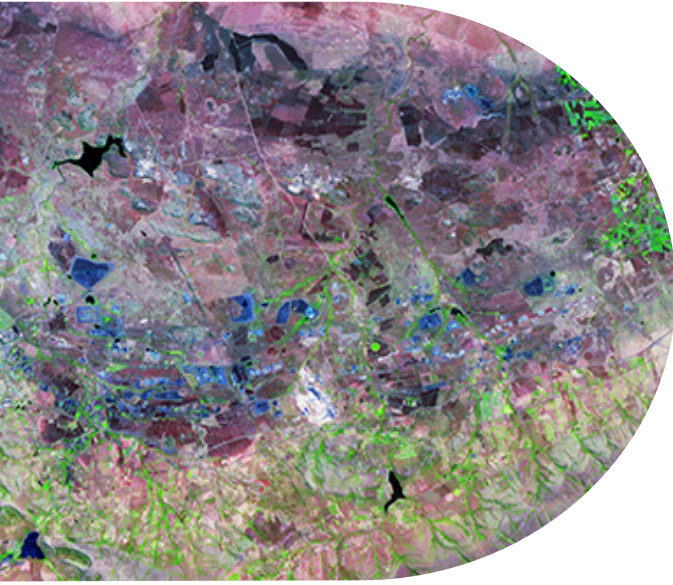


The Bushveld Igneous Complex as seen from space. Image credit: NASA/GSFC/METI/ERSDAC/JAROS, and U.S./Japan ASTER Science Team, courtesy NASA/JPL-Caltech

PLATINUM SUPPLY CONSTRAINTS

Platinum is rare and highly concentrated in one location with underground reserves requiring significant time and capital investment to extract and refine



At 2 billion years old, South Africa's Bushveld Igneous Complex (BIC), which holds the largest concentration of Platinum Group Metals (PGM) in the world, continues to reveal the mysteries of its formation to geologists. BIC has three principal PGM-bearing ore bodies, that together provide c.75 per cent of platinum globally.

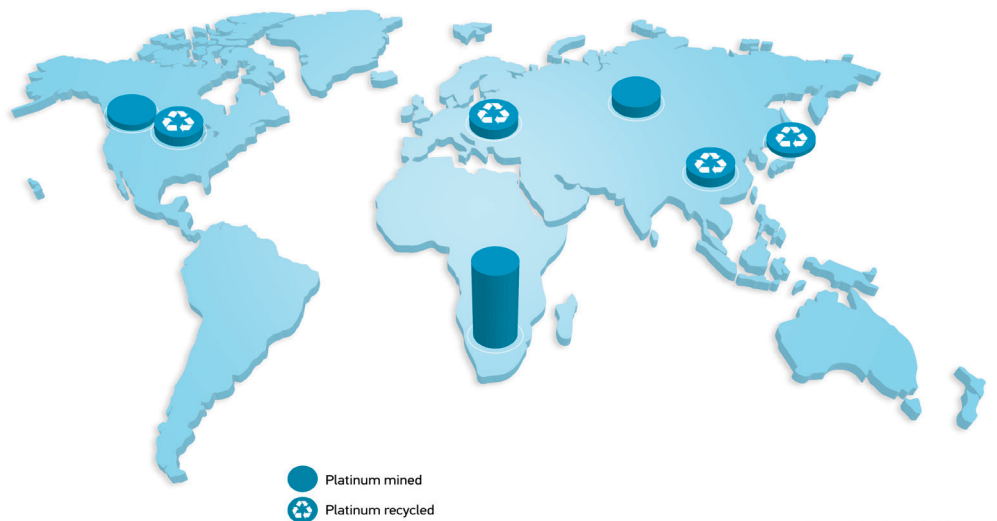
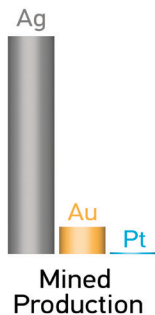
A recent study by researchers at the University of Witwatersrand has shed new light on the formation of platinum deposits by studying the BIC's Merensky ore body. The research report concludes that the 'reef' structure of the Merensky platinum deposits was created by crystals that grew in situ, rather than

the settling of crystals through gravity as previously believed.

Thirty times rarer than gold, platinum deposits occur at very low concentrations in the Earth's crust. Around 6 moz (190 metric tons) of platinum is mined worldwide each year, compared to 108 moz (3,300 metric tons) of gold, with 72 per cent of annual platinum production coming from South Africa.

The balance comes from: Russia - 11 per cent; Zimbabwe - eight per cent; and North America - six per cent. Other minor producers including China, Colombia and Finland produce the remaining three per cent.

Mining Supply 2018



Source: Bloomberg, WPI Research.

In addition to its rarity, platinum is not easy to access. While over 70 per cent of all mineral extraction globally arises from surface mining, in contrast, the geology and location of the world's platinum reserves mean that platinum mining takes place principally underground. Extracting platinum from the layered deposits of the BIC requires a complex physical and chemical processes, namely mining, concentrating, smelting and refining which are time and capital intensive.

In South Africa, PGM-bearing ores generally have a low PGM content of between 2 and 6 grams per tonne and it typically takes up to six months and between 10 and 40 tonnes of ore to produce one troy ounce of platinum (31,1035g).

Platinum output falling

PGM reserves yield not only platinum, but also its sister metals - palladium, rhodium, ruthenium, iridium and osmium – alongside base metals like nickel and copper, as well as gold and silver. Together, these are referred to as the metals 'basket'.

Platinum mining output from South Africa has fallen by 8 per cent since 2011. In fact, recent figures from the South African government's office of statistics shows that in the 12 months to August 2019, PGM production fell 12.5 per cent.

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