

24 February 2010

## GALAXY VENTURES INTO EMD PRODUCTION

### Highlights

- Pre Feasibility Study completed for downstream processing of battery grade Electrolytic Manganese Dioxide (EMD)
- Potential 100% owned EMD plant producing 40,000 tpa to be situated at Jiangsu next to the lithium carbonate plant
- EMD is used in alkaline batteries and lithium manganese oxide batteries
- Galaxy has the potential to be the largest EMD producer in the world
- EMD production has many cost synergies with lithium carbonate process
- Same customer base, marketing and distribution facilities
- Project should generate a post tax net cash of A\$46 million per annum @ FX USD:AUD of \$0.90
- Net Present Value (post tax @10% discount rate) of the project is around \$325 million
- Estimated capital cost is A\$97 million

**Galaxy Resources Limited** (ASX: GXY) is pleased to announce positive results from a detailed Pre Feasibility Study (PFS) into downstream processing of battery grade electrolytic manganese dioxide (EMD) at its Jiangsu site in the in the Zhangjiagang Yangtze River International Chemical Industrial Park.

EMD is a cathode electrode material for alkaline manganese dioxide batteries, lithium manganese primary batteries and lithium ion manganese rechargeable batteries. Currently 40 billion primary manganese dry cells are produced all over the world, out of which 18 billion are alkaline batteries. Alkaline batteries are recording a growth rate exceeding 2% per annum in developed countries and exceeding 10% per annum in developing countries, with an average growth exceeding 3% per annum worldwide.

EMD is also used extensively in manganese versions of lithium primary and rechargeable batteries. An estimated two billion manganese versions of lithium primary and 0.5 billion lithium manganese (LiMn) secondary batteries are produced per annum. The growth rate is in excess of 10% per annum for primary LiMn and 20% per annum for secondary LiMn batteries.

Galaxy Resources Managing Director Iggy Tan said that there is a shortage of battery grade EMD and that by diversifying into other energy storage and battery materials, there is potential for the Company to significantly enhance the value of its Jiangsu site.

"The EMD PFS was completed and the project will be advanced by a **completely independent management team from the lithium project personnel headed by Dr Yatendra Sharma to ensure the flagship lithium carbonate remains on schedule.** The positive outcome of the EMD Pre Feasibility Study represents a fantastic investment opportunity, further enhancing Galaxy's capacity to help meet the increased demand and deliver to the specifications of the world's major battery end users," Mr Tan said.

"By purchasing manganese ore and downstream processing the material into a battery grade EMD feedstock, Galaxy can cement itself within the rapidly growing battery industry supply chain. The Company recently signed a **Letter of Intent with ConsMin Trade Pte Ltd to secure a long term supply of 70,000 tpa of high grade Manganese Oxide ore annually.**"





The results of the EMD PFS have confirmed that the post tax, pre finance Net Present Value (at a discount rate of 10%) of the project is around **A\$325 million**. **The post tax payback is less than two years.**

“There are tremendous synergies between the two value adding project components,” Mr Tan said. “For a start, the customer base is exactly the same customer base for our battery grade lithium carbonate product. Secondly, the process of EMD production is very similar to the one employed in lithium carbonate production, including the use of sulphuric acid and soda ash, which is readily available in the industrial park.”

### Pre Feasibility Study – EMD Production

The PFS is at a very accurate level based on the DFS work that Hatch completed for the Jiangsu Lithium Carbonate Plant. The process employs the conventional sulphate processing technique readily used worldwide for processing EMD. The sulphate route is an established and accepted processing method used extensively across the globe to convert manganese concentrate to alkaline battery grade EMD.

Galaxy has developed and established a risk free flow sheet that is very similar to current operating plants in the world. (See Figure 1).

For the purpose of the study, a kiln feed rate of 70,000 tonnes per annum was assumed. The following key process steps have been proposed:

- Kiln Feed 70,000 tonnes of >45% MnO ore
- 4,000 tpa of coke
- Sulphuric acid leaching
- pH control and precipitation
- Impurity removal
- Electro-winning of manganese dioxide
- 40,000 tpa of alkaline battery grade EMD

Operating Parameters	Quantity
Mn Concentrate Feed	70,000 tpa
Sulphuric Acid Usage	40,000 tpa
Micronutrient Fertiliser Production	90,000 tpa
EMD Production	40,000 tpa

### Project Team Leaders

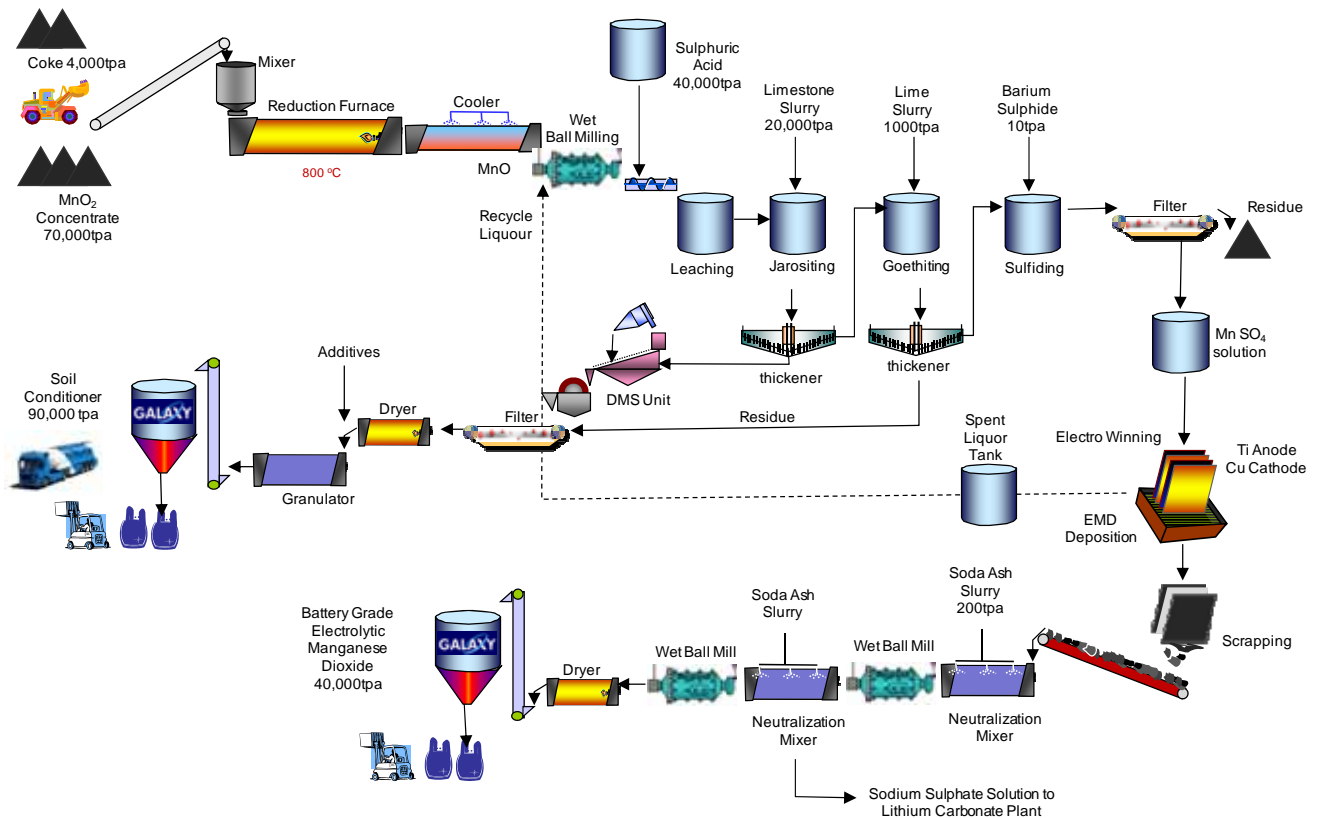
The EMD PFS was completed by a completely independent team from the lithium project personnel. The study team was led by two very experienced EMD joint study managers, Dr Yatendra Sharma and Mr Peter Moore. Dr Sharma holds a PhD in battery technology and conducted research on lithium manganese cathode material. He has also consulted Canadian and Malaysian battery companies on marketing and technical issues. Dr Sharma has an extensive knowledge and experience in the field of EMD, used in primary and secondary alkaline manganese batteries.



Mr Moore is a marketing professional with 20 years association with battery production technology and in particular EMD with which he was involved through BHP. He is well known in the industry and was involved in marketing of BHP's manganese products including EMD from BHP Newcastle for 15 years before the plant was sold to South African company Delta.

Both Mr Moore and Dr Sharma worked in recent times with an EMD project for Hitec Energy Limited.

Figure 1 – Galaxy's EMD Production



The Galaxy process, a mixture of conventional manganese dioxide roasting and advanced electrolytic process to deposit EMD, is ideally suited for the production of best quality alkaline batteries and lithium-ion battery end use as it will deliver a very low impurity material. Importantly, it will also deliver the very low iron levels that manganese cathode producer's desire. High grade manganese concentrates from Australia and will be shipped and unloaded at the Zhangjiagang Port and transferred to the nearby EMD plant (less than 0.5km from the berth) for conversion.

### Capital Cost Estimate

Capital costs have been determined on the basis of new equipment for processing plant and infrastructure, next to the Company's lithium carbonate plant at Zhangjiagang, Jiangsu Province. Capital estimates are based on recent Hatch data collected for the lithium carbonate project DFS as well as other industry estimates. The capital cost estimate is presented in Australian dollars (A\$) current for the 4th quarter 2009 and considered to be within ± 35% order of magnitude.

The capital cost breakdown is as follows:

Capital Costs	Capex A\$
Process Plant & EPCM	A\$ 79.4 million
Working Capital & Land	A\$ 17.4 million
<b>Total Capital Costs</b>	<b>A\$ 96.8 million</b>

### Project Economics

The PFS results indicate that the Jiangsu EMD project is a robust investment with the potential to begin production in the fourth quarter of 2011. The two key factors in the positive results were the synergy savings and marketing benefits associated with the plant's location next to Galaxy's lithium carbonate plant in Jiangsu.

The project will generate an average of **A\$46 million post tax net cash** per annum based on the sale of 40,000 tpa of alkaline battery grade EMD. The project Net Present Value (real, pre-finance, post tax) is estimated at **\$A325 million** using a discount rate of 10%.

Project Economics	<u>0.9 AUD/USD</u> <u>FX Rate</u>
Capital Costs	A\$ 96.8 million
Revenue pa	A\$ 133 million
Net Cash (post tax) pa	A\$ 46 million
Net Present Value NPV (pre finance, real, post tax @10% discount rate)	A\$ 325 million
Internal rate of Return IRR%	59%
Pay back	2.1 Years

### Proposed EMD Plant Location

Galaxy's EMD plant is proposed to be established next to the Company's lithium carbonate plant at Zhangjiagang, a rapidly growing industrial port city located in the centre of the Yangtze River delta, some 80 km north west of the key central coastal city of Shanghai. The Yangtze is the largest river in China and the backbone of the Chinese economy.

The Company recently signed a Letter of Intent on 20 Feb 2010, with the Zhangjiagang Free Trade Zone Administrative Committee to secure a parcel of land next to the Company's Lithium Carbonate Plant for the proposed EMD plant.

Galaxy's EMD plant is therefore located in one of the most developed and most modern parts of China. Galaxy's cost and product quality advantages will make it the lowest EMD cost producer in China. These include:



- The proposed scale of operation and the logistical benefits of its coastal location adjoining a major port.
- Advantages offered by operating in the Jiangsu Yangtze River International Chemical Industrial Park.



- The benefits of adapting proven Chinese EMD extraction techniques to incorporate Australian standard continuous operation procedures.
- Galaxy's designated EMD plant capacity of 40,000 tpa will be the largest producer of alkaline battery EMD in the world.
- Strategic location of the site is close to major Li battery cathode materials producers.
- Preferential income tax treatment as well as access to land on preferential terms; the waiver of a number of local taxes; and VAT rebates.



#### About Zhangjiagang

Zhangjiagang has a population of some 880,000, with a per capita GDP exceeding USD 12,000. It is an important shipping and distribution centre for steel, oil, timber and cereals. The port has the capacity to cater for vessels of up to 80,000 dwt and it handles cargoes through some 19 international shipping lines, handling freight business to more than 140 ports globally. Port throughput capacity currently exceeds 100 million tonnes annually.

**About the Jiangsu Yangtze River International Chemical Industrial Park**



The industrial park has an area of 24km<sup>2</sup> and was approved for development by the provincial government in May 2001. Since that time it has attracted investment from seven of the top 10 world chemical companies including Dow Chemical, Dow Corning, Du Pont, Chevron Phillips, Unocal, Wacker, Messer and Sumitomo. An element of this investment attraction is the offering to all participants of reticulated liquid chemicals, raw materials, industrial gases, steam and finished products throughout the park. For Galaxy, this means it will have ready access to its key process inputs being power, steam, sulphuric acid and caustic soda, as well as a ready market for its by-waste product, being a micro-nutrient fertiliser.

The Park has been acknowledged for its environmentally friendly operation. It has been awarded as a model for synchronised development of the economy and the environment.

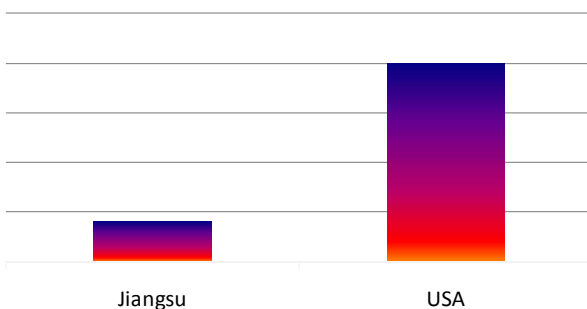
**Low Cost Structure at Jiangsu**

The EMD plant will require 40,000 tpa of concentrated sulphuric acid which will be supplied by the Two Lions (Zhangjiagang) Fine Chemicals Co. Ltd. (Two Lions), located next door. As sulphuric acid is the key driver to EMD production costs, having an acid supplier next door allows Galaxy to be one of the lowest cost EMD producer in the world.



The supply arrangement also includes a quantity of caustic soda (sodium hydroxide) and steam, as well as access to state of the art wharf unloading facilities. Two Lions is based in the Yangtze River International Chemical Industrial Park, next door to the site for Galaxy's lithium carbonate and EMD plants. Two Lions was founded in 2003 and is a large scale chemical enterprise, predominantly engaged in producing basic chemical raw material feed.

**Sulphuric Acid Cost**  
US\$/tonne



The EMD plant will also require a quantity of soda ash (sodium carbonate) from the Jiangsu Huachang Chemical Co. Limited (Huachang). Huachang is based in the Yangtze River International Chemical Industrial Park, close to Galaxy's lithium carbonate plant site. Huachang is a core enterprise of Jiangsu Huachang Group Limited and is mainly involved in the manufacture of basic chemicals, fine chemicals and bio-chemicals.

## EMD Market

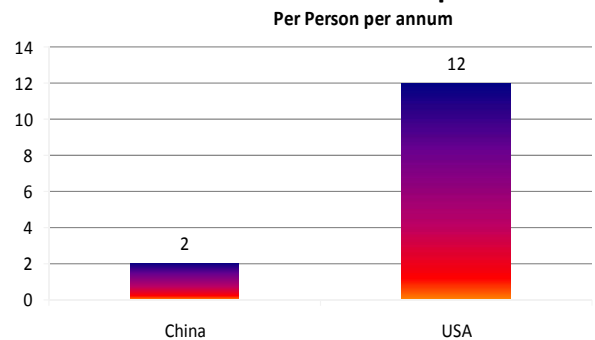
Electrolytic manganese dioxide (EMD) is a cathode electrode material for alkaline manganese dioxide batteries, lithium manganese primary batteries and lithium manganese rechargeable (lithium ion – manganese version) batteries.

### Alkaline Batteries

Currently 40 billion primary manganese dry cells (carbon-zinc and alkaline) are produced all over the world, out of which 18 billion are alkaline batteries. These batteries consumed around 185,000 tpa of EMD in 2008.

Alkaline batteries are recording a growth rate exceeding 2% per annum in developed countries and exceeding 10% per annum in developing countries, with an average growth exceeding 3% per annum worldwide. The average consumption of alkaline batteries in the USA is 12 per 1000 persons per year versus 2 per 1000 persons per year in China.

### Alkaline Cells Consumption 2008



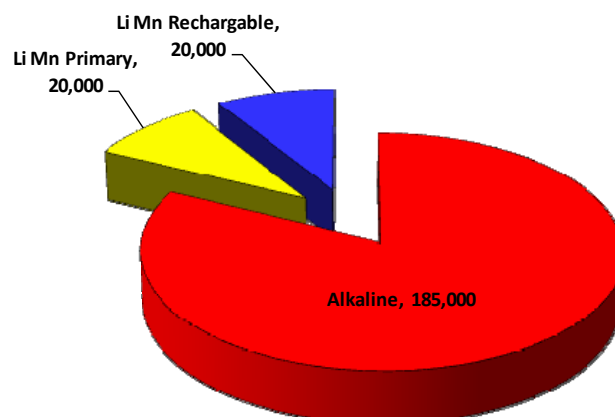
### Lithium Manganese Batteries

EMD is also used extensively in manganese version of lithium primary and secondary batteries. About 2 billion lithium manganese primary batteries were produced in 2008, with a growth rate of 10% and consuming in excess of 20,000 tpa of EMD per annum. Half a billion lithium manganese version secondary (rechargeable) batteries are produced per annum with an annual growth rate 20% per annum.

It is estimated that these batteries consume about 20,000 tpa EMD per annum. The growth rate is very high in this sector of lithium batteries because of growth in manganese versions of the lithium ion batteries for hardware tools, appliances requiring high drain and hybrid electric vehicles (HEV) and electric vehicles (EV) switching to manganese version. These uses make EMD an important electrode material for batteries.

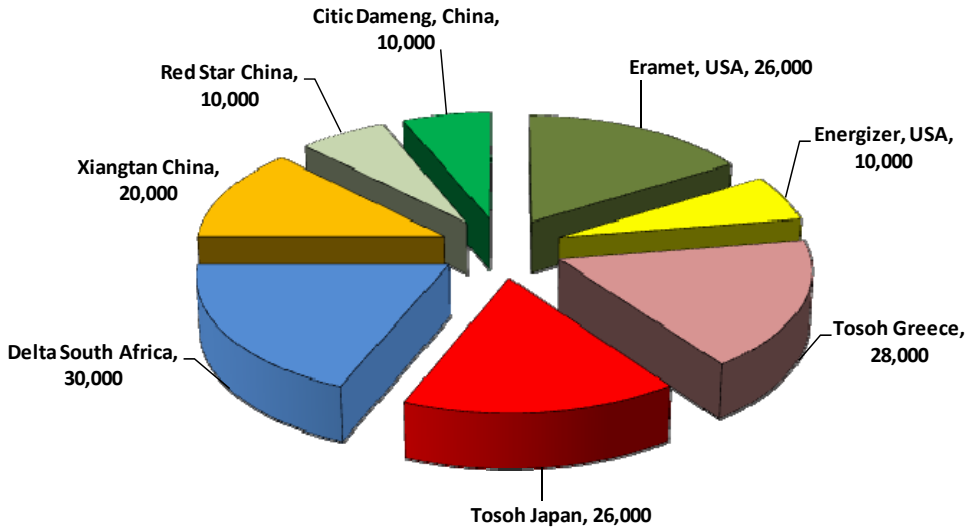
The annual consumption of EMD in alkaline batteries has grown steadily over recent years reaching an estimated 225,000 tpa of EMD.

### EMD Consumption tpa



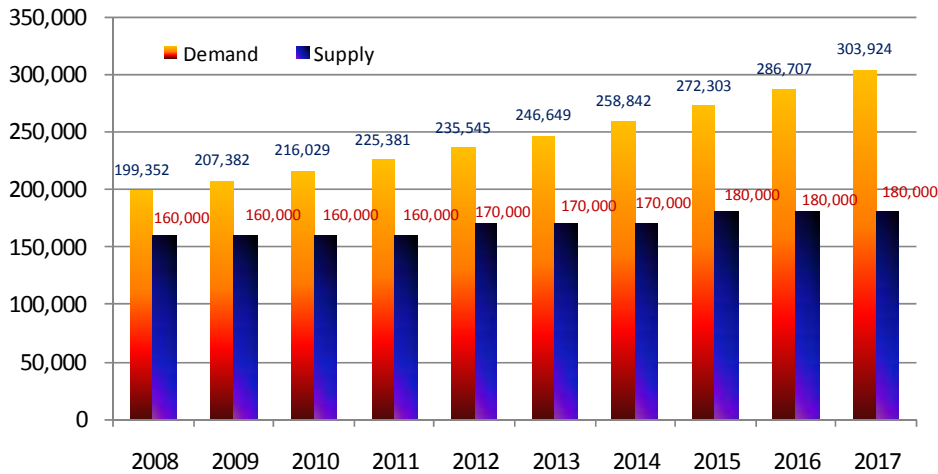
**EMD PRODUCERS**

There are currently eight companies in the world who are producing alkaline grade EMD with a production capacity of 160,000 tpa of EMD. There has been a shortfall of 65,000 tpa in the year 2008.



**SUPPLY AND DEMAND FORECAST**

There is estimated 3% per annum global growth in the consumption of alkaline batteries, 10% per annum in the lithium manganese primary batteries and 20% per annum in lithium manganese rechargeable batteries. Based on these growth patterns, the demand for EMD in the near future is expected to be as follows:



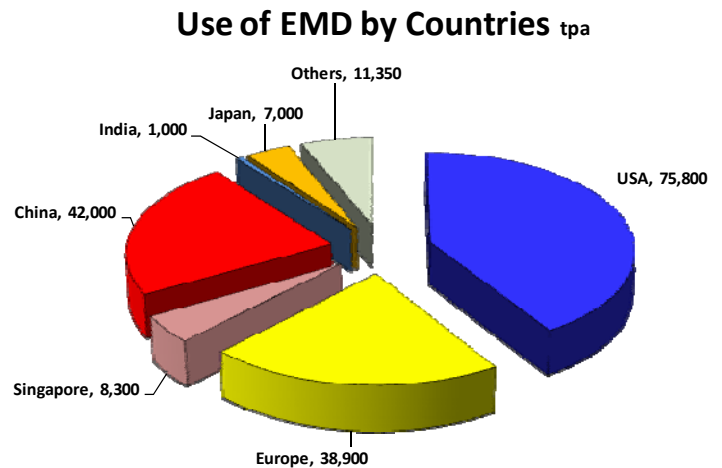
Source: Galaxy Resources



This was met by battery companies blending low grade (Carbon- Zinc Grade) EMD in big size batteries such as D-size and C-size. Mixing low grade EMD results in producing low grade batteries.

As competition is rising, these battery manufacturers who are blending low grade EMD are under tremendous pressure to use proper high alkaline grade EMD to make high grade batteries to compete in the market. It is estimated that by the year 2017, there will be demand of alkaline grade EMD in excess of 390,000 MT/ annum.

The largest EMD users in the USA are Energizer and Duracell using around 25,000 tpa EMD each. Meanwhile, Panasonic (18,400 tpa) and Spectrum (10,200 tpa) are the largest EMD consumers in Europe. The other major consumers in the world are Energizer China (10,200 tpa), Duracell China (12,300) and Nanfu China (12,300 tpa).



### Reasons for the Shortfall in EMD Supply



#### Western Plants – Environmental and high operating costs

On the supply side, older non-Chinese plants that are reliant on high grade ore feeds, and often poorly located, continue to struggle despite recent strong price increases for their output. Those that persist are more often than not propped up by anticompetitive legislation which prevents more efficient plants selling into their local markets. These existing plants are being closed for either environmental reasons (close to cities) or high operating costs. A good example is the cost of sulphuric acid (which is the major consumable costs in the EMD process), where Western plants are paying 4-5 times the cost of sulphuric acid Galaxy can get at Jiangsu (next door to the Two Lions 2.4 mtpa sulphuric acid plant). Following this trend, French company

Eramet has built a new 10,000 tpa EMD plant in Guangxi province and phasing down its operations in New Johnsonville USA due to costs.

#### Chinese Plants – Low Grade

Within China, new plants continue to be built, but in the main, these employ conventional technologies to treat manganese carbonate ore, which results in a pollution levels that are deemed to be unacceptable by the communities in which they are situated. Also, most of these plants in China are only able to produce low grade EMD suitable for carbon-zinc batteries only for lack of adequate technology and power.

#### Manganese Carbonate Ore

The technology used for production of EMD by Xiangtan, Electrochemical Plant, Changsha, China, is based on the use of manganese carbonate ore from their own mine site. This ore is depleting in quantity and quality. Xiangtan are struggling to maintain their current capacity. Their limitation of technology and environmental considerations are making it difficult for them to expand.

Citic Dameng is another large corporate with available resources, and their technology is based on the roasting of manganese dioxide ore obtained from their mine site in Southern China or imported from Australia. Though they have a limitation on the quality of the ore (<37% Mn) available from their China mine site, which increases their operating costs, they have the capability to increase their capacity. It is learnt that they will increase their production capacity by 10,000 tpa by 2012 as well as a further increase in capacity of 10,000 tpa by 2015. Even if this capacity increase takes place, a significant shortfall in the supply of high alkaline grade EMD will remain in the coming years.

**Galaxy's EMD Plant**

Galaxy's plant is a state-of-the-art, continuous process plant with very tight environmental designs and controls. All the waste is sold as a soil conditioner which contains valuable micro-nutrients such as Mn, Fe, K, Ca, which are readily required in most soils around the world.

**Historical pricing of EMD**

The pricing prospects for high purity EMD over the next few years are primarily dependent on the fortunes of the disposable alkaline battery, lithium manganese primary and secondary batteries. Alkaline battery technology has become the dominant technology in disposable batteries and continues to grow at an average of 3% per annum, mainly at the expense of the older zinc -carbon battery technology that is gradually being replaced. Importantly, for future EMD pricing, all new disposable battery formats set to make inroads in this market are unlikely to diminish the requirement for high purity, high performance EMDs.

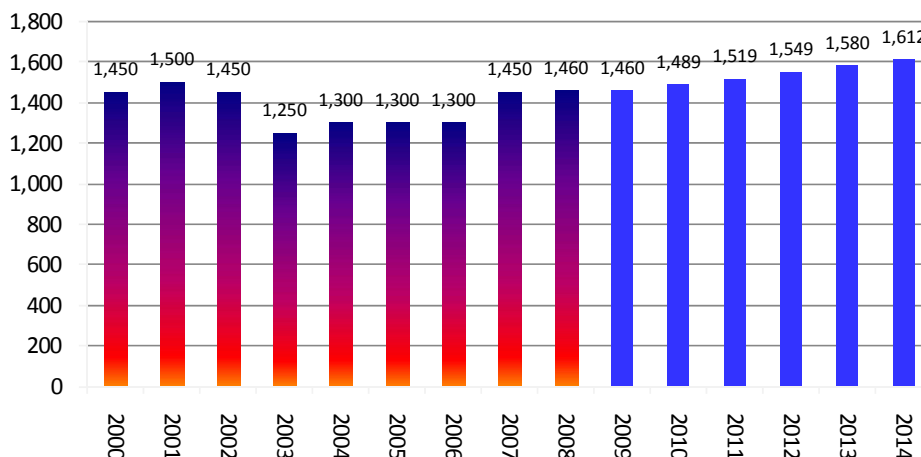


Over the next decade, the pricing prospects for high purity EMD will increasingly be affected by the demand for lithium-ion batteries containing cathode material derived from EMD. This battery technology has quickly become the technology of choice in the cordless power tool industry and is making a strong bid to be the technology of choice in the hybrid electric vehicles (HEV) and electric vehicles (EV) industries.

These batteries require EMD with very low levels of impurities, and favour particularly low iron levels, which is more difficult to deliver using conventional manganese carbonate route to produce EMD.

**Alkaline Battery Grade EMD Price FOB US\$/t**

Galaxy Forecast in Blue



In the years 2003 to 2006, the price of alkaline grade EMD has been at its lowest. This was caused temporarily by Chinese producers of low grade EMD. In an attempt to cut costs and maintain profit (as the commoditisation of the alkaline battery places downward pressure on their revenues) alkaline battery makers used the availability of low cost low grade EMD from China to drive down prices for all suppliers. This has proved to be a failed strategy, as the low grade EMD Chinese pricing was below real cost, and therefore unsustainable, plus the quality of the low grade Chinese EMD was often not as claimed or found to be of inconsistent quality over time. This failed strategy has also been partly responsible for the premature closure of some non-Chinese EMD plants, which in turn is a factor in the market shortages.

It is Galaxy Resources view that the combination of demand and supply side factors noted above will continue to drive EMD prices higher and increasingly force a differentiation in pricing based on product quality. However, to be conservative, Galaxy has used a price forecast (in blue) in its financial model, commencing at current prices and growing at a nominal 3% increase each year.

### Potential Project Timeline

Based on a Board decision, the Company could expect to finalise a DFS by Q3 2010, funding for the project by Q4 2010 and complete construction of the EMD plant by Q4 2011.

#### Key Dates

- Definitive Feasibility Study – Q3 2010
- Project Funding – Q4 2010
- Construction Commencement – Q1 2011
- Commissioning & Start Up - Q4 2011

### Company's Vision

Galaxy believes the power storage business has tremendous growth opportunities in the future and the Company is positioning itself to be one of the largest suppliers of battery and energy storage materials. The Galaxy Board has yet to decide if the Company should proceed to the next stage of EMD development.

– ENDS –

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**Caution Regarding Forward Looking Statements**

Statements regarding Galaxy's plans with respect to its mineral properties are forward-looking statements. There can be no assurance that Galaxy's plans for development of its mineral properties will proceed as currently expected. There can also be no assurance that Galaxy will be able to confirm the presence of additional mineral deposits, that any mineralization will prove to be economic or that a mine will successfully be developed on any of Galaxy's mineral properties. Circumstances or management's estimates or opinions could change. The reader is cautioned not to place undue reliance on forward-looking statements.

**About Galaxy (ASX: GXY)**

Galaxy Resources is a Western Australian company which is soon to become one of the world's leading producers of lithium – the essential component for powering the world's fast expanding fleet of hybrid and electric cars.

By 2010, GXY's Mt Cattlin mine will be the world's second largest hard rock producer of lithium and, through the development of its value adding Jiangsu lithium carbonate plant (17,000 tpa), the Company will be the largest and lowest cost lithium producer in China.

Lithium concentrate and lithium carbonate materials are forecast to be in short supply against high future demand due to advances in long life batteries and sophisticated electronics including mobile phones and computers.

Galaxy Resources has positioned itself to meet this lithium future by not only mining the lithium but by downstream processing to supply lithium carbonate to the lucrative Asian market.