

The background of the advertisement is a photograph of an industrial mining site. Two workers in blue uniforms and white hard hats with the Siemens logo are visible. One worker on the left is pointing towards a large piece of machinery. The machinery has a yellow door and a blue panel with the Siemens logo. The sky is blue with white clouds. Overlaid on the image are digital elements: a grid of binary code (0s and 1s) in various colors (blue, green, pink) and a glowing blue wireframe model of a large, rounded industrial component. The Siemens logo is also visible on the machinery and the workers' hard hats.

**SIEMENS**

*Ingenuity for life*

# SIMINE

Solutions for the  
mining industry

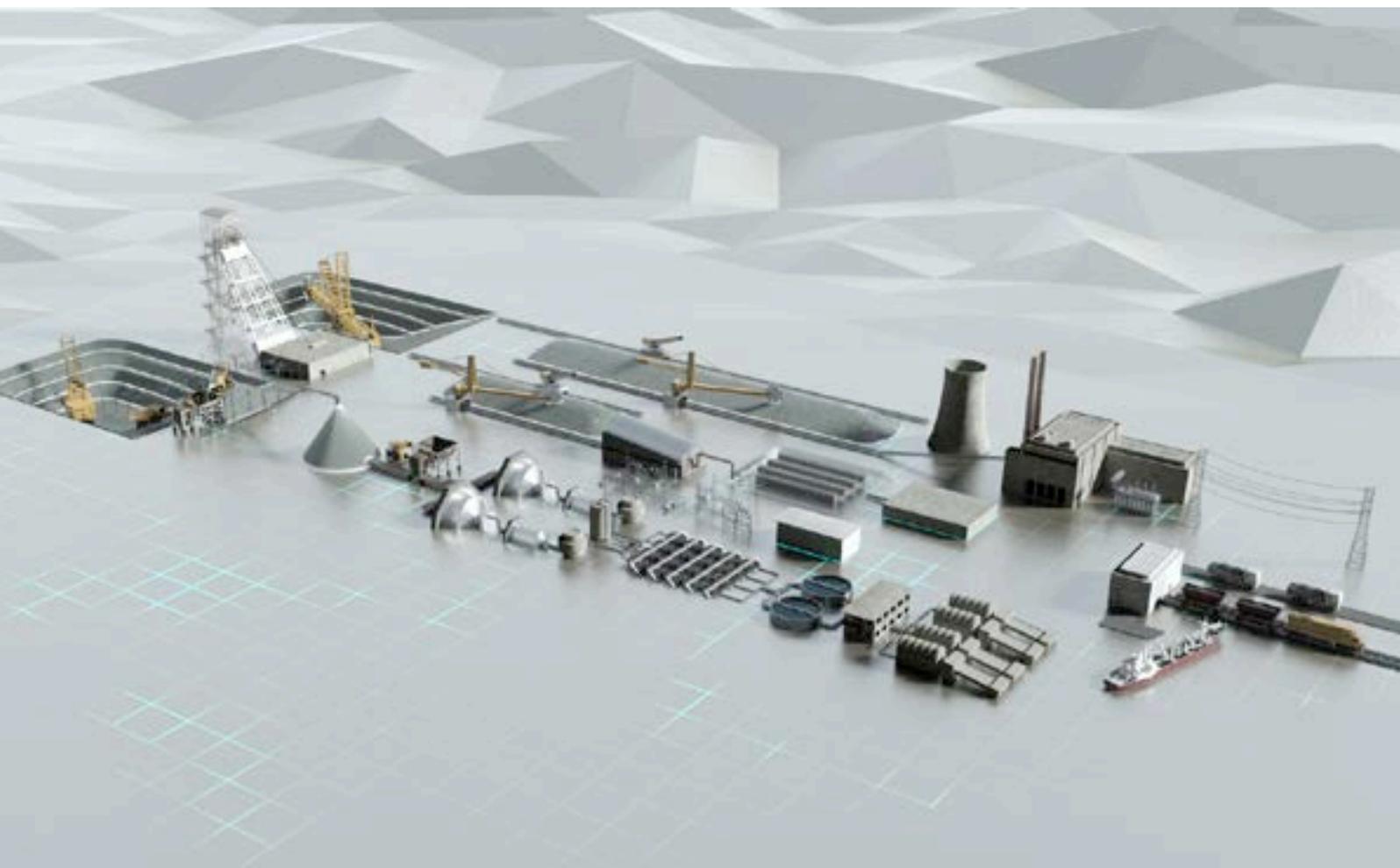
[siemens.com/mining](https://www.siemens.com/mining)

# Welcome to a comprehensive partnership

## Enabling improved outcomes throughout your entire process chain

We understand your business and your processes – as a foundation for successful cooperation.

Right now it's up to you to keep pace with the rising market challenges. That means everything has to work together just right during excavation, transportation and beneficiation – especially when it comes to equipment availability. Gearless drives, perfect interaction between sensors, IT, mechanics and intelligent service strategies are key terms here – and with SIMINE solutions you're always at the cutting edge of technology.

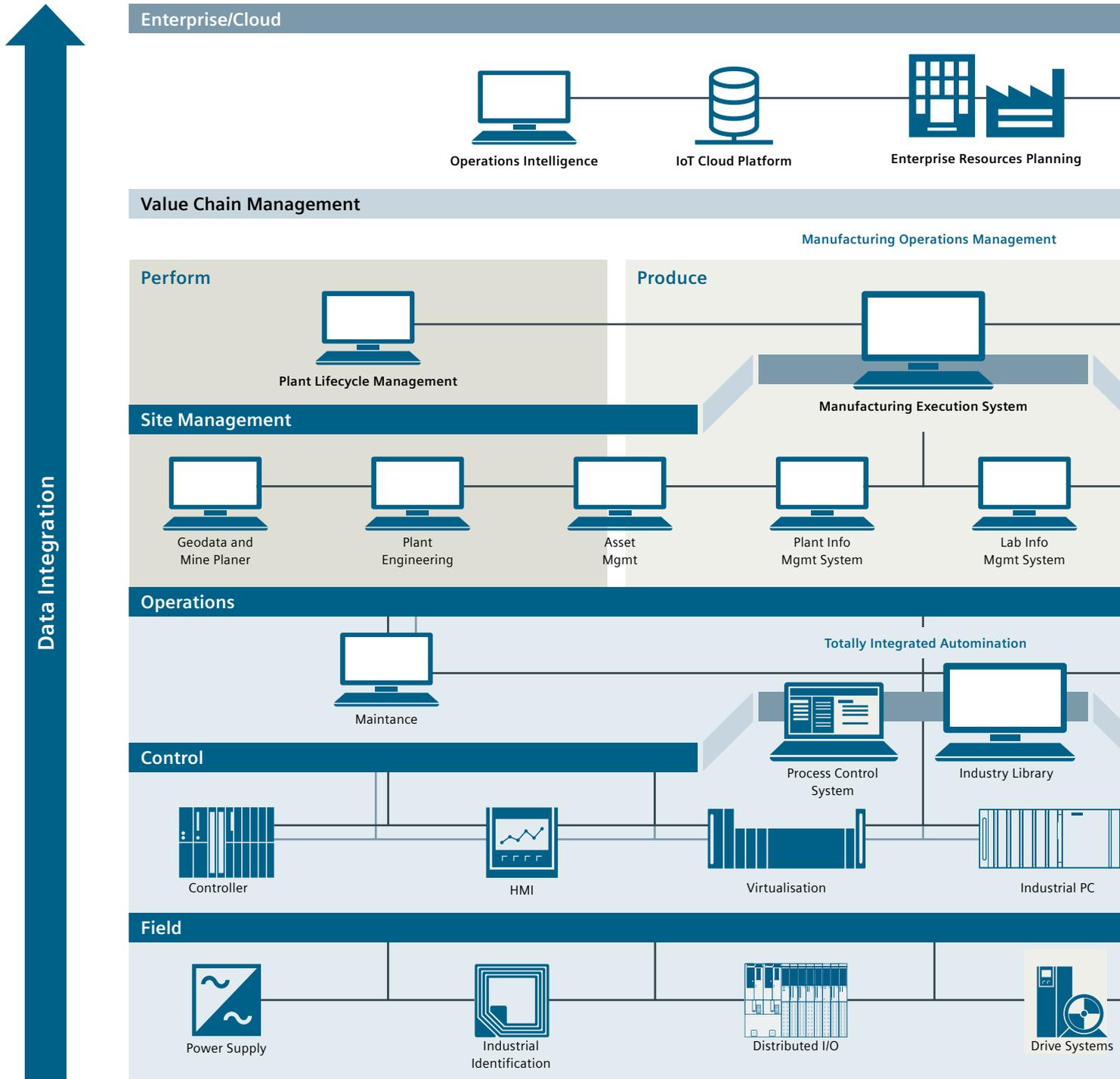




## Content

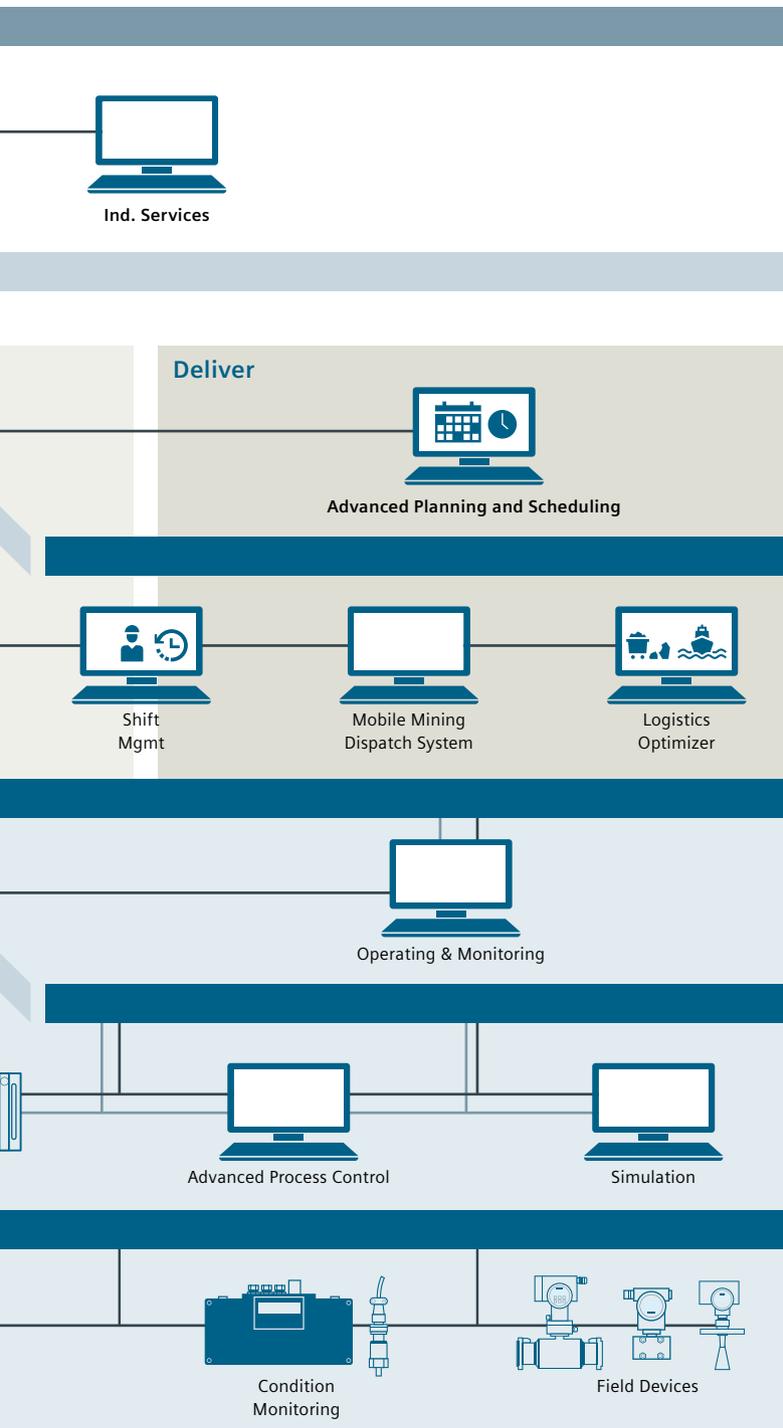
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# Siemens Process Automation and Digitalization increases interoperability of all components



# tion s

Thanks to the uniform communication protocol at every level, all components of the automation network can share their data at any time, regardless if it is located in the plant or the office. The result is a more cost effective decentralized architecture that allows more flexibility, scalability and engineering efficiency. For the operations it brings an increased plant efficiency and more options for remote access. Siemens automation and digitalization enhances your overall plant competitive edge and sustainability.



**Added value in all automation tasks.**



**Integrated Engineering**



**Integrated Operation**



**Industrial Communication**



**Industrial Security**



**Process Safety**

# Tap the full potential of your mine operations



## Digitalization lets you see the whole picture.

By interconnecting, monitoring and analyzing your assets, digitalization helps you collect data and turn it into intelligence.

Declining grades, price volatility, and a weakening global demand are just some of the major challenges the global mining industry is facing – while stakeholder expectations are rising at the same time. To stay competitive in the long run, mining companies have to become leaner, stronger, and more innovative. Here, digitalization plays a crucial role as it opens up new ways and possibilities to increase productivity and operational excellence. Learn how we can support you in putting your mining business into an even better position for the next upcycle.

## SIMINE solutions for...

### Automated stockpile management

Are you taking the first step into the digitized world? Then our automated stockpile management solutions for unmanned operation of stackers, reclaimers, and combined machines are a good start. They help you increase system availability and productivity, improve material quality, and realize significant savings. Safety is ensured at all times as all gear is equipped with sensors to avoid collision. In fact, no incidents have been reported since the first solution was implemented almost 20 years ago. In total Siemens has successfully implemented more than 40 full automatic stockyard machines in unmanned operations.

#### Main benefits:

- Higher performance compared to manned operation
- Increased accuracy and full utilization of stockpile area
- Optimized energy consumption

### The optimal belt conveyor

Are you changing your existing systems or planning new installations for open-pit mines? Our simulation approach for belt conveyors supports engineers in realizing the optimal solution and operators in getting the best productivity from their applications. In addition to determining the maximum load for components, the belt tension or the bearing load, the dynamic behavior of the entire system of both mechanical and electrical parts is analyzed. It also allows engineers to explore and improve how the individual components work together in real operation.

#### Main benefits:

- Confident decision making, e.g. if a drive solution with hydraulic coupling is sufficient or a drive solution with frequency converter is recommendable
- Allows investigation of changes, influences, and consequences in system performance
- Optimized operational and productivity ratios thanks to matched drive solution and controller

### Asset Health Analytics

Do you know exactly how your equipment operates at any given time? Our portfolio for Asset Health Analytics lays the foundation for enabling machines such as belt conveyor systems, autogenous, semi-autogenous, ball mills, and crushers to supply additional data. The analysis of this data provides you with all the information you need to make well-informed, fact-based maintenance decisions in real-time – and to optimally plan maintenance and service measures.

#### Main benefits:

- Precise diagnosis to support operation and maintenance
- Prevent unplanned downtimes by early detection of possible problems
- Recommendations based on prior data analysis, by advanced algorithms or domain experts optionally available

### Manufacturing Execution System (MES)

Digitalization opens up new ways to increase productivity and achieve operational excellence. Our MES solutions provide comprehensive transparency along the entire value chain. You can view and compare operating performance indicators from across all sites. Real-time data supports quick and fact-based decision making, which can increase uptime and productive hours. Furthermore, our MES solutions are future-proved and can grow with your requirements.

#### Main benefits:

- One platform to visualize, analyze and synchronize the entire mining business processes
- Framework developed on standard, cutting-edge IT technology, leading to low cost of ownership, e.g. licenses support elements
- Highly customizable, well tested and proven platform that fits your mining business needs

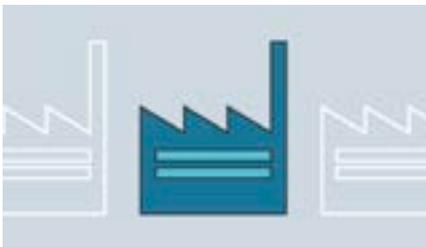
# Power solutions for twenty-first-century mines

Mining operations require safe and reliable power supply under challenging circumstances. To meet productivity goals, conveyor belts, crusher, mills and float lines must operate continually. Every mine’s operations need specific power protection and automation solutions.

## The challenges: Power supply for unusually harsh environments

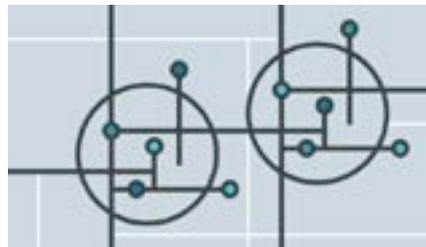
Diminishing productivity, harsh climates, remote sites, rising energy costs and water scarcity are just some of the challenges the mining industry faces every day. The ever-growing market demands require a solution enabling the perfect interaction of all assets during extraction, transportation and beneficiation.

Safety and availability are essential in the mining industry – the extraction of valuable materials should, ideally, continue without interruption to ensure that operations in mainly inhospitable regions around the world will pay off. The power supply plays a key role in this regard: it has to be safe and reliable, as well as efficient and flexible.



### Market-specific challenges

- Harsh environments
- Remote locations
- Long transportation distances



### Grid-specific challenges

- Reliable and efficient power supply
- End-to-end solutions
- Operational safety for humans and plant



### Economic challenges

- Familiarity with industry requirements
- Cost pressure

## Our answer: Totally Integrated Power (TIP)

As a trusted mining partner, we help customers to meet their challenges and thereby enable them to set new benchmarks within their fields. Our TIP concept includes all aspects of the power supply for the mining industry: from electrification and automation to digitalization. Our integrated portfolio includes products, solutions, and services for all voltage levels, areas of application, and plant lifecycle phase. This ensures a reliable and flexible power supply.





*"The solution is more than the sum of its parts."*

Quote by Aristoteles

As an original equipment manufacturer for the mining industry, you strive for shorter time-to-market and shorter time-to-profit. As a mine operator, you expect components to interoperate in a reliable way at low maintenance cost.

Siemens fulfills all of your expectations – with SIMINE solutions, the world's first true one-stop solution, it offers perfect interaction of all components, reduced engineering effort, high CAPEX security and reduced maintenance cost.

With SIMINE solutions, there is simply more to a drive component or system – more productivity, more reliability, more efficiency.

#### Integration beats interfacing

A drive can do a lot more than just provide the required speed and torque at the driven machine – independent of its load or loading and for every operating mode.

#### **SIMINE solutions can do a lot more, for instance:**

- Reduce the operating costs as a result of their high efficiency
- Facilitate longer operating times as a result of the high availability and reliability
- Ensure perfect interaction between all components, e.g. when starting and stopping, in all operating situations
- Facilitate optimum performance by adapting speed and torque to the requirements of the driven load
- Minimize stress on the driven machine by avoiding load peaks and oscillations
- Integrate automation tasks, e.g. load sharing and slip control for multimotor drives
- Improve work conditions through low noise levels

#### Harmony delivers better results

A drive solution always involves several components.

SIMINE solutions have all of these components in different versions, types and sizes. These components either conform to or define state-of-the-art technology. All of these components can be integrated to create drive solutions addressing the specific drive application.

The portfolio extends from individual drive components – through a complete drive train – up to complex drive solutions including power supply and control.

#### Main benefits:

- **More productivity** – thanks to smooth interoperability of all components, optimal performance and higher throughput
- **More reliability** – due to improved operating times, a future-proven system environment and our global support for the system solution
- **More efficiency** – based on optimal use of all capabilities, easiest maintenance and reduced OPEX

# Excavation: Lower cost per ton

## Higher reliability and lower operating costs

AC drives from Siemens embody our long-term experience in extraction processes.

Extraction in open-cast mining challenges both men and machines. Reliability in this harsh environment is of utmost importance. For over 30 years, SIMINE solutions have played a crucial role in safe and reliable operations, while increasing productivity outputs and reducing the overall cost per ton extracted.



## SIMINE solutions for...

### Shovels

For over three-and-a-half decades, Siemens has been the leader in innovative AC drives for electric rope shovels. Today, our solution incorporates rugged traction grade drives and motors, mechanical drives, monitored and controlled by process control software and optimized through innovative technology ranging from energy storage devices to remote monitoring and autonomy.

The advantages over comparable drives range from higher productivity, benchmark reliability and less maintenance, to excellent distribution system compatibility and lower lifecycle costs.

#### Main benefits:

- Benchmark reliability
- Lower lifecycle costs
- Excellent distribution system compatibility, less than 5 percent harmonic distortion



98 percent electrical availability, minimal maintenance – AC drives for shovels

### Draglines

Developed on a shared common platform with our drives for electric rope shovels, our AC drives for draglines provide the same reliability, productivity, efficiency and safety benefits, thus ensuring that the dragline is the high-performance, low-maintenance, lowest-cost-per-ton workhorse in open-cast mining. With up to 20 percent efficiency increases over motor-generator sets, our drives set the benchmark in the market. This makes them the ideal solution for new or retrofit installations.

Siemens innovations, such as the gearless dragline drive, reduce operating costs even more, eliminating the need for gear maintenance and lubrication systems.

#### Main benefits:

- Higher drive system efficiency
- Lower lifecycle costs
- Less maintenance for cost savings of more than US\$1 million per year for gearless draglines



Highly efficient Caterpillar 8750 conventional dragline in operation



## SIMINE solutions for...

### Bucket chain/wheel excavators

Bucket after bucket, wheel and chain excavators have to work at their performance limits: There is no economical alternative to generating maximum output. At the same time, load peaks with their excessive wear and tear result in expensive unplanned shutdowns for maintenance.

SIMINE Excavator offers rugged drive systems made for tough conditions over long time. Our gears have a high power density allowing for reduced weight, volume and cost. Thanks to their modular and flexible construction the drives can be installed with a precision fit and the built-in diagnostic function helps increase their availability.

### Main benefits:

- Reliable high performance without excessive wear and tear
- Fast, efficient fault clearance based on modern integrated diagnostic systems
- Fewer interfaces for project planning and data exchange



Rugged and modular – AC drives for bucket chain and bucket wheel excavators

## Gearless dragline, Zhungeer, China

### Order:

Caterpillar 8750 – world's first gearless dragline

**Bucket capacity:** 120 cubic yards

**Boom length:** 300 ft

### Solution:

- 1 x 13,000-H gearless hoist drive
- 1 x 13,000-H gearless drag drive, one gearless motor replaces eight 1,500-H DC mill motors and all mechanical gearing
- 6 x 1,500-H conventional swing drives with planetary gears
- 4 x 1,500-H conventional propel drives
- High-voltage switchgear
- Drive power transformer
- Auxiliary power transformer
- Low-voltage motor control center
- Distributed I/O and PLC hardware/software
- Maintenance/operator interface – HMI
- Remote access and machine monitoring

### Customer benefits:

- **Higher productivity**  
20 percent increase due to faster hoist and drag speeds
- **Higher efficiency**  
20 percent higher efficiency, 20 percent lower energy costs compared with the motor generator set technology
- **Less maintenance**  
US\$1 million/year reduction in maintenance and operating costs for a Caterpillar 8750 machine

## Mining Basin „Kolubara“, Electric Power Industry of Serbia

### Order:

Complete electrical and automation package for a newly built bucket wheel excavator with a capacity of 4,800 m<sup>3</sup>/h

### Solution:

- Basic and detailed electric project design, delivery of the complete electrical equipment as well as the design and commissioning of the control software
- Drives system based on SIMOTICS motors with a total power rating of 3 MW and SINAMICS S120 drives
- Control system with safety functions based on SIMATIC family: S7-400F controller, HMI Comfort panels, WinCC SCADA system

### Customer benefits:

- Increased production capacity at Kolubara mine
- Easy machine operation and maintenance due to the state-of-the-art control and visualization system



# Transportation: Keeping materials in flow



## Smooth and powerful – from the mine to the processing plant

Faster and more energy-efficient transportation – a combination that makes sense

Extraction in open-cast mining challenges both men and machines. Reliability in this harsh environment is of utmost importance. For over 30 years, SIMINE solutions have played a crucial role in safe and reliable operations, while increasing productivity outputs and reducing the overall cost per ton extracted.

## SIMINE solutions for...

### Trucks and trolleys

Siemens offers the most powerful electric truck drive available on the market. Our combination of high torque, high power and ease of operation in an AC drive system translates into increased payloads, shorter cycle times and higher system reliability. Proven converter technology, integrated drive train and innovative remote monitoring and management tools minimize lifecycle costs. To that, Siemens adds a great array of improved control functions. Currently, Siemens drive system propels the world's largest truck.

Our trucks can also be used with trolley assist to overcome the limitations of engine power and to increase on-grade speed. By tapping into overhead electric lines, the drive system can boost speed by up to 80 percent, even while the engine idles. In addition, noise levels and emissions diminish, and productivity and engine life rise significantly.

#### Main benefits:

- Sophisticated cooling technologies provide very high power levels in a compact package
- State-of-the-art control techniques maximize operator safety and system performance
- Reduction in operating costs far beyond the diesel-mechanical limits with trolley assist



Higher productivity, higher efficiency – AC drives for trucks

### Conveyors

Demanding topographies, increasing distances, individual start-up and stopping requirements: every conveyor solution is unique – and SIMINE Conveyor is designed to fit your needs. We create our custom solutions ranging from standardized products such as slip ring motors with resistor starters or asynchronous motors with turbocoupling to converter-controlled drive units. Whether conventional drive units with gears and couplings or gearless drives, they all come in numerous frame sizes and types, configurable for both overland and underground applications.

If higher megawatt power is required at a drive pulley, our gearless direct drives are the best choice. You benefit from proven precision and efficiency, high availability thanks to reduced complexity, minimized energy losses due to the direct transfer of speed and torque, and low-wear operation under all conditions.

#### Main benefits:

- Efficient use of electric energy in every phase of operation – primarily because the right speed and appropriate torque are permanently provided
- Increased productivity – simultaneous starts and stops of all conveyor systems
- Higher system availability, longer service life of mechanical components and reduced operating and maintenance costs



Always perfect torque and speed – custom-fit AC drives for conveyors



Download Fairs & Events app and scan the brochure with our Augmented Reality tool.

## SIMINE solutions for ...

### Mine winders

How can you increase output in underground mining while also assuring the safety of those in the shaft? Both of these factors depend primarily on the drive system. We use our expertise to engineer the drive and control solution which is best suited for your mine, adapted to the features of your supply network and tailored to your power converter philosophy.

Based on SIMATIC – the world’s leading industry automation standard – we can design any system that is technologically feasible and makes economically sense. Combining intelligent regulation algorithms, advanced winder control technology and a tested safety system, SIMINE Winder offer smooth operation and braking, low maintenance costs, optimized travel time and maximum safety.

#### Main benefits:

- High throughput of your shaft hoisting system
- Maximum safety for personnel, material and equipment
- High availability as a basis for economical operation



High performance with maximum safety – AC drives for mine winders

### Material handling

Wherever bulk materials are extracted, transported or processed, drive solutions that precisely and reliably fulfill their function are required. SIMINE Bulk material handling has a wide range of proven converters, motors, couplings and gear units that can be flexibly combined with one another, ensuring that there is always a suitable solution available for every requirement and for every application.

SINAMICS converters, the SIMOTICS family of motors and Flender gear units can be combined to create a complete drive train or can also be used as individual components.

Drive solutions up to several megawatts can be provided to meet the growing requirements for higher conveying capacities, longer transport distances and greater lifting heights.

#### Main benefits:

- Proven, tailored drive solutions based on standardized individual components
- Effective, energy-efficient use of drives thanks to their high efficiency
- State-of-the-art products that comply with all of today’s requirements and ensure that our customers are optimally equipped for future challenges



Modular and state-of-the-art – AC drives for material handling



## Lignite open-cast mine, Reichwalde, Germany

**Installation:** 2010

### Order:

Coal conveyor

**Length:** 13.5 km

**Capacity:** 6,000 t/h

### Solution:

- 6 single-belt conveyors consisting of totally 9 x 1,250-kW drive units and 9 x 900-kW drive units
- Conveyor speed adjustable according to load requirements

### Customer benefits:

- 98 percent availability
- Energy savings of up to 12 percent
- Maintenance cost savings of up to 15 percent

## Inner Mongolia Yitai Group Co. Ltd., China

### Order:

- Two production machines with integrated 9 MW motors
- Two service machines (3,8 MW and 0,5 MW), each with a delivery scope of:
  - Complete drive train consisting of motor, converter and transformer
  - Entire automation control and monitoring systems
  - Services e.g. engineering, commissioning

### Solution:

- Highly efficient hoisting system, that meet the latest safety standard
- Design of all machines from a single source

### Customer benefits:

- Worldwide highest output per shaft
- Low floor space requirement  
→ Decrease in investment costs
- Lower carbon footprint



# Beneficiation: All you need for a successful finish

## Smooth and powerful – from the mine to the processing plant

High-end gearless and conventional drive solutions for mills

In the overall performance of your mine, beneficiation – namely, grinding – represents a critical process step. With SIMINE Gearless mill drives and SIMINE Pinion mill drives from Siemens, you can redefine your operational reliability, availability, maintenance costs and energy efficiency. Current innovations like condition monitoring enriched to asset health analytics help you keep highest availability over the lifetime of your plant.

## SIMINE solutions for...

### Pinion mill drives

Siemens offers pinion mill drive systems for single or dual-pinion mills, tailored to individual customer requirements and total investment.

SIMINE Pinion mill drives offer complete solutions for pinion mills (including inverter, motor, coupling and gearbox). Components designed to match with each other – which leads to an optimized energy consumption.

#### Main benefits:

- Smooth mill start to minimize wear of the whole drive train
- High flexibility and availability at low budget
- High power factor
- Availability of "Frozen Charge Detection"
- Load sharing for twin-pinion systems
- Low speed induction motor for increased reliability

### Gearless mill drives

SIMINE Gearless mill drives are benchmark when it comes to reliability, availability and grinding throughput. No motor bearings, no mechanical connection between motor and system and a high overload capability are the foundation for minimum maintenance and sparepart costs throughout the entire lifecycle. At the same time, operators benefit from significant energy savings.

Supported by our solid experience you can leverage these potentials. It was Siemens that supplied the first 15-foot gearless mill drive in 1970 and introduced the 42-foot class 40 years later. And we continue to drive development, driven by the fact that the larger the SAG mill, the better your throughput/investment cost ratio.

#### Main benefits:

- Operational reliability – through the robust gearless concept and a vibration-free design with proven track record that reduces unplanned downtimes to a minimum
- Lower operational costs – through optimized electrical efficiency and reduced wear
- Comprehensive service – with a multitude of features that help keep your mill up and running
- Minimized downtime – through dedicated maintenance modes such as creeping or inching with rollback of mill
- High productivity – due to outstanding availability and the highest reliability in the market



Different drive configurations available for single- and dual-drive systems



Highly efficient at variable speed – gearless AC drives for grinding mills



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## Las Bambas Copper mine

### Order:

Gearless drive system for overland conveyor  
Siemens was contracted to supply the complete engineering, manufacture, delivery and assembly of the gearless drive stations

### Solution:

- Complete engineering, manufacture, delivery and assembly of the gearless drive stations and installation of the conveying system
- Gearless drive system with 4 low-speed synchronous motors (4,4 MW, 66rpm) and converter SINAMICS SL150

### Scope of supply

- 2 Prefabricated E-houses
- MV-Switchgears
- LV-Switchgears and Motor Control Centers
- SIMATIC S7-400 controllers
- SINAMICS SL150 drives
- Low-speed synchronous motors
- Cooling system

### The Result

- High availability
- Reduction of operational costs, maintenance costs, noise
- Less down times



## Sentinel Copper Mine, Zambia

### Project information

First Quantum Minerals, Ltd., was looking for an innovative mill drive solution for the Sentinel copper mine in Zambia

### Customer objectives

- Ensure the highest level of availability and efficiency with the mills – a top priority for a mine of this size

### Customer benefits:

- Gearless mill drive solution
- SIMATIC PCS 7 mill automation
- Frozen Charge Shaker
- Functionality

### Customer benefits:

- Operating efficiency of the drive at 95.3%
- Low operating costs through optimized energy efficiency and low-wear operation
- Minimized downtime through special maintenance modes such as deceleration and rollback of mills
- High productivity through outstanding availability and the highest level of reliability on the market

# Our drive systems at a glance

Siemens' comprehensive, well-proven range of drive systems support your mining processes toward higher productivity, reliability and sustainability.

In the following pages you will find our range of drive systems specially designed to cope with all processes in the harsh conditions of the mining industry.



## EXCAVATION

Application	Shovels		Draglines		Bucket wheel excavators	Bucket chain excavators	
	Geared drive	Gearless drive	Geared drive	Geared drive	Geared drive	Gearless drive	Geared drive
	Multiple drives	Multiple drives	Multiple drives	Multiple drives	Single drive	Dual drives	Single drive
Motor type	IM	SYN	IM	IM	IM	SYN	WRM, IM
Frequency converter	Single - parallel converters IGBT (air-, liquid-cooled)	Multiple converters IGBT (liquid-cooled)	Single - parallel converters IGBT (liquid-cooled)	(liquid-cooled)	(liquid-cooled)	Cycloconverters (air-cooled)	Single - parallel converters IGBT (air-, liquid-cooled)
Gearbox	Flender P2NV Flender P1SV	n/a	Flender P1NW	Flender PBUC	n/a	n/a	Flender B3FE 22
Power (motor)	114–2,200 kW	13,000 kW	800–1,800 kW	140–2,200 kW	1,900 kW	1,250 kW	
Voltage (motor)	0.7–1.4 kV	1.1 kV	1.4 kV	0.7–1.4 kV	1,150 V	0.4 - 0.69 kV	
Operating type	4Q	4Q	4Q	2Q, 4Q	4Q	2Q, 4Q	
Nominal speed (motor)	1,500 rpm	35 rpm	1,500 rpm	1,000–1,500 rpm	1.8 ... 14 rpm	1,500–1,800 rpm	

SER = Slip energy recovery (converter cascade for WRIM)  
 SYN = Synchronous motor  
 IM = Squirrel cage induction motor  
 WRM = Wound-rotor induction motor



Shovel



Bucket Chain Excavator

# Our drive systems at a glance

TRANSPORTATION					
Application	Trucks and trolleys	Conveyors		Mine winders	
	Geared drive	Gearless drive	Geared drive	Gearless drive	Geared drive
	Multiple drives	Single and dual drives	Single and dual drives	Single or dual drives	Single or dual drives
Motor type	IM	SYN (air-, liquid-cooled)	SYN, IM, WRIM (air-, liquid-cooled)	SYN (air-, liquid-cooled)	IM (air-cooled)
Frequency converter	Individual converters IGBT (air-, liquid-cooled)	SINAMICS SM 150, SINAMICS SL 150 (cycloconverters) (air-, liquid-cooled)	SINAMICS G 130, G 150, S 120 SINAMICS PERFECT HARMONY GH 180, SINAMICS GM 150, SINAMICS SM 150, SINAMICS SL 150 (cycloconverters) (liquid-cooled)	SINAMICS SM 150, SINAMICS SL 150 (cycloconverters) (air-, liquid-cooled)	SINAMICS S 120 (air-, liquid-cooled)
Gearbox	Flender P2MT-240, Flender P2MT-300, Flender P2MT-330	n/a	Flender B3-SH, Flender B3-SA, Flender B3-SE Couplings	n/a	Flender P2NB / H2SH/B3SH
Power (Motor)	840–1,120 kW	3–10 MW	0.05–3,000 kW	3–10 MW (with 1 or 2 motors each)	200–3,000 kW
Voltage (Motor)	1.4 kV	1–4 kV	0.4–13.8 kV	1.5–3.3 kV	0.4–0.69 kV
Operating type	4Q	4Q	2Q, 4Q	4Q	4Q
Nominal speed (Motor)	3000 rpm	0–100 rpm pulley speed	1000/1200– 1500/1800 rpm	30–100 rpm friction wheel, drum speed	750–1,500 rpm

SER = Slip energy recovery (converter cascade for WRIM)

SYN = Synchronous motor

IM = Squirrel cage induction motor

WRM = Wound rotor induction motor



Truck gearbox



Mine winder



Conveyor Drive – FLENDER Self Aligning System™

BENEFICIATION			
Application	Mills		Pumps, blowers, fans
	Gearless drive	Geared drive	Geared drive
	Single drive	Single and dual drives	Single drive
Motor type	SM (liquid-cooled)	SM, IM, WRIM (air-, liquid-cooled)	IM (air-, liquid-cooled)
Frequency converter	SINAMICS SL 150 (CYCLOCONVERTERS) (liquid-cooled)	SINAMICS PERFECT HARMONY GH 180, SINAMICS GM 150, SINAMICS SM 150, SINAMICS SL 150 (cycloconverters), SER (air-, liquid-cooled)	SINAMICS G 150 , SINAMICS GH 180 (Robicon), SINAMICS GM 150 (air-, liquid-cooled)
Gearbox	n/a	Flender MDSS Flender DMG2 Couplings	Flender standard gear units
Power (motor)	24ft–42ft	1–20 MW	1–20 MW
Voltage (motor)	4 kV	1.5-7.2 kV/10–13.8 kV	0.4–13.8 kV
Operating type	4Q	2Q, 4Q as applicable	2Q
Nominal speed (motor)	0–20 rpm Mill speed	130–1,000/1,200 rpm	as applicable

SER = Slip energy recovery (converter cascade for WRIM)  
 SM = Synchronous motor  
 IM = Squirrel cage induction motor  
 WRM = Wound rotor induction motor



Gearless Mill Drives



Conventional Mill Drives

# Putting a stop to rising cost – together

## A partnership based on long-term experience

We understand your business and your processes – as a foundation for successful cooperation.

Siemens has been involved in the mining industry since 1920, initially in Germany and today at mines all over the world. And in these 97 years, we kept pace with changes on all levels.

As a trusted mining partner, we closely collaborate with original equipment manufacturers as well as mine operators always striving for cooperation that takes place at an early project stage. The result is drive solutions tailored for specific mining applications with best-in-class reliability and focused on minimizing operational cost. We further develop energy-efficient and maintenance-friendly solutions and products and at the same time we make machine operation simpler, including faster troubleshooting and shorter installation times.





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