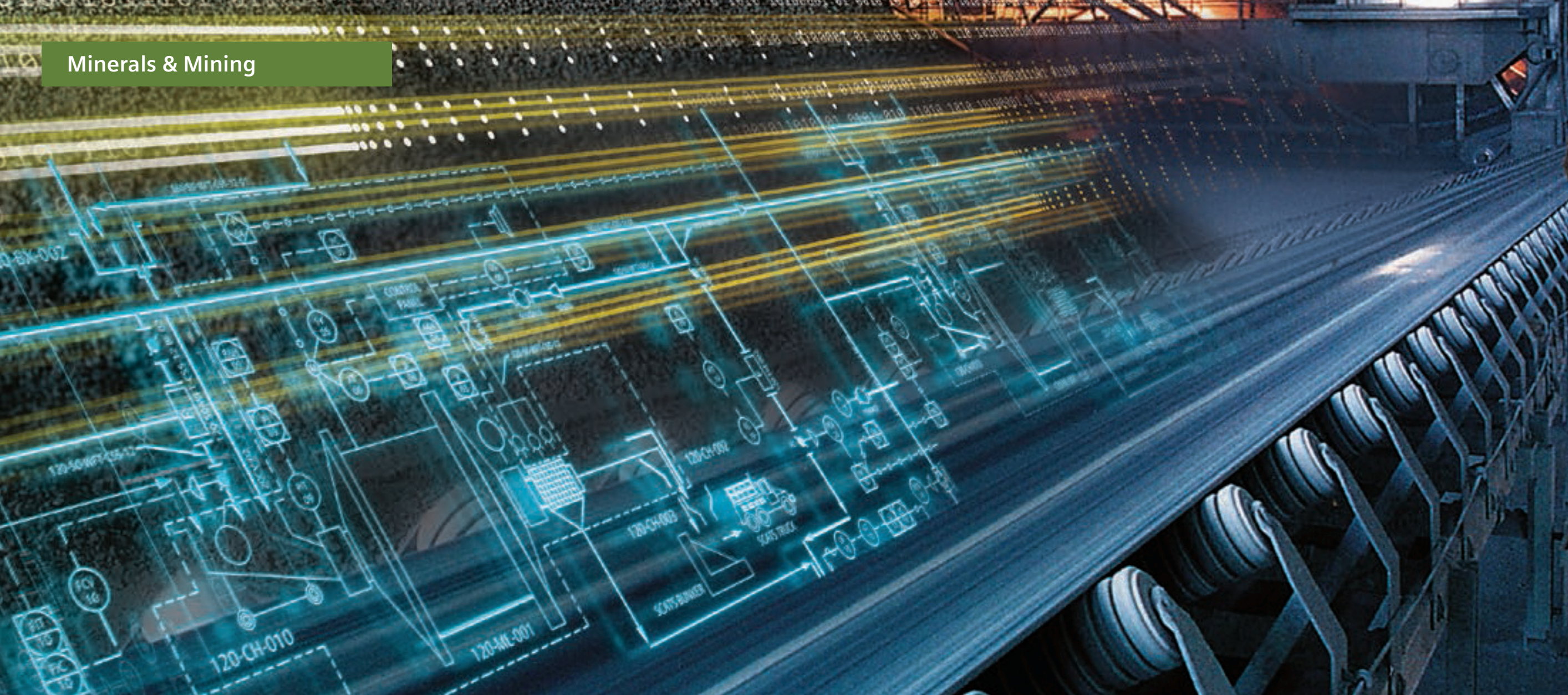




Siemens Digital Industries South Africa

# Dawn of Digitalization and its impact in Africa

Minerals & Mining



### New technologies and digital platforms critical to improve productivity and production margins



South Africa: **Input cost inflation of 6%** for mining sector during 2018



South Africa: **R356 billion GDP contribution** in 2018



Siemens has supported **~33% of SA mining contribution** to GDP



**Exorbitant operational costs** continue to dent investor confidence

Continue

### Overview: Initiatives being sought and undertaken in the mining sector

#### Zambia

- The Zambia Development Agency Act provides incentives to firms investing substantial amounts in the mining sector in the country. The Act specifies that the threshold amount should be US\$ 500,000 or above in order to qualify for fiscal and non-fiscal incentives.

#### Zimbabwe and Namibia

- Last year Zimbabwe scrapped its indigenisation requirements and slashed the 51% indigenous shareholding quota for all minerals; this initially excluded diamonds and platinum. The move was well appreciated by investors.
- A similar measure was implemented in Namibia. The country relaxed the requirement for mining entities to have a minimum indigenous shareholding of 5% held by previously disadvantaged groups.



Continue

#### South Africa

- The Mandela Mining Precinct's role is to identify barriers and develop a vision for long term development and transformation of the mining industry. The project also emphasises on improving mining efficiencies and introducing most modern mining technologies.
- Introduction of Mineral beneficiation (Platinum Group Mineral) for fuel cell industry development.
- The Amended Mining Charter outlines the expectations of rights holders to invest in South African mining industry.

#### Botswana

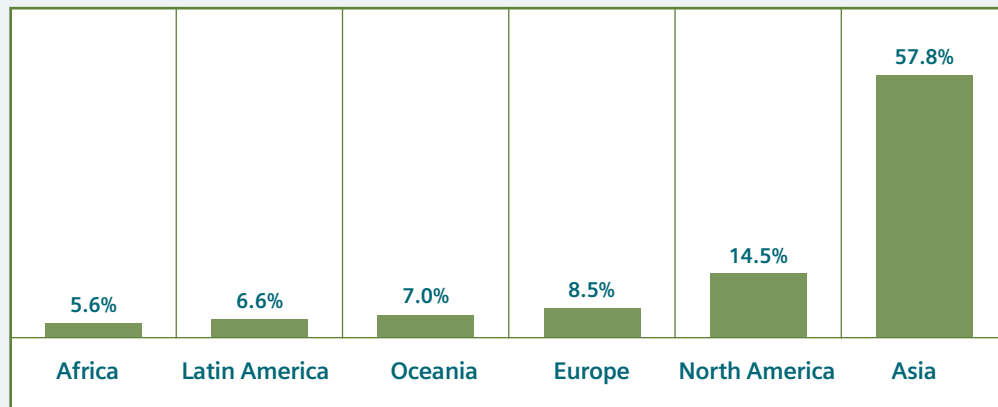
- In 2018, Botswana announced plans to introduce the country's new minerals policy. The policy aims to improve the investment climate in the minerals sector. Moreover, the country has completed the legislative amendments to the Mines and Minerals Act, Precious and Semi Precious Stones Act and Diamond Cutting Act to enhance the ease of doing business.



# Despite increasing labour issues and a drop in investment, South African mining industry, one of the largest in Africa, is focusing on improving growth

## Total mining production by continent- 2017

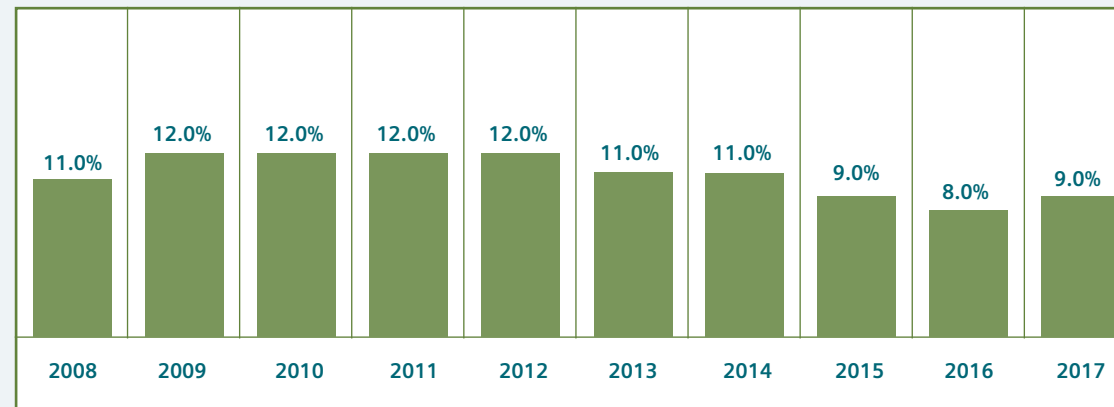
- Africa has excellent potential within its mining sector due to its enormous mineral endowment.
- Mining is one of the key industries for many African countries.
- South Africa's mining industry is one of the largest in Africa and the mining industry is the single largest contributor to the country's exports. In 2018, minerals accounted for 38% of all exports.
- However, mining's share to country's GDP has drastically dipped from 21% in 1980 to 8% in 2018 due to economic uncertainties, labour issues and other political instabilities.



Source: World Mineral Council

## Mining contribution as % of total investment in South Africa

- Total mining investment in South Africa was more or less stable until 2014. After 2014, the industry witnessed a drastic dip in investment, as mining struggled to regain investor trust.
- Lack of an environment conducive to making returns is one of the major reasons. The legal wrangling surrounding the mining charter, low prices forecast for strategic commodities, a contracting construction sector, stringent regulations and exorbitant operational costs may continue to dent investment in the sector in future.



Source: Mining Council SA

Digital Transformation challenges in enhancing labour skill sets, increasing efficiency of mines and changing the way the mining industry operates



**Automation Adoption Maturity 2018**

Manufacturing Sub-Sector	South Africa	Kenya	Ghana	Rest of Africa
Mining				
Metals				
Cement				

Early Developing Mature

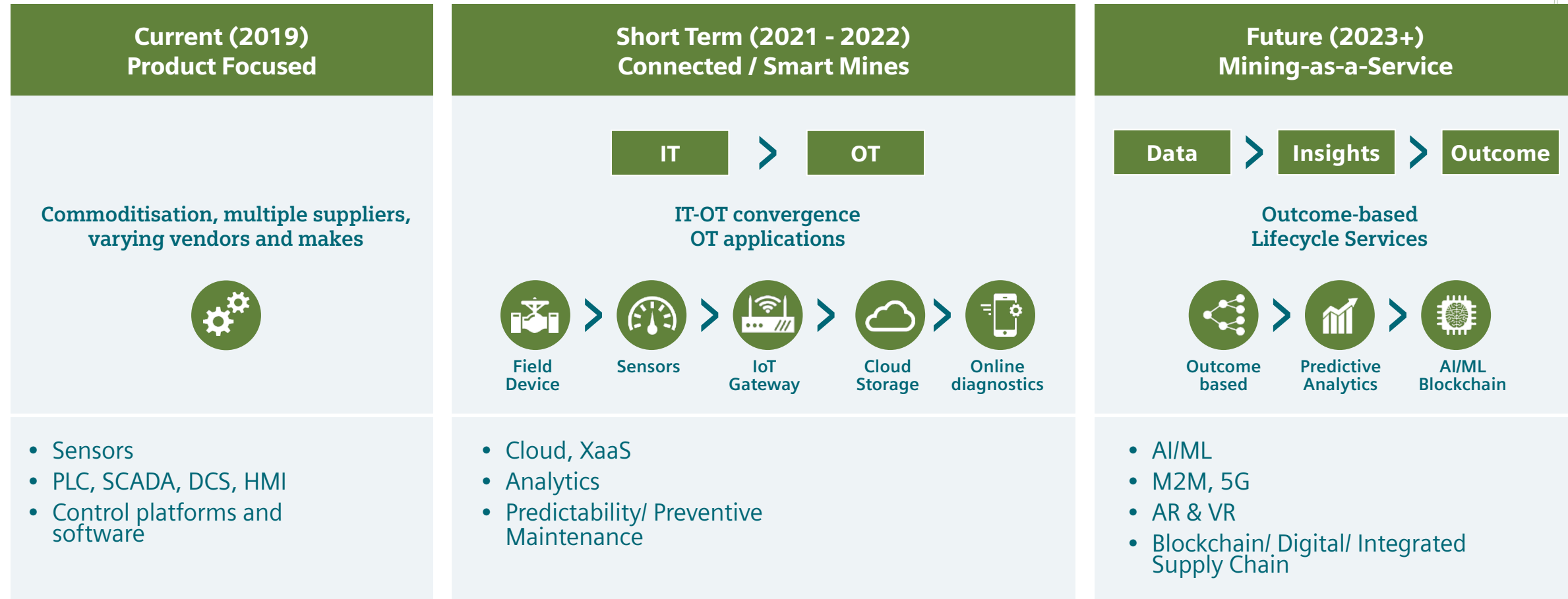
Foreign investors are still wary of challenges facing mining projects in Africa

South Africa leads in the adoption of automation in mining sector

Automation leads to employee skills development and advanced on the job training.



# Outlook: The rise of intelligent mines is not a distant dream; Digitalization is slowly capturing the mining industry of Africa



# Siemens Mining Technologies implementation

### Enhanced Productivity with reduced maintenance & service costs

SIMINE portfolio with complete electrical engineering, drive automation and service packages that increase productivity, improve drive system efficiency and reduce energy costs.

### Optimizing Conveyor Belt Systems

Use of digital simulation tools to reveal the dynamic behavior of the whole system which allows improvements to be made in system operation while also minimizing idle times.

### Optimized Processes and Operation

SIMATIC PCS7 with its open, flexible and scalable architecture forms the basis of the Minerals Automation Standard that aims at improvements in competitiveness, through optimized productivity, plant availability and efficiency.

Exploration &  
Excavation

Transport &  
Material Handling

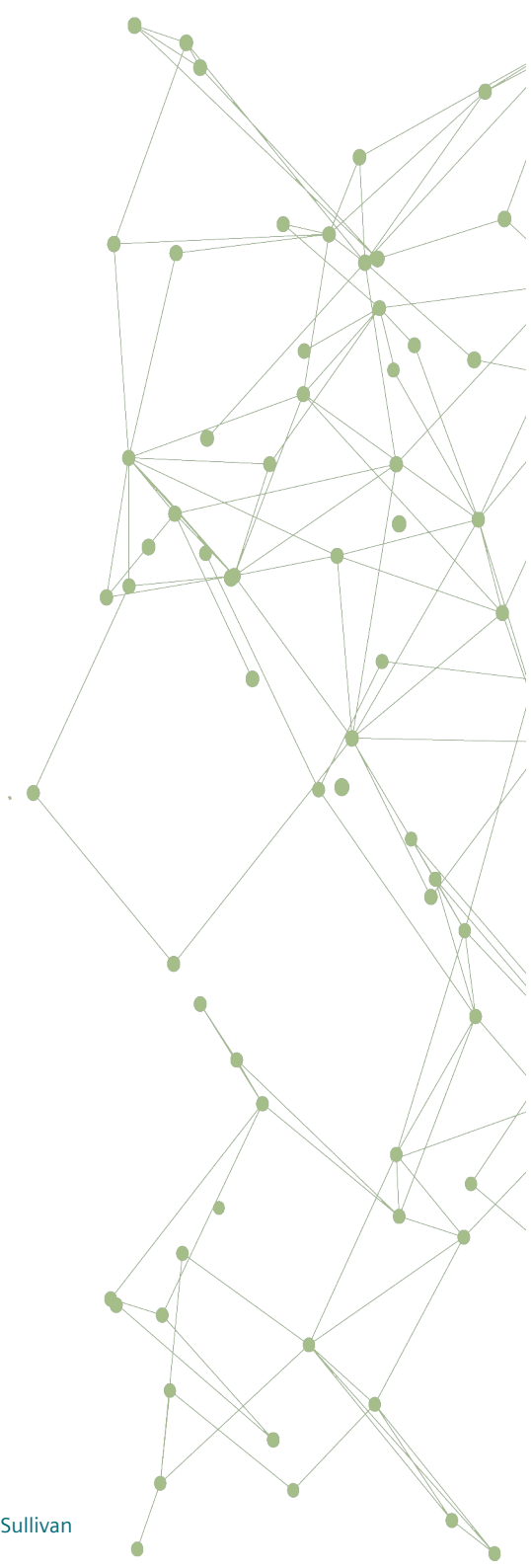
Processing &  
Beneficiation

Refining &  
Agglomeration

### Condition Monitoring Systems

SIPLUS CMS for the early detection of damage to machine and plants which aids in decision making for maintenance staff, operators and management.

Continue



# Siemens Mining Technologies implementation

### Equipment Availability and Efficiency

At the Sentinel Copper Mine in Zambia Siemens has implemented a SIMINE Gearless mill drive with SIMATIC PCS7 mill automation that has resulted in an operational efficiency of 95.3% in addition to lower operating costs, minimized downtimes and improved reliability.

Exploration &  
Excavation

Transport &  
Material Handling

Processing &  
Beneficiation

Refining &  
Agglomeration

### Automation for Underground Mining

At the Freeport McMoran Grasberg copper and gold mine in Indonesia, SIMATIC PCS7 was installed for the DCS that controls eleven production trains and five service locomotives. The automation system allows to minimize production loss in the transition from open-pit to underground mining

### Asset Health Analytic

Siemens' Asset Health Analytics creates a foundation that allows equipment like conveyors, ball mills and crushers to supply additional data. Analysis of this data provides information that allows for fact based maintenance decisions in real time while also planning maintenance and service measures.

