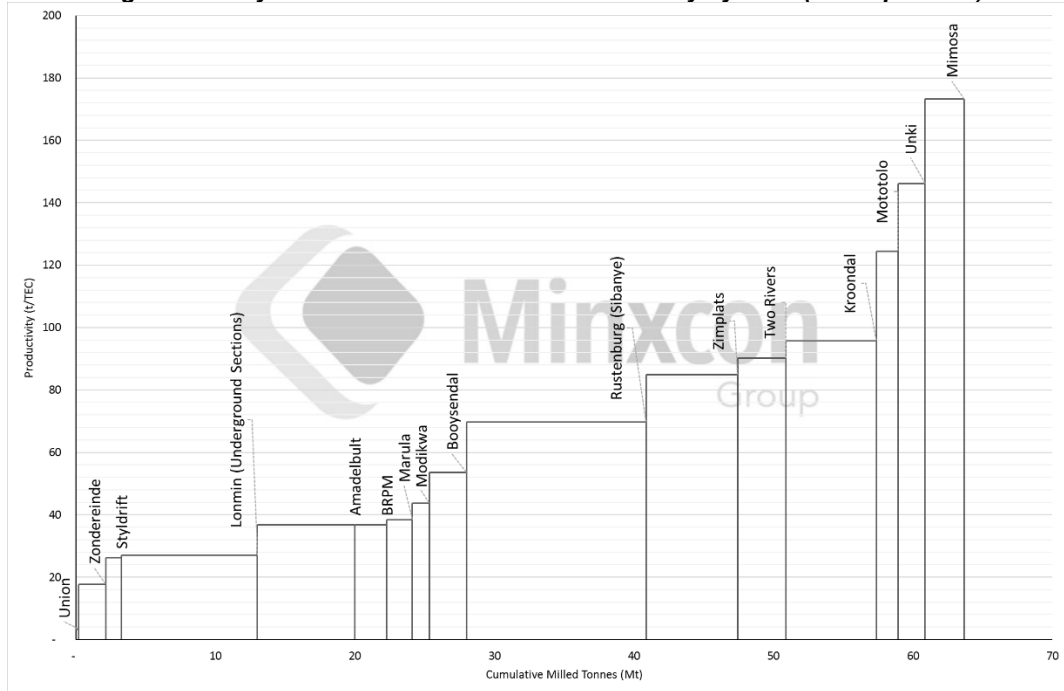


EXPLORATION | CONSULTING | PROJECTS

Mining Productivity - PGE

Productivity influences the organisational performance of mining companies

Tonnage Efficiency Curve: 2018 Southern Africa Industry by Mine (tonne per TEC)

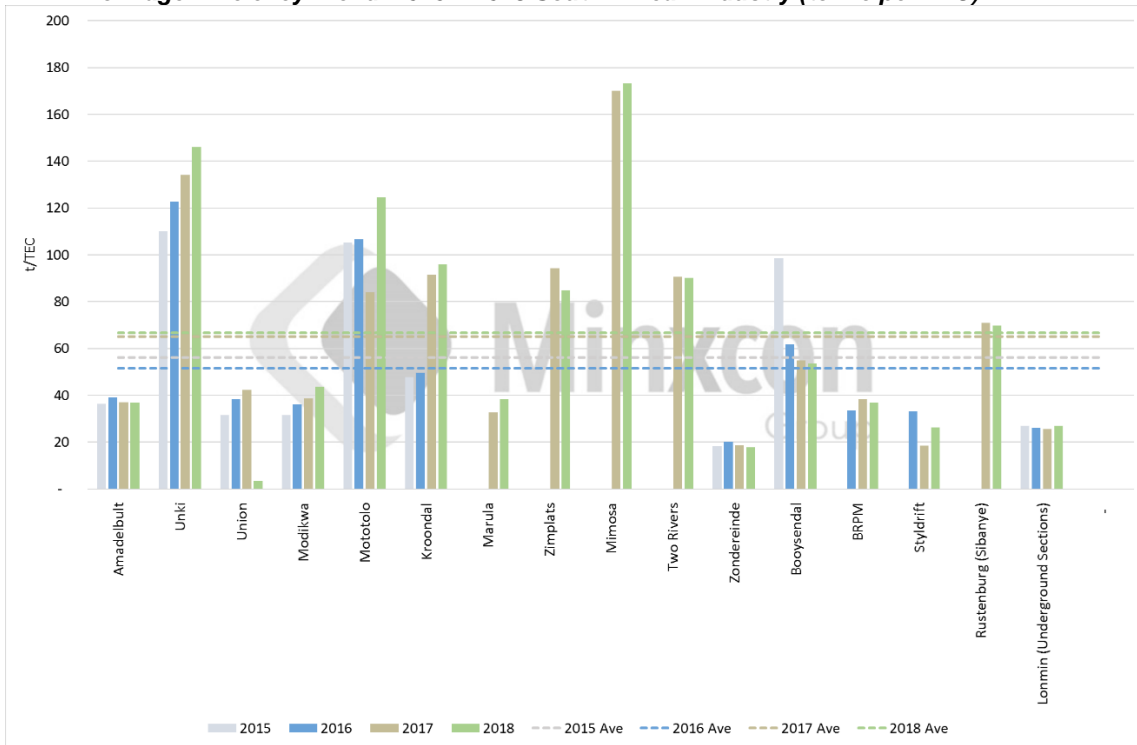


Product Efficiency Curve: 2018 Southern Africa Industry by Mine (gramme per TEC)

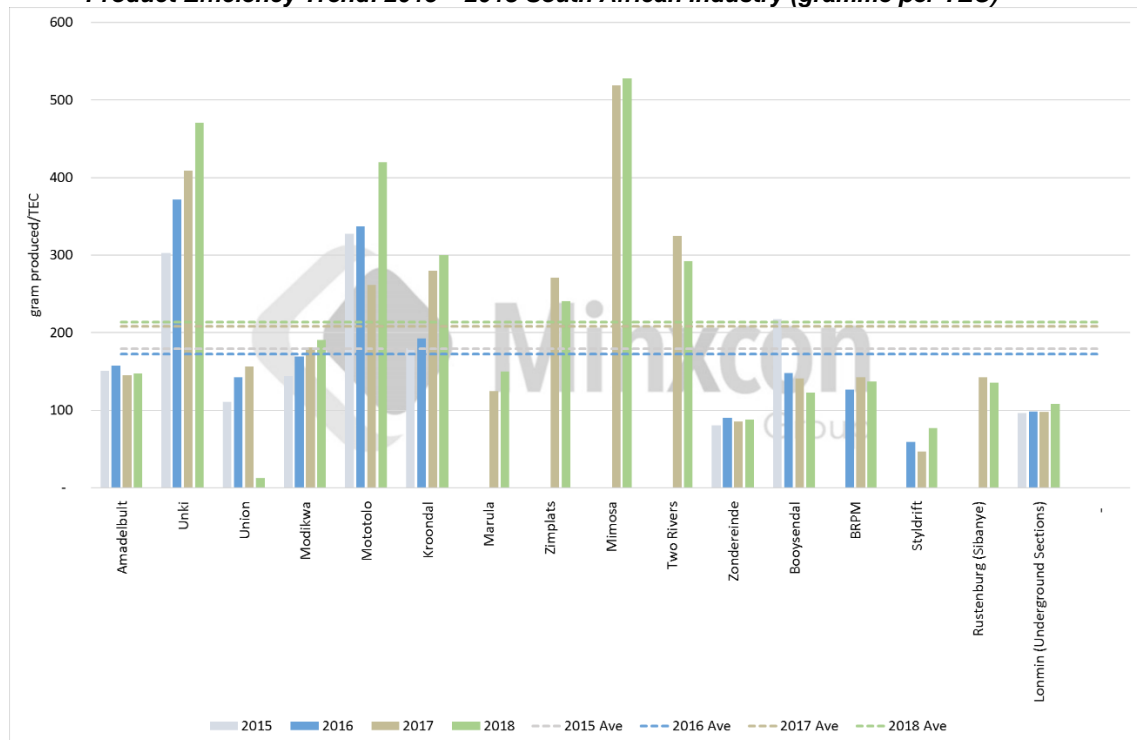


Disclaimer: Information displayed in graph is based on public information collected from the latest respective South African PGE mining company's annual reports. There is no guarantee that the interpreted information is 100% accurate.

Tonnage Efficiency Trend: 2015 – 2018 South African Industry (tonne per TEC)



Product Efficiency Trend: 2015 – 2018 South African Industry (gramme per TEC)



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Globally mining companies continue to face severe economic challenges. These global challenges also influence the South African mining industry and with additional operational challenges that are unique to the country, the survival and competitiveness of the industry is threatened. This forces the South African mining industry to focus on factors that influence their organisational performance: productivity is one of these focus areas.

Productivity can be measured by comparing the relationship of output and inputs used to produce the product. Productivity remains a relative concept and it cannot be said to increase or decrease unless a comparison is made against a standard or a competitor.

Industry productivity curves are valuable tools to benchmark the operational performance of an existing operation or a new proposed mine project against the current industry performances.

The productivity curves are expressed as two measures of productivity typically used in the mining industry. The tonnage efficiency curve shows the tonnes produced by total employees costed. This measure of productivity shows the tonnage production capacity of a labour force. The annual reports analysed for this curve showed that the higher producing mines will have the best tonnage efficiency per total employee costed.

The product efficiency curve includes grade produced as an additional factor. This measure of productivity shows the product produced per total employee costed. This shows the efficiency of the labour force to produce the product. Lower grade operations may employ more labour producing less tonnes with mining operations scattered to ensure an economic grade can be produced. This may result in poor tonnage efficiency, but the product efficiency may be aligned with industry. The data analysed showed the variance for this measure is much lower than for the tonnage efficiency.

When comparing productivity, it is valuable to understand the productivity trends over time to ensure the changes in efficiency are accounted for in planning. The data from 2015 to 2018 showed an 19% improvement in the average tonnage efficiency and a 20% improvement in product produced efficiency. This could be attributed to the massive pressure from poor commodity prices and the need to manage efficiency to drive costs down. Also see the September 2018 Minxcon Newsletter on platinum cost curves highlighting the need to manage costs.

NEWSLETTER SPOTLIGHT

◇ **Zimbabwean operations significantly outperform South African operations**

◇ **Tonnage Efficiency improved by 19% over the last 3 years**

◇ **Product Efficiency improved by 20% over the last 3 years**

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