



Weekly Precious Metals News Articles: December 10, 2021

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Below is a cross section of relevant news article to the world of Precious Metals:

Markets, Supply & Demand, Investment, and Industrial Applications.

Printable PDF version attached. Enjoy-

Gold

- **Gold gains as inflation concerns take centre stage**
 - Gold gained on Friday as a rise in U.S. consumer prices in November boosted its allure as a cushion against inflation, despite expectations that the data may prompt the Federal Reserve's to hasten interest rate hikes.
<https://www.nasdaq.com/articles/precious-gold-gains-as-inflation-concerns-take-centre-stage>
- **Gold gains as dollar retreats; focus stays on U.S. inflation**
 - Gold prices hit a one-week high on Wednesday as the dollar and U.S. Treasury yields slipped, with bullion's safe-haven appeal also buoyed by tensions surrounding Ukraine, in the run up to U.S. consumer prices data later in the week. Spot gold was up +0.4% to \$1,791.40/Toz, while U.S. gold futures rose +0.5% to \$1,793.20/Toz.
<https://www.cNBC.com/2021/12/08/gold-markets-usa-treasury-yields-opportunity-cost.html>
- **The first half of 2022 will be the best time for gold price next year, says TD Securities**
 - "Positive gold story in play for [the] first half of next year," wrote TD Securities commodity strategists. The precious metal could be looking at a rally towards \$1,900 an ounce during the first six months of the year as markets focus on economic growth, inflation and political risks.
<https://www.kitco.com/news/2021-12-02/The-first-half-of-2022-will-be-the-best-time-for-gold-price-next-year-says-TD-Securities.html>

Semiconductor Related Articles (impacting Precious Metals electronics):

- **Global Semiconductor Sales Increase 24% Year-to-Year in October; Annual Sales Projected to Increase 26% in 2021, Exceed \$600 Billion in 2022**
 - The Semiconductor Industry Association today announced worldwide sales of semiconductors were \$48.8 billion in October 2021, +24.0% from the October 2020 and +1.1% more than the September 2021.
 - Additionally, a newly released WSTS industry forecast projects annual global sales will increase +25.6% in 2021 and +8.8% in 2022. SIA represents 98% of the U.S. semiconductor industry by revenue and nearly two-thirds of non-U.S. chip firms.
<https://www.semiconductors.org/global-semiconductor-sales-increase-24-year-to-year-in-october-annual-sales-projected-to-increase-26-in-2021-exceed-600-billion-in-2022/>
- **Chip Shortages Continue: Top Trends for 2022**

- Looking back at 2021, seismic shifts moved the semiconductor industry, with the most notable being the global ripple effects of the chip shortage. The year 2022 is bound to see the chip shortage continue to impact supply chains, but there are several other key trends that will dramatically shape the landscape of this industry.
- **The Chip Shortage Lives On:** As demand for chips continues to soar, supply chains will remain constrained for the foreseeable future.
- **Geopolitical Impacts:** Governments around the world are setting policies and programs to help solidify or establish their position in the global semiconductor value chain.
- **New Competition:** Many tech giants are now making their own ASIC chips designed specifically for their products. This gives them more control over the integration of software and hardware while differentiating themselves from their competition.
- **Arm Emerging as High-Performance Contender:** While Arm's architecture was born out of a need for low-power chips needed for vertical applications, they have also emerged as a high-performance contender, rivaling the established x86 players.
- **Sustainable Solutions:** The demand is expected to keep increasing due to emerging technologies such as 5G, AI, and the Internet of Things (IoT), production will need to increase, which will cause a massive surge in energy consumption and water usage.
<https://www.eetimes.com/chip-shortages-continue-top-trends-for-2022/#>
- **EETimes - With CHIPS Act, US Risks Building a White Elephant**
 - Intel lags behind TSMC and Samsung in process technology in part because of a swing toward buybacks, according to Lazonick. While Intel spent \$50 billion on capital expenditures and \$53 billion on R&D during the past five years, it also lavished shareholders with \$35 billion in stock buybacks and \$22 billion in cash dividends, which altogether used up 100 percent of Intel's net income. Intel's distributions to shareholders have been far greater than those made by either Samsung or TSMC, according to Lazonick.
<https://www.eetimes.com/with-chips-act-us-risks-building-a-white-elephant/>
- **Lack of Solder Column fasteners can disrupt supply chain**
 - A disruption in the supply of a fastener, known as a solder column, can seriously impact the defense and aerospace industries. Today, a tiny monopoly subcontractor provides solder column attachment services to nine out of ten of America's largest FPGA device makers. This production choke point could disrupt delivery of FPGA devices to thousands of downstream customers involved in supporting National Defense efforts. No "Plan B" exists. A natural disaster or sale of the business into unfriendly hands could eliminate America's only subcontractor of solder columns serving a multi-billion-dollar industry.
<https://www.topline.tv/MEPTEC8.html>

Silver

- **Silver Price Slumps as traders brace For Make-or-Break CPI data**
 - Silver has turned sharply lower over the last month as markets digest the potential impact of an aggressive FOMC. Recently, Fed Chairman Powell's increasingly hawkish stance has crushed inflation hedges like Gold and Bitcoin. The silver price has -12% in the last four weeks. However, if tomorrow's Core CPI print comes in hot, it could drive the price into the teens for the first time in 18 months.
 - Friday's Consumer Price Index data is expected to show an increase of 0.5% in November vs 0.6% in October. In simple terms, a print inline or higher than expected will increase the chances of an accelerated taper. In that event, risk assets could come under considerable pressure. On the other hand, Silver may get a reprieve if the inflation gauge shows price pressure is easing.
<https://www.investingcube.com/silver-price-slumps-as-traders-brace-for-make-or-break-cpi-data-commodities-silver/>

- **Silver Price Forecast – Silver Markets Continue to Build Basing Pattern**
 - Silver markets have been a bit noisy during the trading session on Wednesday as we continue to consolidate just above the \$22 level. The \$22 level has been important more than once, so it should not be a huge surprise to see that it has offered a bit of support. With this being the case, the market is very likely to continue favoring buying on the dips in the short term, but whether or not it can hang on to it longer term is a completely different question.
<https://finance.yahoo.com/news/silver-price-forecast-silver-markets-164315402.html>
- **Silver is the only precious metal likely to achieve persistent deficit over 2021-22 - Metals Focus**
 - "Among the four precious metals (Au, Ag, Pt, Pd), silver is the only one likely to achieve a persistent deficit over 2021-22, marking an end to consecutive surpluses over 2014-20. This turnaround is partly due to strong industrial fabrication," the consultancy noted.
<https://www.kitco.com/news/2021-12-07/Silver-is-the-only-precious-metal-likely-to-achieve-persistent-deficit-over-2021-22-Metals-Focus.html>
- **China's path to 100 GW**
 - China is once again the focus of attention across the global solar PV industry. The country's manufacturers have had a turbulent 2021, but domestic demand remains strong, particularly from the booming residential rooftop segment. Despite the supply challenges, China will likely reach 50 GW this year and possibly even 100 GW next year. Given the dynamic market and policy landscape, PV Magazine publisher Eckhart K. Gouras recently caught up with long-time China solar expert Frank Haugwitz, the founder of the Asia Europe Clean Energy (Solar) Advisory (AECEA).
<https://www.pv-magazine.com/magazine-archive/chinas-path-to-100-gw/>

Precious Metals Mining:

- **Implats greenlights \$1.8 billion capital budget for Zimplats expansion**
 - This "will boost nameplate capacity from 6.7 million tons per annum to 8.8 million tons per annum (+31%) and in-country processing capacity to 380,000 tons of concentrate per year."
<https://nehandaradio.com/2021/12/09/implats-greenlights-1-8-billion-capital-budget-for-zimplats-expansion/>
- **Platreef Mine Secures US\$200 Million Gold Stream Financing and Additional US\$100 Million Palladium and Platinum Stream**
 - Offtake arrangements announced for 100% of Platreef's first phase production. Platreef scheduled to commence production in 2024. Definitive feasibility study for Platreef's phased development plan expected to be issued in Q1 2022
<https://stockhouse.com/news/press-releases/2021/12/08/platreef-mine-secures-us-200-million-gold-stream-financing-and-additional-us-100>
- **Northam strikes strategic deal to buy platinum from Robert Friedland's Ivanplats mine**
 - Northam Platinum (Northam) is to buy 50% of the platinum group metal concentrates that will be produced by the Ivanplats Platreef Mine over a ten-year period after the mine starts production in 2024. The deal answers one of the main outstanding questions over the start-up of the Platreef mine in Limpopo province which was how it would get its production refined to the final metal stage because it has no plans at this point to build its own refinery.
<https://www.miningmx.com/news/platinum/48340-northam-strikes-strategic-deal-to-buy-platinum-from-robert-friedlands-ivanplats-mine/>
- **Implats and Northam both acquire more Royal Bafokeng shares as tussle for control heats up**
 - Both Impala Platinum and Northam Platinum have added to their stakes in Royal Bafokeng Platinum as the two continue to compete for a larger share of the business.
 - On Tuesday, Northam announced it has acquired additional shares in RBPlat, increasing its shareholding from 32.8% to 34.95%. On Wednesday morning, Implats announced it has now built up its stake in RBPlat to 32.26%. Implats last week announced it had acquired 24.5% of RBPlat shares from institutional shareholders

<https://www.news24.com/fin24/Companies/Mining/implats-and-northam-both-acquire-more-royal-bafokeng-shares-as-tussle-for-control-hots-up-20211208>

- **Generation Mining enters into binding agreement to become 100% owner of Marathon Project**
 - Sibanye-Stillwater currently owns 11,053,795 common shares of Gen Mining, and on closing of the Transaction will own 32,813,127 common shares, representing approximately 19.1% of the outstanding Gen Mining common shares. Gen Mining will acquire Sibanye-Stillwater's remaining stake in the Marathon Project through the issuance to Stillwater of 21,759,332 common shares of Gen Mining. The Feasibility Study in respect of the Marathon Project estimated that at US\$1725/oz palladium, and US\$3.20/lb copper, Marathon's Net Present Value is approximately C\$1.07 billion with a payback of 2.3 years and an Internal Rate of Return of 30%.
 - The Marathon Project Basket: Palladium, Copper, Platinum, Gold and Silver.
<https://stockhouse.com/news/press-releases/2021/12/08/generation-mining-enters-into-binding-agreement-to-become-100-owner-of-marathon>

E-Waste & Precious Metals Recycle Related:

- **Catalytic converter thefts get attention of Washington state lawmakers**
 - Sen. Jeff Wilson pre-filed a bill that prohibits scrap deals from purchasing catalytic converters unless they come from commercial enterprises and vehicle owners.
<https://www.kgw.com/article/news/politics/catalytic-converter-thefts-proposed-washington-law/281-2afdd7de-add1-4a5f-b30b-2bea12b64e38>
- **Pittsburgh-area processor shuts its doors**
 - According to its website, ECS&R processed 1.4 million pounds of e-scrap in 2020. The company's website notes the business is closed but does not expand on what led to the closure.
 - ECS&R was one of dozens of e-scrap companies that were sued by landlords that owned Columbus, Ohio warehouses leased by Closed Loop Refining and Recovery. When Closed Loop failed in early 2016, it left massive stockpiles of CRT materials, and the landlords sued former CRT suppliers seeking to force them to help pay for the cleanup.
https://resource-recycling.com/e-scrap/2021/12/09/pittsburgh-area-processor-shuts-its-doors/?utm_medium=email&utm_source=internal&utm_campaign=Dec+9+ESN
- **California expands state program to cover more devices**
 - California regulators are planning to add OLED display devices, LCD smart displays and LCD tablets to the state's e-scrap program. The addition, which the California Department of Toxic Substances Control is making via an emergency rulemaking action, means that e-scrap companies can receive payments from the state for collecting and recycling those devices. It also means electronics retailers around the Golden State will have to begin charging customers fees when they buy products in those categories. California's e-scrap program, the first state program in the country, assesses fees on consumers buying new electronics. The money is sent to the state government, and the California Department of Resources Recycling and Recovery approves payments to registered e-scrap processors when they recycle covered electronics.
<https://resource-recycling.com/e-scrap/2021/12/09/california-expands-state-program-to-cover-more-devices/>

Platinum

- **Platinum in Electrolysers**
 - Electrolyser capacity for the production of green hydrogen has started the growth that will significantly benefit future platinum demand. Cumulatively, over the next 15 years, platinum demand from electrolysers is likely to be between one and two million ounces, dependent on technology development over that period and including the volume of platinum that could potentially be used in alkaline electrolysers.

https://platinuminvestment.com/files/sixtysecs/WPIC_60seconds_Platinum_in_electrolysers_12082021.pdf

- **Platinum futures: expect industrial demand to boost prices again**
 - The recent oversupply has caused prices to drop from a February peak of \$1,288/oz to close to \$985/oz last week and for the moment, this surplus is likely to remain in place. The World Platinum Investment Council says that although they expect strong demand for the metal over the next 12 months unwinding of stocks & reduced investment will keep platinum market in surplus during 2022.
 - On the positive side for investors, demand for the metal from car producers has risen an estimated 14% this year compared with 2020 and is expected to increase a further 20% in 2022. Tighter emission legislation and substitution for palladium will work in favour of the white metal. Demand for platinum bars and coins is also expected to rise in 2022, by as much as 10%.
<https://www.thearmchairtrader.com/platinum-futures-prices-industrial-demand/>
- **WPIC: Platinum ETF's**
 - As of November 30, 2021
<https://platinuminvestment.com/investment-research/charts-and-tables#chart-7>

Fuel Cells/Hydrogen Economy Related Articles:

- **Hyzon Motors delivers 29 hydrogen fuel cell electric heavy duty trucks to reduce carbon emissions in the steel industry**
 - 29 fuel cell electric trucks to be used by a major steel conglomerate in China through Shanghai Hydrogen HongYun Automotive Co. ("HongYun")
<https://www.automotiveworld.com/news-releases/hyzon-motors-delivers-29-hydrogen-fuel-cell-electric-heavy-duty-trucks-to-reduce-carbon-emissions-in-the-steel-industry/>
- **The Hydrogen Stream: 'China, Chile, Spain and Australia will lead the hydrogen economy'**
 - The International Energy Agency said the four nations are on track to contribute 85% of the 18 GW of global renewables capacity which is set to be dedicated to green hydrogen production by 2026. Elsewhere, the Port of Valencia has unveiled a plan to install a green hydrogen supply station in the new year.
<https://www.pv-magazine.com/2021/12/07/the-hydrogen-stream-china-chile-spain-and-australia-will-lead-the-hydrogen-economy/>
- **Elon Musk has strong views on hydrogen. Not everyone agrees**
<https://www.cnbc.com/2021/12/06/elon-musk-has-strong-views-on-hydrogen-and-not-everyone-agrees.html>
- **Kongsberg Tests Full-Size Hydrogen Fuel Cell System for Ships**
 - Marine systems provide Kongsberg has tested full-size drivetrain for ships powered by H₂ Fuel Cells for the first time. The company has built a full-scale electric propulsion system running on hydrogen fuel cells at Agotnes outside Bergen They will now test the system for four months to verify its suitability for inclusion in a H₂ powered ro-pax ferry design.
<https://shipandbunker.com/news/emea/688013-kongsberg-tests-full-size-hydrogen-fuel-cell-system-for-ships>
- **Ammonia and hydrogen marine engines will be ready by 2025**
 - Engine designers are pushing on to release new 'green' engines by mid-decade. One of those is Japan Engine Corp, which is working in a consortium with Mitsui OSK Lines and MOL Drybulk Ltd to trial a hydrogen-fueled engine in a dry bulk carrier. The consortium says the as-yet unnamed slow-speed, 2-stroke hydrogen-fueled engine would be the first of its kind.
 - The engine would be developed in joint co-operation between J-Eng, Yanmar Power Technology and Kawasaki Heavy Industries and backed by Japan's New Energy and Industrial Technology Development Organization, part of the Green Innovation Funding Program.
<https://www.rivieramm.com/news-content-hub/news-content-hub/ammonia-and-hydrogen-marine-engines-will-be-ready-by-2025-68727>

Palladium

- **Supply of automotive chips improves in November, December**
 - The global supply of automotive chips increased in November & December after months of shortages, allowing automakers & downstream parts suppliers to begin normalizing some production.
 - Inventories of five major automotive chip vendors, Renesas Electronics, NXP Semiconductors, Infineon, STMicroelectronics, and Texas Instruments, reportedly were slightly up in the 3rd quarter, marking the first gain in 2021. The upturn suggests that the auto chip shortage could be subsiding.
<https://www.digitimes.com/news/a20211203PD216.html>
- **Researchers advance direct ethanol fuel cells**
 - The team from the University of Central Florida, Oregon State University, the University of Pittsburgh, and Southern University of Science and Technology, Shenzhen, China, found that putting fluorine atoms into palladium-nitrogen-carbon catalysts had a number of positive effects—including keeping the power-dense cells stable for nearly 6,000 hours. The findings from the study are published in Nature Energy.
<https://www.greencarcongress.com/2021/11/20211130-defc.html>
- **Mint sells 2021 palladium bullion coins in November**
 - The first 2021 American Eagle palladium bullion coin sales were recorded during the month of November, with 8,700 coins made available from the U.S. Mint to its authorized purchasers.
 - Sales of 2021 American Eagle 1-oz silver bullion coins for the first 11 months total 28,198,500 coins.
 - The 2021 Tuskegee National Historic Site 5-oz silver bullion quarter dollars, or 269,500 oz of silver.
 - Through Nov. 30, 1,201,500 oz of all four denominations of 2021 American Eagle gold bullion coins.
<https://www.coinworld.com/news/us-coins/mint-sells-2021-palladium-bullion-coins-in-november>
- **BASF ESTABLISHES STANDALONE BUSINESS ENTITY FOCUSED ON MOBILE-EMISSIONS CATALYSTS**
 - BASF SE announced that it will establish a separate mobile-emissions catalysts, automotive catalysts recycling and associated precious metal services entity. The new entity will be named BASF Automotive Catalysts and Recycling. The new standalone structure will prepare the business for the upcoming changes in the internal combustion engine market and allow for future strategic options. The new entity will continue to operate globally and comprise approximately 20 production sites and over 4,000 employees. The carve-out process will start in January 2022 and is expected to take up to 18 months. Throughout this process, BASF's top priority is business continuity for its customers, partners and employees.
<https://www.chemengonline.com/basf-establishes-standalone-business-entity-focused-on-mobile-emissions-catalysts/>

PGM Minor Metals (Rhodium, Iridium, Ruthenium, Osmium)

- **Huge \$2.6 billion (1GW) green hydrogen project planned for Europe**
 - Spanish power company Iberdrola and Sweden's H2 Green Steel are to partner and develop a major facility that will produce green hydrogen, in yet another example of how companies are taking an interest in the much talked about sector.
 - In an announcement on Thursday, the firms said the 2.3 billion euro (\$2.6 billion USD) project would see them set up a green hydrogen facility with an electrolysis capacity of 1 gigawatt
<https://www.msn.com/en-us/money/other/huge-26-billion-green-hydrogen-project-planned-for-europe/ar-AArqHPO?ocid=BingNewsSearch>
- **(2GW) Green hydrogen hub backed by \$5 billion of investment planned for the UAE**
 - While fine details of the plan were relatively sparse, the firms will look to develop projects with an electrolyzer capacity of 2 gigawatts.

<https://www.msn.com/en-us/money/companies/green-hydrogen-hub-backed-by-245-billion-of-investment-planned-for-the-uae/ar-AARztGp?ocid=BingNewsSearch>

- **Is iridium demand a potential bottleneck in the realization of large-scale PEM water electrolysis?**
 - The iridium demand for a mature PEMWE market cannot be covered from mine production with current production rates of approximately 7tp. This is due to the scarcity of the element, its geographical concentration in South Africa and coupling of its production rate to the primary PGMs.
 - The iridium catalyst loading in PEMWE cells has to be reduced significantly within the next 15 years to e.g. a target loading of 0.05 g/kW by 2035.
 - *Matt: Technical literature suggests only 0.20 g/kW are technically feasible today.*
 - Two preconditions are necessary to cover the immense future iridium demand for a large-scale PEMWE industry: first, the dramatic reduction of iridium catalyst loading in PEMWE cells and second, the development of an effective recycling infrastructure for iridium catalysts with technical EOL recycling rates of minimum 90% in parallel with the realization of industrial scale PEMWE manufacturing.
 - *Matt: Today's complex Ir Oxide recycle recovery rates are typically more in line with 80% recovery, with limited participation in PEM MEA recycle due to Nafion incarnation and generation of fluorine outgassing requiring special air scrubbers/handling.*

<https://www.sciencedirect.com/science/article/pii/S0360319921016219>

Clean Energy General News (New Section)

- **Precious Metals: Increasing Prices Are Threatening The Green Transition**
 - As green energy is set for take-off, the increasing costs of precious metals are becoming its main dead weight. Copper, steel, cobalt, and nickel —essential for battery manufacturing, wind turbines, and solar panels— have skyrocketed in the last year, throwing a spanner in the decarbonization of the world's economy.
<https://www.benzinga.com/markets/commodities/21/12/24507657/precious-metals-increasing-prices-are-threatening-the-green-transition>
- **How Do We Produce Future Green Technology Without Damaging Seabeds?**
 - As we loosen our dependence on fossil fuel cars, power plants, and factories, with the green revolution upon us, this will increase the demand for key minerals and metals such as cobalt, nickel and manganese and copper for the electric cars, batteries, and wind turbines which all depend on these materials. Mining companies have plans to use robots to extract these metals from below various parts of the ocean floor but the environmental implications of doing so need to be considered.
<https://www.azocleantech.com/article.aspx?ArticleID=1383>
- **The world's largest freshwater wind farm is now online**
 - Windpark Fryslân, the world's largest freshwater wind farm that sits in the Netherlands' Lake IJssel, is now fully commissioned. The 382.7 MW Windpark Fryslân is around 3.7 miles off the Frisian coast, in the north of the Netherlands and parts of northwestern Germany. It features 89 Siemens Gamesa 4.3 MW wind turbines that have been in operation since November.
<https://electrek.co/2021/12/09/the-worlds-largest-freshwater-wind-farm-is-now-online/>
- **Opinion: Coal went from investor pariah to luvvie in one year. How did that happen as the planet warms up?**
 - A year ago, the world's biggest resources companies were apparent slaves to the ESG movement. Many of them were open to ejecting their dirtiest fossil fuels from their portfolios to attract the cherished "green" premium offered by investors who wanted to own more climate-friendly companies. Today, these very same companies are resisting the pressure to ditch their fossil fuels in the name of making their environmental, social and governance credentials more attractive – and

they are getting away it. How to explain the reversal? Turns out that the ESG-inspired sales and spinoffs were not as climate friendly as advertised and the entire industry is rethinking its approach to the “E” part of the ESG equation.

<https://www.theglobeandmail.com/business/commentary/article-coal-went-from-investor-pariah-to-luvvie-in-one-year-how-did-that/>

BEV / LiB Battery Market News

• **Umicore and Volkswagen AG to create European EV battery materials Joint Venture**

- The intention is to gradually ramp up the JV’s precursor and cathode material production capacity. This would start in 2025 with an initial annual production of 20 GWh for Volkswagen AG’s plant in Salzgitter, Germany, and should grow to an annual production capacity of up to 160 GWh by the end of the decade. This compares to an annual production capacity capable of powering about 2.2 million full electric vehicles (EVs).

<https://www.umicore.com/en/newsroom/news/umicore-and-volkswagen-ag-to-create-european-ev-battery-materials-joint-venture/>

• **How the rise of electric cars endangers the ‘last frontier’ of the Philippines (An ESG Warning)**

- With the demand for nickel expected to grow to at least 10 times what it is now by 2030, experts say companies will have no choice but to expand their mining operations, impacting more people like Bartolome and more places like the island paradise of Palawan. But the controversy over the planned mine expansion highlights an often-overlooked reality: manufacturing electric cars, even when done responsibly, still takes a toll on the environment.
- The move to expand the mine comes as the destruction of the world’s rainforests, which play a crucial role in protecting wildlife and slowing climate change, is accelerating.
- Friends of the Earth Japan, announced that it completed an environmental field study in Palawan that it said found unsafe levels of hexavalent chromium, a cancer-causing chemical that was at the center of the Julia Roberts film “Erin Brockovich,” in one of the rivers near the mine.
- In an interview, Hozue Hatae, a researcher at Friends of the Earth Japan, said the group launched the tests after conducting a 2009 survey with 133 households that found 85 percent reported experiencing an uptick in coughs and other respiratory issues, as well as skin lesions.
- The group conducted annual tests on the Togpon River from 2009 to 2019, which found that in the rainy season, it exceeded the hexavalent chromium exposure levels used by the World Health Organization in determining the safety of drinking water.
- Last month, the reporting partner for this story, the Philippine Center for Investigative Journalism, conducted water tests along the Togpon River and the Kinurong Creek. Four of the seven samples taken at different points along the waterways showed levels of hexavalent chromium higher than the WHO standard for drinking water.

<https://www.nbcnews.com/specials/rise-of-electric-cars-endangers-last-frontier-philippines/>

• **How China’s Car Batteries Conquered the World**

- Beijing’s calculated approach to manufacturing electric-vehicle power packs has the U.S., the European Union and other rivals playing catch-up in the race to lead the electric future.
- More than a decade ago, analysts forecast the demise of LFP batteries. They may have been cheaper and safer than other alternatives, but they were big, low-voltage and couldn’t meet consumers’ hunger for greater range. Nickel, cobalt and manganese batteries would theoretically solve these problems. Manufacturers strove to increase the nickel content to achieve greater distance and density. Their enthusiasm prompted rosy predictions that by 2018, over three-quarters of battery demand would be for the NCM type.
- **Rising Fortunes:** LFP phosphate batteries are projected to account for the biggest market share

<https://www.bloomberg.com/opinion/articles/2021-12-02/how-china-s-car-batteries-conquered-the-world?sref=lzNVGnNM>

- **LinkedIn Posting: While #LFP has made an incredible comeback, the pendulum of public opinion has swung too far in favour of predicting its inevitable route to dominance.**

- What's being overlooked is that LFP also carries challenges that will limit its market share potential for use in passenger cars and light duty trucks.
- In terms of cost, next generation #nickel rich chemistries will close the current price gap with LFP. Further, end-of-life LFP based batteries will carry a negative value when it comes to recycling and hence will need to be subsidized by the OEMs. Current generation NCM/NCA chemistries and future ultra-nickel rich chemistries will have a sizeable positive value post recycling with the recovered materials redeployed to produce new cathodes. This effectively makes these chemistries more cost effective than LFP and provides for a closed loop, circular process, that will ultimately greatly reduce the need for extracting the likes of nickel and cobalt from the ground.
- Other notable challenges not cited in the article are slower charging times and poor cold weather performance. Also, with a lower theoretical energy density comes more weight to a given vehicle with the same kWh cell pack. Finally, LFP tech, to its credit, has been nearly fully optimized via such innovations a cell-to-pack configurations. Nickel rich cathodes on the other hand have a developmental roadmap that can lead to higher energy density and better thermal stability than the current generation, leading to a lower cost (\$/kWh) and safer cell pack.
- In terms of net value as measured by cost / performance, LFP lags when taking recycling into consideration and this gap will continue to widen as ternary chemistries reach their potential. Unfortunately for the Western Hemisphere, China also dominates the supply chains for nickel, #cobalt and #lithium.

https://www.linkedin.com/posts/robert-morris6b_how-chinas-car-batteries-conquered-the-world-activity-6872435191445643264-5oML

- **Tesla seeks tariff waiver for graphite from China for batteries**

- Tariffs levied during the Trump administration's trade war with China are contributing to automotive price increases, especially since temporary exclusions to some of those tariffs were allowed to expire in late 2020 or early this year. Tesla and SK Innovation both requested a waiver on tariffs for graphite, which is used in the anode component of lithium-ion batteries in electric cars.
- The outpouring of industry pleas could spur the Biden administration to reinstate government exclusions on 25% tariffs on artificial graphite imported from China, as well as other materials and components.

<https://www.cnbc.com/2021/12/02/tesla-seeks-tariff-exemption-for-graphite-from-china-for-batteries.html>

- **EV industry must work closer with lithium suppliers, executives say**

- As EVs go mainstream, automakers are planning models that can run longer before recharging and handle different weather conditions. Batteries for EVs typically are made with lithium hydroxide that cannot be stored for long periods of time and thus must be made in custom batches.
- As such, producing it requires extensive investment and planning, which lithium producers are hesitant to do even as prices rise unless automakers sign long-term contracts and share development plans, Albemarle lithium division head Eric Norris and Livent Chief Executive Paul Graves said on a Reuters Next panel.

<https://www.mining.com/web/ev-industry-must-work-closer-with-lithium-suppliers-executives-say/>

- **Ford, GM race to brag 'We're Number 3!' in electric vehicle market**

- GM on Wednesday announced plans to form a joint venture with South Korea's POSCO to build a battery cathode materials plant in North America by 2024. The deal is part of the automaker's long-range plan to carefully construct a proprietary, vertically integrated EV machine that it will fully turn on only when costs fall and demand grows in the second half of the 2020s.

<https://www.reuters.com/article/gm-posco-plant-idUSKBN2IG4AE>

- **The Lithium Tech That May Send The EV Boom Into Overdrive**

- But the biggest winner in the lithium bull market could be one who doesn't just make the next major mining discovery, but fundamentally transforms how lithium is mined around the world.
- Medaro is sitting on two promising projects in one of Canada's top lithium-producing regions.
- But it's their new, proprietary technology that we believe could potentially play a role in changing the economics of lithium mining for exploration companies all across the globe.

<https://oilprice.com/Energy/Energy-General/The-Lithium-Tech-That-May-Send-The-EV-Boom-Into-Overdrive.html>

- **London nickel market tightens as China lifts imports**

- London Metal Exchange (LME) nickel stocks have been falling relentlessly since April of this year.
- Exchange inventory has slumped to 110,688 tonnes from 264,606 tonnes over the last six months with almost half of what is left cancelled in preparation for physical load-out.

<https://www.reuters.com/markets/commodities/london-nickel-market-tightens-china-lifts-imports-andy-home-2021-12-06/>

- **Global Energy Battery Installed Capacity In 2021**

- According to the data of SNE research, a South Korean market research institution, in October 2021, the installed capacity of global power batteries was 26.2Gwh, a m/m decrease of 20.4%. Among them, CATL ranked first in the power battery installed capacity in October, with an installed capacity of 8.9Gwh and a market share of 34.0%. LG and Panasonic ranked second and third, with market share of 15.6% and 12.2%. BYD ranked fourth, with an installed capacity of 2.2Gwh in October and a market share of 8.4%.

- Matt: Sept annualized is 384GWh of LiBs. How do we get to 15,000 TWh to meet global zero emission mandates by 2040? A multiple of 39x in 18 years. Maybe we miss.

<http://www.iccsino.com/news/show-htm-itemid-16118.html>

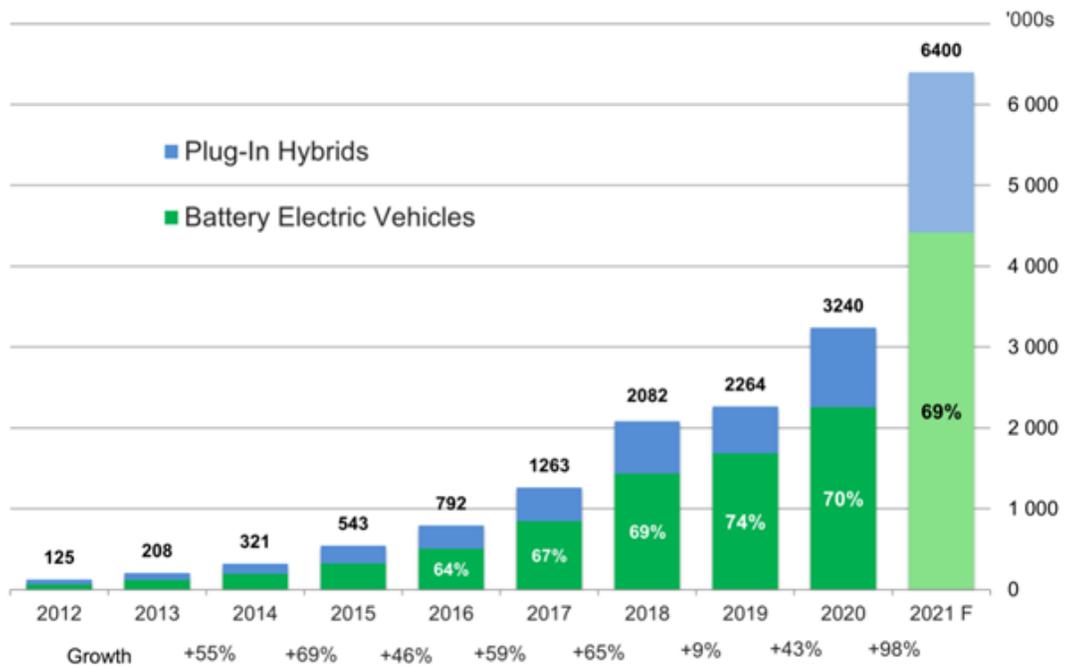
- **The 10 big problems with simply replacing fossil cars with electric**

- The planned rapid transition to electric vehicles has major challenges. Schalk Cloete compiles them into a list of ten, including: (1) preserving our car-centric cities preserves its inefficiencies and societal costs; (2) personal "behavior change" needed; (3) BEVs less efficient than hybrids and modern ICEs for many driving needs; (4) BEVs require about six times more critical minerals than conventional cars, along with the mining ramp up challenges and consequences that entails; (5) the optimal charging patterns BEVs require are badly matched with variable wind and solar; (6) the competition for investment with proven wealth creation pathways that developing nations need. At its heart the argument is that the CO2 avoidance costs for BEVs will exceed \$100/ton.

<https://energypost.eu/the-10-big-problems-with-simply-replacing-fossil-cars-with-electric/>

GLOBAL PLUG-IN VEHICLE SALES

EV VOLUMES



Regards –