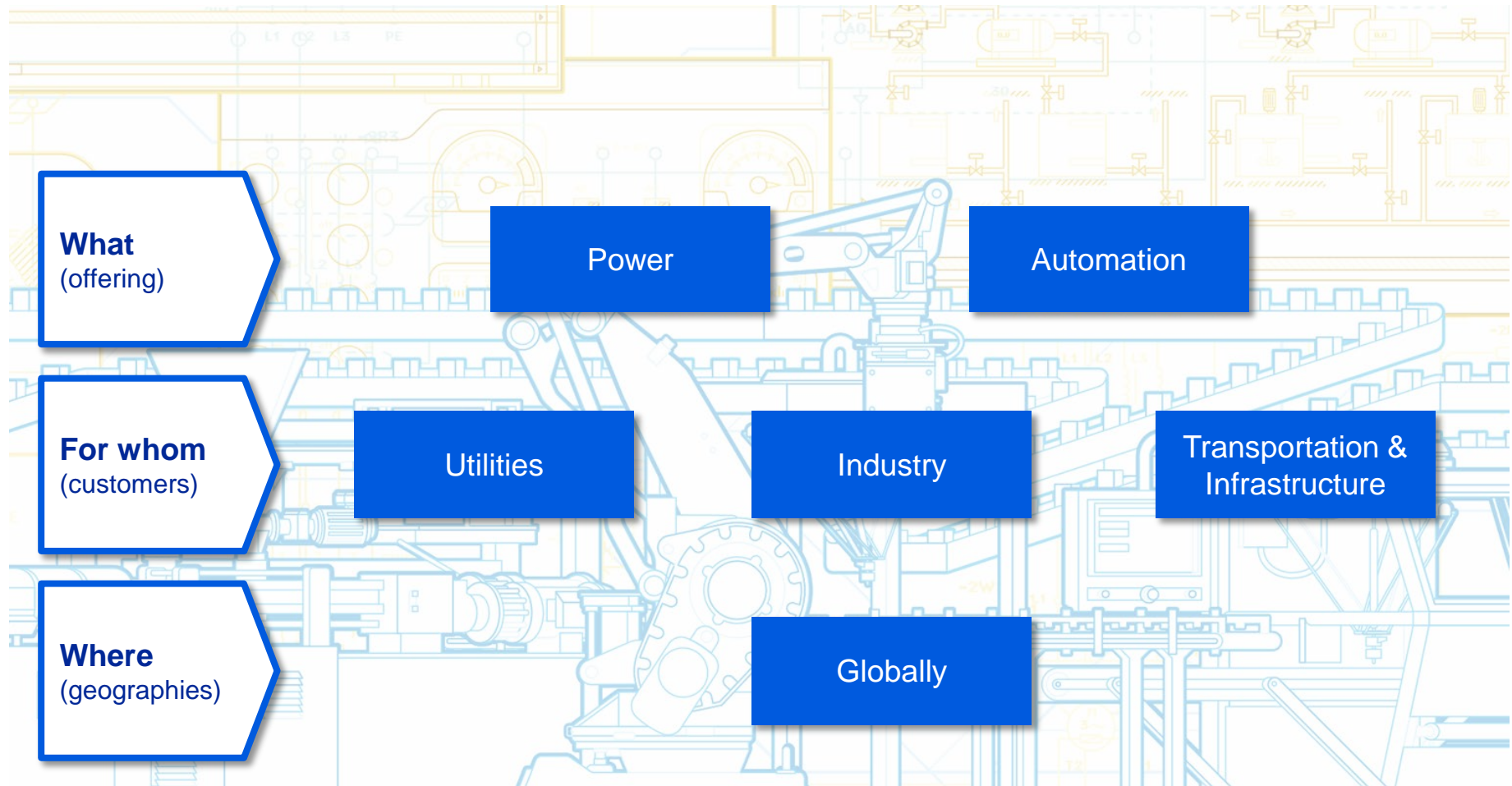


Peter Terwiesch, President, Process Automation division. June 9, 2015

Next Level industry Integrated automation

ABB

In simple terms



Deliver power and automation

Through products, systems and services to industry

Key deliverables

Fully engineered products, systems, and services for process control, safety, instrumentation, plant electrification, and energy management

Power



Service



Systems



Key industries served

Oil, gas, and chemicals

Metals

Pulp and paper

Marine and ports

Life Sciences

Food and Beverage

Data centers

Cement

Pharmaceuticals

Mining

Domain-generic products

Control systems,
Measurement products



Domain-specific products

Gearless mill drives, mine hoists, Azipod
marine propulsion, Turbochargers



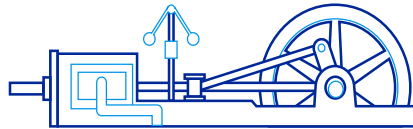
A leading automation player

Paradigm shifts

Internet of Things, Services and People

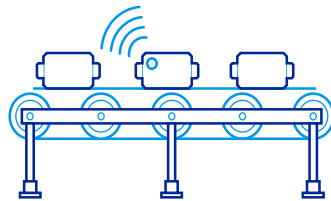
Industry 1.0 – 1712

Mechanical production with the help of steam



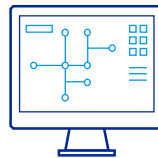
Industry 2.0 – 1870

Assembly lines with the help of electricity



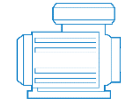
Industry 3.0 – 1969

Further automation with the help of electronics and software-based control

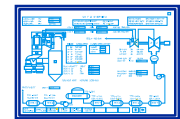


Industry 4.0 – today and tomorrow

Things



Services



Internet
of

People



We drive the change!

Internet of Things, Services and People (IoTSP)

Improve visibility, planning and real-time coordination

Top benefits

How we can help

Improve operations
visibility



By providing complete, accurate and timely data

Improve coordination
between functional silos



By providing better visibility and real-time management
system integration

Support improved
production rates and
throughput



By providing better planning capabilities to minimize
bottlenecks

Reduce hazard
exposure

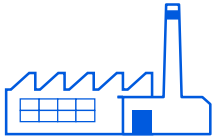


By removing people from hazardous environments
through better information and communications systems

Plant of the future – IoTSP - IT/OT integration

What this means

Industry



- Integrated operations
- Energy/water efficiency
- Safety and security
- Smart lighting
- Maintenance
- Surveillance
- Waste management
- Bio wearables

Transport



- Cloud-controlled electric vehicle charging networks –
- Traffic control,
- Shipping - Integrated vessel and fleet monitoring,
- Predictive maintenance,
- Global positioning,
- Trains

Infrastructure



- Smart grid
- Building automation
- Port lighting
- Data centers
- Cloud controlled irrigation systems
- Municipal wireless communications

Home



- Controlled lighting
- Temperature monitoring
- Humidity control
- Appliances
- Energy/water efficiency
- Sun shading
- Intercom/entry system
- Security/Alarm
- Remote monitoring,
- Entertainment

Next Level mining – attractive changes moving forward

Mines of the future will have...

... people further away from processes

Reduce cost, increase productivity, and safety by remote monitoring, diagnostics and interventions



The old way



Remote monitoring of equipment, preventive maintenance

... equipment closer to processes

Move automation and electricity to where the ore is extracted, minimize haulage, and transport



The old way



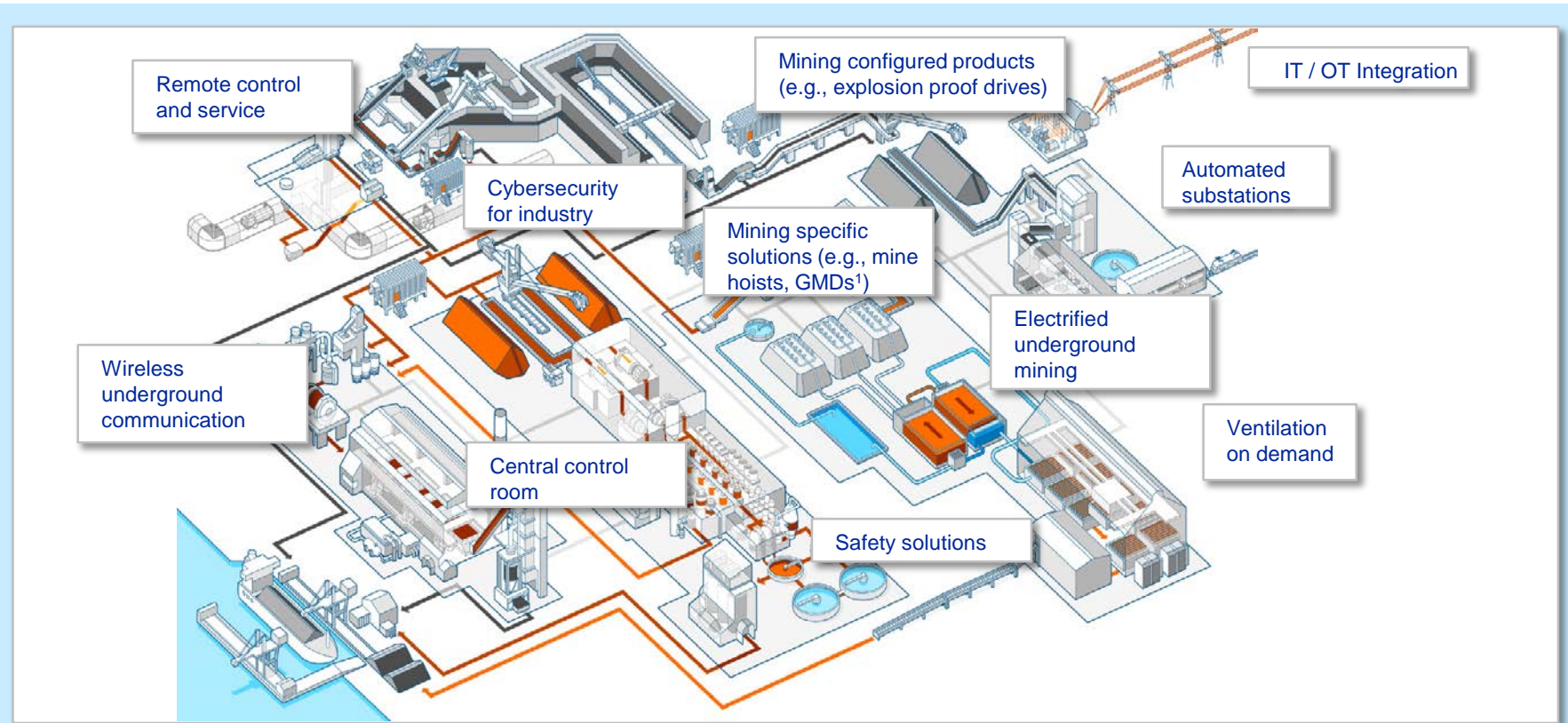
Underground electricals and autonomous equipment

... enabled by integrated operation from pit to port, fully automated, and remotely controlled

Key features of future mining operations

- Limited human presence in production area
- Continuous production and mechanical excavation
- Central control room with decentralized decision making

ABB supports the integration of the entire value chain Safer, leaner, greener...and more productive

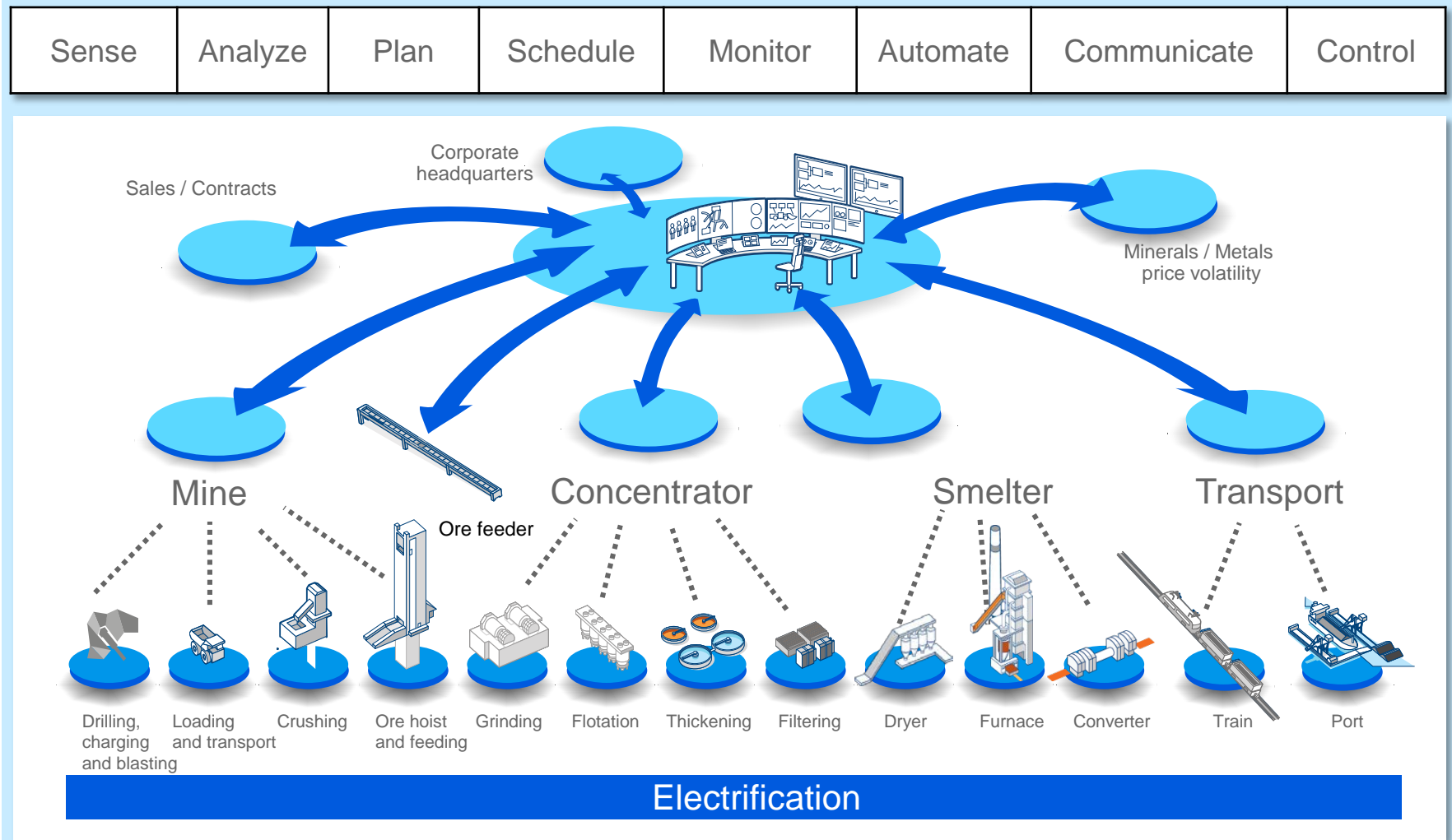


What are the benefits

- Higher productivity, enhanced collaboration
- Increased energy efficiency
- Holistic commercial view of the whole enterprise
- Improved safety

The future of mining – extended automation

Bringing things, services and people together



Process optimized according to ore properties

Plant can react to variability ahead of time

1

Real time ore analyzer detects changes to ore grade

2

Control system alerts process plant



3



5

The result is higher equipment utilization, increased recovery and lower energy consumption

4

Predictive adjustments made to grinding and flotation circuit according to ore properties

The old way

- No information on upstream downstream impact
- Can't prioritize significant data volumes - manual
- Production, equipment and other control systems not integrated
- No optimization of grinding or floating

The new way

Optimized grinding and flotation using data from real-time analyzers detecting changes to ore grade as it is extracted.

Wireless communications

Enables just-in-time optimal process management

1

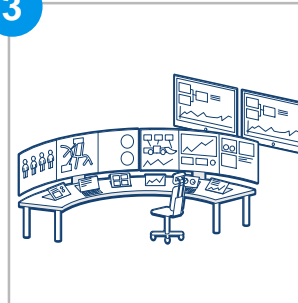
Integration of underground communications improves production efficiency

2

Computerized mobile and fixed equipment report local environmental data, their status and location



3



5

New work plans and loading sequences for the production machines can be calculated and executed

4

Production reports, analyses and statistics can be retrieved on-line in real time

The old way

- No information about the location or status of mobile or fixed equipment
- Can't prioritize work plans and loading sequences
- Operational teams working underground working sub optimally

The new way

WLAN enables high degree of automation and information access. Optimized communication improves production efficiency.

Production targets optimized for market conditions

Process set points refined to maximize financial returns

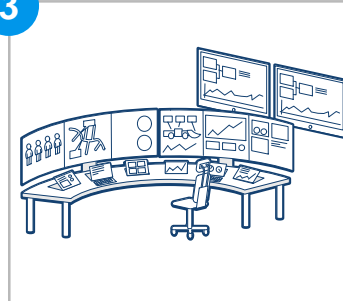
1 Convergence of business IT systems and process control systems



2 Information from sales and global pricing index



3



The old way

- Unable to contextualize information on relative product pricing and sales contracts because information is stored on disparate systems

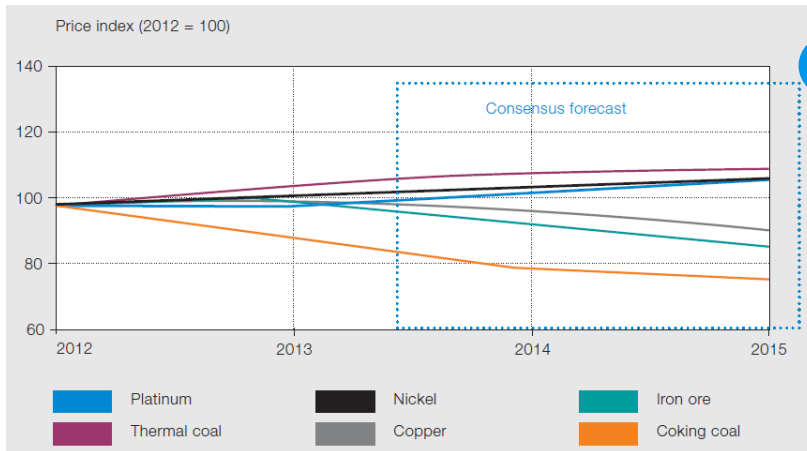
The new way

Convergence of business IT systems and process control systems enables advanced process control.

5 Maximizes financial returns for current feed material and product pricing

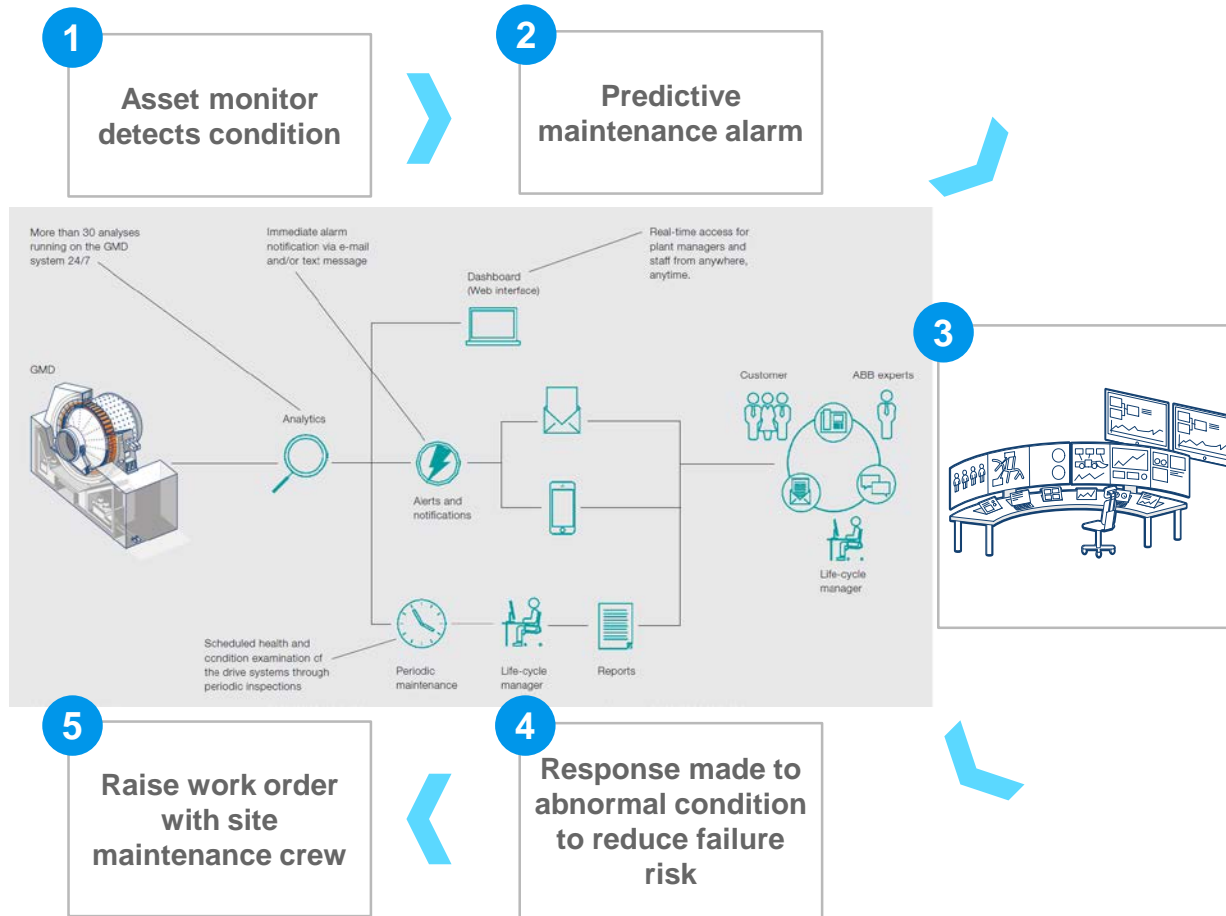


4 Allows advance process control systems to refine process set points



Asset condition monitoring in real time

Reduces losses due to equipment failure



The old way

- Reactive maintenance
- High operating costs
- Unexpected breakdown of critical assets
- Catastrophic impact on production targets

The new way

Control system integrated with maintenance system. Predictive maintenance strategies in place helping reduce operating costs.

Optimization from rock face to end customer

Eg, integrated power generation & mining

1

Coal stock levels at power station low

2

Message sent to fully automated mine

3



4

Mine digs, blends and mixes coal automatically

5

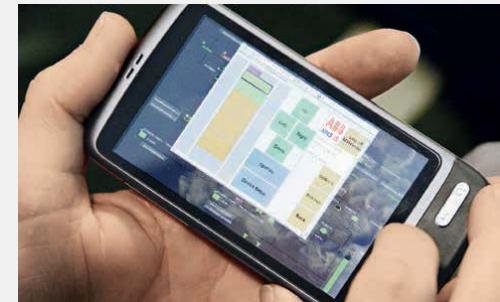
Delivers to power station

The ultimate goal of future mining projects

Remote operations centers enable the vision

Holistic approach featuring

- smart devices and equipment,
- enabled for autonomous configuration,
- efficient operation,
- self-diagnostics,
- real-time transparency
- even to mobile devices



Internet of Things, Services and People (IoTSP)

Major opportunities and benefits – in summary

Top benefits

How we can help

Process optimized



Integrate Automation and Control Systems with Enterprise Asset Management and Production software

Communications



Wireless information from people and infrastructure for predictive adjustments, scheduling, optimal equipment utilization and energy savings

Optimized for market conditions



Product demand, pricing index, sales and contract fulfilment to maximized financial returns

Condition monitoring



Detailed information to optimize asset maintenance and drives business cases for capital investment

Power and productivity
for a better world™

