«NORNICHEL» is a leader in the Metal & Mining industry in Russia and in the world

- №1 in the world in the production of refined nickel
- №1 in the world in the production of palladium
- №4 in the world in the production of platinum
- №4 in the world in the production of rhodium
- №11 in the world for copper mining
- №11 The company also produces gold, silver, iridium, selenium, ruthenium.
Strategic priorities

SECURITY AND ECOLOGY EMPHASIS

- 20% reduction in LTIFR per year
- Zero death tolerance
- Implementation of the Integrated Environmental Program with a 75% reduction in SO₂ emissions in the Norilsk industrial region

EFFICIENCY IMPROVEMENT

- 5-8% metal production growth in the short term
- Strict cost control - keeping cash costs below inflation
- Labor productivity growth up to 15% (2020 to 2017 level)

LONG-TERM PRODUCTION GROWTH BASED ON EXISTING ASSETS

- Long-term (2025 +) increase in metal production by 15-25%
- Production projects at the existing fields of the Talnakh ore cluster, development of the Southern cluster, construction of the 3rd phase of the Pacific Fleet

RESEARCH OF NEW OPPORTUNITIES FOR GROWTH

- Evaluation of a unique blue sky project to develop in partnership the potentially world’s largest new IPY cluster (Arctic Palladium)
Based on the results of the implementation of the Strategy 2014-2018, Nornickel is in the process of completing basic automation.

- Primary implementation of ERP systems
- Basic infrastructure construction
- Creating workflow systems
- Creation of accounting systems for production operations
- Creation of unified repositories and reference information

### BASIC LEVEL

- Mobility (including for repairs)
- Big data
- Predictive analysis
- Cost-effective operational planning systems
- Sensors on key equipment nodes to prevent failures and downtime

### ADVANCED LEVEL

- Robotization
- Artificial Intelligence
- Neural networks
- Unmanned vehicles

Under the strategy 2019-2023, the MMC Norilsk Nickel will complete the basic automation programs launched in 2014-2018 and introduce a balanced portfolio of digital technologies for advanced automation with a certain financial and economic effect to move to an advanced level.
The basic principle of building a landscape is maximum simplicity and elimination of flaps
Is it possible to make innovations in the ERP system? In Master Data Management process

Of course

- Robotization of master data management (MDM) processes (application of robots, RPA technology).
- The use of artificial intelligence for the auto-classification of material and technical resources (Machine Learning technology).
- Implementation of intelligent search (Machine Learning technology).
- Transfer of MDM System to the latest version of the SAP Fiori interface. Implementation of chatbot (consultant assistant for users). Implement dashboards for real-time MDM SLA control.
- Creation of a mobile version of the MDM System, using SAP UI5 technology (for iOS and Android).
- Integration of the functionality of QR codes in the automated control system of the MDM for use in the warehouses of Norilsk Nickel (already used in the warehouses of Kolskaya MMC and Gas companies).
- Application of SAP Celonis for the analysis of processes of automated control systems of MDM.
- Implementation of automatic integration of the material and technical resources directory with the Caterpillar supplier database (project in progress).
Is it possible to make innovations in an ERP system? In Master Data Management process

Possible. For example, a chat bot in Master Data Management based on the SAP Conversational AI platform:

- 24/7 user consultation
- Self Learning Algorithm Using Machine Learning
- Reducing the load on the technical support service up to 30%
Digitalization - increasing efficiency and transforming culture

- **Digital lab**: Analysis of the applicability of digital technology for the company
- **Big data**: Creating a digital layer for storing all company data
- **Cost optimization and breakdown of bottlenecks in the value chain**

Projects aimed at introducing **artificial intelligence**, **robotic systems**, **digital doubles**, etc.

- **Electrolysis Short Circuit Diagnostics**
- **Excavator Tooth Monitoring**
- **Identification of elements clogging ore**
- **Augmented Reality**

**Expected results**

- EBITDA increase
- Labor productivity growth
- Industrial Safety Improvement
- Corporate Culture Transformation
The digital lab is a key element in building an Intelligent Enterprise

**Sources of Ideas**

- Innovation proposals from Company divisions
- Innovation proposals from integrators, equipment suppliers and vendors
- Successful experience in applying innovative technologies by industry companies

**Digital lab**

Managing a portfolio of innovative technology initiatives

- Prioritizing potential impact initiatives
- Prototyping solutions based on innovative technologies
- Building competencies in new technologies
- Monitoring the emergence and development of new technologies

**Company investment portfolio**

- Implementation of IT projects
- Implementation of proven innovative ideas
- Detailing, verification and achievement of the declared business effect

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Feedback on the results of prototyping vendors and the market

Non-financial effect (business interest)

Potential economic Effect

Archive initiative

+ calculation of potential effect
Commercialization is one of the key success factors.

1. Computer vision for detecting objects on an ore feed conveyor to an enrichment plant

   Solution: a video analytics system, based on machine learning algorithms, can recognize various events / objects on the transport conveyor for subsequent reaction to them.

2. Short circuit detection during electrolysis

   Solution: at the input, the program receives data obtained using a thermal imager, analyzes and outputs the results in the form of a table of bathtubs and electrodes indicating the coordinates.

Laboratory of Joint Innovations Nornickel and SAP is a division of the Company that creates prototypes of digital systems for the needs of the Company on the SAP platform with a view to their further commercialization. The division includes Laboratory staff and production site experts.
Thank you!