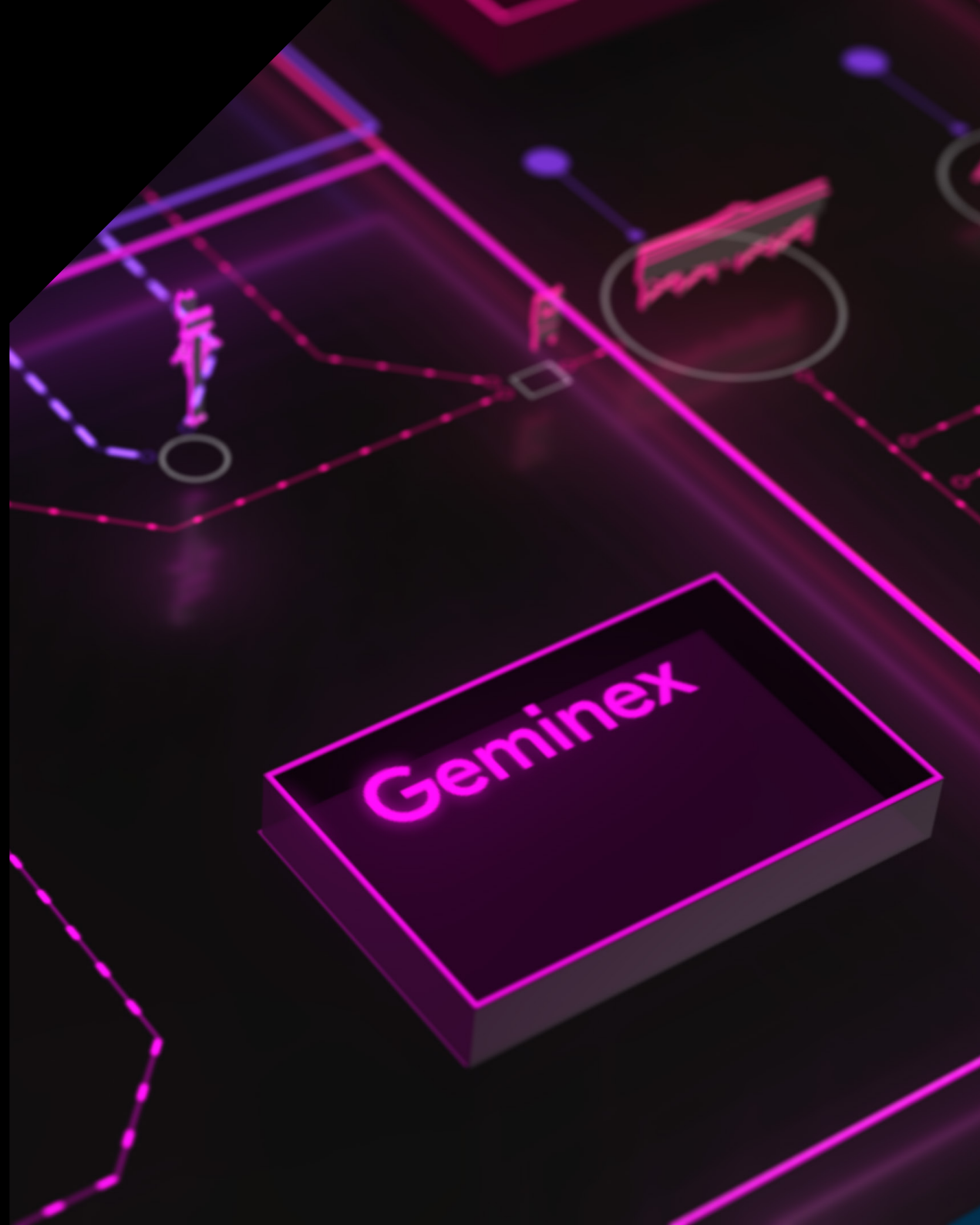


Metso:Outotec

Metallurgical digital twin

Metso Outotec  
Geminex™





# Managing variability, optimizing resources

A metallurgical digital twin, Geminex™ combines operational data and Metso Outotec expertise, delivering insight-driven performance that gives efficient management of variability in your mining and metallurgical operations.

Combining our expertise with your enriched data in an accurate digital simulation allows for better predictions, processes and decision-making. The accurate functional digital model of the whole metallurgical process is based on combined real data from both internal and external data sources, resulting in better recovery and process optimization.

Take a quick digital leap for better environmental and financial performance.

Sustainability is one of Metso Outotec's key strategic priorities. We are committed to limiting global warming to 1.5°C with science-based targets.

Planet Positive is our all-encompassing approach to sustainability. It covers the environmental, social and financial aspects of sustainability. Planet Positive efforts such as Metso Outotec Geminex™ enforce our purpose to enable sustainable modern life.

We focus on the positive impact on the environment and people through further growing our sustainable offering. We also focus on minimizing the environmental impact of our own operations and supply chain to diminish our ecological footprint.





*"The results of the digital solutions were tangible and achieved faster than anticipated. The use of Metso Outotec Geminex™ will be a part of routine operator procedures."*

- Metso Outotec gold mining customer

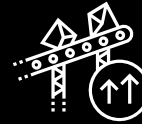
## Why choose Metso Outotec Geminex™

### Enriched decisions



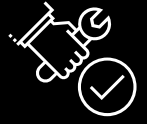
- Optimize and minimize your carbon footprint and use of resources
- Simulate without environmental or financial risks
- Enable material traceability with enriched information

### Calibrated performance



- Increase profitability by optimizing performance with AI enhanced models and predictions
- Science based physical and calibrated models with real process data
- Cyber secure solution that keeps your data safe

### Tangible benefits



- Very fast and easy to implement
- Metso Outotec's unique HSC process models for planning and production
- Solution learns and adapts from process data
- Improve how your key processes interact for tangible benefits

# Enriched decisions lead to optimized production

## **Minimize your carbon footprint**

Sustainability is at the forefront of industry discussion and a top priority. By solving resource efficiencies and emission footprints with accurate models, the Metso Outotec Geminex™ enables sustainable and economical operations. Recipe matching to variable ore types allows for significant savings in energy, water and chemicals per produced ton of product.

## **Maximize your use of resources**

Metso Outotec Geminex™ allows operations to efficiently use resources in an optimal way while considering both the impacts and constraints. The performance feedback and plant information hub allows for the opportunity to better understand how the processes interact and influence each other. Different scenarios and parameter changes can be simulated and tested based on real data and proven methods.

## **Simulate without environmental or financial risks**

With the ability to test run any process configuration and operating strategy before execution, the risk of environmental, financial or safety issues are greatly mitigated. Medium to long term production planning with alternatives for flowsheet optimization is based on expected metallurgical performance and operational constraints. This increased knowledge allows for better decision-planning within the plant.

## **Enable material traceability**

Track transparent material flows from the mine to processing and refining plants with online material balances. Online assays with automatic mass balance reconciliation provide operations with information about material flows, but also traceable confidence to the quality of data, health of assaying equipment and practices.



Take a quick digital leap for better environmental and financial performance



# Calibrated performance

## **Increase profitability**

Maximized value of production, optimized cost structure to match with material, asset availability and business variability all result to increased profitability for your plant.

## **Real process data**

With Metso Outotec expertise, engineers, researchers and scientists worldwide have developed science-based physical and calibrated models with real process data. The processing plant model is built from process unit models that are easy to understand and integrate seamlessly.

## **Optimize performance with AI**

For process insight, Metso Outotec Geminex™ uses enhanced models and predictions with metallurgical principles powered by AI. The process model parameters adapt automatically to live plant data and eliminate bias.

## **Cyber secure solution**

High-end IT security with proven and certified cloud and IoT solutions will keep your data safe and secure.



Improve your core processes for better interaction and tangible benefits

## Tangible benefits

### Fast and easy to implement

Metso Outotec Geminex™ is modular to allow for phased implementation, addressing the quickest return of investment and proof of business case. This phase-wise solution applies metallurgical models for plant daily operation. Most design and engineering for deployment are completed off-site and require only minor resources from the customer.

### Learns and adapts from process data

An automated model calibration with online plant and external data. The Metso Outotec Geminex™ integrates easily with existing infrastructures, cyber security and IT policies. The process model parameters adapt automatically to live plant data, which eliminates bias.

### Unique HSC process models

For both planning and production, Metso Outotec Geminex™ utilizes unique HSC process models that has already over 20,000 users worldwide within the industry for operations and research. The process models are tried and tested in hundreds of minerals and metals processing flowsheet development cases, and the same models are utilized in plant run-time optimization.

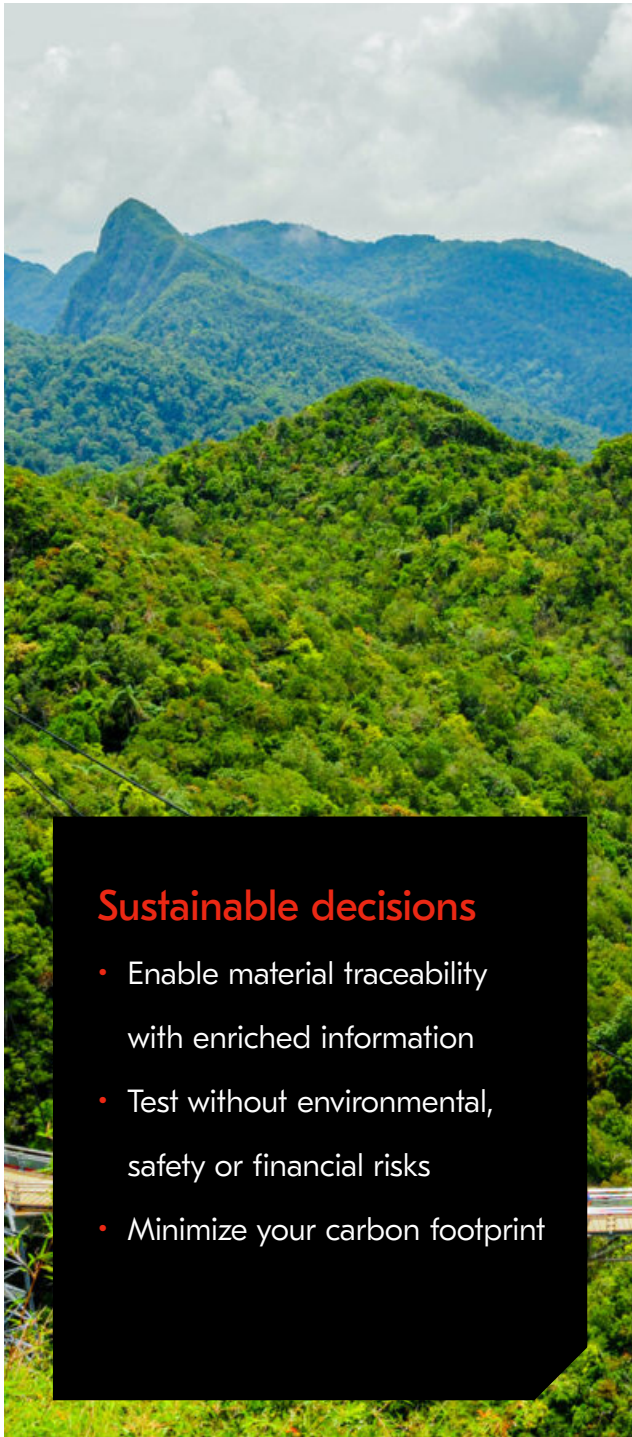
### Full processing value chain

By providing a view of the full processing value chain the operation is optimized as a whole. Metso Outotec's leading position with a wide presence in the industry allows Metso Outotec Geminex™ to provide a unique end-to-end digital solution. This creates awareness on how key processes impact up and down streams with implications to costs and revenues.

### Aftermarket offering included

Metso Outotec Geminex™ can be coupled with performance and sustainability services to ensure your plant and business optimization. The modular structure allows phased implementation and add-on modules to address continuous improvement and growing business needs.





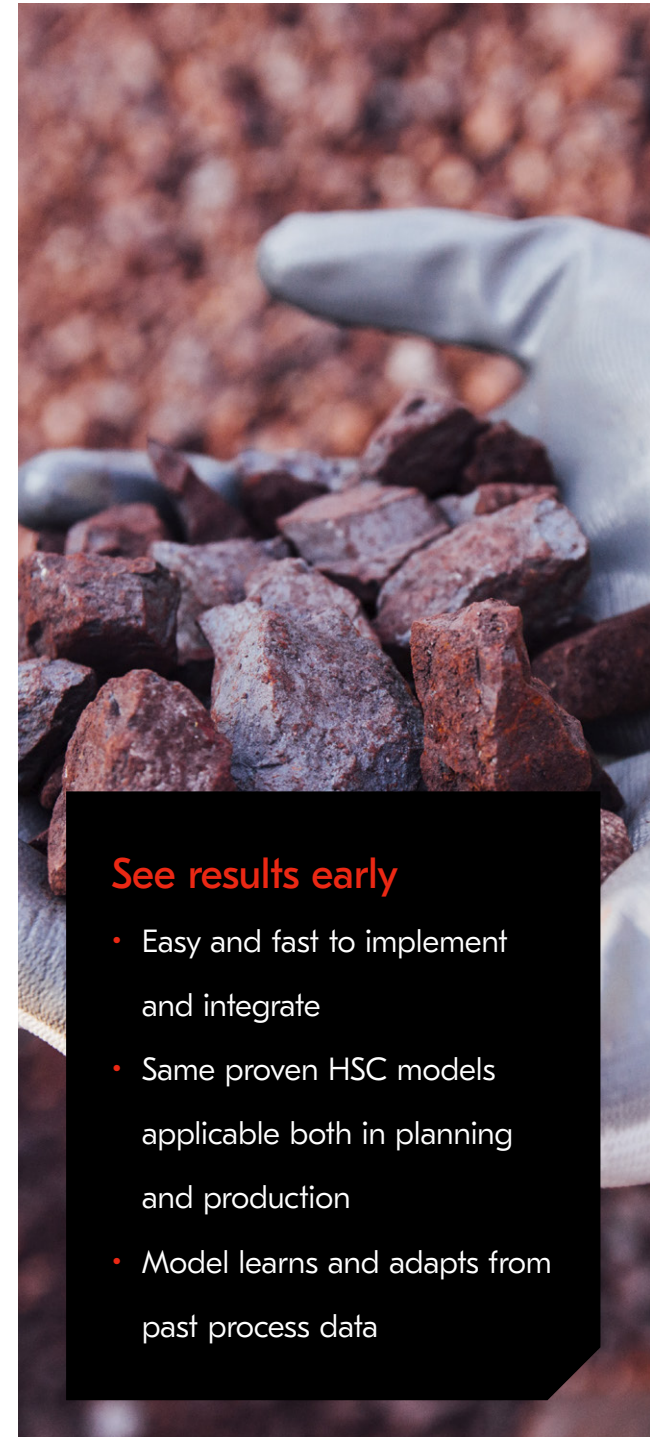
### Sustainable decisions

- Enable material traceability with enriched information
- Test without environmental, safety or financial risks
- Minimize your carbon footprint



### Confident performance

- See how the processes interact and influence each other
- Test different scenarios with real data and proven methods
- Increase production and reduce costs by optimizing performance with AI



### See results early

- Easy and fast to implement and integrate
- Same proven HSC models applicable both in planning and production
- Model learns and adapts from past process data

