

Can the palladium market continue to defy gravity?

Palladium prices have risen from US\$316/oz in January 2016 to US\$2,329/oz today, representing an impressive 637% gain in just under 5 years. The big question investors want to know is where will the prices go from here? To get a feel for the answer, today I look at palladium supply and demand and what the industry expects.

Palladium prices have had an impressive rally since January 2016 up 637%



Source

2020 palladium supply vs demand forecast

Palladium supply decreased in 2020 due to COVID-19 related supply disruptions from South Africa, but palladium demand also weakened in 2020 due to a slowdown in conventional car

sales due to COVID-19.

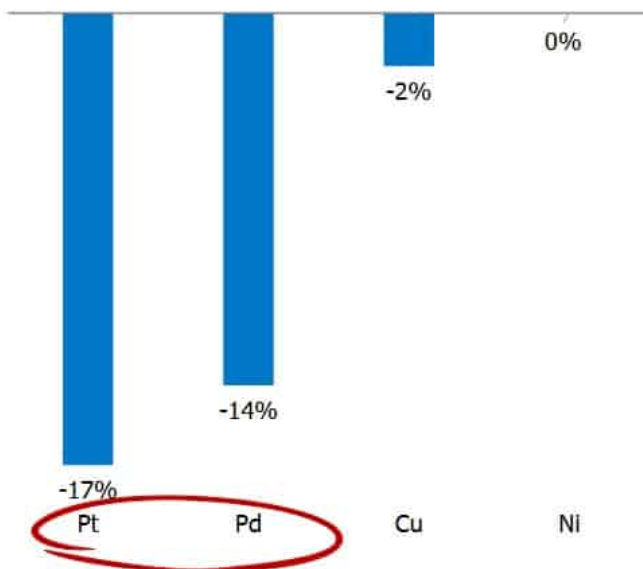
According to the world's largest palladium producer, Norilsk Nickel, 2020 global palladium supply is forecast to fall 14% and demand is forecast to fall 16%. Effectively balancing a market that was previously in deficit. This forecast suggests that palladium prices should remain relatively high in 2020, especially if auto demand continues to pick up in Q4, 2020.

Palladium (Pd) supply estimated to fall 14% and demand to fall an estimated 16% in 2020

COVID-19: Major Distortion to Commodity Markets in 2020

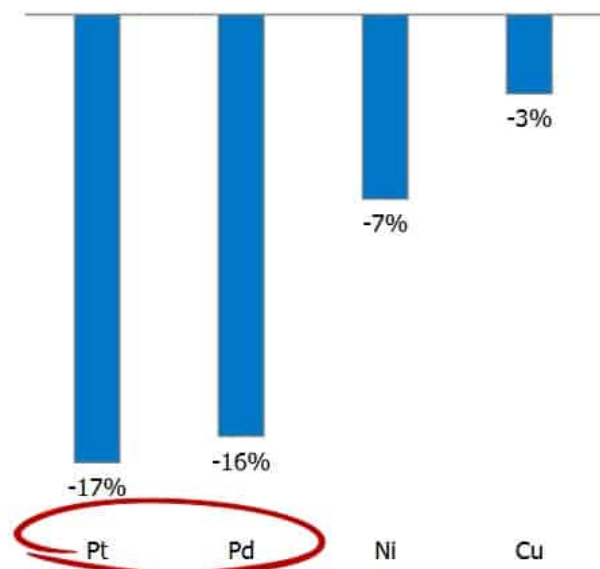
Global Supply of PGMs Impacted the Most due to Quarantine in SA, Little Impact on Base Metals

Supply 2020E vs 2019



Global Demand for PGMs Down Sharply on a Major Contraction of Autos, Base Metals Being Less Affected

Consumption 2020E vs. 2019



Source

Mid term palladium demand continues to look strong as tightening auto-emissions rules are requiring larger volumes of palladium in exhaust systems (75% of palladium demand comes from catalytic converters). By 2030 onward 100% battery electric vehicles (EVs) may be taking significant market share that palladium auto demand begins to decline. At that point the EV and battery metals such as lithium, cobalt, copper,

nickel, manganese and graphite should be doing very well as EV sales start to dominate.

In the mid term new palladium supply is expected to continue to be slow to come online as palladium is usually mined as a by-product of nickel or platinum mining. In the long term high palladium prices will most likely lead to more supply and some price reductions for palladium.

Best palladium performers on Sept. 30, 2020 from InvestorIntel's Palladium Watchlist



Source

A palladium company we have been watching lately is Canadian Palladium Resources Inc. (CSE: BULL | OTCQB: DCNNF | FSE: DCR1). Canadian Palladium is an exploration stage company that has a 100% interest in the East Bull Palladium Property in the Sudbury Mining Division in Ontario, Canada. The company recently found high grade palladium at their East Bull

Palladium Property. Canadian Palladium also owns the Tisova Copper/Cobalt Project which gives them exposure to the EV metals market in the longer term. You can click the link below to read more.

- Canadian Palladium strikes high grade palladium at their East Bull Project

The palladium market continues to perform very well in 2020 despite COVID-19 related supply and demand issues. In the short term palladium demand should continue to recover as global auto sales recover. In the mid term palladium demand is expected to remain strong due to tightening emission standards globally. Norilsk Nickel forecasts the medium term outlook for palladium as neutral and the long term outlook as positive. Longer term, by 2030, palladium demand should begin to fall as we move faster to EVs and conventional internal combustion Engine (ICE) car sales decline rapidly.

Canadian Palladium strikes high grade palladium at their East Bull Project

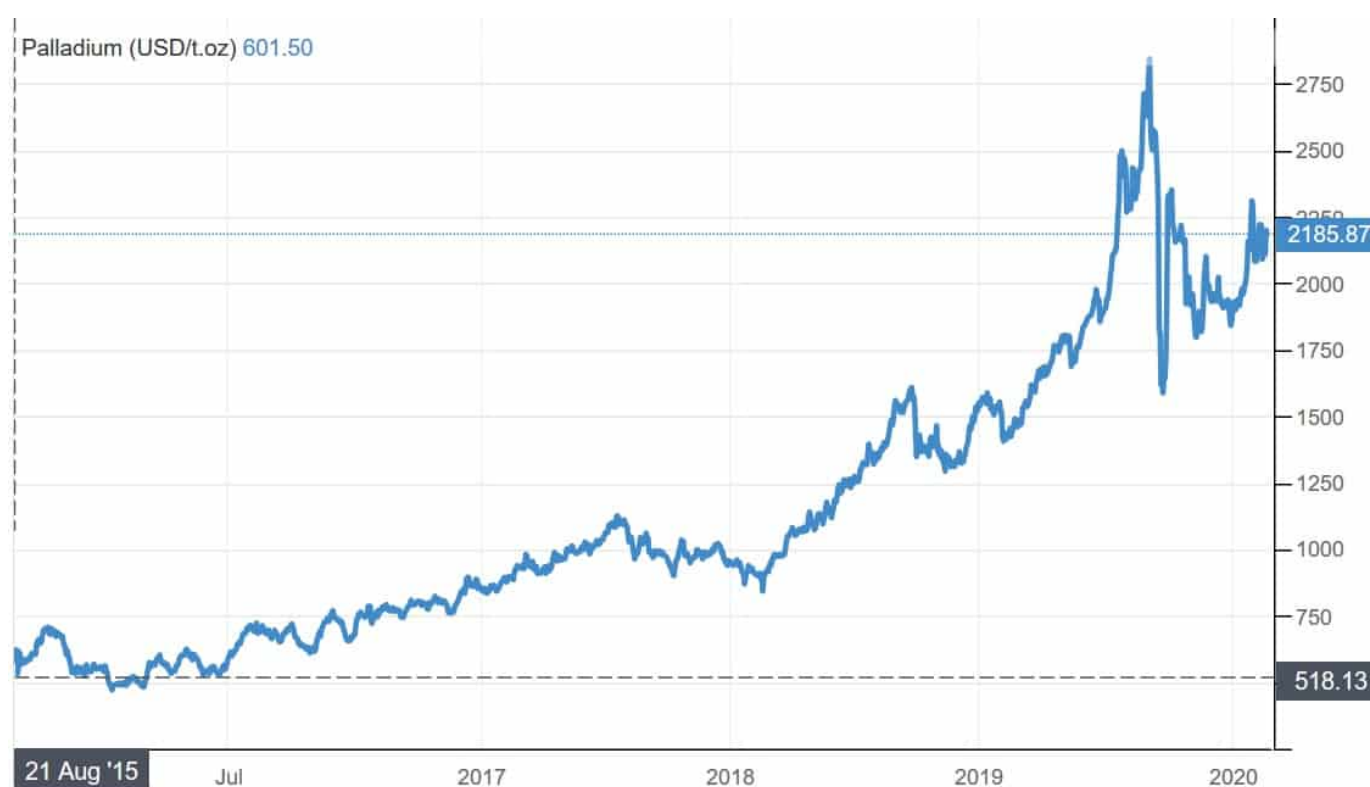
Palladium's bull market is rising faster than gold

Many people are surprised when they hear that palladium (Pd) is more valuable than gold. Gold may get all the attention from investors, but palladium is currently having an ever bigger bull market than gold thanks to the push to reduce vehicle emissions and the need for palladium in catalytic

converters. Palladium is up a staggering 4.2 fold (a 320% gain) over the past 5 years, compared to gold which is up 1.8 fold (an 80% gain).

The good news for palladium is that the world continues to tighten emission standards which means more demand for palladium, and likely continued strong prices. Analysts agree that palladium will remain in supply deficit for at least 7 years. Junior miners who can successfully build up a resource of palladium can potentially do as well as those finding gold.

Palladium is up a staggering 4.2 fold (320%) in the last 5 years – Palladium US\$2,185



Source: Trading Economics

One palladium junior miner of note has just struck good grades of palladium in Canada and is in the process of expanding their resource. Canadian Palladium Resources Inc. (CSE: BULL | FRANKFURT:DCR1 | OTCQB:DCNNF) is an exploration company focused on palladium. In 2019 Canadian Palladium acquired an option agreement to acquire a 100% interest in the 992 hectare

East Bull Palladium Property in the Sudbury Mining Division in Ontario, Canada. The Project has good logistics and infrastructure from being in a very mining friendly location near Sudbury.

This week Canadian Palladium announced their latest drill results at their East Bull Palladium Property. The results include several high-grade palladium intersections with significant platinum (Pt), rhodium (Rh), gold (Au), and copper (Cu) with associated nickel (Ni) and cobalt (Co). The best drill holes were:

- Hole EB20-01 with 4.0 m at **8.15 g/t** palladium equivalent (Pd-Eq).
- Hole EB20-03 with 3.0 m at 6.29 g/t Pd-Eq, as part of 15.0 m at 2.69 g/t Pd-Eq.
- Hole EB20-07 with 3.0 m at 7.47 Pd-Eq, as part of 24.0 m at 2.14 g/t Pd-Eq.

Back in June 2020, the Company reported:

- Hole EB – 20-12 with 2.68 g/t over 3 .0 metres and 2.28 g/t over 3.0 metres within a broader interval of 1.32 g/t over 20 metres.

The East Bull Palladium Project has a 43-101 compliant inferred resource estimate of 1.1m tonnes at a grade of 1.46g/t Pd Eq for a total of **523,000 ounces** palladium (Pd) Equivalent (Eq), with significant upside potential.

43-101 compliant inferred resource estimate for the East Bull Palladium Project

	Tonnes	Au	Pt	Pd	Rh	Cu	Ni	Co	3PGM+Au	PdEq	PdEq
Inferred	M 11.1	g/t 0.05	g/t 0.05	g/t 0.58	g/t 0.04	% 0.14	% 0.05	% 0.01	g/t 0.93	g/t 1.46	Oz k 523

Source: Company investor presentation

The Project has been drilled over a 1.8 km strike length to

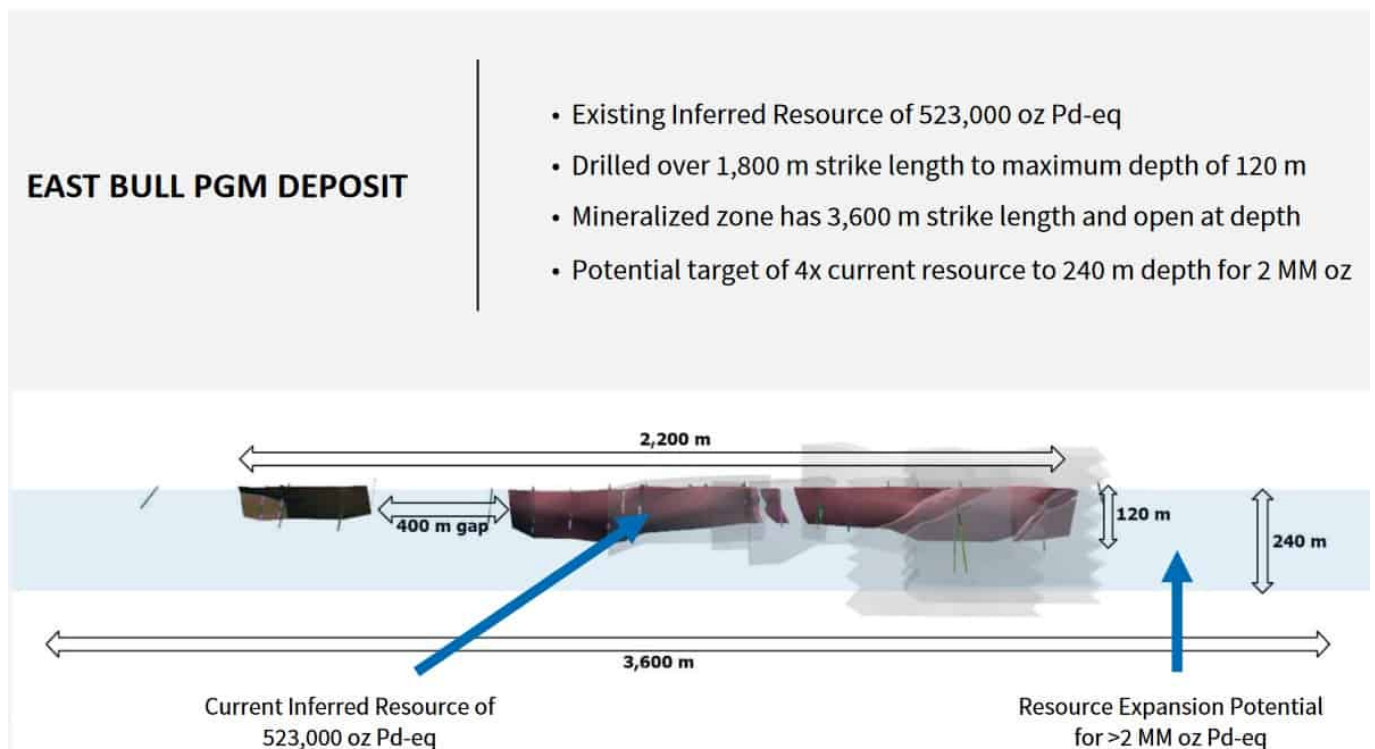
maximum depth of 120 m, however the mineralized zone is 3.6 km in length and open at depth. The latest drill results reinforce the company's belief that there is significant exploration upside potential for the deposit.

"Canadian Palladium is pleased with the results from the initial holes in this program," said company director Garry Clark, P.Geo. "These intersections report complete assay results that include palladium, platinum, rhodium, gold, copper, nickel and cobalt. High-grade palladium intersections are rare and these results have exceeded our grade expectations based on Canadian Palladium's 2019 Inferred Mineral Resource Estimate of 523,000 oz Pd-Eq at a grade of 1.46 g/t Pd-Eq for East Bull. We look forward to releasing additional results on this exciting Project."

Recent magnetotelluric (MT) survey results announced in July on the East Bull Palladium Project identified two new, shallow drill targets that are adjacent to the Valhalla Deposit palladium resource.

Canadian Palladium believes the East Bull PGM deposit has considerable resource expansion potential

– Resource Expansion Potential at East Bull PGM Deposit



Source: Company investor presentation

Canadian Palladium also has a second project called the Tisova Copper-Cobalt Project located on the Czech/German border and has recently sold their Turner Lake property in Canada for one million common shares in Pacific Cascade Minerals Inc. plus a 1% NSR royalty with a buyout value of C\$1m.

Closing remarks

It is a great time to be exploring for and finding both palladium and gold as well as other associated valuable metals such as rhodium, platinum, cobalt, nickel, and copper. Canadian Palladium has all of these metals in one deposit at their East Bull Palladium Project.

With an already robust inferred resource, Canadian Palladium thinks they can continue to grow the resource with additional exploration. Given the Company trades on a market cap of just C\$16.7m there is plenty of potential upside left for investors should they succeed.

Search Minerals expands their rare earths discovery with critical materials' zirconium and hafnium

As the West looks to establish a non-Chinese source of supply of critical rare earth elements, one Canadian company has been successfully expanding its rare earths project, as well as discovering some additional valuable metals like zirconium (Zr) and hafnium (Hf).

Zirconium dioxide (ZrO_2) is used in laboratory crucibles, metallurgical furnaces, as a refractory material, and in ceramics (including use in dental ceramics); because it is mechanically strong and flexible. Zircon ($ZrSiO_4$) and the cubic zirconia (ZrO_2) are cut into gemstones for use in jewelry. Ceria-zirconia is widely used as a component in current three-way catalytic converters.

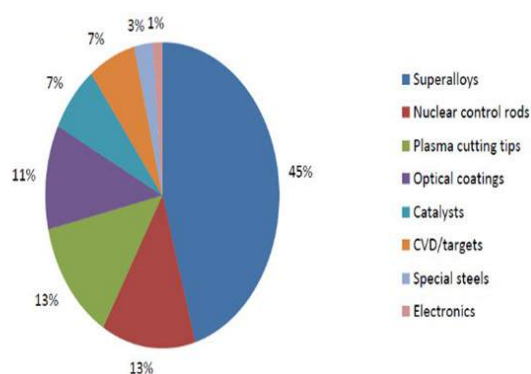
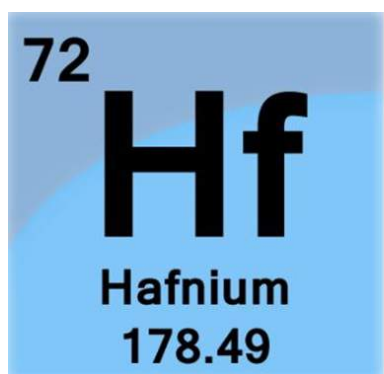
Zirconium is used in ceramics, jewelry, dentistry, and catalytic converters



Hafnium is a good absorber of neutrons and is used to make control rods, such as those found in nuclear power plants and submarines.

Hafnium is used in some superalloys for special applications such as jet engine turbines in combination with niobium, titanium, or tungsten. Hafnium oxide is used as an electrical insulator in microchips, filaments and electrodes.

Hafnium is used in superalloys, nuclear rods in nuclear submarines, microchips, and jet engine turbines



Search Minerals discovers zirconium and hafnium

Search Minerals Inc. (TSXV: SMY) recently announced that they have discovered zirconium and hafnium, in addition to their existing valuable rare earths dysprosium (Dy), neodymium (Nd), praseodymium (Pr), terbium (Tb) and yttrium (Y). The discovery was made at their Silver Fox Deposit.

With regards to the Silver Fox discovery Search Minerals stated: "This surface expression is significantly longer, but thinner, than the surface expressions of the nearby and related **FOXTROT** and **DEEP FOX** Resources. The mineralization is similarly hosted by peralkaline volcanic rocks and contains slightly lower grades of the REE magnet materials (Nd, Pr, Tb and Dy) but significantly higher grades of Zr and Hf."

Dr. David Dreisinger commented: "The objective of metallurgical testing of the **SILVER FOX** (and other deposits) will be to recover a high grade zirconium by-product for sale

with minimal processing cost and complexity. Search is engaged with our technology advisor, SGS Canada, to identify process flowsheet options.”

Search Minerals expands the mineralized zone at Fox Meadow

Search Minerals also recently announced that they have successfully expanded the critical rare earth element mineralized zone at Fox Meadow. The Company stated:”The trenching/channelling programs at **FOX MEADOW** have outlined a mineralized zone of up to 123.6 m wide and at least 500m in strike length; mapping and airborne magnetic anomalies suggest that the zone is up to 650m long. In contrast, both the **DEEP FOX** and **FOXTROT** mineralized resources are about 350-450m long and up to 40m thick.”

About Search Minerals

Search is focused on finding and developing critical rare earth element mineral assets in Labrador, Canada. The Company controls properties in three distinct areas of this region; the Port Hope Simpson (PHS) Critical Rare Earth Element District in SE Labrador; the Henley Harbour Area in Southern Labrador; and the Red Wine Complex located in Central Labrador.

Within the Port Hope Simpson District, Search’s main discoveries are the Foxtrot Resource, Deep Fox, Fox Meadow, and Silver Fox deposits which contain rare earths including dysprosium (Dy), neodymium (Nd), praseodymium (Pr), terbium (Tb) and yttrium (Y).

The flagship Foxtrot Resource covers a 70 km long and 8 km wide belt. At Foxtrot the Total Indicated Resource is 7.392 million tonnes with grades of neodymium oxide (1,732ppm), neodymium (1,485ppm), praseodymium (397ppm), and dysprosium (191ppm).

The 14 year LOM Foxtrot Project offers an IRR of 16.7% on an

after tax NPV10% of \$48 million, with a CapEx of \$152 million.

Investors should note the NPV quoted above is only for the Foxtrot Project, so once the other projects are combined into a bigger project the NPV should improve materially.

Closing remarks

Search Minerals is both expanding their existing very promising rare earths project as well as finding other valuable metals zirconium and hafnium. Investors will need some patience, as more exploration work needs to be done to further grow the resource and improve on the economics.

Combined with an excellent management team, and strong Government and local support, the Company continues to advance their Port Hope Simpson District project at a steady pace. Rare earths expert Jack Lifton recently stated about Search Minerals: "I think it may well be Canada's first commercial rare earth producer."

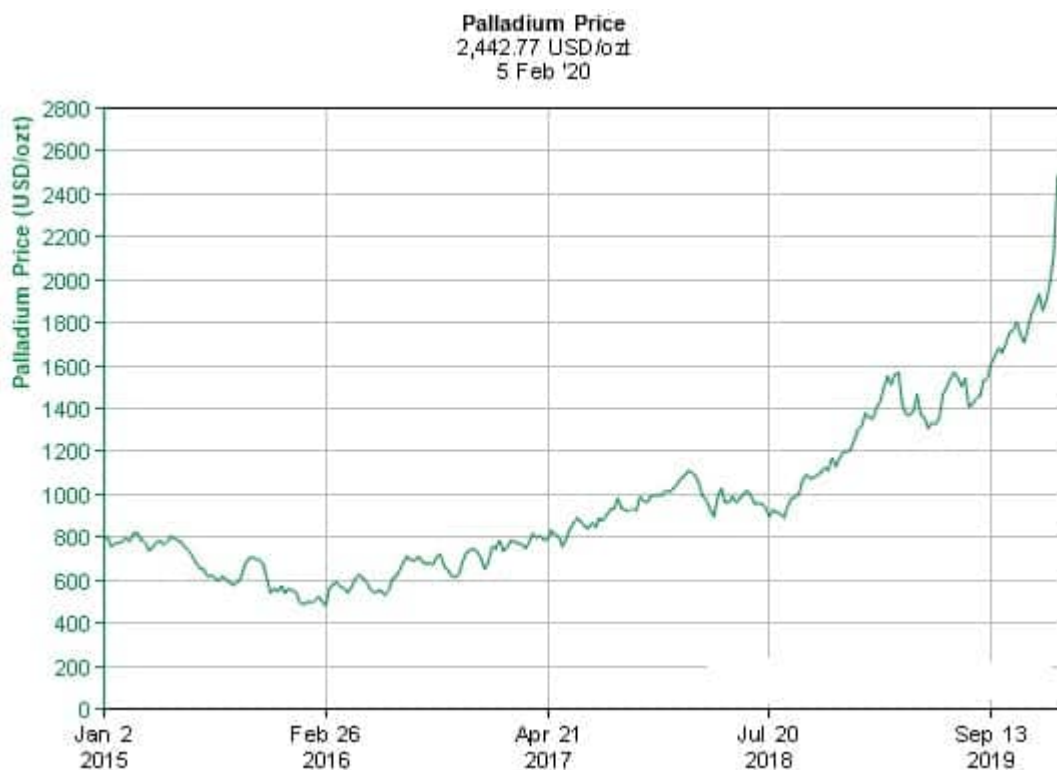
With a market cap of just C\$9 million there is plenty of potential upside ahead for investors if Jack is right.

The palladium bull run continues as we take a look at two promising palladium juniors

The palladium market continues to rocket higher as a severe structural palladium deficit continues due to strong demand and restrained new supply.

Palladium is currently priced at USD \$2,442 and is showing no signs of falling, as tightening emissions standards in Europe and China in 2020 have meant demand is increasing.

Palladium prices continue to surge higher – Now at USD \$2,442



Palladium's uses

Palladium is a key ingredient in vehicle catalytic converters which account for over 75% of palladium demand. Palladium in catalytic converters is not easily replaced and compared to the overall car cost the price rise can be tolerated by car companies, at least for now. Other uses for palladium include electronics, dentistry, medicine, chemical applications and jewelry (white gold).

Two Canadian junior palladium exploration companies

Canadian Palladium Resources Inc. (formerly 21C metals Inc.)

Canadian Palladium Resources Inc. (CSE: BULL | OTCQB: DCNNF) is an exploration company focused on palladium. In 2019 Canadian Palladium (then 21C Metals) acquired an option

agreement with Pavey Ark Minerals Inc. to acquire a 100% interest in the East Bull Palladium Property in the Sudbury Mining Division in Ontario, Canada.

The East Bull Palladium Project is situated on the 992 hectare East Bull property. It has a 43-101 compliant inferred resource estimate of 1.1 million tonnes of ore at a grade of 1.46g/t Pd Eq for a total of 523,000 ounces palladium (Pd) Equivalent (Eq), with significant upside potential.

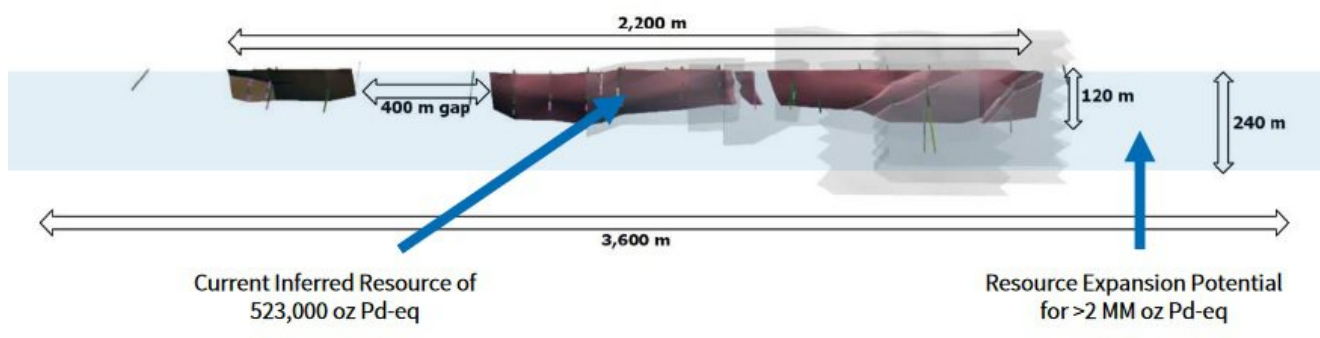
The Project has been drilled over an 1.8 km strike length to a maximum depth of 120 m; however, the mineralized zone is 3.6 km in length and open at depth. This suggests the final resource is potentially ~4x the current resource (assumes it continues to a depth of 240 m) for about 2 million oz of palladium equivalent.

After a recent successful capital raising the Company is fully funded for a new 10,000 m drilling program set to start soon. The purpose is to test the full strike length and expand upon the inferred resource.

The Project also has good logistics and infrastructure.

The current market cap is just C\$19.8 million.

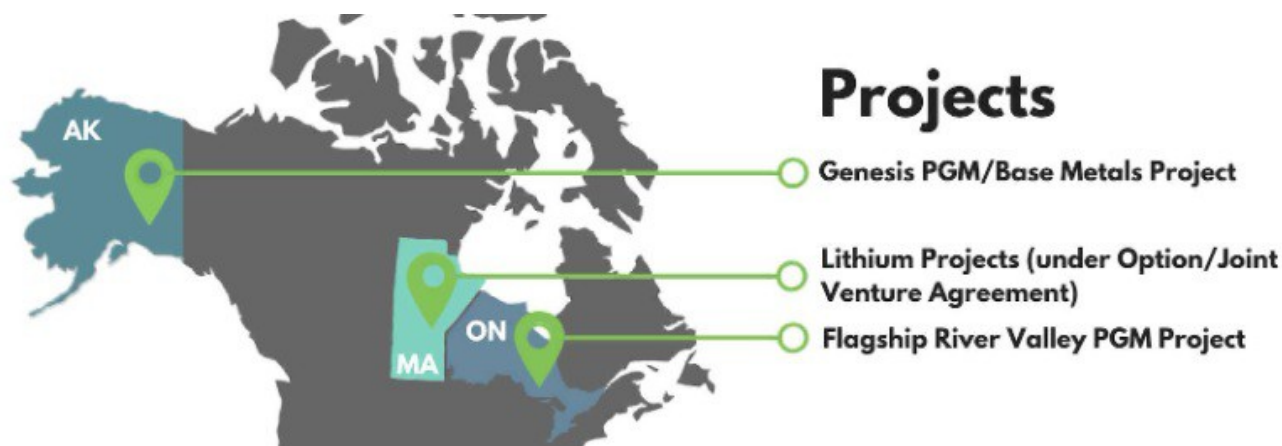
Based on the mineralization the potential resource is 4x larger



New Age Metals Inc.

New Age Metals Inc. (TSXV: NAM | OTCQB: NMTLF) is a mineral exploration company focused on the exploration and development of platinum group metals (includes palladium and platinum) and lithium. The Company's flagship is their 100% owned River Valley PGM Project in Canada. They also have options to purchase and JV into several lithium projects, and the Genesis PGM/Base Metals Project.

New Age Metals projects summary



The River Valley Project (flagship) is located in the Sudbury region of Northern Ontario. Overall, the River Valley PGM deposit is 16 km+ of mineralized deposit. The Company state that their project is Canada's largest primary platinum group metals deposit.

The NI 43-101 Mineral Resource Estimate announced January 9, 2019 resulted in a Measured & Indicated Resource estimate of **2.866 million ounces** of contained palladium equivalent (@0.9%), and an Inferred Resource of 1.059 million ounces of contained palladium equivalent (@0.63%).

Class]	PGM + Au (oz)	PdEq (oz)	PtEq (oz)
Measured	1,394,136	1,700,957	1,700,957
Indicated	983,071	1,165,978	1,165,978
Meas +Ind	2,377,207	2,866,935	2,866,935
Inferred	840,851	1,059,473	1,059,473

A recent Preliminary Economic Assessment (PEA) resulted in an after tax NPV5% of \$138 million, an after tax IRR of 10%, over a 14 year mine life. The initial CapEx was estimated at C\$495 million. The key here is that if the mine life can be extended to 20 years then the NPV would improve significantly. Also the above was based on a palladium price of only US\$1,200/oz Pd, compared to today's price of US\$2,442; and a gold price of US\$1,350 compared to today's price of US\$1,562. According to the Company if the PEA used a base price of US\$2,090/oz Pd, then the after-tax IRR would rise significantly to 27%.

The current market cap is just C\$8.7 million.

Closing comment

Investors should consider both **Canadian Palladium** and **New Age Metals** as a way of gaining early stage exposure to the palladium sector. Naturally, the early stage means risk is higher, but both companies already have good initial resources and are located in the safe jurisdiction of Canada.

It looks clear for now that the precious PGMs and gold will continue to be in strong demand in future years. This is a great opportunity here for patient investors wanting cheap early to mid-stage exploration exposure to the precious metals.