OPEN-PIT MINE DEWATERING

This case study shows how Flownex was used to evaluate new dewatering strategies at Mogalakwena Mine and identify energy-saving opportunities.

Anglo Platinum's Mogalakwena Mine is the largest open-pit platinum mine in the world. Each active pit depends on dedicated dewatering systems to maintain efficient operations. Water accumulation can delay drilling, blasting, loading, and hauling activities, meaning the dewatering system has a direct impact on both productivity and operational cost.

CHALLENGE

The key challenge was to reduce energy costs by shifting pumping operations away from peak electricity tariff periods, while overcoming the limitations of a manually operated and poorly coordinated dewatering system.

BENEFITS:

Flownex enabled engineers to develop a validated, system-level model of the mine's dewatering network, calibrated using in-field measurements. This digital representation made it possible to accurately simulate real system behaviour, evaluate transient pumping strategies without disrupting operations and quantify the exact energy savings and load-shifting potential.

SOLUTION:

A complete Flownex model of the dewatering network was developed, incorporating pits, pipelines, pumps, and storage systems. Multiple dewatering scenarios were simulated to evaluate optimized pumping strategies. The results showed that:

- 1,497 MWh of energy could be shifted away from peak Time-of-Use (TOU) tariff periods *(TOU refers to electricity pricing that varies depending on the time of day, with higher costs during peak demand periods)*
- This corresponds to an annual saving of approximately R 2.107 million (~$128,000)

Importantly, these insights were achieved without the need for physical testing on-site, avoiding operational risk and disruption.

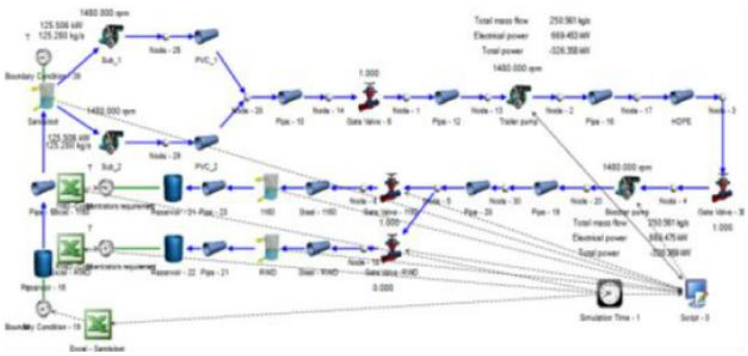

Figure 1: Flownex model of the dewatering system

The mine layout, including the Sandsloot storage pit, North and South concentrators, pipelines and pumps, was recreated as a full Flownex network.



Figure 2: Anglo Platinum's Mogalakwena Mine

CONCLUSION

Flownex provided a safe and accurate platform to evaluate load-shifting strategies for mine dewatering at Mogalakwena. By modelling the real system, engineers were able to identify substantial cost-saving opportunities without interfering with ongoing operations.

This study highlights how Flownex can support data-driven decision-making in complex industrial systems—particularly where physical testing is costly, risky, or impractical.