Class I Nickel

I级镍

Silver Bullion **sells Class I battery-grade nickel parcels**, in the form of 250 kg (551 lb) industrial drums or 2 ton (4,409 lb) bulk bags.

Silver Bullion**出售电池级Ⅰ级镍金属包裹**，分别以250公斤(551磅)工业桶或2吨(4409磅)集装袋的形式进行销售。

These parcels are uniquely identified physical property, tracked in our parcel ownership list, audited by Ernst & Young LLP and Bureau Veritas, fully insured against loss, guaranteed to be genuine, and stored in Singapore.

这些包裹是独一无二的实物财产，可以通过我们的包裹产权清单中进行查询，由安永会计师事务所和必维国际检验集团进行审计，具备全额保险，保证真品，并储存在新加坡。

Being your property, these parcels can be sold 24/7, used as collateral for low interest peer-to-peer loans, or taken delivery of.

作为您的财产，您可以全天候对其进行出售，并且可以用作点对点低息贷款的抵押品，或进行配送。

Storage fees for nickel parcels are fixed at **76.28 SGD (55.65 USD)** per 250 kg parcel per year. In percentage terms, the storage fee:

每年每250公斤镍包裹的存储费为**76.28新元（55.65美元）**。按百分比计算，存储费为：

- is 1.51% of the current nickel price

  目前镍价格的1.51%

- will be 0.75% if nickel doubled in value

  如果镍的价格翻倍，则为0.75%

- will be 0.50% if nickel tripled in value

  如果镍的价格再翻倍，则为0.50%

Any unused storage will be refunded upon sellback or delivery.

对于未使用的存储期限，会在回售或实施配送时予以退还。

Class I nickel is at 26% of its 2007 high, and will be in great demand

目前 I 级镍的价格是 2007 年高点的 26%，需求量将会非常大

The outlook for Class I nickel is one of deepening deficits, falling stocks and rising prices. The widely anticipated expansion in electric vehicle (EV) production and sales is likely to exacerbate the predicted structural shortage in nickel. Furthermore, as less than half of the nickel supply can be used for batteries, we will likely see an increasing price premium for high purity Class I over Class II nickel.

I级镍的前景将是短缺加剧、库存下降和价格上涨。广泛预期的电动汽车(EV)生产和销售扩张，可能会加剧镍的结构性短缺。此外，由于只有不到一半的镍可用于电池生产，我们可能会看到相较于II级镍高纯度的I级镍的价格溢价会越来越高。

Class I nickel is trading around 14,932 USD per ton, a **28% of its 2007 high** of 54,000 USD per ton. Based on our conversation with two nickel mining CEOs, it is unlikely that new Class I production will come online unless nickel prices remain over 30,000 USD per ton for a sustained period of time. The high cost and risk of converting Class II nickel to Class I means that a sustained price of 55,000 USD per ton is needed to make the process profitable.

I级镍的价格约为每吨14932美元，只有**2007年高点**54000美元每吨**的28%**。根据我们与两位镍矿公司首席执行官的谈话，除非镍价在一段时间内保持在每吨3万美元以上，否则不太可能有新的镍矿进行投产。将II级镍转换为I级镍的工程由于成本高、风险大，想要盈利则需要镍的价格能够维持在每吨5.5万美元。

Only high purity Class I nickel is usable for batteries

只有高纯度的I级镍可用于生产电池

Nickel is traditionally used in steel production. Nickel prices skyrocketed to 54,000 USD per ton in 2007 when the Chinese construction boom, and steel demand, peaked. It is important to note that steel is typically alloyed with low purity Class II nickel, which is unsuitable for batteries. The construction demand surge eventually caused large amounts of cheap, low grade Class II nickel supplies to accumulate in the Philippines and Indonesia whose abundance, once the construction boom ended, caused a nickel price crash to around 10,000 USD per ton.

一直以来，镍主要用于钢铁生产。2007年，当中国建筑热潮和钢铁需求达到顶峰时，镍价曾飙升至每吨5.4万美元。值得注意的是，II级镍是典型的钢合金材料，但是不适合用于电池生产。建筑需求的激增最终导致大量廉价、低级的II级镍在菲律宾和印度尼西亚囤积起来，当建筑热潮褪去，这些国家的过度供应导致了镍价格暴跌至每吨10000美元左右。

The low nickel prices and large Class II supply in turn made it increasingly unprofitable to operate high cost Class I nickel mines, curtailing Class I nickel production. This resulted in a worldwide mining shift towards lower grade Class II nickel, thereby substantially reducing the percentage of nickel that is suitable for efficient battery production.

II级镍低廉的价格和大量的供应反过来又使经营高成本I级镍矿变得越来越无利可图，从而限制了I级镍的生产。这导致了全球采矿业向低级II级镍的转变，从而大大降低了适合高效电池生产的镍的比重。

According to McKinsey's 2017 report, Class I nickel supply suitable for battery production represents approximately half of the global supply of 2.1 million metric tons (mT) – although only 0.35 million mT are available to be processed into powder and briquettes that could be used to produce the nickel sulphate needed for batteries. For the full report, refer to The future of nickel: A Class Act by McKinsey.

根据麦肯锡2017年的报告，适用于电池生产的I级镍约只占全球210万公吨(mT)供应量的一半——更是只有35万公吨镍可被加工成粉末和块状，用于生产电池所需的硫酸镍。完整的报告，请参考麦肯锡的《镍的未来：A级品质》。

Demand for Class I nickel in high-performance batteries will increase exponentially

高性能电池对I级镍的需求将呈几何倍数增长

NMC (nickel, manganese, cobalt) and NCA (nickel, cobalt, aluminum) chemistries are the most promising cathodes for lithium-ion electric vehicles and the type used by Tesla cars. These batteries rely on nickel sulphate (NiSO4), which in turn is made from highly refined Class I nickel to obtain their high energy density storage. In this chemistry, cobalt is used as a stabilizer whereas nickel stores the power.

NMC（镍、锰、钴）和NCA（镍、钴、铝）是最有前途的锂离子电动汽车阴极材料，也是特斯拉汽车使用的阴极材料类型。这些电池依靠硫酸镍（NiSO4）储存高密度能量，而硫酸镍则由高度精炼的I级镍制备而成。在这种材料中，钴被用作稳定剂，而镍则用于储存能量。

Early NMC batteries utilized a 1-1-1 ratio of nickel, cobalt and manganese. As of 2018, advanced high performance batteries utilize a more powerful 6-2-2 chemistry, implying that 60% of the battery cathode is made up of nickel. In the next decade, the industry will transition to a new generation of performance, and lower cost per kWh, made possible by 8-1-1 batteries having an 80% nickel composition.

早期的NMC电池使用镍、钴和锰的比例为1:1:1。截至2018年，先进的高性能电池采用更强大的6-2-2化学材料，这意味着60%的电池阴极材料是由镍构成的。在下一个十年，该行业将向新一代过度，并降低每千瓦时的成本，通过8-1-1电池使80%的镍成分成为可能。

The 8-1-1 chemistry is expected to bring the cost per kWh below 100 USD, further increasing EV demand and battery volumes. This chemistry is not expected to meaningfully change over the next decade (upcoming solid-state batteries and graphene enhanced batteries will use a similar 8-1-1 cathode chemistry), and vast production facilities are now being constructed to produce batteries requiring massive amounts of Class I nickel.

8-1-1化学材料预计将使每千瓦时的成本低于100美元，从而进一步增加电动汽车的需求和电池容量。这种化学技术在未来十年不会有实质性的改变(固态电池和石墨烯增强电池将使用类似的8-1-1阴极化学材料)，目前以I级镍为主要材料的电池生产设施正在大规模地被建造。

The following slides were presented in 2017 by Vale, one of the largest mining conglomerates worldwide, on the expected impact of electric vehicle on nickel demand.

2017年，全球最大的矿业集团之一淡水河谷就电动汽车对镍需求的预期影响发布了以下幻灯片。