Dr Chris Baker
February 2024

Southern Palladium Ltd (ASX:SPD, $0.36. Market cap A$32.3m)

Jewel of the East: Bengwenyama Scoping Study released

Investment view: *To say that the results of the Bengwenyama Scoping Study surprised us is somewhat of an understatement. Production forecasts are significantly higher than we'd thought, capital lower and opex significantly lower. This is largely attributable to an impressive 7E mineable grade of 6.55g/t, the highest UG2 grade on the Eastern Limb with the bulk of the mining inventory under 500m vertical depth. Using relatively conservative commodity prices, project economics are impressive, with an NPV_8 of just under US$700m (100% basis, after tax) and an IRR of 21%. This is a special project – in our view the best greenfield PGM project globally - and one which deserves far more attention than the market is currently paying.*

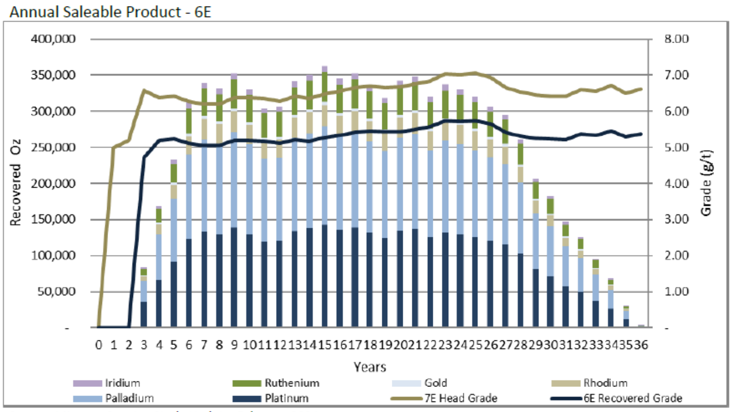
We are currently in South Africa and will visit site with management and consultants Minxcon to fully understand this very encouraging Scoping Study.

Bengwenyama Scoping Study

The physicals – an unusually high grade deposit for the Bushveld delivering 300-350kozpa PGMs for over 30 years.

At the heart of the Bengwenyama scoping study is the following production and grade profile, well in excess of our estimates. Head grades for a +30 year mine life average 6 to 7g/t (7E). At a 2mtpa mill throughput, mine production following a 3 year ramp up is forecast to range between 300 and 350koz (7E basis or 250 to 300koz 4E basis). Again, this is well above our estimates presented on our August 2022 report and will be of a scale comparable with the major mines on the Eastern Limb of the Bushveld.

The grade of the mining inventory at 6.55g/t (7E), significantly higher than other operations on the Eastern Limb. As we've been saying for some time, Bengwenyama appears to be the sweet spot on the Easter Limb.



Source: Minxcon Scoping Study Update, February 2024

Life of mine cash costs are estimated at an exceptionally low US$771/oz (7E basis excl. royalties, US$910/oz 4E basis), roughly $200/oz lower than our early estimates. This places the Bengwenyama project firmly towards the lower end of the South African (and global) PGM cost curve. Pre-production capital is impressive, at just over US$400m (against our estimate of US$450m) including a conservative 15% contingency. The company has commented that several of the items have already been costed at PFS levels.

The headline mine life for the Study is 36 years, however as shown in the chart above reserves and production start to wain in Year 28. It's worth making the point that in addition to the 10.9Moz contained within the "mining inventory" there are a further 3Moz contained in the resource base (14Moz in total) and a further 11.5Moz in Exploration Target (midpoint of estimate). This project holds the promise of a very long mine life.

The table below summarises the key outcomes from the Scoping Study.

Capex		Base case	Optimistic case	Comments
Pre-production, years 1-3	US$m	408		
Ongoing (>year 3)	US$m	104		
Sustaining (life of mine)	US$m	406		
Peak funding	US$m	406	380	
Payback period	Years	6.5	5.2	
Production				
Mill thoughput	Mtpa	2.0		
Head grade (4E), average	g/t	5.41		
Head grade (7E), average	g/t	6.55		
Metallurgical recovery (4E)	%	85%		
Metallurgical recovery (6E)	%	81%		
PGM production (4E), range	Kozpa	260-310		At full production rates
PGM production (6E), range	Kozpa	315-360		At full production rates
Chromite production, approx	Ktpa	125		Estimated, full production
Operating cost				
Costs, C1, 4E, average, LOM	US$/oz	910		
Costs, AISC, 4E, average LOM	US$/oz	970		
Costs, C1, 7E, average, LOM	US$/oz	771		Excl. royaties
Costs, AISC, 7E, average LOM	US$/oz	836		
Payability (4E)	%	86%		Less for minor PGMs
Commodity/FX assumptions (long term)		**Base case**	**Optimistic case**	**Spot prices**
Platinum	US$/oz	1200	1450	931
Palladium	US$/oz	1100	1350	985
Rhodium	US$/oz	5000	7000	4450
Gold	US$/oz	1800	2100	2054
Iridium	US$/oz	5000	5000	5000
Chrome (42%)	US$/t	285	300	NA
Exchange rate	ZAR/USD	18.9	20	18.6
Basket price (4E)	US$/oz	1529	1720	Estimated for optimisitic case
Basket price (7E)	US$/oz	1495	NA	
Economoic analysis		**Base case**	**Optimistic case**	
EBITDA margin (4E)	US$/oz	619	810	Basket price less AISC
EBITDA margin (7E)	US$/oz	659	NA	Basket price less AISC
EBITDA margin (4E)	%	40%	47%	
EBITDA margin (7E)	%	44%	NA	
NPV(8), pre tax	US$m	1043	NA	
NPV(8), post tax	**US$m**	**698**	**1328**	
IRR, pre tax	%	24.0%	NA	
IRR, post tax	**%**	**20.8%**	**30.0%**	

A few comments:

- To achieve production levels of around 2Mtpa (170kt/month), a new mine plan has been proposed which involves the establishment of two declines, the first into the main section of the UG2, the second into the so-called Northern Horst Block.

- As released earlier, the consultants propose a hybrid mining method, consisting of mechanised methods for mine development and conventional (hand held) stoping. This is the mining method employed at the Modikwa mine to the north.

- No surprises in the process plant: very much a conventional crush/grind/gravity/float circuit. Capital costs are modest (US$99m initial capital estimated).

- The two areas which need refining in our judgement are (1) metallurgical recoveries where only limited work has been conducted and (2) payabilities for the PGM suite. We have little concern around the metallurgical response of the ore. There seems to be quite a high degree of consistency within the UG2 Reef in the Bushveld.

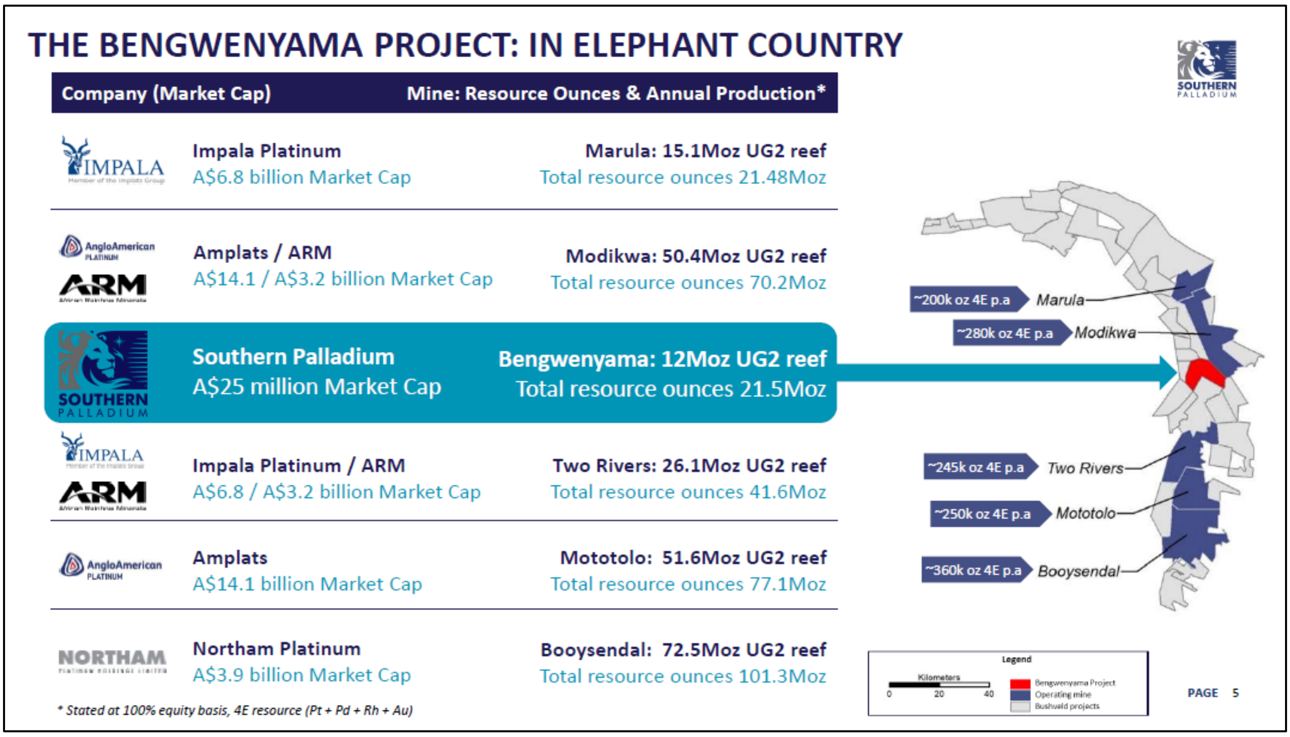
- Regarding concentrate offtake, SPD state that with the completion of the scoping study the company is now able to commence discussions with the smelters. UG2 smelting capacity is held by all the majors, Impala (Refining Services), Amplats, Sibanye and Northam. As we understand, all have a history of dealing with the non-integrated producers (eg Tharisa, Sylvania, Ivanplats). We look to develop comfort that an average payability of 86% (as used in the Study) is achievable.

- Base case commodity price assumptions, while higher than spot, appear perfectly realistic. In our evaluation of the project (modelling is underway), we will likely use slightly higher commodity prices, believing that the current flood of Russian metal will eventually dry up. It is worth highlighting that the WPIC is forecasting a platinum deficit of over 1 million ounces this year. If this is correct – and WPIC analysis has been very good over recent years – its hard to imagine the PGM basket remaining at these subdued levels.

Comparing Bengwenyama with its peers

SPD, in a recent presentation, highlighted its proximity to Tier 1 PGM assets within the Bushveld's Eastern Limb. Immediately to the north is the world class Modikwa mine of Amplats/ARM, and to the south is the Two Rivers mine of Implats/ARM. Production, largely from the UG2 Reef at five operations, totals over 1 million ounces (4E basis), with resources an eye-watering 200Moz. Of course, many of these ounces are deep and are unlikely to be economic at current metal prices. All the existing mines are at least 15-20 years old.

To this can be added the prospect of 260-300,000 low cost ounces (4E) from Bengwenyama for at least 30 years.



In the table below, we compare Bengwenyama's mining inventory (what will likely become mineable reserves) with the five mines of the Eastern Limb. Bengwenyama's mineable grade appears to be materially higher than its neighbours. The mining width is narrower, but not materially when compared with the northern neighbours, Modikwa and Marula. The mines to the south (Two Rivers, Mototolo and Booysendaal) extract using fully mechanised mining methods from wider and lower grade sections.

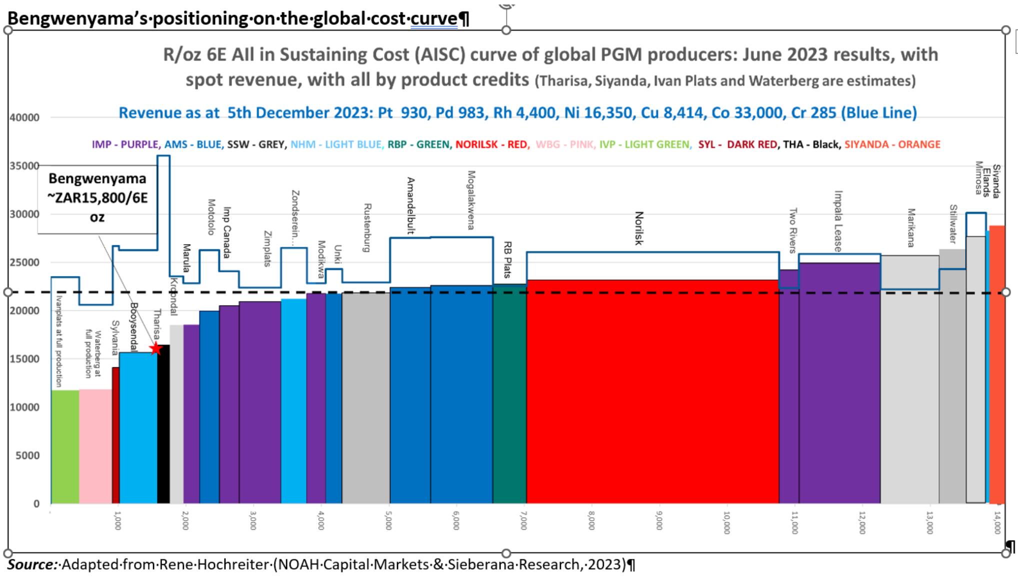
UG2 Reserves					
Deposit/Mine	Owners	Grade (4E,g/t)	Mining Width (cm)	g.cm	Concentrator Recoveries %
Marula	Implats (72.6%)	3.7	119	440	87
Modikwa	ARM (50%), Amplats (50%)	4.2	119	505	87
Bengwenyama	SPD (70%) - mining inventory	5.4	110	596	85
Two Rivers	ARM (51%), Implats (49%)	2.7	246	670	81
Mototolo	Amplats (100%)	3.3	218	713	84
Booysendaal	Northam (100%)	2.2	230	497	84

A common comparison of orebody quality uses "gram-centimetres", that is the orebody grade times the mining width. All else being equal, the higher the number the better. At 596g.cm, Bengwenyama compares favourably against its northern neighbours. Demonstrating how this rule doesn't always work, the lowest cost mine to the south is Northam's Booysendal mine, assisted by a high mining rate (we assume). Two Rivers, at one time Implats flagship mine, has experienced metallurgical issues and costs are now very high, as shown in the cost curve below.

The cost curve: Bengwenyama firmly in the lowest quartile

As shown in the chart below, Bengwenyama's life-of-mine cash costs are inferred to sit well within the lowest cost quartile, lining up against the Booysendaal mine and the chromite co-product Tharisa mine. We are to be convinced that the yet-to-be-financed Waterberg mine of Platinum Group Metals (PTM TSXV) will continue to demonstrate ultralow cash costs. Ivanplat's low costs reflect the full 5.2Mtpa Stage 2 expansion.

Bengwenyama's positioning on the global cost curve



Source: Adapted from Rene Hochreiter (NOAH Capital Markets & Sieberana Research, 2023)

How does the Scoping Study compare with our expectations?

In August 2022 we put together what we thought could the likely outcome of a scoping study. This was well before a more recent resource upgrade, which delivered higher grades than were estimated.

Mill throughput is a little higher than we'd been expecting. The largest difference – excluding commodity price estimates – lies with the cash costs assumed.

Operating Metrics	Unit	Scoping Study	BSCP Est	Diff	% Diff
		Jan-24	Aug-22		
Throughput	Mtpa	**2.00**	1.80	0.2	11%
Grade	g/t PGM (6E+Au)	**6.55**	4.50	2.05	46%
Recovery	%	**85**	85	0	0%
Production	kozpa PGM (6E)	**330**	250	80	32%
Mine Life	Years	**36**	20	16	80%
Capex	US$m	**408**	451	-43	-10%
C1 Cash Cost	US$/oz (6E)	**717**	1,100	-383	-35%
Assumptions					
Pt	US$/oz	**$1,200**	$800	$400	50%
Pd	US$/oz	**$1,100**	$1,500	-$400	-27%
Rh	US$/oz	**$5,000**	$14,000	-$9,000	-64%
Au	US$/oz	**$1,800**	$1,750	$50	3%
Financials					
NPV_8(post tax)	US$m	**698**	1,035	-$337	-33%
IRR (post tax)	%	**21**	29	-8	-28%

We will look to substantially update our Bengwenyama model following the forthcoming webinar (Monday 5 February) and a site visit (Thursday). This will also need us to revisit our commodity price assumptions, with higher platinum likely, while dropping our palladium and rhodium assumptions. At the moment we would contest that forecasting PGM prices involves a degree of faith, but we do note from the cost curve above that around 50% of the industry is operating at or below the current average price. This is clearly not sustainable (but may take time for markets to rebalance).

With the marked slowing in EV demand, and a steady growth outlook for ICE vehicles, we suspect the commodity analysts will need to revisit their PGM demand numbers.

As well, we note that Nornickel's platinum and palladium output was down significantly in the December quarter (17% and 15% respectively, YoY), which may go some way toward balancing markets in the short term. There is an emerging view in the PGM industry that Russian sales were largely responsible for the rapid fall in PGM prices (especially palladium and platinum).

By downloading this report you acknowledge receipt of our Financial Services Guide, available on our web page www.bridgestreetcapital.com.au.

Bridge Street Capital Partners Pty Ltd is licensed to provide financial services in Australia; CAR AFSL 456663; Level 14, 234 George Street, Sydney NSW 2000
Bridge Street Capital Partners Pty Ltd is providing the financial service to you.

General Advice Warning

Please note that any advice given by Bridge Street Capital Partners Pty Ltd or its authorised representatives (BSCP) is GENERAL advice, as the information or advice given does not take into account your particular objectives, financial situation or needs. You should, before acting on the advice, consider the appropriateness of the advice, having regard to your objectives, financial situation and needs. If our advice relates to the acquisition, or possible acquisition, of a particular financial product you should read any relevant Prospectus, PDS or like instrument.

Disclaimers

BSCP provides this financial advice as an honest and reasonable opinion held at a point in time about an investment's risk profile and merit and the information is provided by BSCP in good faith. The views of the adviser(s) do not necessarily reflect the views of the AFS Licensee. BSCP has no obligation to update the opinion unless BSCP is currently contracted to provide such an updated opinion. BSCP does not warrant the accuracy of any information it sources from others. All statements as to future matters are not guaranteed to be accurate and any statements as to past performance do not represent future performance. Assessment of risk can be subjective. Portfolios of equity investments need to be well diversified and the risk appropriate for the investor. Equity investments, made by less experienced investors, in listed or unlisted companies yet to achieve a profit or with an equity value less than $50 million should collectively be a small component of a balanced portfolio, with smaller individual investment sizes than otherwise. Investors are responsible for their own investment decisions, unless a contract stipulates otherwise. BSCP does not stand behind the capital value or performance of any investment. Subject to any terms implied by law and which cannot be excluded, BSCP shall not be liable for any errors, omissions, defects or misrepresentations in the information (including by reasons of negligence, negligent misstatement or otherwise) or for any loss or damage (whether direct or indirect) suffered by persons who use or rely on the information. If any law prohibits the exclusion of such liability, BSCP limits its liability to the re-supply of the Information, provided that such limitation is permitted by law and is fair and reasonable.

Disclosures

Dr Chris Baker, an authorised representative of BSCP, certifies that the advice in this report reflects his honest view of the company. He has over 30 years investment experience in wholesale capital markets. He worked as a mining analyst for brokers BZW and UBS for 11 years and has a further 16 years' experience as a mining analyst and portfolio manager with Colonial First State and Caledonia Investments. He now provides independent financial advice on a part time basis. He may own securities in companies he recommends but will declare this when providing advice. He currently owns shares in SPD. He is remunerated by BSCP but is not paid a specific fee for providing this report. BSCP are Corporate Advisors to SPD and may receive fees from SPD for services provided. BSCP, its directors and consultants may own shares and options in SPD and may, from time to time, buy and sell the securities of SPD.

BSCP was lead manager for the IPO of SPD and received fees for that service.

US Disclaimer: This investment research is distributed in the United States by Bridge Street Capital Partners Pty Ltd and in certain instances by Enclave Capital LLC (Enclave), a U.S.-registered broker-dealer, only to major U.S. institutional investors, as defined in Rule 15a-6 promulgated under the U.S. Securities Exchange Act of 1934, as amended, and as interpreted by the staff of the U.S. Securities and Exchange Commission. This investment research is not intended for use by any person or entity that is not a major U.S. institutional investor. If you have received a copy of this research and are not a major U.S. institutional investor, you are instructed not to read, rely on or reproduce the contents hereof, and to destroy this research or return it to Bridge Street Capital Partners Pty Ltd or to Enclave. The analyst(s) preparing this report are employees of Bridge Street Capital Partners Pty Ltd who are resident outside the United States and are not associated persons or employees of any U.S. registered broker-dealer. Therefore, the analyst(s) are not subject to Rule 2711 of the Financial Industry Regulatory Authority (FINRA) or to Regulation AC adopted by the U.S. Securities and Exchange Commission (SEC) which among other things, restrict communications with a subject company, public appearances and personal trading in securities by a research analyst. Any major U.S. institutional investor wishing to effect transactions in any securities referred to herein or options thereon should do so by contacting a representative of Enclave.

Enclave is a broker-dealer registered with the SEC and a member of FINRA and the Securities Investor Protection Corporation. Its address is 19 West 44th Street, Suite 1700, New York, NY 10036 and its telephone number is 646-454-8600. Bridge Street Capital Partners Pty Ltd is not affiliated with Enclave or any other U.S. registered broker-dealer