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WHAT I LEARNED THIS WEEK®

Excerpt from August 18, 2022

BHP Group's bid for OZ Minerals highlights its forecast for accelerated EV sales and copper demand.

Earlier this week, Australia's *Financial Review* disclosed the key rationale behind BHP's recent US$6 billion bid for OZ Minerals: a year ago, BHP was forecasting that EVs would constitute 25% of global vehicle sales in 2030, but the company now anticipates that the percentage will be 60% in 2030, 80% in 2035 and 90% in 2040. **This is up from just over 4% in 2020.**

The company also forecasts that **EVs will make up 45% of the global light vehicle fleet by 2035, far higher than the 17% forecast 18 months ago.** The EV adoption curve BHP is now estimating is considerably faster than the U.S. EIA's projections, summarized in *WILTW* March 10, 2022, which called for 31% of the global vehicle fleet to be electric by 2050. Either way, **the opportunity for copper miners is enormous.** (See section 4.)

We suspect that BHP's projections are way too optimistic in terms of their magnitude, although the direction will be steadily upward. The optimism appears to contradict the fact that all of the minerals and materials needed for the transition—lithium, cobalt, nickel, rare earths, etc.—are in tight supply following years of underinvestment and rising resource nationalism.

Furthermore, these tight supplies are going to continue driving up costs for EVs, which will slow down their adoption. McKinsey recently noted that **the powertrain of a typical battery-electric vehicle (BEV), consisting of the battery, inverter and electric motor, together cost more than $10,000—three to four times more than a conventional internal combustion engine (ICE) vehicle.**

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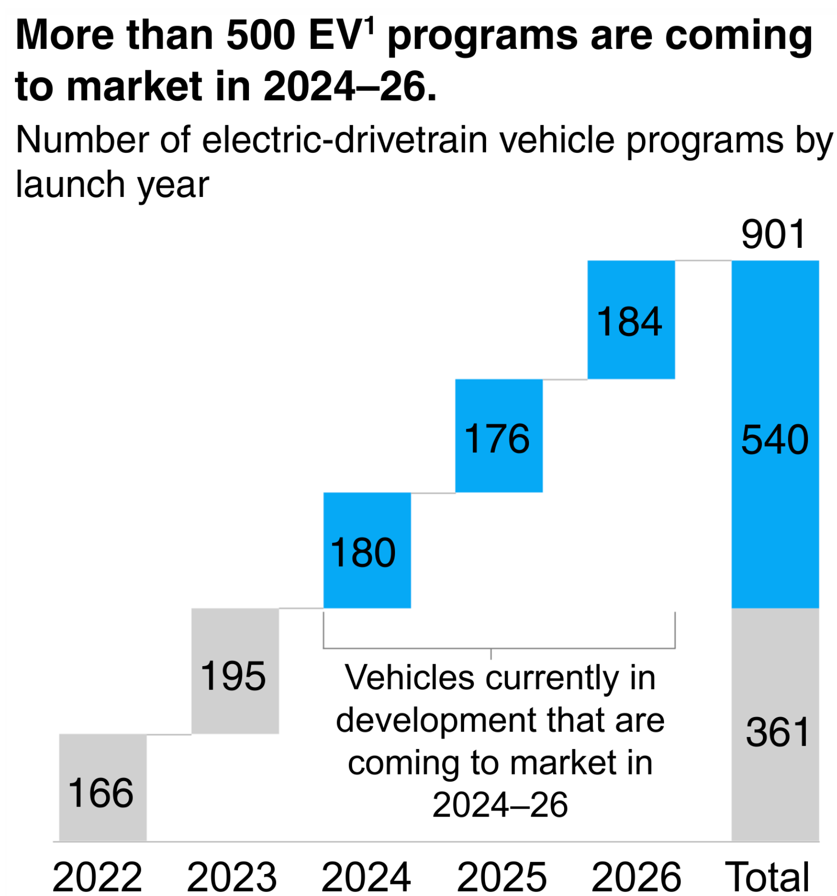
Going forward, in the absence of a massive increase in low-cost metals supply, cost reductions will have to rely heavily on advancements in engineering designed to reduce materials content. Adding to these concerns are **serious shortcomings in the existing public EV-charging infrastructure, as noted by a recent J.D. Power survey.**

Not far from BHP's forecast, McKinsey estimates that electric vehicle sales (BEV and PHEV) will approximate 47 million by 2030, up from 23 million in 2025 and only 3 million in 2020. **This forecast is based on the more than 500 EV programs being planned by the world's automakers between 2024 and 2026**, which *highlights the urgency for miners to accelerate their pace of investment.*



Source: McKinsey

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The sector is so far behind the curve that it may be impossible to avoid a doubling (or more) of copper prices by decade's end. S&P Global's July 2022 report—*The Future of Copper*—is predicting a nearly **10 million metric ton (mt) shortfall in copper supply by 2035**, under its baseline scenario, which assumes a continuation of current trends in the capacity utilization of mines and recycling of recovered copper.

The report adds: "One way to meet the demand growth would be to develop and open new mines. Theoretically**, future demand could be met by opening three 'tier-one' mines, each producing 300,000 metric tons of copper per year every year for the next 29 years.** That would be a monumental and taxing job, and without any precedent historically and **costing over $500 billion in today's dollars**. Moreover, it can take more than a decade and a half to develop a new mine."

To put these needs in perspective, consider that **only 12 significant copper deposits (containing over 500,000 tons in reserves, resources and past production) were discovered during the last decade, containing a total of 60.5 million mt of copper**. And only three discoveries were made over the last five years, containing a mere 5.6 million mt. On top of this, the average annual exploration expenditure has averaged $2 billion in each of the last five years.

Declining ore-grades and resource depletion are major drags on future supply that receive relatively little attention. In its mid-year economic outlook, BHP estimated that **grade declines could remove approximately 2 million mt of gross mine supply annually by 2030, using a 2019 operating asset baseline, while depletion of underlying resources could potentially remove an additional 1.5-2.25 million mtpy by 2030.**

The punchline, according to BHP: "Our view is that the price-setting marginal tonne a decade hence will come from either a lower grade brownfield expansion in a lower risk jurisdiction, or a higher grade greenfield in a higher risk jurisdiction. **Neither source of metal is likely to come cheaply."**

Substitution can only help at the margins. The ability to substitute other materials in place of copper is limited due to cost and performance concerns. **Copper has the second-highest conductivity of all metals, behind only**

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silver, which costs over six times as much. And while aluminum can be used as a substitute for copper in some applications, its lower conductivity means that cables must be larger and require more space.

Copper substitutes also tend to have lower energy efficiency, and in the case of aluminum, can be subject to greater fatigue under stressful conditions, therefore requiring greater maintenance. Meanwhile, copper has technical advantages that make it particularly superior in terms of corrosion, friction and fire resistance.

With copper prices having fallen over 25% or more from their high, clouded-over by fears about the Chinese economy and a global recession, this might be the last opportunity for copper assets to be purchased relatively cheaply**.**

BHP Group (BHP US, $56.53) **is in an exceptionally strong position to add to its portfolio of forward-facing commodities,** *such as copper, which will benefit from global de-carbonization trends.* The company generated a 16% improvement in underlying EBITDA in FY 2022 (ended June 30th), to US$40.6 billion, with a 65% EBITDA margin.

The three main profit drivers were as follows: Iron Ore—$21.7 billion of EBITDA at a margin of 71%; Copper—$8.6 billion of EBITDA at a margin of 61%; and Metallurgical Coal—$7.7 billion of EBITDA at a margin of 62%. **The company generated an overall return on capital employed (ROCE) of nearly 49% in FY2022, up from 32.5% in FY2021.**

In addition to having a diverse, low-cost base of underlying assets, one of our favorite attributes of BHP is that it **generated a massive amount of cash: in FY2022, it generated over $24 billion of free cash flow from continuing operations—and that was after investing over $6 billion of capex in its continuing operations.** (It divested its oil operations via a merger with Woodside Petroleum earlier this year. See *WILTW* August 19, 2021.) The excess cash generation enabled it to return $17.9 billion of dividends to shareholders, **while reducing its net debt by more than 90% to $0.3 billion.**

Although the stock has sold off due to the widespread decline in commodity prices, recession/China-slowdown fears, the technical pattern presents an

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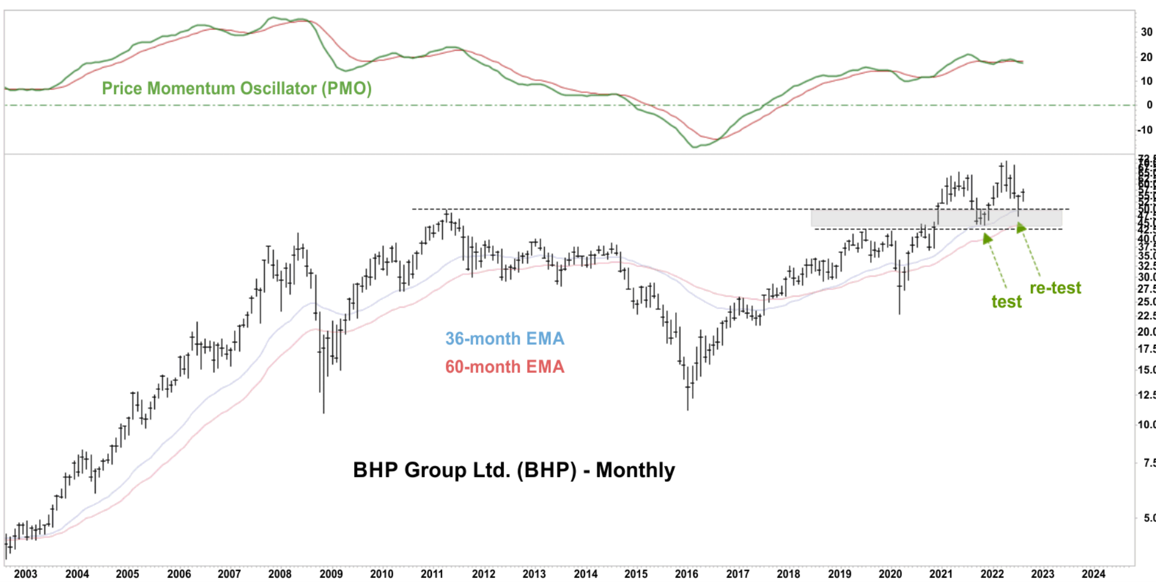
intriguing parallel uptrend on top of a lengthy base. **And with an EV/EBITDA multiple of 4.7x, based on *Bloomberg's* estimate for FY2023, the stock has the potential for multiple expansion if the Chinese economy improves from here.**

CEO Mike Henry recently hinted that the China slowdown fears may have run their course: **"We think that over the next six-to-12 months, China, if anything, is going to provide some stability to global growth and will help offset some of the slowing that we see elsewhere."** With China increasingly stimulating its economy, chances are that BHP shares will return to the higher end of the parallel channel in the coming months.



Source: StockCharts

The recent price weakness in copper also presents another opportunity in **Foran Mining** (FOM CN, C$2.36), which we originally wrote-up in *WILTW* May 27, 2021. The Ontario Teachers' Pension Plan is considering a **C$200 million investment in Foran's McIlvenna Bay project** (closing of the deal is anticipated later this fall) which would be done at an **implied valuation roughly double the company's current market cap of C$472 million.**

McIlvenna Bay is estimated to be the largest undeveloped Volcanogenic Massive Sulphide (VMS) deposit along the prolific Flin Flon Greenstone Belt of eastern

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Saskatchewan. Recent feasibility studies outlined an initial-phase 18-year mine life, with **production forecast at 65 million pounds of copper equivalent at an average AISC of $0.90/lb.** (net of credits). Foran aims to turn McIlvenna Bay into the world's first carbon-neutral copper mine.

This major investment follows the C$100 million investment from Prem Watsa we wrote about last year, further demonstrating the attractiveness of investing in high-quality copper assets in first-class jurisdictions like Canada. It is also noteworthy that **Foran outperformed its peer group in a down market (down 7.5% YTD in local currency, versus COPX down 15.6% YTD), which is often a good sign when the cycle eventually turns upward.**

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