

Galaxy is closing on its target of becoming the largest, most efficient battery grade lithium carbonate producer in the key Chinese market in 2011. Commissioning, marketing and financial tasks must be successfully completed in the next 12 months, but Galaxy remains at least that far ahead of any rivals. Lithium battery demand and manufacturing capacity appears on track to absorb Galaxy's output by 2012. On current projections Galaxy is valued at A\$1.73 per share.

## Investment Data

Share price (last trade 22 Oct. 2010):	A\$1.55
ASX code:	GXY

## Issued Capital

Fully paid ordinary shares:	190.5m
Unlisted options:	24.0m
Market capitalisation (fully diluted):	A\$292m

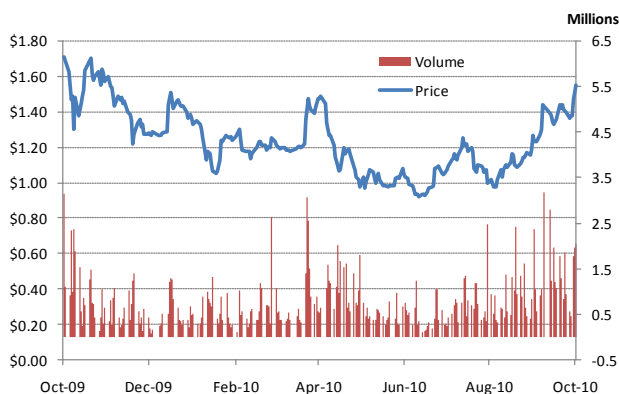
## Major Shareholders

Creat Resources Holdings Ltd:	19.9%
-------------------------------	-------

## Directors

Craig Readhead	Non Executive Chairman
Iggy Tan	Managing Director
Charles Whitfield	Executive Director
Anthony Tse	Executive Director
Robert Wanless	Non Executive Director
Yuewen Zheng	Non Executive Director
Ivo Polovineo	Non Executive Director
Xiaojian Ren	Non Executive Director
Kai Cheong Kwan	Non Executive Director

## Share price graph



## Analyst

John Macdonald	+61 8 9437 9059
Green Leader	john@greenleader.com.au
Equities Research	www.greenleader.com.au

## RECOMMENDATION: Speculative buy

**Galaxy is stealing a march on its competitors. By securing a large share of the Chinese lithium carbonate production by the end of 2011 Galaxy is aligning its fortunes with potentially the biggest lithium battery and electric vehicle markets in the world.**

## KEY POINTS

- Galaxy is mining the Mt Cattlin lithium resource in WA, and building the Jiangsu downstream processing plant in China.
- Galaxy is planning to produce and sell 17,000 tonnes of battery grade lithium carbonate per year from 2011, equivalent to 20% of global demand in 2008.
- Mt Cattlin began producing spodumene concentrate in October 2010. The revised Jiangsu schedule and construction budget is due to be finalised in October 2010.
- Demand for lithium is in a new growth phase on the take up of lithium ion batteries for automotive use. All major auto firms are developing lithium battery powered cars. Lithium based battery manufacturing capacity is expected to almost treble between 2010 and 2015.
- Lithium supplies are currently concentrated in a handful of projects. Among greenfield projects, resource quality and proximity to a low cost industrial complex are uncommon.
- The lithium carbonate plant in Jiangsu is the largest of its kind. Jiangsu is close to utilities, port, consumables suppliers, by-product markets and battery component manufacturers.
- Galaxy has off-take agreements in place for all of Jiangsu's lithium carbonate output for five years.
- China is a battery making hub and a key market for electric vehicles, motorbikes and bicycles. By the end of 2011 Galaxy plans to be the largest single supplier of battery grade lithium carbonate in China.
- Galaxy has raised A\$97 million in new equity since late 2009. Galaxy drew down a US\$105 million debt finance facility in September 2010. A A\$30 million convertible note issue is also planned.

## RISKS

- Inventories must be built up and maintained at the mine, concentrator, ports and converter, requiring careful logistics management, particularly in the commissioning phases.
- Sales into the spodumene concentrate and technical grade market are likely during Jiangsu's commissioning and qualification periods in 2011. Galaxy's budgets allow for maximum cash draw down in the second half of 2011.
- Battery grade lithium carbonate demand is still building from a relatively small base as new auto battery factories come on line. Volatile demand curves for lithium batteries and any mismatches with supply chain development rates will affect lithium product prices.
- Galaxy will face competition from other lithium sources, particularly from 2012.

## 1. Company Background

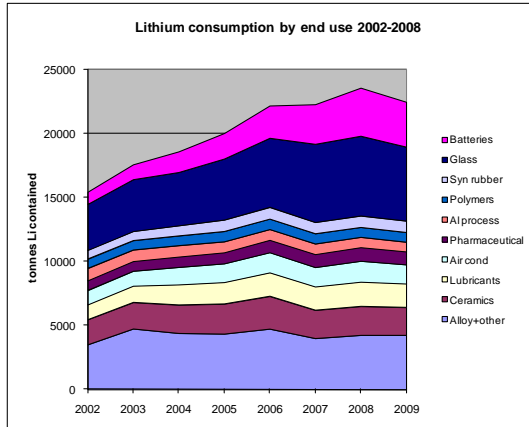
Galaxy Resources Limited listed on the Australian Securities Exchange in early 2007 after a prospectus issue. In 2009 the company completed feasibility studies of a plan to produce lithium carbonate, comprising a mine and concentrator at Mt Cattlin in Australia integrated with a chemical processing operation at Jianguo in China.

Upon receipt of finance, permits and sales contracts Galaxy began construction at Mt Cattlin and Jianguo in 2009 and 2010 respectively.

Galaxy is an Australian based company with operational and financial links to China. In October 2010 Galaxy was examining the case for a dual ASX and Hong Kong Stock Exchange listing.

## 2. Lithium Demand

Lithium is a familiar component of the batteries commonly used to power portable electronic devices and electric tools. The success of lithium based battery technologies has led to a solid growth trajectory in demand for primary lithium.



Source: TRU Group

Battery lithium use has accounted for most of the 7% annual lithium consumption growth rate since 2002.

Among metals, the volume of lithium required is still modest. In 2009, a handful of primary producers shared total lithium revenue of about US\$500 million, of which only about 15% was due to battery demand. However in 2010 lithium demand is undergoing a transformation as governments and auto manufacturers enter a critical phase of the concerted push to introduce a new generation of mass produced electric vehicles.

Prior to 2009, mass produced hybrid electric vehicles made by the major auto manufacturers almost exclusively used nickel metal hydride batteries. With the benefit of certain

technological advances momentum has shifted almost entirely to lithium batteries for automotive use.

In 2008, the Obama administration pledged to put 1 million hybrid electric vehicles on the road by 2015. As part of policies to reduce offshore energy dependence and carbon emissions, the US government has implemented several measures designed to establish a mainstream electric vehicle market in the US. Subsequently 15 of the 27 European member states, Canada, China and Japan have established tax incentives for purchasers of battery driven vehicles.

Policies encouraging electric vehicle development and manufacture have served to funnel funds into lithium based battery development. The first commercial facility manufacturing lithium ion cells for automotive use was commissioned in France in early 2009. Mercedes Benz and BMW began selling the S400 Hybrid and the 7 Series ActiveHybrid cars respectively in late 2009, each using 1.9 kWh lithium ion battery packs.

In August 2010 all major auto makers have plans, at various stages of implementation, to introduce vehicles incorporating lithium batteries in the drive train.

Among the more advanced electric vehicle programs, the Nissan Leaf is due to be sold in select markets in the US, Japan and Europe from December 2010.

Each Nissan Leaf vehicle is driven by a 24kWh lithium ion battery pack containing 4 kg of lithium. The batteries are currently being manufactured in Zama, Japan (capacity of 90,000 battery packs per year established in 2010). In future the batteries will also be made in Smyrna, Tennessee (200,000 units per year from 2012), Sunderland, UK (60,000 units per year from 2013), Flins, France (100,000 batteries from 2014) and Cacia, Portugal (50,000 units from 2012). In terms of energy output and lithium content the total battery manufacturing capacity to be built by 2014 for Nissan and Renault models, is equivalent to between 55% and 75% of the total of all kinds of lithium batteries manufactured in 2008.

Nissan's (and Renault's) electric vehicle plans are invariably echoed by other auto makers. The estimated total lithium battery manufacturing capacity announced to be built by 2015 is sufficient to equip the equivalent of 2.6 million electric vehicles with 24kWh battery packs (Roland Berger, 2010). The implied new battery demand for lithium at full capacity is 10,400 tonnes, or almost three times the lithium consumed in batteries of all kinds in 2008.

Aided by government incentives and domestic market purchasing power, the highly visible battles for electric vehicle market position are being played out in the US. Meanwhile a parallel electric vehicle development stream is underway in China.

The Chinese government has awarded substantial development subsidies, and subsidies to electric car buyers, designed to make China a market leader in electric vehicle development. Although driven by a similar set of energy dependence and pollution imperatives to the US, the Chinese market may prove a more fertile field for electric vehicle adoption. In China, vehicle power expectations are not entrenched, commutes are generally short, legal liability laws are not problematic for car makers, and there is some official ability to direct demand. Moreover, aided by tax incentives and subsidies, Chinese domestic vehicle sales surged to 13.6 million units in 2009, surpassing US vehicle sales for the same period.

Some advanced electric vehicle programs have levered off established lithium battery technology and capacity in China. BYD, the Berkshire Hathaway backed Chinese company, has developed lithium ion battery manufacturing capacity in Shenzhen for its own auto models. CODA Automotive, in joint venture with Lishen Power Battery, has established lithium battery making capacity in Lishen to supply CODA electric cars initially destined for sale in the US. Other Chinese auto makers, SAIC Motor Co, and Geely Holding Group have agreements with US battery makers to build lithium battery plants in China.

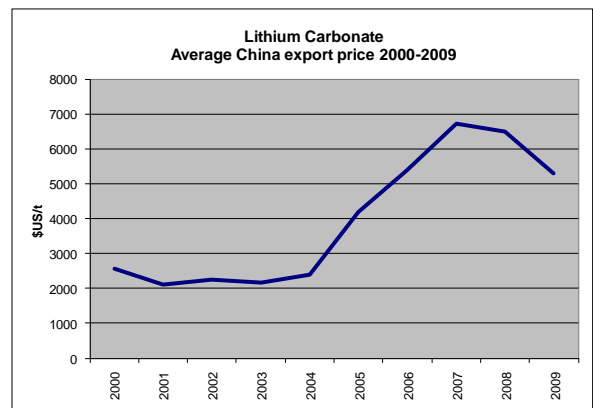
Electric bicycles, scooters and motorbikes also present scope for increasing lithium consumption. To date the use of lithium based batteries for two wheeled transport has been limited, despite annual sales in China of over 20 million electric bicycles carrying lead-acid batteries. A switch to lithium batteries hangs on safety and pollution concerns, and the development of large scale manufacturing capacity. Honda and Yamaha have plans to introduce lithium battery driven electric motorbikes to the Japanese market in late 2010, with an eye on the massive south and east Asian markets that account for 60% of the world's two wheel vehicle demand.

In terms of contained lithium per unit, transport use is in another league to mobile phones and laptops. A typical mobile phone battery contains 0.4 grams of lithium and a laptop computer contains about 18 grams. 'Mild' hybrid vehicles like the Mercedes S400 (in which the batteries assisting the internal combustion engine are recharged internally only), contain about 250 grams of lithium. Each Chevy Volt or Nissan Leaf (electric vehicles charged principally through mains electricity) will carry between 2 and 5 kilograms of lithium.

Estimates of future automotive lithium demand depend on the technology mix and the adoption rate, neither of which are predictable with much assurance. 60 million new cars and 80 million new motorcycles are registered around the world each year. An adoption rate of 10% of new cars only,

using an average of 1.5kg of lithium per vehicle, would require 9,000 tonnes of new annual lithium production, or about 40% of current world supplies. Assuming other applications maintain their current growth rate, the 9,000 additional tonnes of lithium consumed in autos by 2020 would require a 5% average annual growth rate in lithium supplies.

While the above figures are fairly arbitrary, they do suggest that the lithium industry could conceivably keep supplies up to coming demand. Studies conducted for the auto industry have concluded as much, relying on recycling to contribute significantly after 2020. For now fears that supply shortages could strangle lithium battery development have been set aside. Suppliers are on notice however to start developing new lithium resources. The rising price of lithium carbonate is one symptom of the pressure building on lithium supplies.



Source: Galaxy Resources.

### 3. Lithium Supplies

The first efforts to find and develop primary lithium sources began in the mid 1970s. Most early production came from coarse grained igneous rocks called pegmatites, in which lithium minerals are often associated with tin and tantalite. Established mines extracting tin and tantalite with physical separation processes added lithium streams as the lithium market developed in the 1980s.

Lithium also occurs in brine deposits, leached from the surrounding rocks and concentrated by evaporation in high altitude, dry climate salt lakes.

In 1997, the lithium carbonate price collapsed in concert with a major expansion of output from the Salar de Atacama in Chile. Lithium from the Salar de Atacama, the second largest salt flat in the world (the Salar de Uyuni in Bolivia is the largest), has since dominated supplies.

In 2008, about half of the world's lithium was produced from two brine complexes on the Salar de Atacama, operated independently by Chilean based SQM and Chemetall, of the US. A third major brine operation, Salar del Hombre Muerto in Argentina, was developed by FMC Corp in 1998, operated

well below capacity until 2005, and produced 15% of the world's lithium in 2008.

The largest pegmatite source of lithium is Talison Minerals' Greenbushes operation in Western Australia. In 2009, Greenbushes supplied about 24% of the world's lithium, in the form of spodumene concentrates. Spodumene ( $\text{Li}_2\text{O} \cdot \text{Al}_2\text{O}_3 \cdot 4\text{SiO}_2$ ) is the most common and highest grade lithium mineral in commercial pegmatites. A third of Greenbushes' 2009 concentrates were sold as direct feed in glass and ceramics applications. In 2009 Talison sold the remaining two thirds of its spodumene concentrates to Chinese 'converters'; small to medium scale manufacturers of lithium carbonate.

### 3.1 Brownfields Lithium

Excepting Talison's concentrate operations, no explicit cost indications are available or discernible for the world's lithium carbonate supplies. In all cases costs are veiled by one ore more of: co-product costs and revenues, diversified conglomerate accounts, commercial in confidence considerations, and a general desire to deter competitive lithium suppliers, particularly new entrants.

In this spirit, the major lithium producers have each recently stressed their reserve longevity and their ability to expand to meet new demand, while hinting at the difficulties facing new aspirants. Commitments to expansions though, are generally more guarded.

SQM expanded its lithium carbonate capacity from 30,000 to 40,000 tonnes of lithium carbonate equivalent (LCE) in 2008. Chemetall aims to expand to 40,000 tonnes LCE by 2015 after producing 27,000 tonnes LCE in 2008. Expansion plans on the Salar de Atacama may be tempered by lower marginal grades, the capital costs of new evaporation ponds and the need to find new markets for co-products. FMC struggled for several years at its Argentinian salar, suspending lithium carbonate production because of higher than planned capital and operating costs. The salars have their own challenges and they are not necessarily a cheap and plentiful future source of lithium.

In contrast with the more historically important tantalum operations, which are suspended, Talison has recently expanded its Greenbushes lithium output to meet the needs of the Chinese converters. There are currently about 10 Chinese converters with a collective capacity of 20,000 tonnes of lithium carbonate. Talison supplies about 60% of the Chinese converters' spodumene feed. Talison and its predecessors at Greenbushes have long sought greater access to the lithium chemicals market. A lithium carbonate plant was installed at Greenbushes in 1997 but never achieved capacity and was later dismantled. In late 2009 Talison was "continuing to evaluate downstream processing opportunities". The issue of setting up in

competition with its customers is a stumbling block for Talison.

Production of lithium from China's brines has been held back by remoteness and high magnesium, despite ongoing development efforts. Four independent operations produced a total of about 4,500 tonnes of LCE chemicals in 2009. High magnesium to lithium ratio in brines requires a separation step in the process, which invariably constrains output and/or introduces intolerable fresh water and power needs.

### 3.2 Greenfields Lithium

The building hype surrounding the lithium market has encouraged the promotion of new projects, including Galaxy Resources' Mt Cattlin. Claims and counter claims about lithium sector costs should be viewed in the light of the absence of any yardsticks and the degree to which market share is desperately being sought and protected.

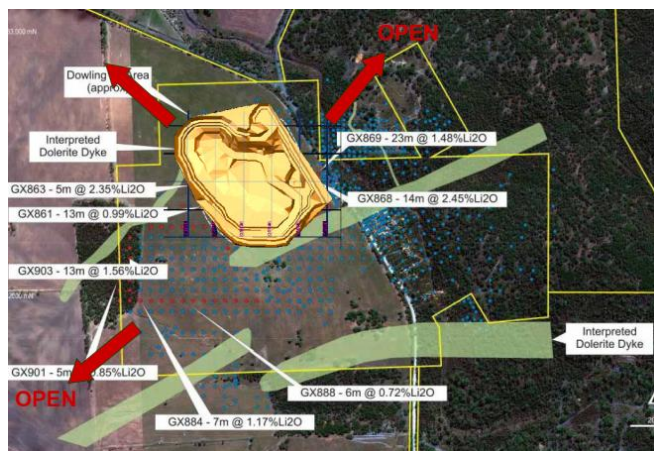
There are several new lithium project proposals. In November 2009, after offers from international companies were entertained, the Bolivian government announced it would be developing the large scale brine deposits in Bolivia's Salar de Uyuni by itself. Bolivia plans to spend \$US500 million to overcome the relatively high magnesium content and remote location of the Salar de Uyuni, and establish capacity of up to 30,000 tonnes of LCE per year from 2014.

The most advanced, independently held brine project, Rincon in Argentina, was sold by its distressed owner to hedge fund Sentient Group in early 2009 for US\$23 million. The major players allowed the deal to pass, in the process indicating that few undeveloped salars can match the favourable chemistry and evaporation rates on the Salar de Atacama. Sentient is building a pilot plant at Rincon capable of producing 1,200 tonnes of LCE.

A variety of pegmatites and other potential sources of lithium are also being brought forward for potential development. In the past the best margins for pegmatite derived lithium were available from selling spodumene concentrates for direct feed into glass and ceramic manufacturing processes. The anticipated growth in battery demand is leading most developers, including Galaxy, to investigate the viability of converting spodumene to lithium carbonate. The cost of conversion is expected to be 30-50% of the total cost of lithium carbonate production. Hence in addition to favourable ore deposit characteristics a new set of natural advantages are sought, including access to low cost power and soda ash, and an ability to sell a sodium sulphate by-product. Galaxy believes the combination of the Mt Cattlin pegmatite with an integrated lithium carbonate plant in China will deliver cost competitive lithium carbonate to Asian markets.

**4. Mt Cattlin**

Galaxy acquired the key Mt Cattlin tenement in late 2006 from the receivers of Sons of Gwalia for A\$730,000. Outcropping pegmatites at Mt Cattlin, just two kilometres outside Ravensthorpe in Western Australia, had been drilled for tin and tantalite by Western Mining in the 1960s and again by Pancontinental in the 1980s. Galaxy recognised the project’s lithium potential, consolidated the tenure and drill database and recommenced drilling in March 2007.



*Mt CATTLIN RESOURCES, JANUARY 2010*

Category	Mt	Li <sub>2</sub> O%	Ta <sub>2</sub> O <sub>5</sub> ppm
Measured	2.7	1.17	150
Indicated	9.6	1.09	171
Inferred	3.6	1.00	145
<b>TOTAL</b>	<b>15.9</b>	<b>1.08</b>	<b>161</b>

The Mt Cattlin pegmatite comprises one or more flat lying sills beneath zero to 30 metres of overburden. The mineralised zones average 8 metres thick and are drilled mostly on a 40 by 40 metre spacing across a 1km by 1km area. Parts of the resource margins are open and require more drilling.

Galaxy’s reserve estimate (11.4 million tonnes at 1.05% Li<sub>2</sub>O, proved and probable as at March 2010) draw only on the measured and indicated resources. Galaxy is planning an open pit mine at Mt Cattlin to extract 1.0 million tonnes of ore per year for 15 years, including some of the resources currently classed inferred. The average waste to ore ratio over the pit life is expected to be about 3:1. Galaxy has mining approval on one side of the road traversing the pit design. Mining is not planned east of the road until after 2015. Galaxy’s mining contractor mined the first pegmatite at Mt Cattlin in June 2010. Ore is

currently being stockpiled in preparation for the process plant commissioning planned to start in August 2010.



*Mining at 1A pit, Mt Cattlin*

Galaxy began construction of the Mt Cattlin processing plant in November 2009. Processing entails crushing to -6mm and screening, with the +0.5mm fraction proceeding to gravity concentration and two stage heavy media separation. Spodumene concentrate will be produced on site. By-product tantalite concentrate will be recovered from the -0.5mm fraction.

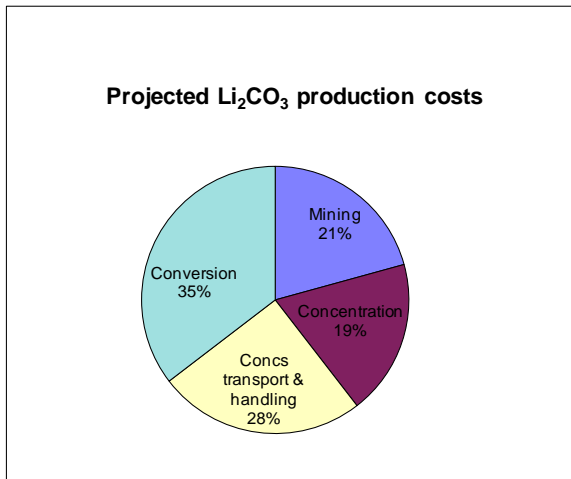


*Construction of Mt Cattlin DMS plant*

Peak capacity of 5MW of power will be generated on site by diesel gensets. Galaxy expects to meet the plant’s water requirements with on-site bores. The workforce is expected to live in the district.

A single stream of spodumene concentrate will be trucked 185 kilometres to the port of Esperance. The concentrate is chemically stable and can be held on site and in Esperance storage facilities. Minor amounts of tantalite concentrate will be recovered and trucked to Fremantle for export.

Commissioning of the Mt Cattlin crushing circuit began in August 2010. First spodumene concentrate was produced in late September 2010. Galaxy plans to ship 15,000 tonnes of spodumene concentrate in November 2010.



Source: Galaxy, Green Leader

Planned annual output from Mt Cattlin is 137,000 tonnes of spodumene concentrate grading 6% Li<sub>2</sub>O.

Spodumene concentration at Mt Cattlin involves conventional physical processes commonly applied in mineral extraction plants around the world. Initial focus will be on maximising recovery while maintaining an average 6% concentrate grade. Galaxy has targeted successful control of mining dilution, fines generation and mica separation among the keys to plant performance.

Galaxy aims to recover 75% of total lithium (non-spodumene lithium minerals such as lepidolite are present and will not report to concentrate) into a concentrate grading 6% Li<sub>2</sub>O. The higher the concentrate grade the higher both recovery and throughput at the conversion stage.



Mt Cattlin control room

The option of installing a flotation circuit, post commissioning, to recover additional spodumene from the - 0.5mm fraction is included in the process design. The benefits of increasing the recovery and the concentrate grade are to be weighed against the influence of the fines on calcine performance in the converter in China.



Mt Cattlin spodumene project

## 5. Jiangsu

Having recognised Mt Cattlin's fit with the lithium chemical market in China, an entry to the lithium carbonate market was sought. With the brines players and the fragmented Chinese conversion industry unable to quickly expand, Galaxy sensed a gap in the market opening for a new lithium carbonate plant.



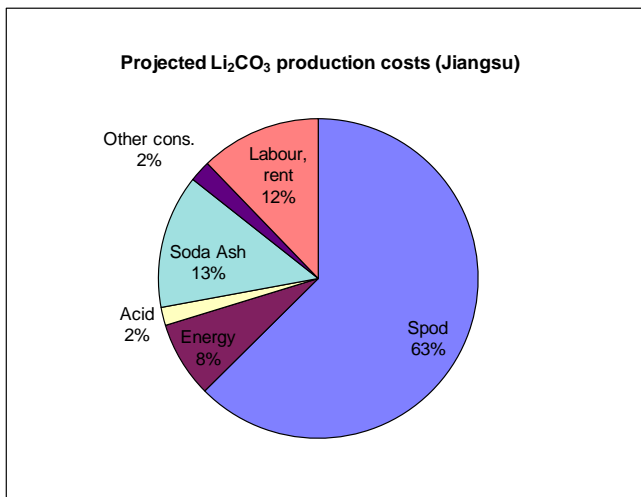
Artist impression of Jiangsu project

Galaxy's strategy is to replicate the Chinese converters' process route and success, but with several improvements;

- The plant will be the largest mineral to lithium carbonate conversion facility in the world, with better economies of scale than the small Chinese plants.

- Galaxy will build a plant using a continuous cycle with automated process control. The existing Chinese converters use batch processing and manual process control.
- The facility will be built next to a port, in an industrial park, where reagent suppliers, by-product customers and residue disposal options are readily available. The existing converters were built up to 600km inland next to pegmatite resources that have since given way to imported spodumene, largely from Greenbushes. Inland transportation is a significant cost burden.

In June 2009, Galaxy signed a 50-year lease agreement on a site suitable for a lithium carbonate plant in the Yangtze River International Chemical Industrial Park, in the Jiangsu Province of China. The site is to be connected by a 500 metre long conveyor to the wharf where Mt Cattlin spodumene concentrate will be unloaded.



Source: Galaxy, Green Leader

Galaxy intends to build a plant capable of converting the entirety of Mt Cattlin's annual output to 17,000 tonnes of lithium carbonate each year. Hatch Engineering China completed the Jiangsu Feasibility Study for Galaxy in October 2009. Hatch was subsequently awarded the EPCM contract for Jiangsu and began process design and preliminary site works in December 2009.

In July 2009 Galaxy signed letters of intent to purchase soda ash and sulphuric acid from suppliers within the industrial park to cover the plant's needs. The two main by-products, alumino silicate (130,000 tonnes per annum at full capacity) and sodium sulphate (52,000tpa) are potentially saleable within the park. Alumino silicate can be used as a cement additive. Sodium sulphate is consumed in textile and detergent manufacturing.

Project Approval and a Business Licence were awarded to Galaxy for the Jiangsu project in February 2010. Receipt of

a Construction Permit in June 2010 marked the successful completion of the permitting process.

At the end of September 2010 the concrete foundations for the Jiangsu plant and site office buildings were in place.

Galaxy expects to finalise the construction budget and completion schedule for Jiangsu in October 2010.

## 6. Capital Expense, Timetable

In mid 2009 Galaxy estimated the capital cost of Mt Cattlin's development to full capacity at A\$68 million. At the end of July 2010 Mt Cattlin was on time and budget according to the feasibility study.

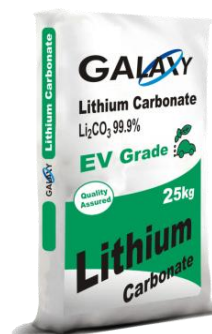
In September 2009 the Jiangsu lithium carbonate facility capital cost was estimated at A\$55 million, with commissioning scheduled for late 2010. The 2010 resurgence of construction activity in China doubled the lead times for critical plant items at

Jiangsu, extending the construction phase. Galaxy is revising the Jiangsu cost and schedule in light of the new delivery timetable and changes to the plant design. The accompanying forecasts assume capital expenditure of A\$75 million for Jiangsu, and commissioning from the March quarter of 2011.

Working capital to cover the split process and build up of stocks in Australia and China prior to first revenue is estimated at A\$12 million.

With delays at Jiangsu and commissioning on schedule at Mt Cattlin, Galaxy plans to sell limited amounts of spodumene concentrate to Chinese converters in late 2010 and early 2011. As of August 2010 demand for spodumene concentrate comfortably exceeds supply, and Galaxy has secured contracts to sell the scheduled concentrate surplus. The accompanying forecasts assume Galaxy sells about 30,000 tonnes of spodumene concentrate at US\$220 per tonne (CIF China), realising US\$6.5 million in revenue.

## 7 Marketing



Lithium carbonate is the base material for manufacturing various intermediate lithium chemicals that are delivered as cathode or electrolyte to battery makers. Battery grade lithium carbonate (>99.5% Li<sub>2</sub>CO<sub>3</sub>) is the standard feed for cathode material. High purity lithium carbonate (99.99% Li<sub>2</sub>CO<sub>3</sub>) is feedstock for battery electrolyte. Technical grade material (less than 99.5% Li<sub>2</sub>CO<sub>3</sub>) competes with

specialty spodumene in the glass and ceramics market and commands 10-15% lower prices.

In 2010 Galaxy amended the Jiangsu process design to include a circuit capable of producing high purity (+99.9%) or "EV Grade" lithium carbonate for the entirety of its output. The plant will also be designed to produce a smaller amount of electrolyte grade material (+99.99%). Galaxy believes price premiums up to US\$3,000/t and US\$10,000/t can be realised for the respective higher grades.

The addition of the process, which involves redissolution of lithium carbonate with carbon dioxide and water, ion exchange and precipitation, has the additional benefit of giving Jiangsu the means to attain battery grades across its output soon after commissioning. Also Galaxy believes lithium battery technology will drive demand towards higher purities of lithium carbonate for both cathode and electrolyte uses.

Chinese firms are major players in battery manufacturing. About half of the world's intermediate lithium chemicals destined for battery use is manufactured in China. Galaxy intends to sell up to 60% of its lithium carbonate into the domestic Chinese market. Domestic sales attract a VAT refund resulting in a net 7% differential in local and offshore revenues for Chinese producers.

In February 2010 Galaxy signed an agreement granting Mitsubishi Corporation off-take sales and distribution rights to a proportion of Galaxy's lithium carbonate output destined for Japan. In April 2010 Galaxy announced that 13 Chinese cathode producers had secured off-take rights to minimum fixed amounts of Galaxy's lithium carbonate output from 2011. Together with the Mitsubishi agreement Galaxy has off-take agreements in place for 17,000 annual tonnes of lithium carbonate for five years.

Galaxy noted in its April 2010 announcement that "Almost all of the lithium cathode producers Galaxy has engaged with are increasing capacity in the coming 12 to 24 months..."

All of Galaxy's lithium carbonate sales agreements are subject to customer approval processes; in which samples are tested over 6-12 months to ensure product compliance with set specifications. During the qualification period Galaxy plans to deliver most of its lithium carbonate into the larger technical grade market, receiving 15% lower prices than prevailing battery grade lithium carbonate prices.

At 17,000 tonnes per year, Galaxy plans to enter the market with about 17% of the world's 2008 lithium carbonate market demand and about 80% of the lithium carbonate total produced in China in 2008.

Given the pace of development of new battery production facilities around the world (and in China) it is conceivable that Galaxy's lithium carbonate will be absorbed by new

demand growth. Assuming 2.5% growth in other applications, about 18% growth in battery demand for lithium carbonate in each of 2010, 2011 and 2012 would be required to absorb 17,000 new annual tonnes in 2012. This growth rate is within the bounds of most industry forecasters, and not out of sync with the frenetic activity observable in transport markets.

Galaxy is still likely to face competition from other lithium carbonate producers, both from China and elsewhere, seeking to maintain or expand market share. Ultimately, Galaxy's initial marketing success will depend on its ability to deliver consistent, good quality material to its customers at a price less than equivalent material shipped from South America. Presently, Chinese cathode and Japanese electrolyte buyers contend with variable quality, batch made lithium carbonate from a number of domestic producers. South American brines sourced material does not currently compete in the Chinese market in significant quantities. Apart from the import duty issues and freight differential, brines sourced lithium chemicals have different contaminant elements that the Chinese cathode makers are not necessarily geared to handle.

Galaxy also has an eye on other opportunities that might flow from an early established presence in lithium carbonate production. The scale and efficiency of the Jiangsu facility could attract interest from spodumene concentrate producers worldwide. Galaxy has made design allowances for Jiangsu's expansion.

Lithium carbonate demand is likely to become more quality conscious as technical demands on batteries increase. Once Jiangsu is commissioned and the 2011 qualification periods are passed Galaxy expects to develop products according to customer needs, further entrenching market position and pricing power. The accompanying forecasts do not assume Galaxy will receive a premium above standard battery grade lithium carbonate prices, however premiums of up to 100% are available for high purity material.

## 8. Exploration

Subsequent to the resource and reserve estimations of March 2010 Galaxy drilled into newly discovered pegmatite beneath and to the north west of the pit design. The deeper pegmatites are flat lying, continuous, up to 26 metres thick and higher grade than the Mt Cattlin resource average. Galaxy is examining the implications of the discovery for resources and mine plans. Open pit and bulk underground mining methods, probably beginning late in the mine plan, will be considered.

There is further scope for underlying repetitions and lateral extensions of the known Mt Cattlin pegmatites.

Galaxy is the largest regional tenement holder in the Ravensthorpe district and until recently, as a primary

exploration target, lithium was largely ignored. Pegmatite outcrops on Galaxy tenements two kilometres north of Mt Cattlin. Galaxy suspects that a detailed search of the district is likely to reveal a wide distribution of spodumene mineralisation.

## 9. Finance

Galaxy placed 51 million new shares at A\$1.28 each in October 2009, raising A\$65 million. A further 36.3 million new Galaxy shares were issued to a subsidiary of Beijing based investment company Creat Group Co Ltd, in December 2009 and April 2010, at A\$0.88 each, raising A\$32 million. At the completion of the placements Creat Group and its subsidiaries held 19.9% of Galaxy's issued ordinary shares.

In late 2009 Galaxy entered into direct negotiations with RZB, an Austrian commercial and investment bank and China Development Bank (CDB) over a \$US105 million debt finance facility. As part of the process Galaxy drew down a US\$20 million bridging loan from the syndicate in November 2009 and repaid it in the June 2010 quarter. In September 2010, the US\$105 million debt facility was fully drawn after a delay due to the late receipt of the Construction Permit for Jiangsu. Galaxy must hold US\$50 million in reserve accounts to service the RZB/CDB facility, which has a seven year term and an interest rate of SIBOR + 4.5%.

In October 2010 Galaxy agreed to issue a A\$30 million convertible note to a Chinese investor. The funds are designated for additional working capital. Details of the terms and the investor are to be disclosed upon final documentation. The issue is subject to Galaxy shareholder approval.

Galaxy has 190.5 million issued ordinary shares and 24 million unlisted options, with varying exercise prices up to

A\$1.11 each. At the end June 2010 Galaxy had A\$18 million in cash after A\$68 million in capital expenditure in the June 2010 half.

## 10. Directors and Management

Iggy Tan was appointed Managing Director of Galaxy in 2008. He was previously manager of the lithium mineral and lithium carbonate plants at Greenbushes in 1995, and has held managerial roles at SCM Chemicals, Westlme, Iluka Resources, Imdex Minerals and Metals X Limited.

Mining engineer Terry Stark is General Manager of Galaxy's Western Australian operations. Galaxy appointed Anand Sheth Marketing and Business Development Manager in 2009. Anand Sheth previously managed the lithium and tantalum marketing programs for Sons of Gwalia/Talison from 1999 to 2009.

## 11. Lithium's Big Four

**SQM.** Chilean based, NYSE listed. Produces lithium from Salar de Atacama only. World's largest producer at about 29% of world lithium output in 2008, along with potassium chloride, potassium sulphate, boric acid and magnesium chloride co-products. Lithium comprised 8% of revenues in 2009.

**Chemetall.** Subsidiary of diversified Rockwood Holdings. A large operation on the Salar de Atacama and a small brine at Silver Peak, Nevada. 28% of world's lithium output in 2008.

**FMC.** Produces lithium from Salar del Hombre Muerto in Argentina. Lithium comprised a small revenue proportion of total revenue in 2008. Capacity 17,000 tonnes LCE pa (15% of the world's lithium output).

**Talison/China.** Talison produces about 25% of the world's lithium from the Greenbushes pegmatite, of which about two thirds is converted to lithium carbonate by numerous third parties in China.

## 12. Forecasts

### 12.1 Production Forecasts – Mt Cattlin/Jiangsu

Year End 31 Dec	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
<b>Mt Cattlin (100%)</b>										
Ore treated (000t)	150	875	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000
Head grade (%Li <sub>2</sub> O)	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10
Spod prodn (000t)	21	120	138	138	138	138	138	138	138	138
Conc. grade (%Li <sub>2</sub> O)		6.0%	6.0%	6.0%	6.0%	6.0%	6.0%	6.0%	6.0%	6.0%
<b>Jiangsu (100%)</b>										
Li <sub>2</sub> CO <sub>3</sub> sales (000t)		8.9	17.3	17.3	17.3	17.3	17.3	17.3	17.3	17.3
GXY capex (A\$m)	139	25	6	6	6	6	6	6	6	6

## 12.2 Profit and Cash Flow Forecasts – Galaxy Resources Limited

Profit & Loss	Unit	12-10F	12-11F	12-12F	12-13F	12-14F	12-15F	12-16F	12-17F
<b>Net Revenue</b>	A\$m	(9)	(7)	50	55	60	66	72	78
<b>Total Costs</b>	A\$m		(10)	(12)	(12)	(13)	(13)	(14)	(15)
EBITDA	A\$m	(9)	(17)	38	42	47	52	58	63
Depreciation/Amort	A\$m	2	(12)	(10)	(9)	(7)	(5)	(3)	
<b>EBIT</b>	A\$m	(8)	(29)	28	34	40	47	55	63
Net Interest	A\$m		9	(8)	(10)	(12)	(14)	(16)	(19)
<b>Pre-Tax Profit</b>	A\$m	(8)	(20)	19	24	28	33	38	44
Tax Expense	A\$m								
<b>NPAT</b>	A\$m	(8)	(20)	19	24	28	33	38	44
Abnormal Items	A\$m	(9)	(7)	50	55	60	66	72	78
<b>Reported Profit</b>	A\$m		(10)	(12)	(12)	(13)	(13)	(14)	(15)
Balance Sheet	Unit	12-10F	12-11F	12-12F	12-13F	12-14F	12-15F	12-16F	12-17F
<b>Cash</b>	A\$m	96	51	59	74	97	127	140	213
Other Current Assets	A\$m	7	11	11	11	11	11	11	11
<b>Total Current Assets</b>	A\$m	103	62	70	85	108	138	151	224
Property, Plant & Equip.	A\$m	183	201	194	186	178	168	157	145
Investments/other	A\$m	3	5	5	5	5	5	5	5
<b>Tot Non-Curr. Assets</b>	A\$m	186	206	199	191	183	173	162	150
<b>Total Assets</b>	A\$m	289	268	270	277	291	311	313	374
Short Term Borrowings	A\$m								
Other	A\$m								
<b>Total Curr. Liabilities</b>	A\$m								
Long Term Borrowings	A\$m	152	152	127	102	77	52	2	2
Other	A\$m								
<b>Total Non-Curr. Liabil.</b>	A\$m	152	152	127	102	77	52	2	2
<b>Total Liabilities</b>	A\$m	152	152	127	102	77	52	2	2
<b>Net Assets</b>	A\$m	137	116	142	175	213	259	311	372
Cash Flow	Unit	12-10F	12-11F	12-12F	12-13F	12-14F	12-15F	12-16F	12-17F
Operating Cashflow	A\$m	(9)	(7)	50	55	60	66	72	78
Income Tax Paid	A\$m								
Interest & Other	A\$m	2	(12)	(10)	(9)	(7)	(5)	(3)	
<b>Operating Activities</b>	A\$m	(8)	(19)	40	46	53	61	69	78
Property, Plant & Equip.	A\$m	(139)	(25)	(6)	(6)	(6)	(6)	(5)	(5)
Exploration	A\$m	(2)	(2)						
Investments	A\$m								
<b>Investment Activities</b>	A\$m	(141)	(27)	(6)	(6)	(6)	(6)	(5)	(5)
Borrowings	A\$m	124		(25)	(25)	(25)	(25)	(50)	
Equity	A\$m	31							
<b>Financing Activities</b>	A\$m	155		(25)	(25)	(25)	(25)	(50)	
<b>Net Cash Change</b>	A\$m	6	(45)	8	15	22	30	13	73
Ratio Analysis	Unit	12-10F	12-11F	12-12F	12-13F	12-14F	12-15F	12-16F	12-17F
GCFPS	A/c	(4.2)	(3.3)	23.4	25.8	28.3	30.9	33.6	36.4
CFR	X	(32.4)	(41.4)	5.9	5.3	4.8	4.4	4.1	3.8
EPS	A/c	(3.5)	(9.5)	9.1	11.2	13.3	15.5	17.9	20.7
PER	X	(38.9)	(14.4)	15.1	12.3	10.3	8.8	7.6	6.6
Interest Cover	x	6.0	na	2.7	4.0	6.0	9.3	na	na
ROCE	%	-5%	-8%	19%	22%	26%	30%	35%	42%
ROE	%	-5%	-25%	19%	19%	19%	18%	18%	17%
Gearing	%	111.3%	131.1%	89.4%	58.5%	36.2%	20.2%	0.7%	0.6%
*All values fully diluted unless otherwise stated									
Price Assumptions	Unit	12-10F	12-11F	12-12F	12-13F	12-14F	12-15F	12-16F	12-17F
Li <sub>2</sub> CO <sub>3</sub> battery grade	US\$/t	6000	6000	6367	6622	6887	7162	7448	7746
Exchange Rate	A\$/US\$	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85

## 13. Valuation

Reference date 31 December 2010.

Assets	A\$M	Cents /share
Mt Cattlin/Jiangsu	415	218
Cash and deposits	96	51
Debt	(153)	(81)
Option adjustment	(29)	(15)
<b>Share valuation</b>	<b>267</b>	<b>173</b>

The Mt Cattlin/Jiangsu project is valued under the assumptions described above, at an 8% real, after tax discount rate. A\$30 million) in convertible note yet to be issued is treated as debt. An AUD/USD rate of 0.85 is assumed for the life of the project. Lithium carbonate prices are escalated 4% per annum from 2012 and no price premiums are included for Galaxy sales prices above the average China export price of lithium carbonate.

## 14. Peer Comparison\*

Company	Ticker	Shares million	Price A\$	Mkt Cap A\$m	Net Cash A\$m	EV A\$m	Comment
SQM de Chile S.A.	NYSE:SQM						Low leverage.
FMC Corp	NYSE:FMC						Low leverage.
Rockwood Holdings	NYSE:ROC						Low leverage.
Talison Lithium	TSX:TLH	94	4.85	453	14	440	Merged with Salares Lithium
<b>Galaxy Resources</b>	<b>ASX:GXY</b>	<b>190</b>	<b>1.36</b>	<b>258</b>	<b>18</b>	<b>240</b>	<b>Mt Cattlin pegmatite. Commissioned Oct 2010</b>
Orocobre	ASX:ORE	91	2.40	217	25	192	Argentina Salar de Olaroz. Feas study due 2010
Canada Lithium	TSX V:CLQ	150	0.81	122	14	108	Quebec pegmatite. Feas study due 2010
Reed Resources	ASX:RDR	193	0.53	102	17	85	Mt Marion Australia pegmatite. Permitting Kings Valley rhyolite Nevada. Scoping study, met testing.
Western Lithium	TSX V:WLC	83	1.19	99	19	80	Cyr pegmatite, Canada. Resource est. Met testing
Lithium One	TSX V:LI	47	1.09	51	5	46	
Rodinia Lithium	TSX V:RM	65	0.46	29	6	23	Clayton Valley brine Nevada. Drilling
Salares Lithium	TSX V:LIT	36	0.61	22	5	17	Salares 7 Chile. Drilling
Linear Metals	TSX:LRM	53	0.24	13	1	11	Seymour Lake pegmatite Canada. Exploration
North Arrow Minerals	TSX V:NAR	36	0.17	6	0	6	Beaverdam pegmatite Canada. Exploration
First Lithium	TSX V:MCI	50	0.11	5	1	5	Valleyview brine Canada. Exploration

AUD/CAD = 1.01



*Mt Cattlin concentrator plant*



*Mt Cattlin operation at dusk*

### **Disclaimer and disclosure of interest**

This document (Report) is issued by Helmsec Global Capital Limited, Australian Financial Services Licence No. 334838 (Helmsec). This Report is intended solely for the use by wholesale/institutional clients within the meaning of section 761G of the Corporations Act 2001 (Cth) (Act), sophisticated investors pursuant to Section 708(8) of the Act, professional investors pursuant to Section 708(11) of the Act and/or otherwise persons to whom a disclosure document is not otherwise required to be given under Chapter 60 of the Act.

To the extent that any recommendations or statements of opinion made by Helmsec in this Report constitute financial product advice, they constitute general financial product advice only and do not constitute personal financial product advice in any manner whatsoever. Accordingly, any such recommendations or statements do not take into account the investment objectives, financial situation, taxation requirements and/or the particular needs of any recipient. Before subscribing for securities in the Company named in the Report (the Company), you should consider, with the assistance of independent financial and legal advisers, whether the potential investment is appropriate in light of your particular investment needs, objectives and financial circumstances.

Any recommendations or statements of opinion contained in this Report are based on assumptions made by Helmsec. These assumptions may or may not eventuate and accordingly, any such recommendations or statements of opinion may prove to be incorrect. This Report has been distributed in confidence and may not be reproduced or disclosed to any other person without the prior written consent of Helmsec.

The information contained in this Report has been prepared by Helmsec with due care but no representation or warranty whatsoever is made, express or implied, in relation to the accuracy and/or completeness of this information. This Report is based on information obtained from sources believed to be reliable and Helmsec has made every effort to ensure the information in this Report is accurate however Helmsec does not make any representation and/or warranty that any information in this report is accurate, reliable, complete and/or up to date. Except for any liability which cannot be excluded, Helmsec disclaims all liability for any error or inaccuracy in, or omission from the information contained in this Report or any loss or damage suffered, directly or indirectly by the reader or any other person as a consequence of relying upon the information.

Helmsec and its Directors, employees, agents and consultants accept no obligation whatsoever to correct and/or update any information and/or the opinions in this report. Opinions expressed are subject to change without notice and only accurately reflect the opinions of Helmsec at the time of writing this report. Helmsec and its Directors, employees, agents and consultants accept no liability whatsoever for any direct, indirect, consequential and/or other loss arising from any use of this Report and/or further communication in relation to this Report. The historical information in this Report is, or is based upon, information that has been released to the general market. Helmsec may or may not be paid by the Company to produce this document and Helmsec may or may not have been appointed by the Company to act as corporate advisor and/or as lead manager in relation to any future placement of securities in the Company. Helmsec may receive fees and securities in the Company if a placement does proceed.