Maximizing ROI and sustainability in metals through digital transformation

EcoStruxure for Metals

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We help the metals industry adopt a culture of innovation that ensures long-term sustainability, productivity, energy efficiency, and value chain excellence.

Our digital-first approach integrates automation, power, and process solutions. The result of this connected consolidation is enhanced stakeholder return and a more sustainable, efficient operation.
SECTION 01

Industry challenges today and tomorrow

Metals operations today face five main challenges.
## Challenges

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<td>In addition to adhering to the highest safety standards, metals companies today need to contribute to community development and environmental sustainability. Expectations for responsibility are embedded in the industry’s social license to operate; metals companies must navigate stakeholder pressure while driving down OpEx.</td>
<td>The demand to remain profitable in a very competitive landscape, all while doing more with less, is another hurdle metals companies must face.</td>
<td>Metals operations need to be able to swiftly pivot to the traditional value chain. Market changes and price volatility undergird the values that digitization brings to the metals industry, including improved connectivity and flexibility.</td>
<td>By 2025, millennials will comprise 75% of the workforce. As experienced employees retire, it’s important to transfer their knowledge by leveraging technology. Right now, however, the metals industry needs to attract new talent and improve gender diversity.</td>
<td>As is true in many industries, there’s a relentless drive to accelerate digital transformation, technology adoption, and innovation to remain competitive.</td>
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The digital transformation — the promise of new technology

Digital technologies and IIoT

The digital transformation is happening all around us, and the metals industry has taken notice. The advantages of a digital, IIoT-connected environment are necessary not just for survival, but to attract the best and brightest of the next generation of workers. It’s also a key contributor in maintaining and improving sustainability.

From data to wisdom

Smart devices and sensors are generating lots of data from processes, from both fixed and mobile equipment, and with unprecedented granularity. They even allow data to be collected from things such as fire extinguishers and personal protective equipment that are not typically connected to a network. But massive amounts of data alone is not an answer. Companies need to derive real business value from this ocean of data and turn it into meaningful, insightful information – and that is achieved thanks to intelligent software and technology that can transform data into information, information into knowledge, and ultimately knowledge into action that advances efficiency and profitability.
Resiliency through EcoStruxure

Ensure four competitive advantages

Companies that digitally transformed

Mining solutions in action

Industry challenges today and tomorrow

Our digital differentiator

72% of companies interviewed plan to achieve an advanced level of digitization in the next 5 years¹

¹ PwC Strategy & Global Industry 4.0 Survey 2016
Our digital differentiator

We empower through digital transformation to ensure our customers’ competitive advantage.
Why partner with Schneider Electric?

We have an unrivaled ability to integrate power and process throughout the entire value chain — from design, planning, and scheduling to operation, production, and maintenance.

- Our deep industry knowledge features demonstrated value through a metals-specific application portfolio.
- We offer the greatest breadth of smart connected products, edge control solutions, and analytics that cover the entire industrial automation space.
- Our strategic partnership with AVEVA™ allows us to build digitally connected, unified environments quickly.
- EcoStruxure for Metals delivers IoT-enabled solutions that drive operational and energy efficiency in the metals industry.
Resiliency through EcoStruxure

Build a collaborative digital environment with EcoStruxure, our open and interoperable IoT architecture that makes the metals industry sustainable, safer, and more efficient.
EcoStruxure for Metals

What is EcoStruxure for Metals?
EcoStruxure is our IoT-enabled architecture designed to leverage the digital transformation. It connects existing sensors to your fixed operations and mobile equipment, collects data, and analyzes and presents that data. This allows you to take real-time corrective action in the short term so you can optimize your entire ecosystem over the long term.

How are we different?
1. We have an unmatched portfolio of solutions and hardware.
2. Our solutions are interoperable; open standards allow for seamless integration of third-party systems and devices.
3. Our offers enable users to access data on-premise or via the cloud.

Innovation At Every Level
We have leveraged advanced technology in IoT, mobility, sensing, cloud, analytics, and cyber security for solutions that deliver Innovation At Every Level.

Connected products
Field devices with embedded intelligence such as sensors, circuit breakers, meters, variable speed drives, and process instrumentation provide the link to real-time data that is essential to higher-level control and decision-making.

Edge control
Most metals processes are mission-critical, so control of devices at the edge of the IoT network is a must. This essential capability provides real-time solutions that enable local control at the edge, increasing safety and uptime.

Applications, analytics, and services
Sophisticated problem solving and analysis at the enterprise level optimizes business operations and maximizes results.
Ensure four competitive advantages

Discover the wide array of benefits unleashed by digital transformation.
Four values enabled by digital transformation

Metals industry leaders will achieve their biggest successes by embracing digital technologies like IIoT and advanced analytics. We see four main areas that digitization will improve:

- **Maintain license to operate**
  Provide clean, safe, and reliable operation while ensuring compliance and brand image by increasing end-to-end sustainability and corporate transparency.

- **Improve asset efficiency**
  Digitally transform operations for reduced OpEx and resiliency, improve process and technology interoperability through integrated power and process for data-driven decision-making.

- **Optimize value chain from resource to market**
  Increase value chain flexibility, agility, and predictability to boost competitiveness in a volatile environment.

- **Empower workforce**
  Retain knowledge, eliminate information silos, improve operator safety, and provide virtual learning programs, immersive training, and collaborative digital environments that allow for informed decisions in real time.
Maintain license to operate

Digital transformation helps our clients transition to renewable energy while facilitating clean, safe, and reliable operation. In addition to allowing metals companies to more easily meet compliance goals, digital transformation enhances brand image by increasing end-to-end sustainability and corporate transparency.

The digital transformation is greatly enhancing metals companies’ social license by:

- Improving compliance and safety of people, buildings, and assets with integrated safety and security
- Eliminating power incidents and supporting business continuity through reliable power distribution and automation
- Increasing corporate sustainability and transparency with a comprehensive strategy and implementation plan
- Optimizing resource usage with real-time control
- Decarbonizing and reducing energy costs while making it easier for companies to manage a complex energy mix
- Protecting business, assets, and people with end-to-end cyber security
Improve asset efficiency

Digitally transform operations for reduced OpEx and resiliency. Improve process and technology interoperability through integrated power and process for data-driven decision-making.

Digital transformation is improving asset efficiency for the metals industry by:

- Mitigating information silos by unifying key power and process across the value chain
- Minimizing production losses through integrated asset performance
- Allowing for the real-time analysis of performance indicators through a suite of optimization solutions
- Reducing process variability and increasing profitability with state-of-the-art automated process control
- Improving operations efficiency by optimizing power and process engineering, and designing via simulation
- Decreasing costs by minimizing maintenance OpEx with an integrated, mobile workforce
Optimize value chain

Increase value chain flexibility, agility, and predictability to boost competitiveness in a volatile environment.

Digital transformation is optimizing the metals industry's value chain at every level by:

- Improving decision-making by embedding key processes across the value chain through integrated operation
- Optimizing value chain visibility with unified planning and scheduling solutions
- Reducing transfers, damages, and bottlenecks in supply lines with automated material handling solutions
- Improving response agility with real-time inventories that allow for rapid containment measures and optimized immobilization
Empower workforce

Retain knowledge, eliminate information silos, improve operator safety, and empower the workforce through virtual learning programs, immersive training, and collaborative digital environments that allow for informed decisions in real time.

Digital transformation greatly enhances process management and empowers all levels of the metals industry’s workforce by:

- Allowing for rapid training of new teams on safety and other best practices via immersive virtual training
- Enabling faster and better-informed decisions with instant, hands-off augmented reality digital diagnostics and maintenance
- Mitigating information silos for improved decision-making in a collaborative environment
- Equipping field workers with essential data on operations and maintenance, equipment diagrams, and operating history using digital, current, and valid technical and process information
- Lowering training costs with fast, easy access to training modules, especially during production stoppage
Metals solutions in action

Optimize for today and build for tomorrow with EcoStruxure Ready products, software, and services for metals.
Resiliency through EcoStruxure

Ensure four competitive advantages

Companies that digitally transformed

Mining solutions in action

Industry challenges today and tomorrow

Our digital differentiator

Maintain license to operate
- Energy management and renewables
- Electrification and power
- Facilities management

Improve asset efficiency
- Integrated plant
- Process automation and control
- Asset health

Optimize value chain
- Material handling
- Resource-to-market integration

Empower workforce
- Digital worker

Solutions Portfolio

Services, projects, and consulting
Energy management and renewables

Energy management systems
Schneider Electric offers a comprehensive set of services across all areas of an organization’s energy and sustainability management program, including supply, demand, and sustainability. Our solutions provide comprehensive, real-time reporting and visibility of the critical energy measures in a production context, enabling personnel to make fully informed energy management decisions that maximize energy performance and deliver critical energy savings.

Hybrid energy generation
Our combined expertise in solar and microgrid technologies allows us to deliver effective renewable-based solutions for metals operations.

Microgrid solutions
Our microgrid solutions help ensure energy reliability by digitizing energy infrastructure. Aside from reducing emissions, digitization also allows metals companies to optimize resource usage based on availability and pricing, and enables energy to be sold back to the grid.
 Electrification and power

Medium-voltage and low-voltage equipment
From low-voltage and medium-voltage equipment to transformers and grid automation, we deliver complete solutions that cover all your power distribution needs. Our IoT-enabled power management architectures enhance connectivity, network security, real-time operational reliability, and smart analytics for peace of mind and significant financial benefits.

Intelligent motor control center
IMCCs help production and maintenance operations to leverage the large amount of information from intelligent motor starters, smart relays and variable speed drives to improve plant performance and avoid potential motor failures.

• Improve project efficiency 15% – 20%*
• Improve commissioning time, compared to simple MCCs, from 10 starters/day to 30 – 40 starters/day*
• Improve motor protection with up to 90% fewer motor burn-outs*
• Reduce unscheduled downtime up to 70%*
• Reduce maintenance costs up to 50%*

* Schneider projects
Electrification and power

Harmonic filtering
Accusine PCS+ is the Schneider Electric solution for active harmonic filtering in industrial installations. It is a flexible, high-performance, cost-effective solution for stabilizing electrical networks by providing harmonic mitigation, power factor correction, and load balancing.

Medium-voltage and low-voltage variable speed drives
Schneider Electric’s variable-speed drives are more than just a drive. They are smart, connected products we call “Services-Oriented” drives because they deliver information to your fingertips that lets you make business decisions in real time. Their innovative features enable process and asset optimization, as well as improved energy management, to optimize your entire asset base of motors.
Facilities management

Data center solutions
Schneider Electric’s solutions for data centers include the capability to deliver full enterprise data centers and prefabricated customized systems. Our prefabricated data centers are critical for managing, storing, and securing crucial data collected throughout the metals plant. They offer highly predictable performance, and can be scaled as needed.

Critical power (uninterruptable power supply)
Schneider’s Uninterruptible Power Supplies are designed to withstand harsh environments, including seismic activity and extreme temperatures.

Building management
We offer a fully integrated architecture for building management that provides interoperability and openness for full visualization and control of all building systems, including: access controls, surveillance, HVAC, lighting control, and energy management.
Integrated plant

Bringing it all together
Digitalization, IoT, and the Schneider Electric solutions that are enabled by them allow you to centralize many of the monitoring and control functions for multiple remote operations in a single physical location: the Integrated Operations Center. This centralized operations hub gives you the ability to locate certain key front-line workers all under one roof where you can more easily replicate best practices across all mine sites, optimize the supply chain, foster more efficient problem solving, and deliver savings to the bottom line for a greater competitive edge.

Manufacturing operations management
Our secure manufacturing management information platform and interface delivers production management, performance analysis, quality control, and regulatory compliance. This integrated approach helps to ensure that all facets of your operation – from materials and people to processes and equipment – act in concert to help you meet demanding product specifications and customer requirements.
Integrated plant

Energy management systems

Schneider Electric offers a comprehensive set of services across all areas of an organization's energy and sustainability management program, including supply, demand, and sustainability.

Our Energy Management and Information solutions provide comprehensive, real-time reporting and visibility of the critical energy measures in a production context, enabling you to make fully informed energy management decisions that maximize energy performance and deliver critical energy savings.
Process automation and control

Automation and control

Process control applications can be highly distributed and heavily instrumented, requiring an integrated and flexible automation and control platform that can address their complexity. Our process control portfolio provides solutions suitable for small operations to advanced Ethernet distributed architectures able to manage complex instrumentation networks and demanding applications.

Users get a single software environment that delivers flexible engineering, operation, and maintenance capabilities that are necessary to address these challenges, and which is also both process and object-oriented: The application is modeled according to the actual operation and process (digital twin), making it intuitive to configure and easy to use.

Process optimization

Process Optimization uses real-time process and economic data to determine set points that guarantee maximum operating profit while satisfying all regulatory requirements, providing sustainable plant performance and increased return on investment.
Process automation and control

Advanced process control
Advanced Process Control is comprehensive model predictive control software that improves process profitability by enhancing quality, increasing throughput, and reducing energy usage. It uses state-of-the-art technology to provide automatic control systems capable of releasing process potential.

Advanced Process Control easily integrates with distributed control systems (DCS), programmable logic controller (PLC)-based control systems, and plant information system databases.

Dynamic process simulation
Process simulators enable companies to meet plant lifecycle requirements, from steady-state simulation for plant and process design to dynamic simulation for process control engineering, control check out, operation, process scalability studies, process benchmarking, and optimization.
Virtual reality and immersive operator training and simulation

Our virtual reality and OTS (Operator Training and Simulation) solutions provide operators and plant personnel with a high-fidelity 3D virtual process and plant environment in which to learn operating procedures and train for emergency situations. It also enables the capture and knowledge transfer of best practices, increasing efficiency and reducing costly errors and maintenance procedures.
Asset health

Condition monitoring and predictive analytics
From condition monitoring to advanced machine learning and modeling solutions that identify subtle changes in system behavior, our solutions identify the early warning signs that can lead to diminished equipment performance and unplanned failures. Solutions are available for both on-premise or the cloud.

Enterprise Asset Management
Our Enterprise Asset Management (EAM) software ensures you are getting the most out of your assets through proper maintenance scheduling and tracking, spares and inventory management, and procurement capabilities that ensure efficiency across your entire asset portfolio.

Remote asset monitoring for electrical distribution
With this predictive analytics service, we remotely monitor critical systems and proactively address issues to mitigate electrical failure risks. Combines a best-of-breed technological platform with our expertise in maintenance and electrical equipment manufacturing.
Material handling

Integrated Autonomous Crane System (IACS)
We combine best-in-class power, automation, and IT systems to deliver fully autonomous crane operations.

Unmanned cranes deliver precise, optimized, and automated movements of each unit of steel, from production to yard to warehouse to shipping.

When integrated with our Warehouse Management System (WMS), you achieve both real-time inventory tracking and optimized material movement.

Benefits:
• Provides real-time inventory management
• Reduces labor costs
• Reduces product handling defects/damages
• Improves productivity
• Reduces mechanical stress
• Digital operation delivers intelligent supply chain management and analytics, and enables better decision making
Resource-to-market integration

Production performance management
It is difficult to make real-time decisions based on information spread across various databases, applications, and spreadsheets.

Our production management solution consolidates and manages data from multiple metals, plant, and business systems, enabling miners to identify production issues, manage inventory and quality, track production and asset performance, understand costs, and analyze business KPIs.

Supply chain management
Our pit-to-port unified solution for planning and scheduling takes into account the mined materials, processing, supply chain capabilities, and costs to deliver an optimal plan that maximizes profit. The optimized plan sets targets for detailed scheduling, focusing on long-term efficiency instead of short-term gains.

The scheduler allows metal companies to quickly see how closely the schedule is being followed, and to adapt if necessary to meet the plan.
Digital worker

Real-time data acquisition and reporting
Our mobility solutions allow users to view data and KPIs on mobile devices like smartphones and tablets and enable real-time decision making.

Safety, maintenance, and environmental inspections
Mobility technology for workflow, data collection, and general task management (safety, maintenance, and environmental) helps achieve consistent and precise execution of procedures.

Augmented reality
Innovative augmented reality software for mobile devices uses the device’s camera to recognize electrical panels, cabinets, machines, and process areas and then superimpose real-time data and virtual objects onto them. This gives operators and technicians immediate access to relevant technical, performance, and condition information and speeds up decision-making, troubleshooting, and performance efficiency.
Services, projects, and consulting

Field services
For over 30 years Schneider Electric Field Services has been modernizing and extending the useful life of equipment for electrical distribution, automation, critical power, and building management systems around the world. Our services keep employees and assets safer while increasing the efficiency and reliability of the overall technical infrastructure at thousands of industrial installations.

Remote access management
Our Monitoring & Diagnostics Services Center engineers can remotely monitor your industrial assets using predictive analytics technology to monitor all covered assets and provide early warnings and diagnostic guidance. This enables organizations to improve equipment reliability and performance, and reduce maintenance costs, capital expenditures, and total cost of ownership.
Services, projects, and consulting

Energy and sustainability services
Schneider Electric offers a full scope of energy and sustainability services as well, including demand side, supply side, sustainability strategy (reporting, compliance management), and technology implementation (software and reporting).

Cyber security
Our team of highly dedicated and skilled professionals can help you identify potential cyber security risks to propose and deliver a customized, scalable solution that will help protect your assets and your business.
Companies that digitally transformed

Hear directly from industry leaders on how they’re bringing their operations into the digital age.

Arcelor Mittal ensures quality and safety while enhancing sustainability

Baosteel boosts logistics efficiency

Tenaris shortens maintenance time

Novelis embraces change to improve efficiency