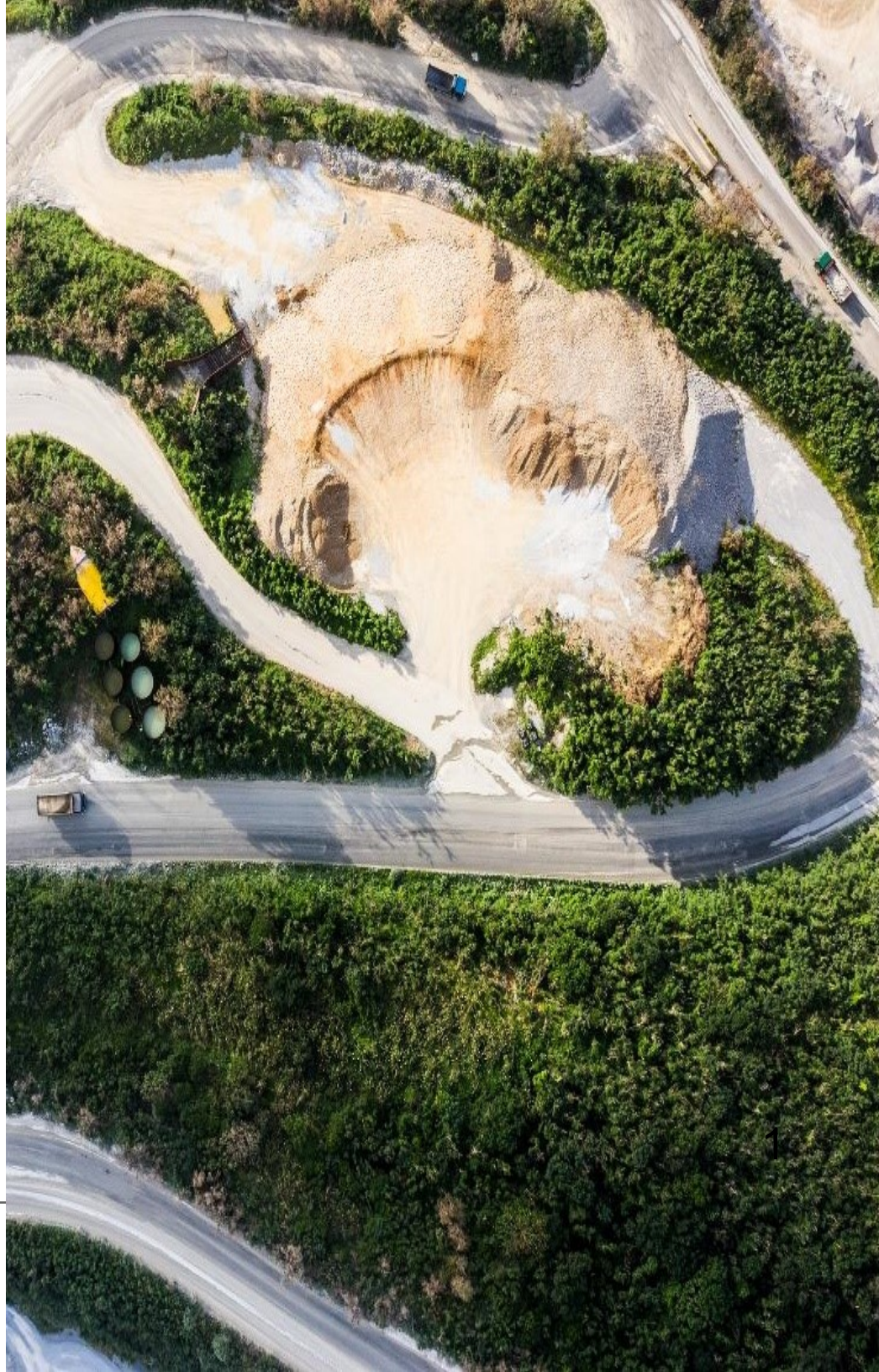


**Early PGM Demise Exaggerated—
Hybrids and Supply Constraints a
Positive Force**

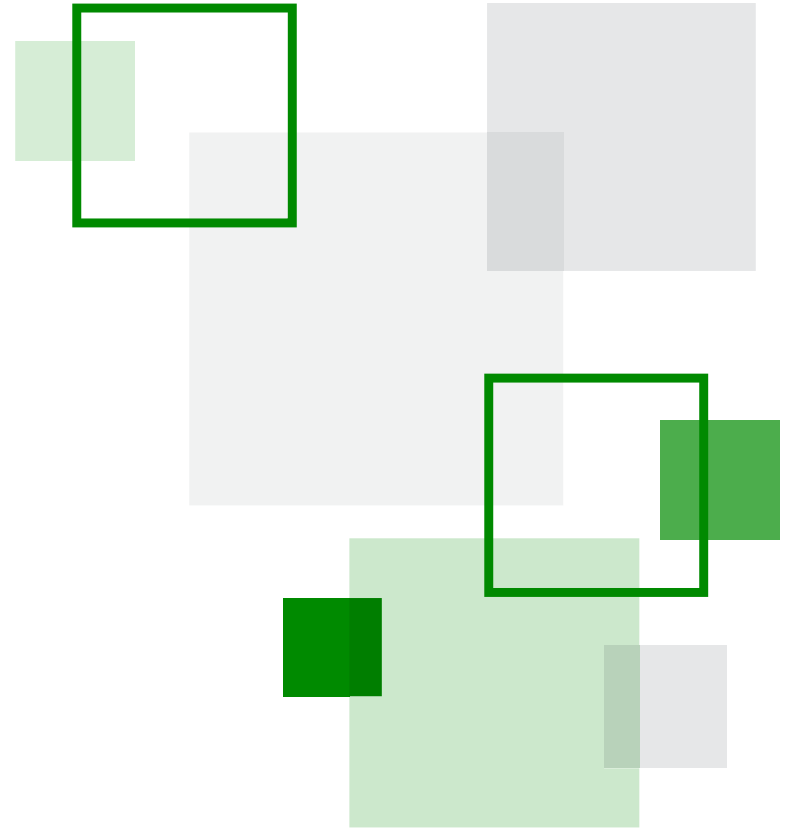
Bart Melek
Managing Director and Global Head of Commodity
Strategy

November 2024



Platinum and Palladium Outlook

- Platinum and Palladium in deficit, despite previous expectations of demand collapse due to BEV market share growth.
- Demand trends are largely favorable for PGMs into 2026, as the global economy responds to lower rates. Tougher catalyst standards, less market enthusiasm for BEVs in NA, stronger appetite for hybrid/ICE vehicles amid economic bounce and Trump policies also PGM supportive.
- Firmer demand and weaker mining and secondary supply set to tighten markets, which is price supportive.



Commodity Price Forecasts



Commodity Forecasts													
Commodity (Avg of forward month contracts)	Spot Price	2025				2026				Annual			
		Q1F	Q2F	Q3F	Q4F	Q1F	Q2F	Q3F	Q4F	2024F	2025F	2026F	
Precious Metals													
Gold	¹ \$/oz	2,641	2,675	2,700	2,625	2,625	2,600	2,600	2,525	2,525	2,387	2,656	2,563
Silver	¹ \$/oz	30.87	33.25	33.00	34.00	36.00	38.00	38.50	39.00	39.00	28.35	34.06	38.63
Platinum	¹ \$/oz	970	1,125	1,150	1,125	1,125	1,125	1,125	1,100	1,100	970	1,131	1,113
Palladium	¹ \$/oz	1,033	1,100	1,150	1,100	1,100	1,075	1,075	1,050	1,050	1,005	1,113	1,063
Base Metals													
Copper	² \$/lb	4.07	4.42	4.40	4.35	4.38	4.31	4.31	4.26	4.26	4.20	4.39	4.29
	\$/tonne	8,968	9,750	9,700	9,600	9,650	9,500	9,500	9,400	9,400	9,264	9,675	9,450
Zinc	² \$/lb	1.35	1.39	1.41	1.41	1.32	1.29	1.27	1.22	1.22	1.25	1.38	1.25
	\$/tonne	2,976	3,075	3,100	3,100	2,900	2,850	2,800	2,700	2,700	2,753	3,044	2,763
Lead	² \$/lb	0.90	0.99	0.98	1.00	1.00	0.97	0.96	0.93	0.92	0.95	0.99	0.95
	\$/tonne	1,988	2,175	2,150	2,200	2,200	2,138	2,116	2,050	2,028	2,089	2,181	2,083
Nickel	² \$/lb	7.11	7.94	7.94	7.82	7.82	7.71	7.71	7.60	7.60	7.77	7.88	7.65
	\$/tonne	15,667	17,500	17,500	17,250	17,250	17,000	17,000	16,750	16,750	17,138	17,375	16,875
Aluminium	² \$/lb	1.19	1.18	1.16	1.15	1.16	1.15	1.16	1.17	1.18	1.10	1.16	1.16
	\$/tonne	2,613	2,600	2,550	2,525	2,550	2,525	2,550	2,575	2,600	2,414	2,556	2,563
Iron Ore	⁴ \$/tonne	93	94	92	90	90	85	85	85	85	104	92	85
Energy													
WTI Crude Oil	\$/bbl	70	66	68	70	70	72	72	70	70	76	69	71
Brent Crude Oil	\$/bbl	74	69	71	73	73	75	75	73	73	80	72	74
Heating Oil (ULSD)	\$/gal	2.26	2.10	2.20	2.30	2.30	2.35	2.35	2.30	2.30	2.44	2.23	2.25
Gasoline	\$/gal	2.07	2.15	2.15	2.20	2.25	2.30	2.30	2.25	2.25	2.35	2.24	2.20
NYMEX Natural Gas	\$/MMBtu	3.39	2.75	2.75	2.75	3.00	3.00	3.00	3.25	3.25	2.28	2.81	2.90

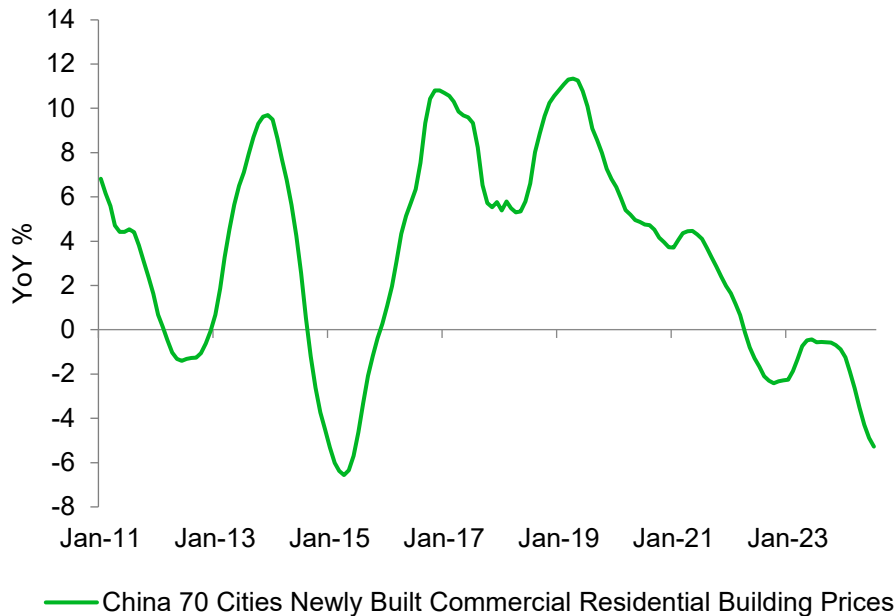
Notes: F = Forecast, E = Estimate, A = Actual; 1. London PM Fix; 2. LME; 3. Molybdenum equivalent to moly oxide, FOB USA; 4. CFR China, 62%Fe, dry; 5. Japan CIF steam coal marker-Newcastle

Source: Bloomberg, TD Securities

Risk Assets, Industrial Metals Vulnerable to Economic Weakness — Gold More Resilient



Real Estate is a Major Drag in the Middle Kingdom Aggregate Demand



Source: Bloomberg, TD Securities

Weak Economy a Strong Negative for Industrial Metals

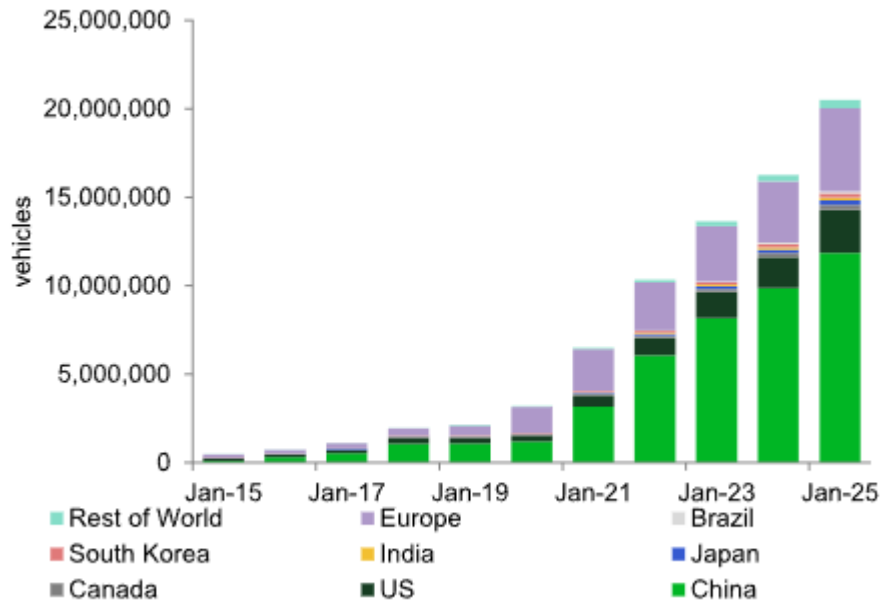


Source: Bloomberg, TD Securities

BEVs Remain a Threat to PGMs — But Less NA Appetite, Rise of Hybrids, GOP Administration and Supply Mitigating Factors

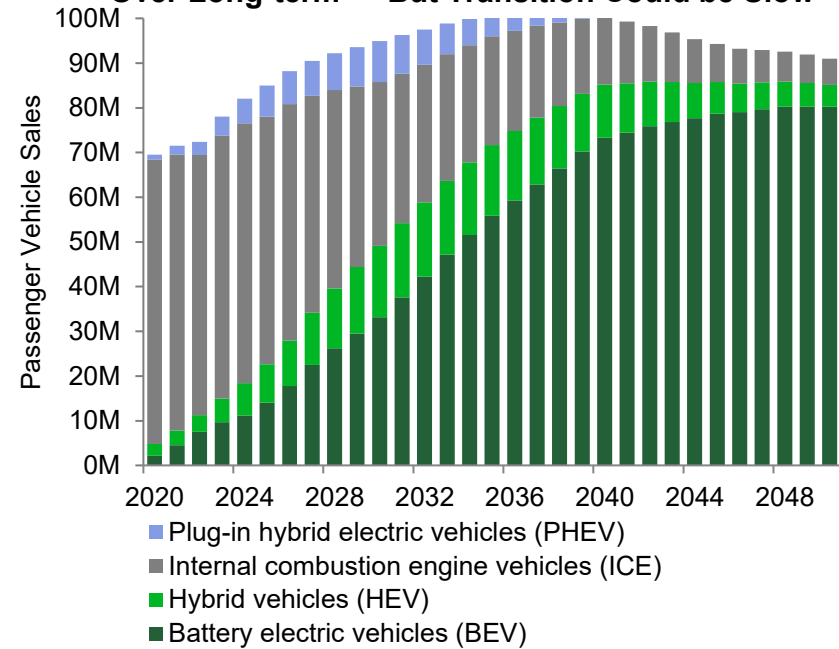


The EV Boom is Well Underway



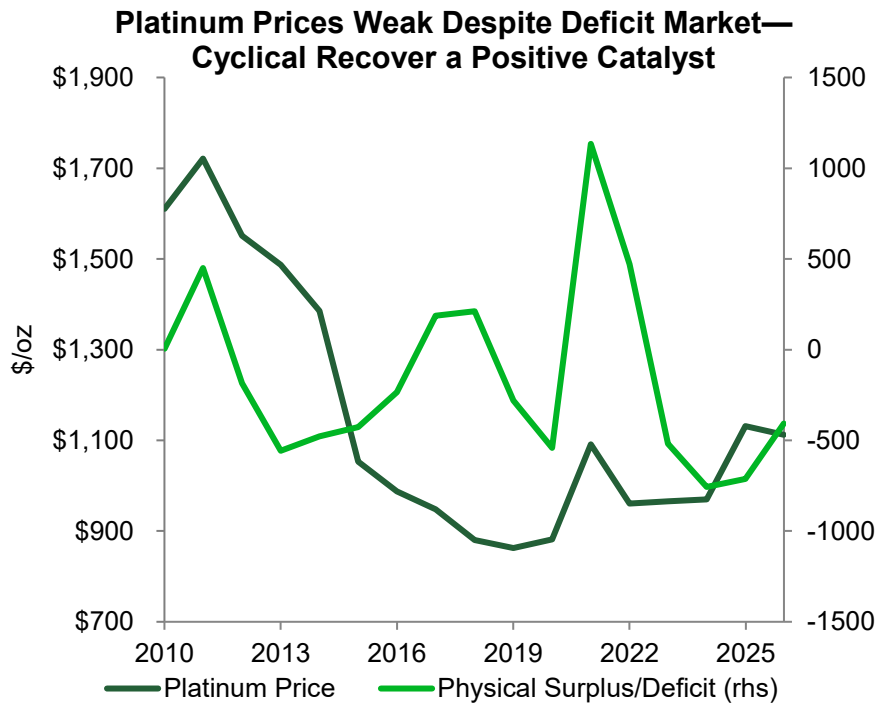
Source: TD Securities, BNEF

BEVs Expected to hold Majority Market Share Over Long-term— But Transition Could be Slow

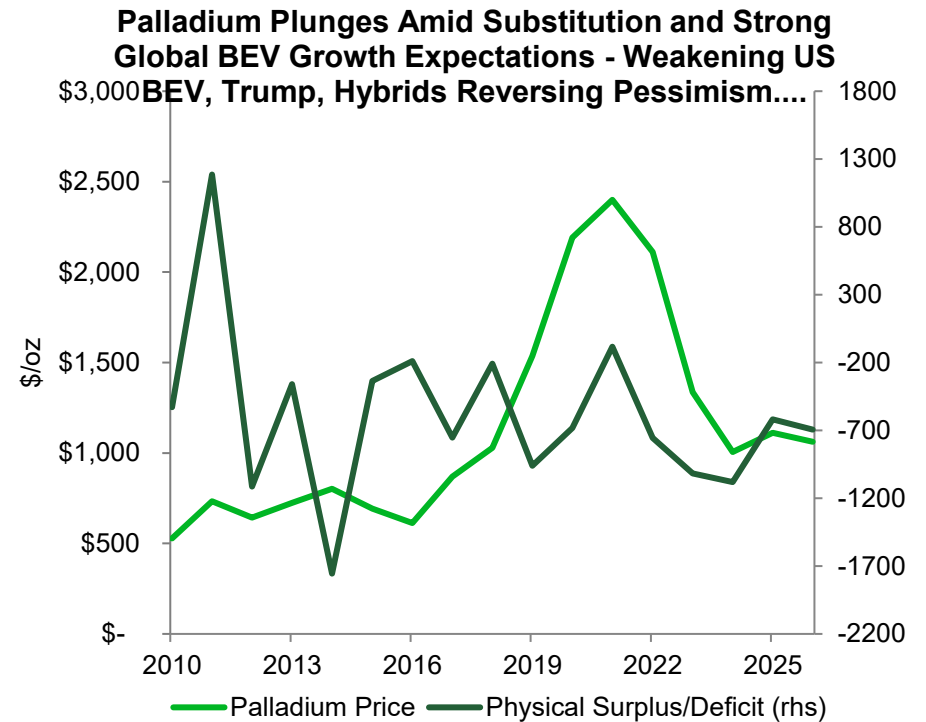


Source: Bloomberg, TD Securities

Weak Mining and Secondary Supply Growth, Slower BEV Market Share Growth Set to Boost PGMs Prices



Source: Metals Focus, TD Securities

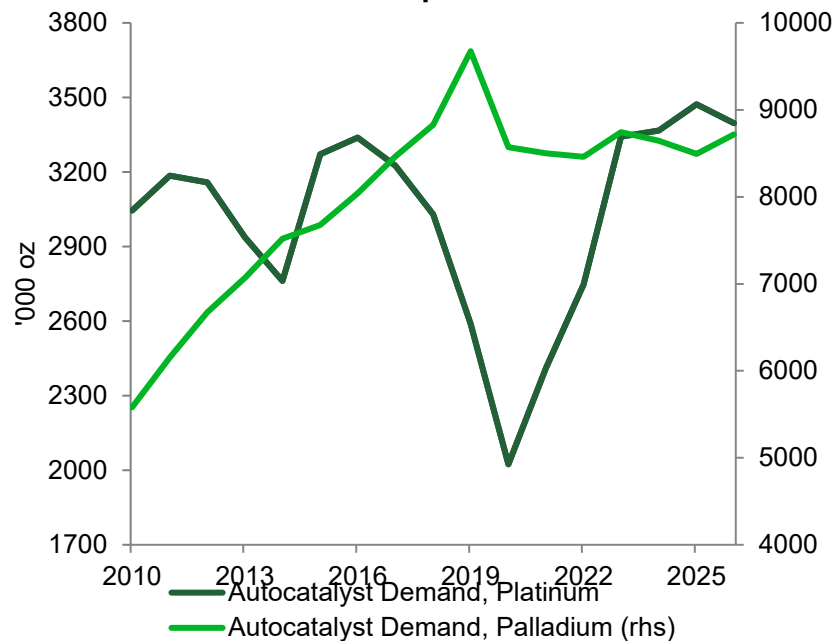


Source: Metals Focus, TD Securities

Facts on The Ground Accretive for PGMs— Expectations Notwithstanding

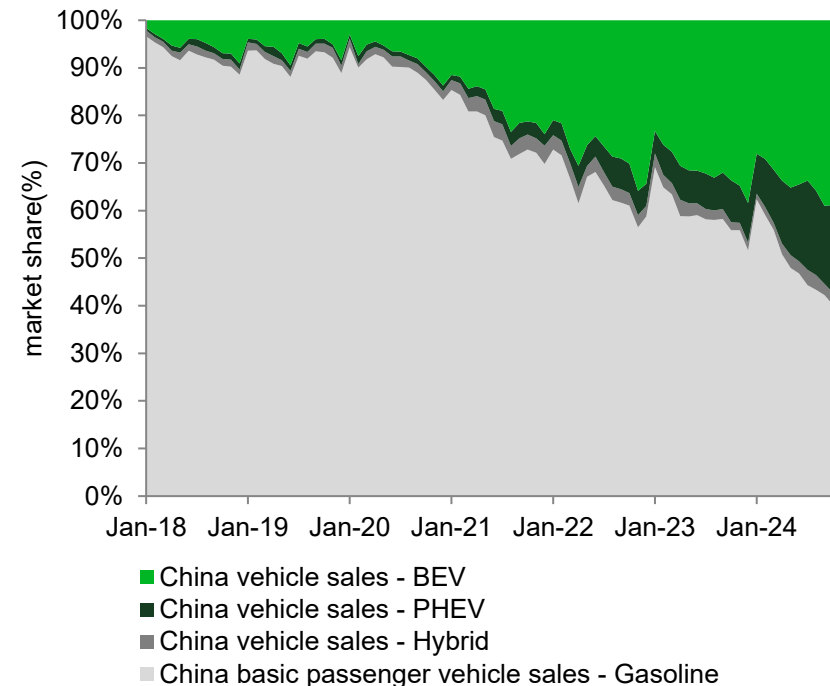


Hybrids & Substitution Still Bolstering Platinum Demand Despite BEV Boom



Source: Metals Focus, TD Securities

PHEVs Gaining Ground in China



Source: TD Securities, China Automotive Information

Tighter Regulations a Catalyst for Auto Catalyst Demand



Emissions Legislation for Light Duty Vehicles

	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Europe	Euro 6					Euro 7					
North America (EPA)	Federal Tier 3 Phase-in					Federal Tier 4 Phase-in					
North America (CARB)	LEV III Phase-in			PM = 1 mg/mile	LEV IV Phase-in			SULEV 30 for non-ZEV			
Japan	Japan 18 (WLTP)										
South Korea (Gasoline)	LEV III (97g/km CO2 from 2020)										
South Korea (Diesel)	Euro 6d (RDE Phase II, 97g/km Co2)					Euro 7 (estimated)					
China (Main economic areas)	China 6b, no RDE	China 6b, RDE				China 7 (estimated)					
China (Nationwide)	China 6a	China 6b, RDE				China 7 (estimated)					
Brazil	PROCONVE L-7			PROCONVE L-8							
India	BS VI Stage I (Euro 6b)	BS VI Stage II (RDE)					BS VII (estimated)				
Indonesia (Gasoline)	Euro 4					Euro 5 (estimated)					
Indonesia (Diesel)	Euro 4										
Thailand	Euro 4			Euro 5							

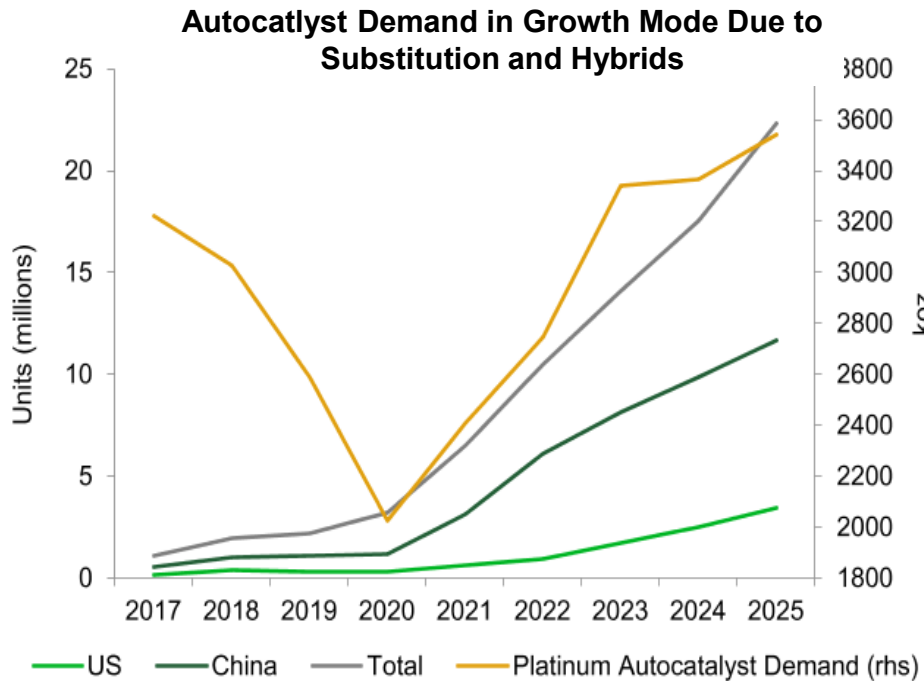
Source: Johnson Matthey, TD Securities

Emissions Legislation for Heavy Duty Vehicles

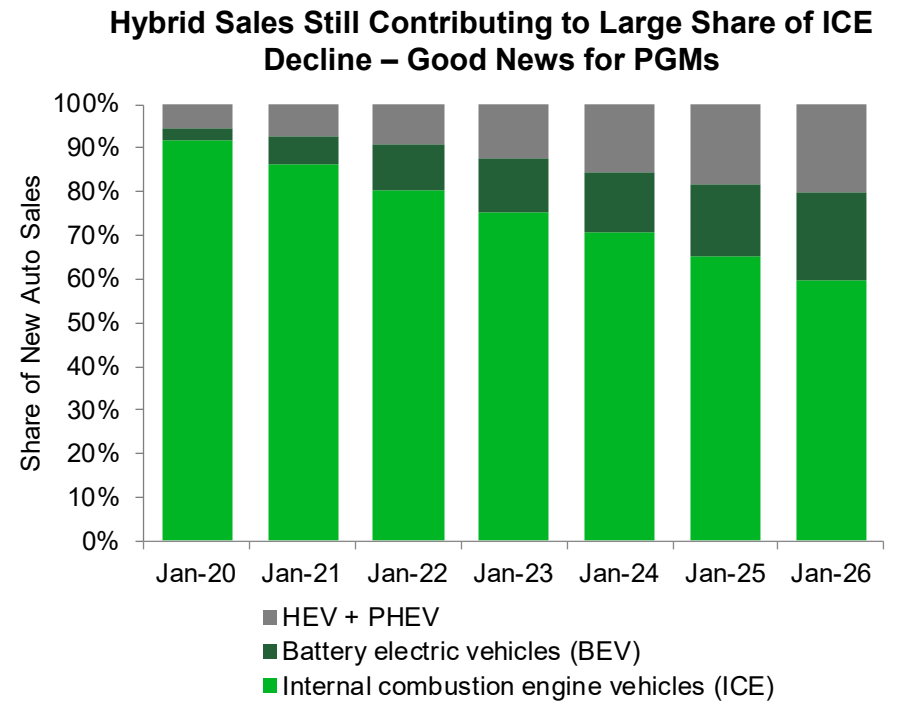
	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Europe	Euro VI						Euro VII (July 2028)				
North America (EPA)	US 2010					EPA 2027					
North America (CARB)	US 2010		CARB 2024		CARB 2027						
Japan	Japan 2016										
South Korea	Euro VI						Euro VII				
Brazil	PROCONVE P-7	PROCONVE P-8									
India	BS VI	BS VI RDE						BS VII (Estimated)			
China	China VIa	China VIb				China VII (Estimated)					

Source: Johnson Matthey, TD Securities

Loadings, Consumer Preferences and Trump Autocatalyst Supportive



Source: Bloomberg, TD Securities

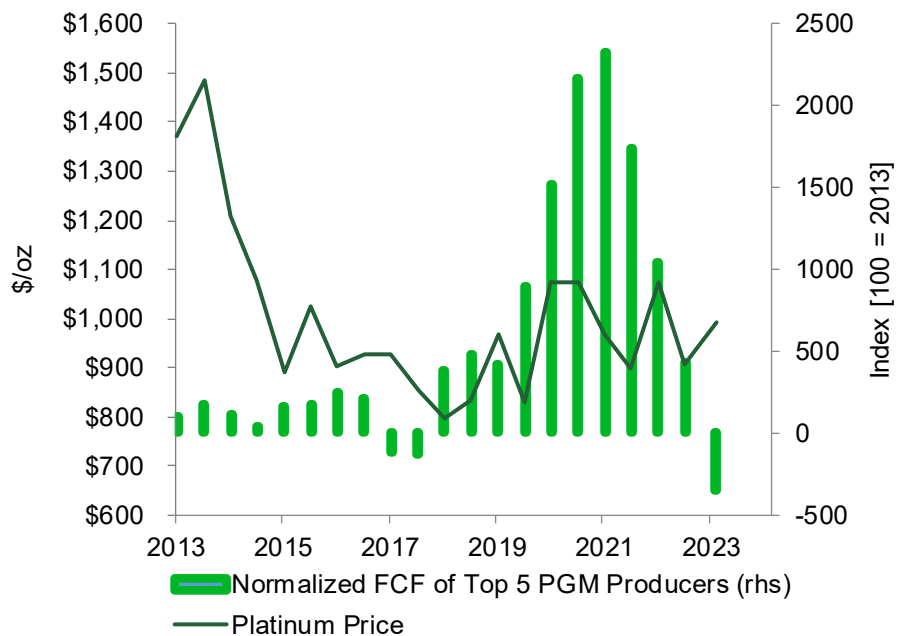


Source: BNEF, TD Securities

Supply Erosion A Stabilizing Factor for PGMs Prices at a Time Market Has Existential Demand Concerns

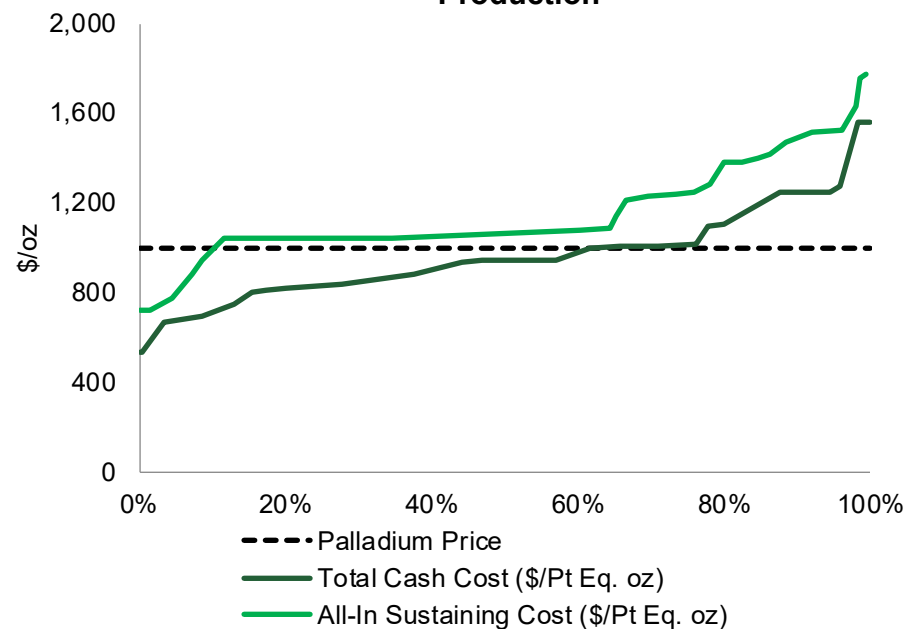


Poor Profitability Keeping Mine Supply Tight



Source: Bloomberg, TD Securities

Palladium Price Low Relative to Cost of Production

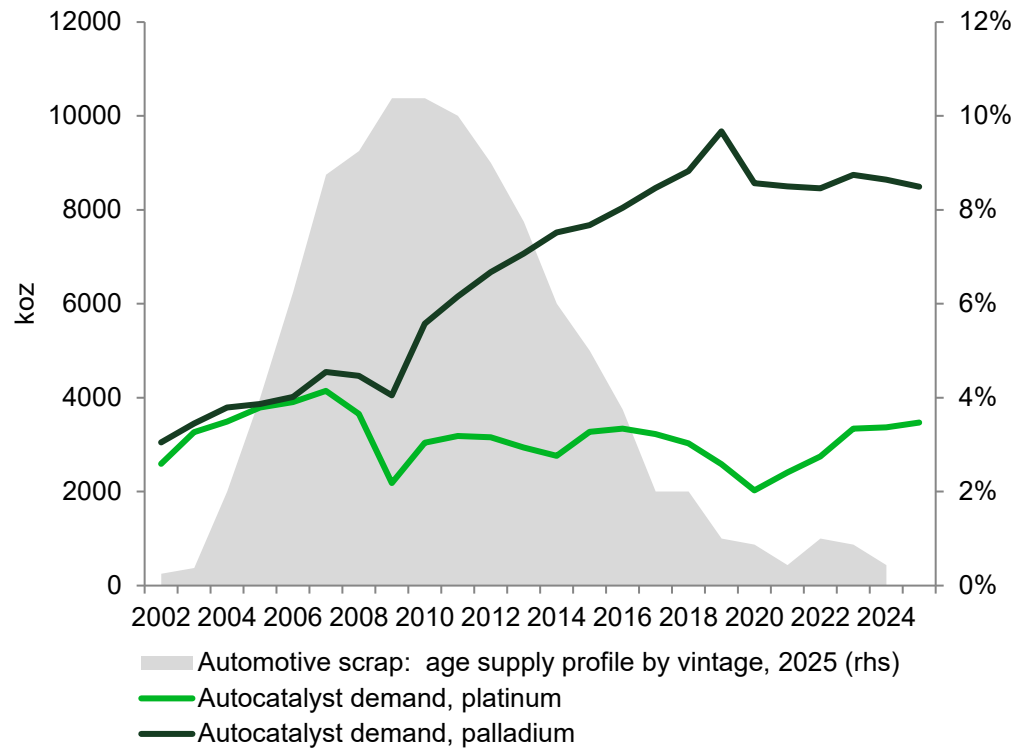


Source: Metals Focus, TD Securities

Secondary Supply Helping to Feed Deficits



Aging Fleet to Support Palladium Secondary Supply



Source: TD Securities, Metals Focus, Johnson Matthey, GMFS, Industry Reports, Reuters

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