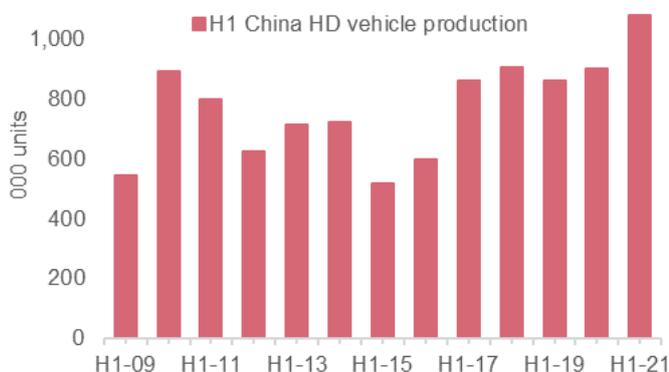


## Platinum demand upside from higher loadings and rising production of heavy-duty vehicles

The heavy-duty (HD) vehicle sector globally saw production volumes grow by 5% to c.4.36 million vehicles in 2020 according to the International Organization of Motor Vehicle Manufacturers (OICA). This unexpected growth contrasted with the COVID-driven light vehicle (LV) weakness and was principally driven by the 31% surge in Chinese HD diesel production. Over the first 6 months of this year, Chinese HD diesel production has risen by 20% to c.1 million units, while North American and European markets have experienced growth of 33% and 34% respectively, as infrastructure and construction focussed stimulus policies have spurred continued demand for HD vehicles. Positive HD production trends, plus the impact of tightening HD emissions regulations, are a key driver of automotive platinum demand growth.

China VI emission standards, which are significantly more stringent than China V, apply nationally for all HD vehicles from July 2021. Johnson Matthey (JM) expect platinum group metal loadings to treble to meet the tighter standard. JM forecasts platinum automotive demand in China in 2021 to rise 93% YoY, from 205 koz to 395 koz (Figure 1, p2). Demand comes from c.1.9 million diesel light vehicles (LV) and c.1.55 million HD diesel vehicles this year. All HD vehicles produced from July 2021 have the significantly higher loadings – c.13 g/HD diesel vehicle based on the JM forecast.

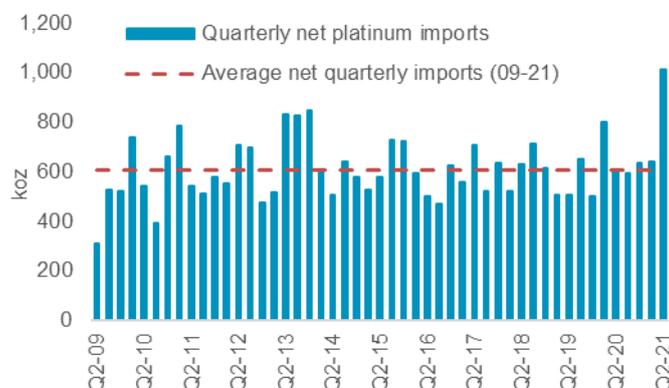
*Chinese total HD vehicle production in H1 2021 surprised to the upside, following on from rapid growth in 2020*



Source: China Auto Information.net, WPIC Research

The average of public forecasts for Chinese H2 2021 HD diesel production is currently c.550 thousand units despite there being over 1 million units produced in H1 2021. This slowdown is reportedly due to a front loading of China V HD production and sales ahead of the full China VI implementation. However, Chinese HD vehicle production and sales are typically strongly correlated with investment in construction and infrastructure. It is expected that in H2 2021 such investment will increase due to concerns regarding the potential for economic underperformance in China. This suggests upside potential for forecast Chinese HD diesel production. Indeed, if second half production were merely to match the pre-COVID H2 2019 level of c.750 thousand units, Chinese automotive platinum demand would increase by an additional 80 koz.

*China platinum imports surged in Q2 2021 ahead of full implementation of China VI HD emissions regulations*



Source: China Customs, WPIC Research

*Platinum demand upside could be higher when platinum loadings per HD vehicle are considered. China now has the strictest emissions regulations globally, yet HD platinum loadings for China VI vehicles based on the JM forecast of c.13 g/unit appear low compared to other auto markets. HD production rates and JM demand point to average North American HD platinum loadings of c.25 g/unit*

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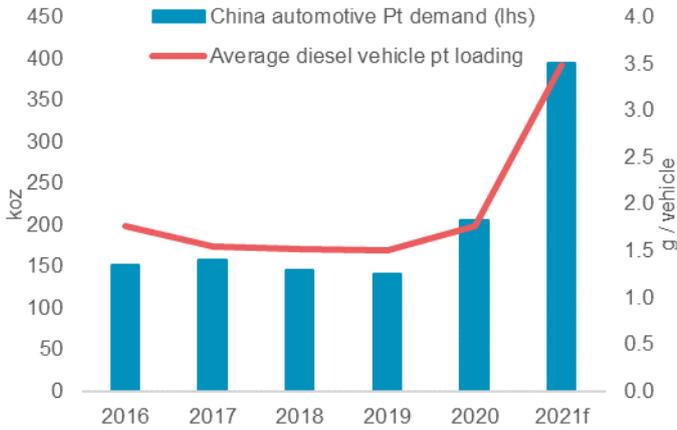
London W1J 9EF

August 2021

**Platinum's attraction as an investment asset arises from:**

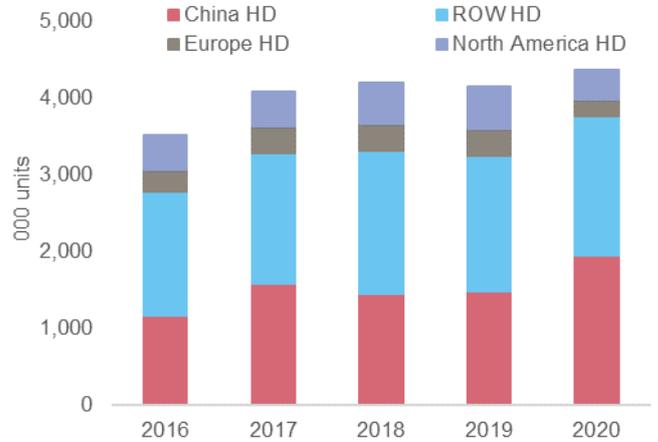
- Supply severely constrained for three more years despite some new investment in mining capacity
- Platinum price is near all-time lows relative to gold and at record lows relative to palladium
- Automotive PGM demand growth should continue due to increasingly restrictive emissions rules
- Market balance and price mismatches between palladium and platinum drives substitution
- Investment demand has surged as institutions begin to factor low price and positive fundamental outlook

**Figure 1: Johnson Matthey project a 93% jump in China's 2021 automotive platinum demand, as the roll out of China VI regulations triples HD loadings**



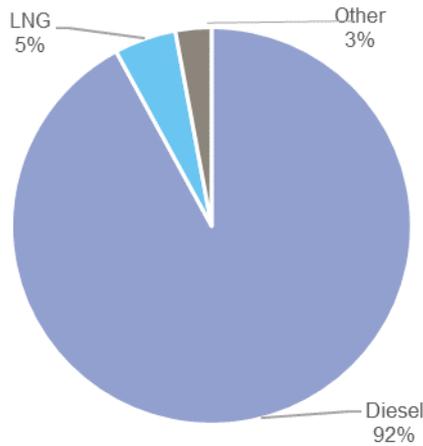
Source: Johnson Matthey, China Auto Information.net, WPIC Research

**Figure 2: Global heavy-duty output grew by c.5% in 2020 according to data collated by OICA, driven by largely 31% growth in Chinese HD production**



Source: OICA, China Auto Information.net, WPIC Research

**Figure 3: Diesel has accounted for c.92% of heavy-duty vehicles produced in China in 2021 YTD, up from 89% in 2020**



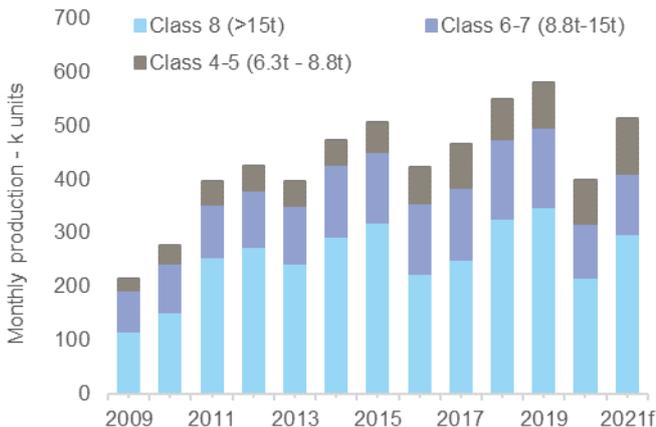
Source: China Auto Information.net, WPIC Research

**Figure 4: H1'21 class 8 truck orders in North America have surged by 226% to 213,445 vehicles, the second highest net order volume on record**



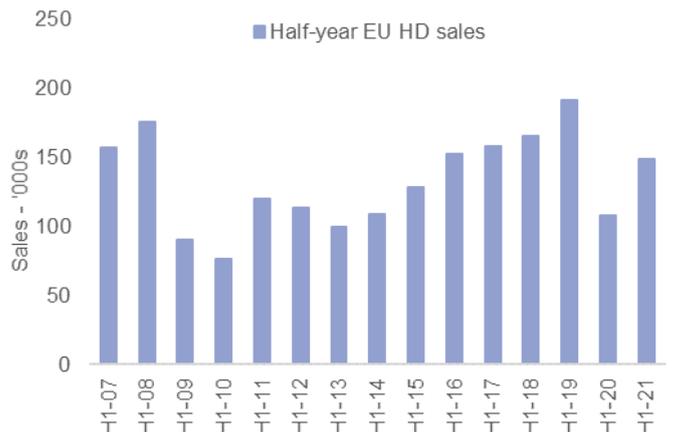
Source: FTR Associates, WPIC Research

**Figure 5: 2021 North American Class 4-8 (>6.3t) vehicle shipments are projected to be 3rd highest on record, adding to a positive platinum auto demand outlook**



Source: FTR Associates, WPIC Research

**Figure 6: EU HD (>16t) vehicle sales recovered by 37% YoY in H1-2021, a quicker pace of recovery than the post GFC period**



Source: ACEA, WPIC Research

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