The background image shows a massive open-pit mine at night. The steep, layered rock walls of the pit are illuminated by artificial lights, creating a dramatic play of light and shadow. In the foreground, a yellow mining excavator is visible, its arm raised and bucket digging into the earth. Other pieces of mining machinery and vehicles are scattered across the dark, rocky terrain.

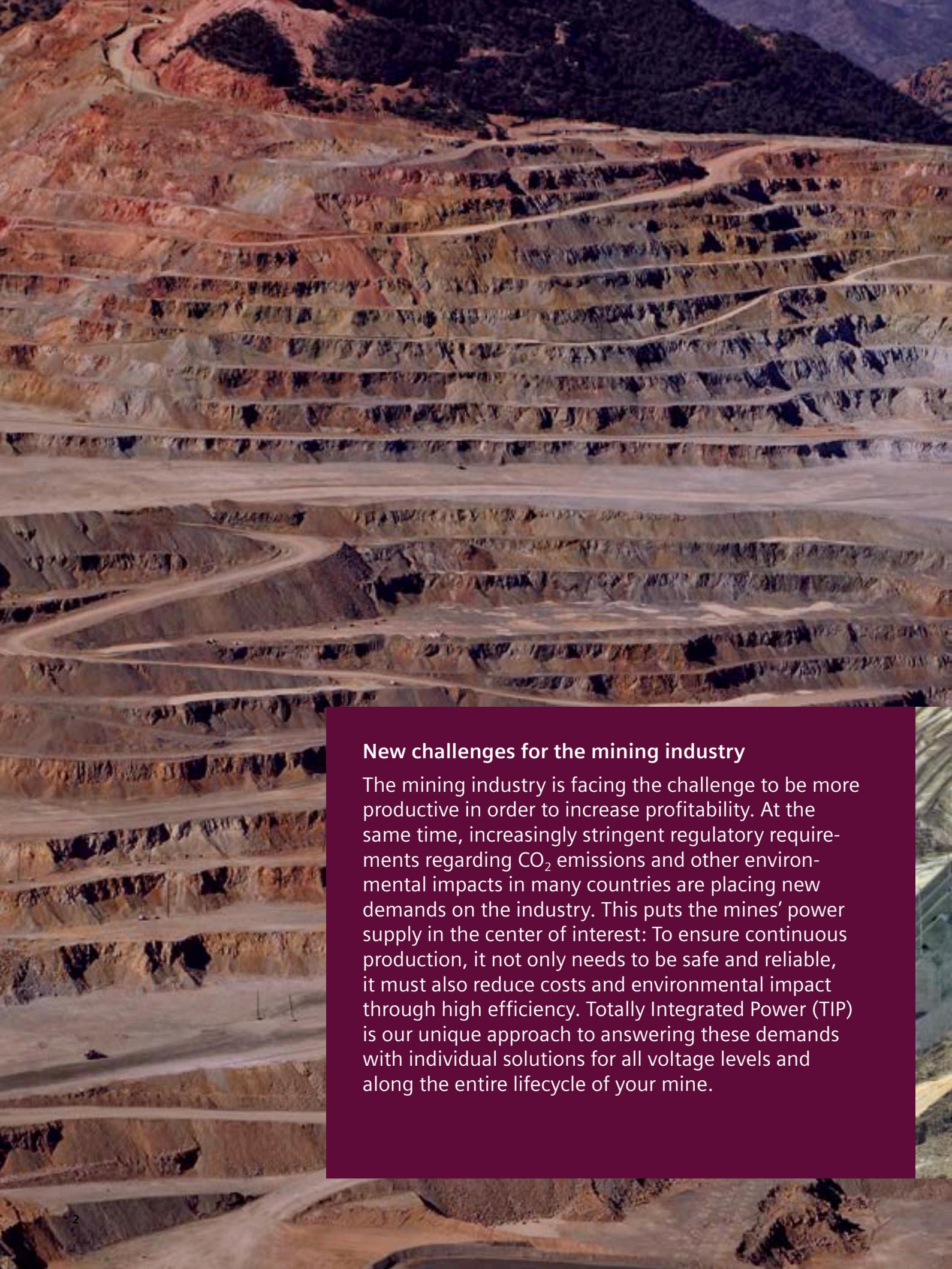
**SIEMENS**

*Ingenuity for life*

Energy automation  
solutions for the  
mining industry

Safe, efficient, and reliable

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## New challenges for the mining industry

The mining industry is facing the challenge to be more productive in order to increase profitability. At the same time, increasingly stringent regulatory requirements regarding CO<sub>2</sub> emissions and other environmental impacts in many countries are placing new demands on the industry. This puts the mines' power supply in the center of interest: To ensure continuous production, it not only needs to be safe and reliable, it must also reduce costs and environmental impact through high efficiency. Totally Integrated Power (TIP) is our unique approach to answering these demands with individual solutions for all voltage levels and along the entire lifecycle of your mine.

# Safe and dependable electric power is a must

## A prerequisite for successful operation:

### Safety first

In all our installations, personnel safety is of the highest importance. To achieve this, energy automation systems from Siemens take care that the design of your power grid is safe. For example, our automation schemes ensure safety interlockings between your assets to prevent accidents and improve overall safety.

### Tailor-made protection and automation for highest reliability

Mines need an absolutely reliable power supply for smooth and continuous operations. The success of the entire mine operation ultimately depends on the steady functioning of all electrical components such as crusher, mill, pump and conveyor drives, as well as automation systems. And since the challenges are as individual as a mine, they require specific, tailor-made solutions for protection and energy automation.

## Efficient solution for your needs

Our solution integrates protection, power monitoring, substation automation, and energy management. We automate your power supply, protect your plant against possible damage, and ensure that your electrical power and service are monitored and operating within acceptable limits. Effectively integrating these functions in one state-of-the-art solution instead of individual legacy systems helps keep costs low while ensuring availability of all required features.





# A systematic approach to higher competitiveness

Our energy automation solutions open up numerous opportunities to increase the performance of your mine while making operation more efficient. Rely on our experience in finding the best solution for your mine: We can build it from our comprehensive low-, medium-, and high-voltage portfolio as a well-functioning integrated system.

## Step-by-step analysis

Before designing a specific energy automation solution for your mine, we thoroughly analyze all your needs today and in the future. To this end, we always look at your power supply in its entirety – from power generation or utility power supply, through medium-voltage distribution, to machinery and other equipment. To protect your investment and ensure the success of your business over the entire plant lifecycle, we always take into account your site's future requirements, when designing our open, flexible energy automation solutions.

## Our energy automation systems offer the following functional modules:

- Protection and automation of the power supply
- Calculation and storage of the power supply system parameters
- Monitoring and control of the entire power supply system (SCADA)
- Alarm management and logging functions
- Comprehensive analysis of power system
- Load management, including control of power generation
- Load shedding in the event of overload and crisis situations
- Microgrid management and generation control
- Automatic restarting of power
- Power quality monitoring
- Energy management

## More performance with an integrated solution

Integration is at the core of our solutions: We build an energy automation system that is tailored to your needs using products with the ability to work with open, common communication protocols, such as IEC 61850 and others, to provide a proven solution. It includes the power supply from utility or local generation, as well as your entire medium- and low-voltage network, and the emergency power supply, too. We also integrate all data and information needed to manage and monitor your power supply, including switch positions, measured values, warnings and alarms, as well as any required signals. Typically OPC or Modbus is used for coupling and exchanging data with your process automation system.

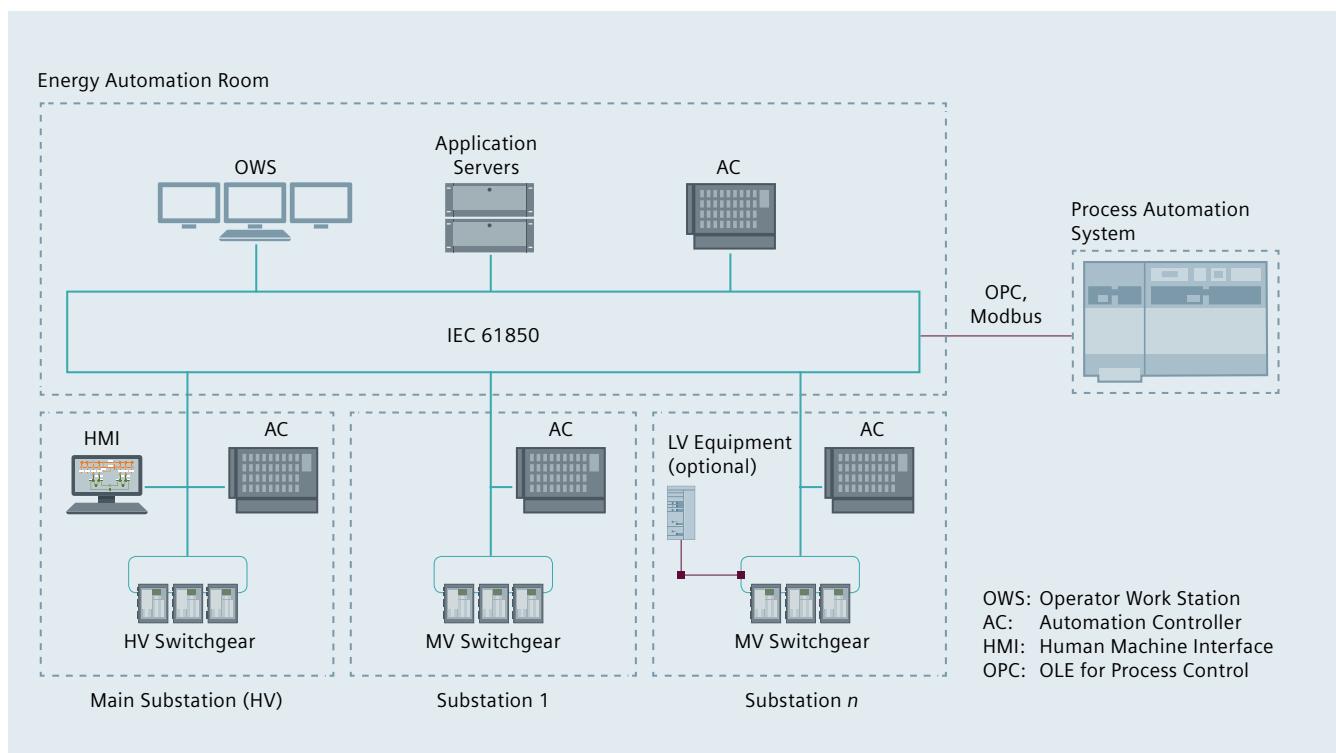
## Robust components and design configurations

Reliable hardware adds to the overall reliability of your energy automation system. That is why we use dedicated hardware from the Spectrum Power™, SICAM, and SIPROTEC families for all data processing and control functions. The same applies to the Human-Machine Interface (HMI), as off-the-shelf technologies can easily be replaced, even in remote locations.

## Power quality – your way to higher availability

Opencast and underground mining equipment is always "on the move." Higher profitability means that mines must have a permanently high and dependable extraction capacity and a continuous availability of the power supply. Monitoring of infeed power quality provides the mines with valuable information and early alerts to avoid interruptions and ensure maximum availability.

## Energy automation system





# One integrated system – many advantages

With a modular package and all services from one source, we support the proper functioning of your energy automation system. Benefit from the many advantages that only a partner like Siemens can offer.

## Integrated solution

A system overview helps you locate and rectify errors more quickly. Our energy automation system enables you to obtain and manage all relevant information about your high-, medium-, and low-voltage installations on a single screen.

## Central monitoring and control interface

All switching and administration can be carried out conveniently from a central operator terminal. In an emergency, you can quickly inform all parties involved, fully automatically, per SMS or email. This allows you to timely detect an imminent error and to intervene quickly in the right place to prevent a potential loss of power.

## **Highest supply reliability**

Selectively disconnecting less important sections of the plant can help you to reduce the risk of an interruption of the power supply. Built-in load-shedding functions assist you if any instability occurs in the power supply, such as load unbalances or overloads.

## **Optimum power utilization**

Special load management functions guarantee the availability of the exact amount of energy you need at any given time. Unnecessary power consumption can be detected, and suitable action helps to prevent it in the future.

## **High availability and reliability**

Rugged, industry-tested components and proven standards guarantee high availability and operational reliability. This directly impacts the overall availability of your assets. We can optimally adapt the level of automation to your processes, and thus help you react quickly and correctly in critical situations.

## **Lower operating and maintenance costs**

Logging energy data is among the standard functions of our energy automation systems, because continuous monitoring can help you plan required maintenance activities in advance and carry out preventive maintenance. The result: higher availability, lower maintenance efforts.

## **Energy automation from Siemens – performance made to measure**

Our energy automation systems are always designed and optimized to meet your specific requirements. The use of standard components allows us to scale the system in every respect. This means we can offer you a comprehensive range of solutions, from straightforward visual display systems for the power supply to a highly complex energy control system with special control functions and algorithms for the energy flows.

All functions share a common goal: They are designed to prevent unwanted interruptions of the power supply at your plant and thus eliminate possible danger to personnel and equipment. Another important task for the system is the cost-optimized control of the energy flow throughout the entire complex.



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