10-year PGM market outlook (session 2)

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Positioning in the supply chain, a collective approach



Platinum Group Metals (PGM's) are a small but very strategic market

- Primary production amounts to less than 15 million 5E (Pt, Pd, Rh, Ir, Ru) ounces
- Very precious metals, but used for industrial purposes

Strategic customer relationships to create shared value beyond transactional selling

- Working together with compatible strategic partners across the value chain to align demand with supply
 - Co-develop technologies (e.g. clean hydrogen production, driving circularity)
 - Development of new applications for metals
 - Substitution

Close working relationships with well-established, industrial customers with global presence

- Autocat markets including OEMs and fabricators
- Electronics and fuel cell markets
- Global market coverage through our customers (USA, EU, Asia)
- Partnership approach to customer relationships
 - Two-way, problem-solving mindset
 - Superior and flexible customer service



Longer term, sustainability of PGM supply into the green hydrogen economy requires value chain participants to work together

Value-adding presence in the market



Market Development and Sales Model that supports customer focus

- Focus on longer term contractual relationships
- Spot market sales supports operational flexibility and tactical selling
- Ability to offer metal from primary production, recycled production and multiple geographical sources

Shared Intelligence into demand and supply developments

- Shared valuable, short-term market intelligence from cross section of customers in different industries and regions
 - Enhanced ability for production and inventory planning
- Long-term demand outlook to inform market balance and strategic decision-making

Inroads as 'new' entrant into the PGM market

- As new entrant, able to adopt a fresh, pragmatic approach to sales and market development
- More than just suppliers of metals, but rather partners to solve problems using our metal products as the solution



- Sustainable long term PGM supply
- Recycling of PGMs
- Battery metals



- L Understanding and evaluating opportunities across the hydrogen value chain
- Substitution to balance demand and supply mix

R&D



 Various projects to grow and balance demand across range of industrial applications

Volatility versus sustainability Kleantha Pillay, SVP Sales & Marketing

Stillwater



Recent volatility caused by short term disruptions



Supply disruptions

- Anglo ACP outage
- Covid-19 lockdown and implementation of related health and safety protocols in South Africa
- Norilsk environmental, flooding and concentrator incidents
- Producers in the market as buyers, prices supported

Demand disruptions



- Covid-19 shutdowns
- Supply chain/logistics constraints
- Global chip shortage
- Spot sellers flood the market resulting in rapid price declines

- Disruptions over a 1-2 year period result in periods of volatility but do not inform the long term trend
- Frequent revisions to recent auto forecasts suggest high levels of uncertainty in the short term
- Timeous insights from strategic customer relationships (fabricators and OEMs) inform our short-term inventory planning and metal placement into the market
- On a longer term basis, we consider fundamentals rather than short term market dynamics

ICE does not disappear by 2035



Possible engine mix by 2035



 Announced bans of new ICE sales will impact ~25% of total light vehicles by 2035

What does this mean for battery metal demand in 2035?



Lithium: 2,098 kt LCE

- +937% vs forecast demand in 2021 (202 kt)
- Current deficits continue to deepen without significant investment in potential projects*



Over 110 million light vehicles by 2035

- Almost 30 million BEVs based on planned bans



• ICE technology to remain a substantial element of Auto mix for the medium term



Nickel: 1,203 kt**

- +383% vs forecast demand in 2021 (249 kt)
- Deficits forecast from end of decade



Cobalt: 152kt

- +252% vs forecast demand in 2021 (43 kt)
- Deficits forecast from 2026 onwards

10 year outlook is based on fundamentals and informs our long term strategic decision-making

* Not yet at feasibility stage

* Ni demand for EVs only; Gross Ni demand by 2035 is 6.7kt or 5kt net of stainless steel recycling Source: SFA (Oxford)







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Primary platinum supply tapers at the end of the decade

Primary supply declines 5% from 6moz in 2019 to 5.7moz in 2030, driven by declining South African supply

2021E

Secondary supply growth of +200koz from 2019 to 2030 increases recycling's share of supply from 19% to 22% by the end of the decade



Platinum supply (koz)

Primary platinum supply by region

Total supply CAGR of -0.1% (2019-2030), driven by declining primary supply from South Africa despite 1.2% per year growth in recycling

7,000

6,000

5,000

4,000

3,000

2,000

1,000

0

2017A

2016A

Other

2019A

North America

2018A

2020A

koz

30%

25%

20%

15%

Russian and North American expansion keeps primary palladium supply flat

Primary supply CAGR of -0.1% between 2019 and 2030 as Russian and North American growth compensates for falling South Africa supply Secondary supply grows from 2.9moz in 2019 to over 4moz in 2030 (assuming no recycling constraints), increasing recycling's share of supply from 30% to 40% over the decade



Primary palladium supply by region



Total supply CAGR of +1.4% (2019-2030), driven by growth in recycling of +4.3% per year between 2019-2030



Primary rhodium supply follows the platinum trend

Primary supply declines 9% from 760koz in 2019 to 690koz in 2030, Secondary supply grow driven by declining South African supply recycling's share of sup

Secondary supply growth of +160koz from 2019 to 2030 increases recycling's share of supply from 32% to 42% by the end of the decade







Total supply CAGR of +0.7% (2019-2030), driven by growth in recycling



Demand





Palladium and rhodium are largely auto metals



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Platinum's industrial application is almost as big as its demand in auto

Source: Company data

Light vehicle forecasts and engine mix have changed significantly in a short period of time





Global BEV market share forecasts



Q3'21 light vehicle forecasts have increased compared to Q3'20 forecasts, despite downward revisions in-between due to chip shortage

Steep increases to BEV forecasts over short period of time

We see downside risk for aggressive BEV penetration forecast





Our BEV forecasts are within current ranges

• 2020, 2025 and 2030 data for cars with extrapolation for years in-between

• SSW: Sibanye-Stillwater

Source: SFA (Oxford), LMC Automotive, IHS Markit, International Energy Agency, analyst reports, company data

ICE continues to underpin our growing light and heavy vehicle forecasts





Light vehicle production forecast

Heavy vehicle production forecast



- 12% BEV market share by 2025, up to 22% by 2030
- FCEV grows to just over 1% share by 2030

- ~7% share for BEV by 2030
- ~7% share for FCEV by 2030

Outlook for PGM-containing vehicles remains robust through the decade

Note: Hybrids included under ICE Source: Company data

Emissions legislation is supportive of light and heavy vehicle loadings





Loadings rise to meet emissions targets

Substitution of palladium with platinum in light gasoline vehicles gains momentum



Platinum added / palladium removed from light gasoline vehicles



- Absolute quantity of Pt added/Pd removed driven by vehicle production, engine mix and level of substitution
- Substitution levels of 20% to 50% expected in different regions
- As prices change, the incentive to substitute also changes
- Timeframe for decision-making reduced through ability to tweak ratios of PGMs in trimetal catalysts without recertification

Critical for the value chain to work together to balance the basket by ensuring controlled substitution

Platinum demand for fuel cells is expected to grow over the decade



Gross platinum demand for fuel cells



- Growth in platinum demand for fuel cells is driven by growth in FCEVs, particularly in the heavy vehicle segment (included in auto demand)
- FCEVs and stationary fuel cells can be fueled by gray/blue hydrogen and hydrogen containing fuels such as methanol
- Fuel cell demand is therefore not necessarily coupled to electrolysis for green hydrogen
- By the end of the decade, platinum demand for (auto and stationary) fuel cells grows to 13% of total platinum demand, compared to just 1% in 2019

Demand for PGMs in electrolysers for the production of green hydrogen is limited; growth expected post 2030

Substitution and FCEV growth drive platinum demand





[■] Jewellery ■ Industrial ■ Auto ■ Investment

Industrial demand CAGR of +1%, jewellery CAGR of -5% (2019-2030)

Note: includes investment demand for 2019, 2020 and 2021 as at 30 June Source: Company data

Palladium demand declines as a result of autocat substitution





Palladium demand

Auto demand also impacted by tapering in ICE vehicles at the end of the decade

Note: includes investment demand for 2019, 2020 and 2021 as at 30 June 20 Source: Company data

Rhodium demand tapers only at the end of the decade as ICE production declines





Source: Company data

Auto demand supported by tightening emissions legislation, despite thrifting

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Market balances





More controlled substitution and reduction in recycling impact market balances



3,000





Pt deficits limited to 1moz; Pd recycling reduced 10% per year from 2025 onward

2021 price = average for 1H 2021; 2021 balance includes investment demand as at 30 June 2021

...with more sustainable 2E basket and Rh in deficit through to 2030





Pt deficits limited to 1moz; Pd and Rh recycling reduced 10% per year from 2025 onward

Conclusion







PGM supply fundamentals	 Primary PGM supply declines over the decade, particularly for Pt and Rh Supply is supported by forecasted growth in recycling, however downside risk remains
ICE underpins auto demand	 ICE vehicle forecast remains well supported over the decade due to a growing car-park, despite increasing market share for BEVs in the light vehicle segment ICE continues to dominate a growing heavy vehicle segment Autocat demand is well supported by tightening emissions regulations Adoption of FCEVs in the heavy vehicle segment will accelerate in the second half of the decade to support emissions targets and Pt demand
Substitution successful in balancing the basket	• Substitution of Pd with Pt in gasoline vehicles helps balance the 2E basket to mid decade
Sustainable market balances	 Overall, we forecast a sustainable 2E balance over the decade with Pd moving into surplus and Pt into deficits in the second half of the decade Rh remains in relatively small deficits through to 2029 More controlled substitution, over shorter timeframes, can provide even more sustainable 2E balances during the second half of the decade Modest reductions in Pd and Rh recycling will reduce Pd surpluses even further and move Rh into deeper deficits

Our operations are ideally placed to deliver into a PGM market that we understand well

Questions?



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Appendix





Emissions regulations for both light and heavy vehicles tighten over the period



Heavy vehicle emissions legislation

	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
North America	US 2010							CARB 2024				CARB 2027, EPA 2027 expected			
Europe	Euro VI							Euro VII expected							
Japan	Japan 2	009	Japan 2016 WHTC												
China (National)	China IV			China V				China Vlc		China VIb			China VII expected		
India (National)		BS III		BS	IV				BS VI						



Governments and OEMs positive on FCEVs and H2 refueling infrastructure



		Country/region	FCEVs	HRS
JAGUAR	FCEV prototypes on the road by 2021; FCEVs powertrain development plays a role in the "Reimagine" strategy	China	>1 million in 2030	>1,000 by 2030
STELEANTIS	Launching 400km range fuel cell HCV in 2021	South Korea	1.8 million in 2030	>500 in 2030
GWM	Launch of world's first C-class FCEV SUV and incoming fleet of 100 FCEV 49-tonne trucks	Japan	800,000 by 2030	900 by 2030
	Renault-Plug Power JV (HYVIA) to launch three FCEV LCVs during 2021	California	30,000 by 2025	200 by 2025
L汽集团 SAIC MOTOR	SAIC to launch at least 10 FCEV models by 2025, and to have at least 10,000 FCEVs on the road by then	EU	435,000-468,000 by 2030	1,350-2,050 by 2030

High BEV growth in light vehicles has been off a very small base



Global BEV sales (million units)



Required levels of BEV growth unlikely to be sustained over the next 10 years

Post 2030, green hydrogen is expected to be competitive in a number of applications





Required H_2 production cost for breakeven with conventional solutions (with US\$100/t CO₂e cost)



Longer term demand for green hydrogen is driven by industrial, hard-to-abate applications, beyond our forecast period

Source: Hydrogen Council

Demand for Ir in PEM electrolysers becomes significant beyond the forecast period



PGM-containing PEM electrolysers represent ~70% of pipeline projects to 2040

27 76 Electrolyser Electrolyser technology technology in EU & UK in EU & UK (based on pipeline of projects) 2020 21 2040 69 PFM Alkaline Solid oxide

Thrifting is vital for cost reduction and technology sustainability Cost breakdown for a 1 MW PEM electrolyser, moving from full system, to stack, to CCM



• Ir and Pt contribution to CCM can be significant, depending on price

- But relatively small part of overall costs
- Scope for other costs to decrease more with scale-up, so putting Ir and Pt in spotlight

Opportunity for industry collaboration to align Ir demand with supply through thrifting, substitution and innovative recycling

CCM = Catalyst coated membrane

Source: SFA (Oxford); IRENA (2020), Green Hydrogen Cost Reduction: Scaling up Electrolysers to Meet the 1.5°C Climate Goal,

Platinum market forecast to move into deficit in the latter half of the decade





Base case market balance --- Excl. Investment ---- PLATINUM PRICE

Move into deficit driven by substitution in light gasoline autocats

Palladium market forecast to move into surplus towards the end of the decade





PALLADIUM MARKET BALANCE --- Excl. Investment ---- PALLADIUM PRICE

More controlled substitution of Pd with Pt in gasoline autocats required in second half of the decade

2021 price = average for 1H 2021; 2021 balance include investment demand as at 30 June 2021

Sustainable 2E market balances forecast in our base case





Increasing 2E surpluses in electric scenario

Rhodium forecast to remain in marginal deficit for most of the decade





Rhodium market balance

-----Rhodium price

Thrifting drives more balanced market in the near to medium term