological prospecting and a drilling programme for the winter of 2008/09.

In July 2008, it announced the diamond drilling of new targets. Since then Energizer's emphasis has switched to the Green Giant property in Madagascar.

All anomalous areas defined through Energizer's work to date have coincident kaolinite to kaolinite-illite signatures. They are bisected by one or more interpreted major or subsidiary faults, have anomalous soil and/or rock assays, have anomalous reverse circulation and diamond drilling assays, and are favourably located to be source candidates for the Mistamisk boulder field based on Quaternary analysis. There is also potential for discovering a volumetrically significant unconformity associated polymetallic uranium-style deposit on the Sagar property.

In addition to this, there is potential for IOCG-style mineralisation. Similar to the boulder field index derived from soil sample results, a multi-component normalised 'IOCG index' was developed and applied to reverse circulation drilling, soil, and water geochemical data collected over the Sagar property. This IOCG index identified targets associated with a large east-west trending structure that bisects the Romanet horst.

The IOCG Index also identified an anomaly that corresponds with the Alpha boulder field index soil anomaly. Diamond drill holes in the Alpha area did not intersect significant sulphide mineralisation, but they did intersect pervasively carbonate-, hematite- and chlorite-altered rocks which could indicate proximal IOCG mineralisation.

# Financials

Profit & Loss							
Year ending June (C\$m)	2009	2010E	2011E	2012E	2013E	2014E	2015E
<b>Revenues</b>	<b>0.1</b>	—	—	—	—	—	<b>275.0</b>
COGS	—	—	—	—	—	—	(79.9)
Gross profits	0.1	—	—	—	—	—	195.1
Administrative Costs	(3.9)	(1.8)	(1.8)	(1.9)	(1.9)	(2.0)	(2.0)
<b>EBITDTA</b>	<b>(3.8)</b>	<b>(1.8)</b>	<b>(1.8)</b>	<b>(1.9)</b>	<b>(1.9)</b>	<b>(2.0)</b>	<b>193.1</b>
Depreciation & amortisation	(0.1)	(0.1)	—	—	—	—	(22.3)
EBIT	(3.9)	(1.9)	(1.8)	(1.9)	(1.9)	(2.0)	170.8
Interest	0.1	0.1	0.2	0.4	(1.0)	(10.0)	(14.8)
EBT	(3.8)	(1.8)	(1.6)	(1.5)	(2.9)	(12.0)	156.0
Tax paid	—	—	0.4	0.4	0.7	2.9	(37.4)
<b>Earnings</b>	<b>(3.8)</b>	<b>(1.8)</b>	<b>(1.2)</b>	<b>(1.2)</b>	<b>(2.2)</b>	<b>(9.1)</b>	<b>118.6</b>
Dividends	—	—	—	—	—	—	—
<b>Retained earnings</b>	<b>(3.8)</b>	<b>(1.8)</b>	<b>(1.2)</b>	<b>(1.2)</b>	<b>(2.2)</b>	<b>(9.1)</b>	<b>118.6</b>

Cashflow statement							
Year ending June (C\$m)	2009	2010E	2011E	2012E	2013E	2014E	2015E
EBIT	(3.9)	(1.9)	(1.8)	(1.9)	(1.9)	(2.0)	170.8
Depreciation	0.0	0.1	—	—	—	—	22.3
Stock-based Compensation	0.7	—	—	—	—	—	—
Gains, Writedowns, Recoverables	1.0	0.0	—	—	—	—	—
(Increase) decrease in receivables	(0.1)	0.0	—	—	—	—	(41.2)
(Increase) decrease in inventory	—	—	—	—	—	—	(9.6)
Increase (decrease) in payables	(0.1)	0.1	—	—	—	—	12.0
<b>Net cash from Ops</b>	<b>(2.4)</b>	<b>(1.7)</b>	<b>(1.8)</b>	<b>(1.9)</b>	<b>(1.9)</b>	<b>(2.0)</b>	<b>154.2</b>
Tax paid	—	—	0.4	0.4	0.7	2.9	(37.4)
Dividends	—	—	—	—	—	—	—
Net interest recieved (paid)	0.1	0.1	0.2	0.4	(1.0)	(10.0)	(14.8)
New equity	0.7	2.5	5.0	5.0	125.0	25.0	—
New (deposits) borrowings	—	—	—	—	50.0	175.0	(60.0)
Capital expenditure	(0.0)	—	—	—	(141.0)	(211.5)	(4.6)
<b>Net cash from financing</b>	<b>0.7</b>	<b>2.6</b>	<b>5.6</b>	<b>5.7</b>	<b>33.7</b>	<b>(18.6)</b>	<b>(116.9)</b>
<b>Net increase (decrease) in cash</b>	<b>(1.7)</b>	<b>0.9</b>	<b>3.8</b>	<b>3.8</b>	<b>31.8</b>	<b>(20.6)</b>	<b>37.4</b>

Balance sheet							
Year ending June (C\$m)	2009	2010E	2011E	2012E	2013E	2014E	2015E
Fixed assets at NAV	0.0	—	—	—	141.0	352.5	334.8
Cash	2.8	3.7	7.5	11.3	43.1	22.5	59.8
Receivables, Recoverables	0.5	0.5	0.5	0.5	0.5	0.5	41.7
Inventory	0.1	0.0	0.0	0.0	0.0	0.0	9.6
<i>Less Payables</i>	(0.2)	(0.2)	(0.2)	(0.2)	(0.2)	(0.2)	(12.2)
<b>Net current assets</b>	<b>3.2</b>	<b>3.9</b>	<b>7.7</b>	<b>11.6</b>	<b>43.3</b>	<b>22.7</b>	<b>98.9</b>
Less loans	—	—	—	—	(50.0)	(225.0)	(165.0)
<b>Capital employed</b>	<b>3.3</b>	<b>3.9</b>	<b>7.7</b>	<b>11.6</b>	<b>134.3</b>	<b>150.2</b>	<b>268.8</b>
<i>Represented by</i>							
Shares in issue	39.7	42.2	47.2	52.2	177.2	202.2	202.2
Add retained profit							
Prior periods	(32.6)	(36.4)	(38.2)	(39.5)	(40.6)	(42.9)	(52.0)
This period	(3.8)	(1.8)	(1.2)	(1.2)	(2.2)	(9.1)	118.6
<b>Shareholders' funds</b>	<b>3.3</b>	<b>4.0</b>	<b>7.7</b>	<b>11.6</b>	<b>134.3</b>	<b>150.2</b>	<b>268.8</b>

Source: Objective Capital

# Appendix: Management

## **Kirk McKinnon, President and Chief Executive Officer**

Mr McKinnon has over 25 years senior management experience. He also serves as president and chief executive officer of MacDonald Mines Exploration Inc, named by the TSX Venture Exchange as No. 2 among Canada's ten top mineral resource companies. Mr. McKinnon also heads Red Pine Exploration Inc and HoneyBadger Exploration Inc. Prior to assuming these roles he served with several high-profile Canadian corporations, including Nestle Canada.

## **Julie Lee Harrs, President and Chief Operating Officer**

Ms Lee Harrs was appointed president and COO in September, 2009. She brings extensive international mining experience to the company, most recently having served as senior vice-president, general counsel and corporate secretary of Sherritt International Corp. Prior to that, Ms. Harrs was associate general counsel and assistant secretary of Inco Ltd. Before joining these mining companies, Ms. Lee Harrs was a corporate lawyer with a national law firm, Blakes. Ms. Lee Harrs has worked on and is familiar with mining projects in Canada, New Caledonia, Cuba and Madagascar.

## **Richard Schler, Director, Vice-president and Chief Financial Officer**

Mr Schler has served in his current role with Energizer since 2006. He holds similar positions with MacDonald Mines Exploration Ltd and Red Pine Exploration Inc, resource companies based in Toronto. Previously, Mr. Schler held senior management positions with several noted Canadian corporations. He has over 25 years of experience in the manufacturing sector.

## **John P. Sanderson, Q.C., C.Med., C.Arb., Director**

Mr Sanderson, a lawyer, has acted as a mediator, facilitator and arbitrator across Canada. He specialised in matters pertaining to commercial transactions, including insurance claims, contractual disputes in construction matters, environmental disputes, employment matters and aboriginal claims.

## **Peter Harter, Director**

Mr Harter is a former, long-serving deputy minister in a number of Canadian government departments, including Industry Canada and the Department of Foreign Affairs. In 2007, he joined Fraser Milner Casgrain LLP as senior policy advisor in Ottawa. Mr. Harter serves as a director for a number of Canadian companies, including Power Finance Corp, IGM Financial Corp, ARISE Technologies, Telsat Canada, and Pinetree Capital Ltd.

## **Quentin Yarie, P.Geo., Director**

Mr Yarie is an experienced geophysicist and a successful entrepreneur, with over twenty years experience in the mining and environmental engineering sectors. From 1992 to 2001, he was a partner of a specialised environmental and engineering consulting group, managing a number of large projects, including the ESA of the Sydney Tar Ponds, the closure of Canadian Forces bases in Germany, and the Maritime and Northeast Pipeline project.

We are pleased to bring you this report on **Energizer Resources Inc.**



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As always, I welcome your comments and feedback on our research!

Gabriel Didham, CFA  
Objective Capital

## **Will Purcell**

Will has been involved in the resource sector for 30 years in a variety of roles. Since the late 1990s, he has been active in assessed mineral resource investment projects. Will has a B. Math degree from the University of Waterloo in Ontario.

## **Richard Thompson**

Richard Thompson is a graduate mining engineer (Camborne) and has worked for over 40 years in the mining industry. His expertise covers mining techniques, the application of mining equipment, mine project evaluation, mining investment promotion and project management.

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