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Application of Techno-economic modelling in the Platinum Mining Industry of Southern Africa

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Abstract

Management does not have an efficient mechanism to test strategic and operational alternatives and to assess the impact of these on the value and underlying trade-off variables of the business. Techno-economic models can be applied for this purpose as they provide a framework for undertaking advanced process simulation and business valuation. The purpose of the research report is to identify key components, principles and best practice as applied in techno-economic models, to improve techno-economic modelling for the purpose of decision-making and business optimization.

The integrated techno-economic model requires a mining model with production planning and scheduling abilities. The half-level system method can be applied to create production profiles for different mining options and only after optimisation the best option is taken forward for graphical design and detailed scheduling. A metallurgical model incorporates the logic and efficiencies of the treatment process into the techno-economic model from which the refined products are determined for revenue and costing purposes. The financial model integrates with the mining and metallurgical elements and uses detailed costing models and sound financial principles for operating and capital cost estimates. An accurate techno-economic model includes key cash flow components and applies rigorous valuation practice for investment analysis.

Techno-economic models are extensively applied in business planning, major project valuations and stay–in-business project valuations. Learnings from the review of these case studies suggest best practice, which allows the models to be applied to different types of business entities and contributes to the accuracy, consistency and efficiency of techno-economic modelling. Integrated techno-economic modelling is also applicable in strategic planning and mine design optimization as it provides a powerful instrument for decision-making and business optimization. The future of the mining business depends on it as an invaluable direction steering tool.