

Upcoming IPO

A Lithium Triangle play

Centaur Resources is developing the Pacha Lithium Project in Argentina, which lies in an established lithium mining district in the 'mining friendly' Salta Province. In the near term, Centaur is seeking a JORC resource of lithium metal at Pacha sufficient for mine development. Centaur is expected to raise ~A\$50m in a forthcoming IPO where the stock is expected to commence trading on ASX early in 2020.

This research provides a tentative valuation of Pacha ahead of the resource statement and PFS/DFS and should be read in conjunction with the 24 September 2018 Prospectus available on CR3's website, as well as the company's August 2019 Corporate Presentation.

An interesting commodity and neighbourhood

The current boom in electric vehicles is expected to boost medium-term demand for all the components of lithium-ion batteries, coming as it does alongside ongoing robust demand for such batteries in smartphones, power tools and wearables. In 2018 there was about 270,000 tonnes of lithium demand and some estimates that suggested this will rise to about 1 million tonnes in 2025. There are two basic sources of lithium – hard rock and brine. The latter represents the low-cost option, since all that is required here, for a mine with sufficiently high grades to be economic, is to drill wells into the brine zones, pump the brine, and let evaporation take its course. The so-called 'Lithium Triangle' encompassing Argentina, Chile and Bolivia holds a lot of the world's economic lithium brine deposits. This part of the world has been a 'company maker' for Australia's Orocobre (ASX: ORE), and various juniors hope to follow in its footsteps. The lithium in the Triangle sits under dried lakebeds called 'salars'. Centaur's neighbours for Pacha on the Salar Pastos Grandes are two Canadian companies - Millennial Lithium and LSC Lithium. Drilling by Millennial has encountered thick lithium-bearing brine zones at depth.

JORC 2012 resource and PFS coming soon

Before December 2019 Centaur intends to complete the relevant exploration and resource drilling, followed by well development, that would allow an initial JORC resource to be proved up. After this resource has been established, Centaur will publish a PFS for an operation producing 25,000 tpa of Lithium Carbonate Equivalent.

ASX: CR3

Sector: Materials

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Source: Company



Source: Company

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Introducing Centaur Resources

Centaur Resources is developing the Pacha Lithium Project in Argentina. This 100%-owned project, which covers around 11,000 ha of ground, is in an established lithium mining district in Salta Province of northwestern Argentina. Until 2019 Pacha was called 'Lobo Blanco'. In the near term, Centaur is seeking a JORC 2012 resource of lithium metal at Pacha sufficient for mine development.

Why is Centaur's location in Argentina important? There are two basic sources of lithium – hard rock¹ and brine. The latter represents the low-cost option, since all that is required here, for a mine with sufficiently high grades to be economic, is to drill wells into the brine zones, pump the brine, and let evaporation take its course². The so-called 'Lithium Triangle' encompasses the 'Puna'³ of northwestern Argentina (Jujuy, Salta and Catamarca provinces) as well as northeastern Chile and southwestern Bolivia. This super-region holds a lot of the world's economic lithium brines which are easy to produce in part because of a superb climate for evaporation⁴.

This part of the world has been a 'company maker' for Australia's Orocobre⁵ (ASX: ORE), and various juniors hope to follow in its footsteps. The lithium in the Triangle sits under dried lakebeds called 'salars'. Centaur's salar for Pacha is the Salar Pastos Grandes, around 240 km west of Salta City, the provincial capital, at an altitude of 3,500-4,000 meters⁶. Centaur's neighbours for Pacha at Pastos Grandes are two Canadian companies - Millennial Lithium (TSX-V: ML) and LSC Lithium (TSX-V: LSC). Drilling by Millennial has encountered thick lithium-bearing brine zones at depth.

All the relevant pieces of infrastructure to develop world-class lithium mines are available in the district. Argentina holds a General Election on 27 October 2019. While there are concerns that this election may see a swing to the left, Centaur believes that the policy settings for the Argentine lithium industry will remain positive given Argentina's heavy reliance on mineral exports.

Why are potential new lithium mines valuable? The current boom in electric vehicles has significantly boosted demand for all the components of lithium-ion batteries, coming as it does alongside ongoing robust demand for such batteries in smartphones, power tools and wearables. In its September 2018 corporate presentation Centaur has cited several sources that are bullish in their medium-term outlook (see, for example, slide 6).

What has Centaur achieved at Pacha. Since bringing its project together in 2018, Centaur has achieved the following:

- Completed two resource wells that have confirmed lithium grades above 650mg/Litre, as well as a low lithium-to-magnesium ratio and a deep brine-bearing zone in excess of 500 metres.
- Negotiated access to steam, gas, power and demineralized water that gives the project competitive advantage.
- Completed a 'concept' Feasibility Study, with the PFS already underway

The Lithium Triangle was a company-maker for Orocobre

Centaur will initiate a DFS on a 25,000 tpa LCE operation after the JORC resource is completed

¹ With spodumene and pegmatite the two most notable sources.

² To produce lithium carbonate then typically requires impurity removal via solvent extraction, followed by carbonation and ion exchange to produce high purity lithium carbonate.

³ In Argentina the 'Puna' is a general term for the Andean high plateau. The word comes from the native Quechua language and means 'a cold and remote place that it is difficult to live in'.

⁴ There are also notable brine deposits in the US states of Nevada and Wyoming. Anson Resources (ASX: ASN) is developing the Paradox Brine Project in Utah.

⁵ Whose Salar de Olaroz Mine in Jujuy province, when it started production in 2015, made Orocobre the first brine based global lithium carbonate supplier in over twenty years.

⁶ The nearest town is Santa Rosa de los Pastos Grandes.



- Completed Pacha's environmental 'base case study' ahead of lodgment of the Environmental Impact Assessment, expected before the end of 2019.

What are Centaur's plans for Pacha? Over the next few months Centaur intends to publish its initial JORC 2012 resource estimate for Pacha. After this resource has been established, Centaur will complete the PFS for an operation producing 25,000 tpa of Lithium Carbonate Equivalent (LCE).

Who is Centaur's management? CEO Brian Clifford, (ex-Managing Director of AMCI Investments⁷) whose background is in carbon steel materials, has brought together a team at Centaur with valuable technical knowledge related to the conversion of lithium brines into lithium carbonate and lithium hydroxide. The team includes the ex-CFO of Rincon Lithium.

Pacha is a very promising lithium project

The right geology. At the Salar Pastos Grandes, as with many other salars in this part of the Lithium Triangle, there is an upper halite section, under which lies coarse-grained sands that host aquifers containing lithium-rich brines.

What makes Pastos Grandes interesting is, firstly, the high grades of the lithium that has been identified in drilling – in the order of 400-640 mg/Litre – to levels greater than 650 metres below surface. Grades tend to increase at depth in lithium brines, so that's encouraging. Centaur also believes that, so long as the experience of other operators to its north extend into the Pacha tenements, the relatively coarse-grained rocks to be found in the sedimentary sequences elsewhere at Pastos Grandes will have the kind of porosity making for high extraction rates, while the brine itself will have a relatively low level of sulphate or magnesium impurities. Centaur has been careful to stake out acreage specifically for their groundwater potential, in order to have enough fresh water to have a very strategic footprint on the Pastos Grande salar.

Good results from two resource wells. Centaur's two resource wells at Pacha, drilled in late 2018 and early 2019, confirmed lithium grades above 650mg/Litre of lithium, as well as a low level of magnesium (magnesium-to-lithium ratio only 4.5 to 1), and a very deep brine-bearing zone of more than 500m, with the floor of the salar yet to be established. This bodes well for the JORC 2012 resource estimate which Centaur intends to publish late in 2019. While noting that this estimate has yet to be completed, Centaur has indicated its belief⁸ that Pacha has a resource in excess of 1 million tonnes of LCE⁹, good for a mine life in excess of 40 years.

A relatively good infrastructure position. There is access to the relevant infrastructure for operators on the Pastos Grandes salar. Not only do well-paved roads cover the route from Salta City, but a 375-kilovolt power line runs along the road leading to Chile, and there is a gas pipeline less than 30 km away. For equipment and reagents being brought from abroad, railways run to Salta from both the Chilean port city of Antofagasta and from Buenos Aires. All this gives lithium project developers options that can allow brines to be developed economically in terms of capital costs.

Favourable arrangements for utilities. In August 2019 Centaur completed a number of agreements with a local utility provider covering the offtake of steam, gas, power and demineralized water. Centaur believes these agreements give it competitive advantage against other lithium projects

Brine zones on the Pastos Grandes salar grade very high for lithium

Centaur's ground is close to important infrastructure

⁷ Responsible for the Australian and South East Asia operations of the ACMI Group. AMCI is a private-equity giant run by German billionaire Hans Mende.

⁸ See the company's August 2019 Corporate Presentation, slide 7.

⁹ Each tonne of lithium (Li) is equivalent to just over 5 tonnes of lithium carbonate (Li₂CO₃).



being developed in the region where new power plants, gas pipes in excess of 40km would have to be built.

Cash costs at US\$3,500/tonne? Centaur is working towards reporting a JORC 2012 Resource and completing a PFS for Pacha before the end of 2019. It has conducted a Feasibility Study for an operation producing 25,000 tpa LCE. Currently, Centaur's plans for the Pacha flowsheet can be summarized as follows¹⁰:

- Onsite processing of brine into a 6% lithium concentrate;
- Trucking of that concentrate to a plant at Salta City that can produce both technical and battery-grade Lithium Carbonate¹¹.
- Cash costs at ~US\$3,500/tonne LCE¹² even with trucking 3% lithium concentrate to Salta City¹³. It believes it can get costs this low because there is no additional cost in the trucking due to the reduction in reagent, by-product and personnel vehicle movements.
- Centaur believes that the capital cost of the project would be US\$350m¹⁴

Figure 1: Project value in two scenarios

	Base	Optimistic
Production LCE tonnes p.a.	25,000	25,000
Price of lithium USD/tonne	10,000	12,000
Total costs USD/tonne	3,500	3,000
Capital cost USDm	350	300
Sustaining capital USDm (LoM)	40	30
Tax	40%	40%
Mine life (years)	20	20
Value of Pacha (A\$m)	756	1,275

Source: Pitt Street Research, Centaur Resources

Valuing Pacha

There are risks for any project value estimates, and what follows needs to be read in that light.

Potential value >~A\$700m base case. Obviously, with no JORC 2012 Resource has been estimated for Pacha at this stage, nor a published DFS. Based on what Centaur has disclosed for its internal estimates, a 25,000 tpa LCE operation at Pacha and Salta City could potentially be valued at ~A\$756m base case / A\$1,275m optimistic case using:

- A 10% discount rate;
- A 20-year mine life;
- An AUD/USD exchange rate of 0.7;

Centaur's Pacha Project could have an NPV of >A\$700m base case on our numbers

¹⁰ See the company's August 2019 Corporate Presentation, slide 6.

¹¹ Lithium carbonate for technical use generally requires a grade of 99.0% and battery grade at least 99.5%.

¹² See the company's August 2019 Corporate Presentation, slide 7.

¹³ Note: The assertion that the 3% figure is the basis for the US\$3,500/tonne cost estimate is not in the August 2019 presentation but was communicated to Stuart Roberts by Brian Clifford. Centaur believes that US\$3,300/tonne may be a more reasonable estimate.

¹⁴ See the company's August 2019 Corporate Presentation, slide 45.



- A tax rate of 40%, on the assumption that a new Argentine government would raise taxes in 2020 from their current level. At the present time the Argentine corporate tax rate is 35% and a 3% royalty on mineral products is payable to the province of Salta¹⁵.
- Long-term lithium prices at around the present level of US\$11,000/t LCE.
- Life-of-Mine sustaining capex of 11% of the original capital cost, consistent with other lithium brine operations¹⁶.

This valuation assumes that 100% of capital expenditures, including pre-production expenses and working capital, are financed solely with owner's equity. In reality, Centaur and its partners will likely use leverage.

Lithium's long-run pricing outlook is encouraging

Lithium has been in a bearish environment in 2018 and 2019. Lithium prices spiked in a significant way in late 2015 due to increased offtake for batteries, leading to a bullish environment for the commodity that lasted until late 2017. Lithium carbonate peaked in early 2018 when the average price of around US\$17,000/tonne¹⁷. It is now closer to US\$11,000. Driving the declines has been a ramp-up of certain mines as well as slightly slower than expected offtake from battery producers and other users of lithium.

Most forecasters are expecting a bottoming in 2021 once the marginal producers come off the market, generally from recyclers and hard rock lithium producers¹⁸.

Long-run, the future for lithium is bright, mainly because of the long-term prospects for electric vehicles. In 2018 there were 5.1 million electric cars on the road globally, 2 million more than in 2017. By 2030 the global electric vehicle fleet may be 130 million¹⁹. It is reasonable to expect this massive investment in lithium-ion batteries to begin soaking up a lot of lithium production capacity in the near term. In 2018 there was about 270,000 tonnes of lithium demand and some estimates that suggested this will rise to about 1 million tonnes in 2025²⁰.

Millennial's work at Pastos Grandes has been important for Centaur

Millennial has Centaur's neighboring project on the Salar Pastos Grandes. Vancouver-based Millennial Lithium started work on its Pastos Grandes Lithium Project in 2016. That project sits virtually alongside Pacha and has provided some encouraging drill results over the subsequent three years of exploration on the salar.

Millennial has valued its project at >US\$1bn after tax. By July 2019 it was able to announce a Feasibility Study for the project that suggested an after-tax NPV of US\$1.03bn, based on a 40-year life at an 8% discount rate

Millennial Lithium currently has a >US\$1bn after tax valuation for its Pastos Grandes project

¹⁵ See slide 6 of a presentation headlined *The regulatory perspective: how might policies impact lithium supply* by Daniela Desormeaux of signumBOX to the 9th Lithium Supply & Markets Conference in Montreal in May 2017.

¹⁶ See, for example, the Millennial Lithium press release dated 29 July 2019 and headlined *Millennial Lithium Corp. announces positive Feasibility Study results for its Pastos Grandes Project, Argentina*.

¹⁷ Source: Statista, *Average lithium carbonate price from 2010 to 2018 (in U.S. dollars per metric ton)*.

¹⁸ See, for example *Morgan Stanley predicts a 45% fall in lithium prices by 2021* by Sam Jacobs, Business Insider, 27 February 2018.

¹⁹ Source: IEA, *Global EV Outlook 2019*, 27 May 2019.

²⁰ See *The lithium industry needs a \$17b injection to meet 2025 demand – here come the deals* by Angela East, MSN, 16 May 2019.



- This study envisaged an operation producing ~24,000 tpa of battery-grade lithium carbonate
- The total initial capex estimate was US\$448m
- Mine-life opex was estimated at an average US\$3,338/tonne.

Millennial is currently trading at a significant discount to its long-run potential. Millennial currently has a market capitalization of US\$91.5m on the TSX Venture Exchange²¹. This suggests a significant discount by the market to account for the funding risk of the project.

Argentina remains a good place to develop lithium mines

Argentina's current political situation, clearly market-friendly and mining-friendly since 2015, is now uncertain.

- For most of the period 1996 to 2016 Argentina tended to regress from the market-friendly public policies of the early and mid-1990s. However, the election of Mauricio Macri as President in December 2015, after 12 years of leftist rule, sharply reversed this trend, with reforms implemented by his administration including an end to the ban on overseas remittance of profits and the dropping of the fixed exchange rate against the US dollar²². The Macri government is generally regarded as 'pro-mining', having repealed a 5% tax on mining exports in 2016, and in 2017 negotiated an agreement with most provinces to harmonize taxes and regulations on mining projects²³. Under Macri, investment in the mining sector has been rising²⁴.
- Argentina's next General Election takes place on Sunday 27 October 2019. President Macri is running for re-election, however primaries held on 11 August indicated that he may be headed for defeat, with the coalition backing the President's main left-wing rival, Alberto Fernandez of the Justicialist Party, winning ~48% of the vote versus just ~32% for the coalition supporting President Macri²⁵. Following this unexpected outcome, the Argentine peso dropped sharply on foreign exchange markets and the Buenos Aires Stock Exchange experienced panic selling, with the country's main stock index losing almost half its value in the subsequent weeks²⁶.

A victory for Alberto Fernandez may still have upside for the lithium sector.

- Shortly after the 11 August primaries, Alberto Fernandez met with executives of mining companies active in Argentina, as well as governors from provinces where mining is important to the local economy, in order to address concerns about his stance on the mining sector in Argentina. At that Buenos Aires meeting Fernandez told attendees that his party was working a legal framework to provide certainty for would-be lithium miners. Fernandez was quoted as saying '*If I do my job right, companies will want to keep their money in Argentina*'²⁷. In his remarks to the meeting Fernandez emphasized the importance of mining exports to Argentina's economic wellbeing

The administration of Argentine President Mauricio Macri has been mining-friendly

²¹ 16 September 2019 close on TSX-V.

²² It's worth noting, however, that Macri's centre-right Cambiemos party lacks a majority in both chambers of Argentina's National Congress.

²³ See *Argentina passes mining act expected to create 125,000 new jobs* by Cecilia Jamasmie, minnig.com, 14 June 2017.

²⁴ See *Mining companies still reluctant to tap Argentina deposits* by Juliana Castilla, Reuters, 23 May 2018.

²⁵ In Argentina voting in the primaries is compulsory for all voters and not just party members. Consequently, whoever wins the primaries is seen as a favourite for the presidential polls.

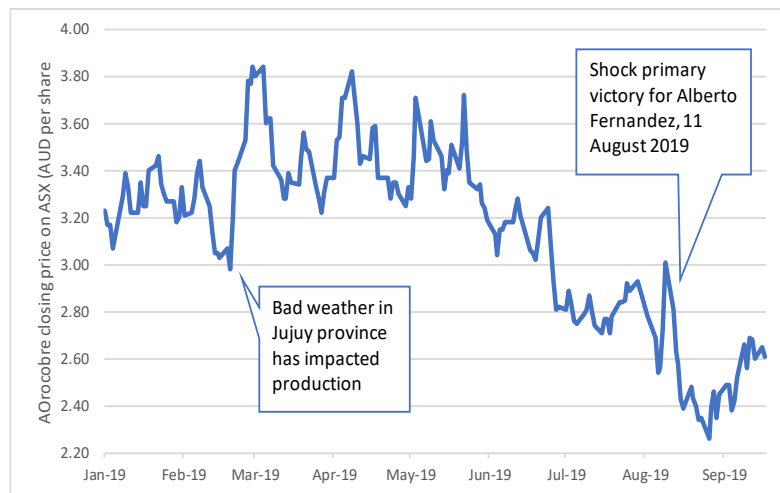
²⁶ See *Time to buy? Argentina's bargain basement stocks start to gain appeal* by Eliana Raszewski and Rodrigo Campos, Reuters, 13 September 2019.

²⁷ See *Argentina opposition candidate Fernandez meets with mining companies, governors* by Cassandra Garrison, Reuters, 27 August 2019.



- It's important to remember that the provincial governments are important to the health of the mining sector in Argentina due to their high level of regulatory oversight compared to the Federal government. The current governor of Salta is Juan Manuel Urtubey, of the same Justicialist Party as Alberto Fernandez. Urtubey was first elected governor in 2007 and his administration has widely been regarded as 'pro-mining'. Salta has no turnover tax and no stamp tax for the mining industry.
- Interestingly, Orocobre stock has begun to recover since the late August Buenos Aires meeting (see Figure 2) .

Figure 2: Orocobre stock has begun to recover from the events of 11 August



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