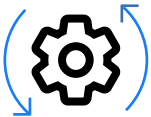# Monitoring energy consuption and industrial downtime

Monitoring energy consumption and industrial downtime.

Aprotech digital service for an eco-packaging production line

Solnechnogorsk Experimental Mechanical Plant (SOEMZ) produces and delivers more than 120 types of packaging and items made of pulper cardboard (molded paper fiber) for various industrial sectors. SOEMZ has seven molding lines that produce various items and adjoining systems that produce the paper pulp used to make packaging.
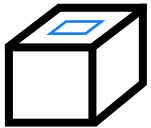
Transportation trays, containers for fruit and vegetables, holders and other items made of pulper cardboard are replacing their plastic counterparts and gaining popularity among producers of goods and services. This is not only due to the sustainability of the material, but also due to its competitive price, quality, and other properties that are just as good as or even better than those of polystyrene foam.

SOEMZ products are in demand on international markets and have high export potential, which is why the company is actively developing its own Industry 4.0 concept. This digital transformation will help keep pace with the competition in new markets thanks to efficient and transparent production.

Mission

It is crucial for the plant to reduce the cost price of its products. Price growth is affected by various production-related factors, such as energy consumption or downtime.

Efficient resource management and downtime prevention requires **centralized data collection** and a **unified digital service** for tracking consumption.

This task can be accomplished in two ways:

1

Upgrade industrial equipment and equip production lines with specialized software (such as SCADA, MES, and ERP systems). This takes a lot of time and involves the cost of creating an expensive infrastructure, as well as the complexities of maintenance and operation. For this reason, more and more companies are trying to avoid this approach. Instead, they prefer the second way

2

Deploy cloud-based digital services that handle monitoring, analysis and planning tasks much more effectively. A cloud application simplifies access to data from all lines connected to the service. Based on this data, a business can get a real-world picture of their entire production situation.

However, despite all its advantages, connecting equipment to clouds also poses some information security risks. High-quality cybersecurity is needed to eliminate the risks associated with compromised information transmission and potential external impacts on devices.

Pilot project

SOEMZ allocated one of its production lines to team up with Aprotech and conduct a pilot project as well as test data collection and transmission.

This project consisted of three phases:

1

Preparation of production equipment

SOEMZ allocated a production line managed by a Siemens S7-1200 controller. For resource assessment purposes, a Siemens Energy Meter module was additionally installed for this line. This module can register energy consumption values from various production sections on the line. The plant customized the controller software to include gas consumption and product output parameters as well as signals from emergency shutdown sensors.

2

Connection to hardware and data transmission

The controller securely connects to the cloud through the **Cyber Immune industrial gateway Kaspersky IoT Secure Gateway (KISG) 100**. It was developed by Aprotech in collaboration with Kaspersky based on the **KasperskyOS** operating system and the Siemens SIMATIC IOT2040 hardware platform.

The built-in resistance of KISG 100 to existing and currently unknown threats (Cyber Immunity) protects any information that traverses the gateway and ensures that its critical gateway functions are carried out under any conditions. Connected equipment is protected against external access by potential cybercriminals thanks to its unidirectional data stream (from the field level straight to the cloud).

Kaspersky IoT Secure Gateway 100 directly communicates with line equipment and gathers a multitude of previously unavailable data on energy consumption, product output and emergency events. The gateway preprocesses this data and relays it to the **Siemens MindSphere** industrial IoT platform.

3

Services on the platform

The **digital service for data monitorin**g developed by Aprotech based on Siemens MindSphere is a versatile tool for real-time tracking of equipment operation. It consolidates data from the entire fleet of devices into one workspace and helps obtain an overall picture of the operational situation. Visualization of parameters on data panels and diagrams helps users analyze production information more conveniently, and notifications quickly inform users about fulfilled orders or malfunctions.

Digital service for data monitoring
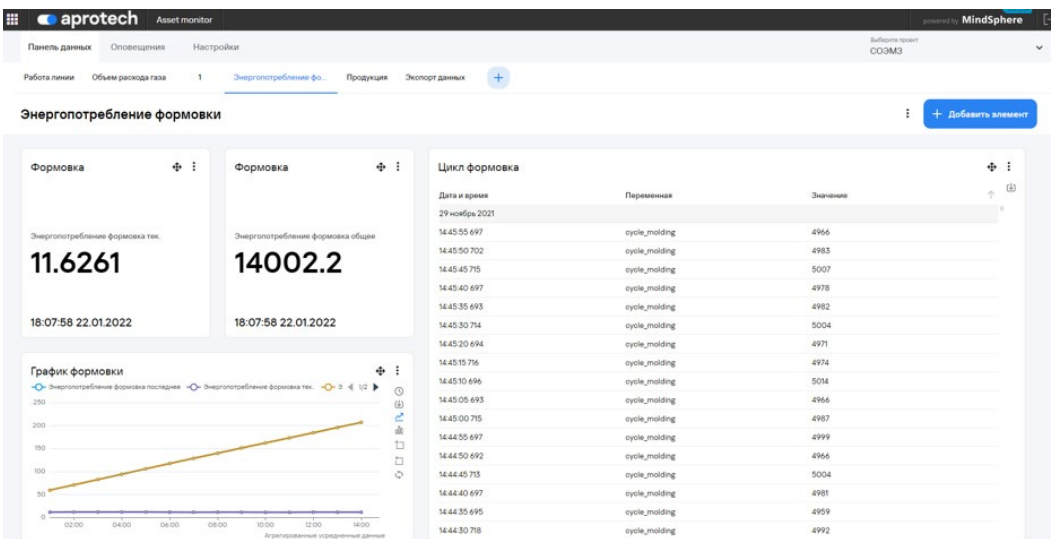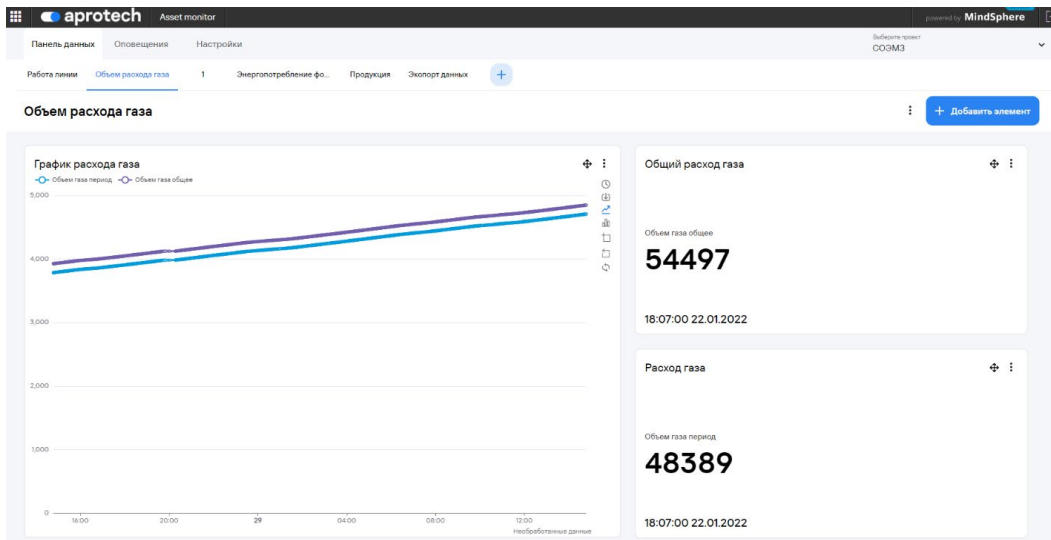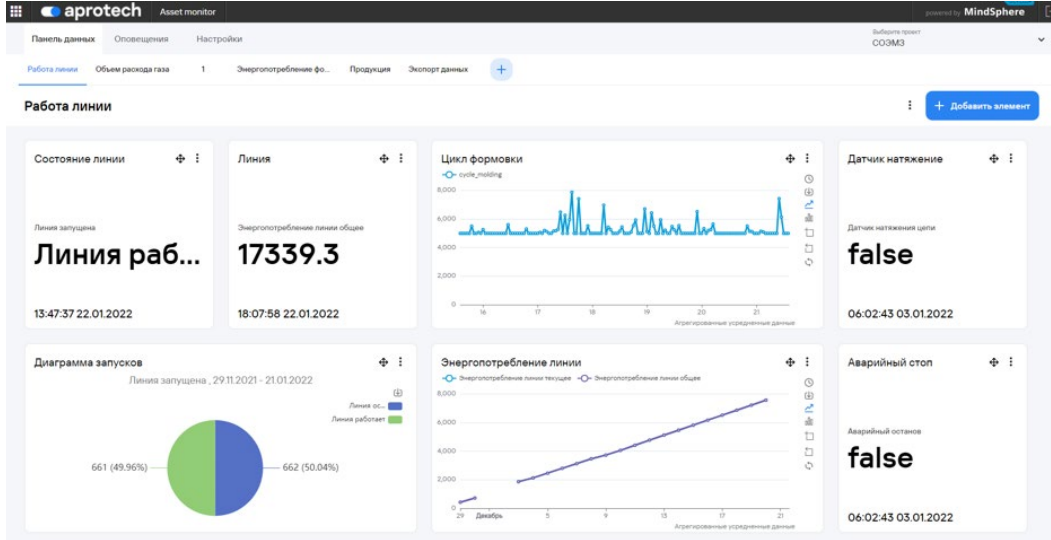
The application from the screenshot is currently valid only in Russian

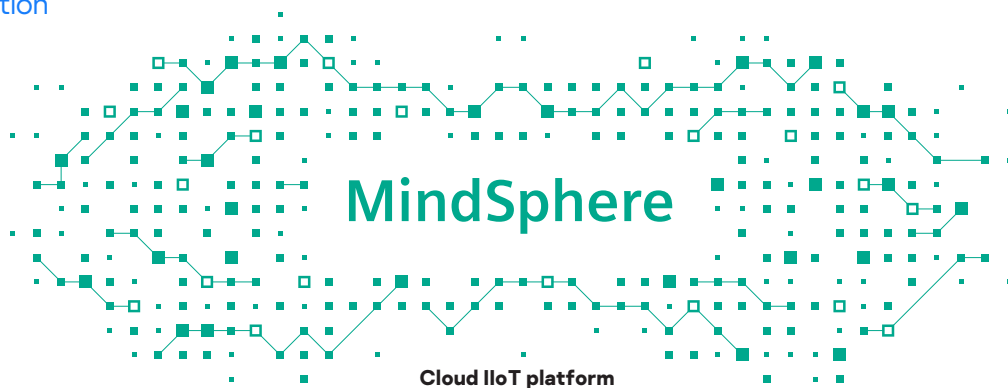# KISG 100 in the infrastructure of SOEMZ

Data consumers

Business users

Scientific and technical staff

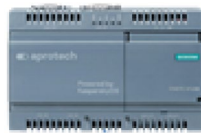**Data storage, processing and visualization**

Cloud service

MindSphere

Cloud IIoT platform
Internet
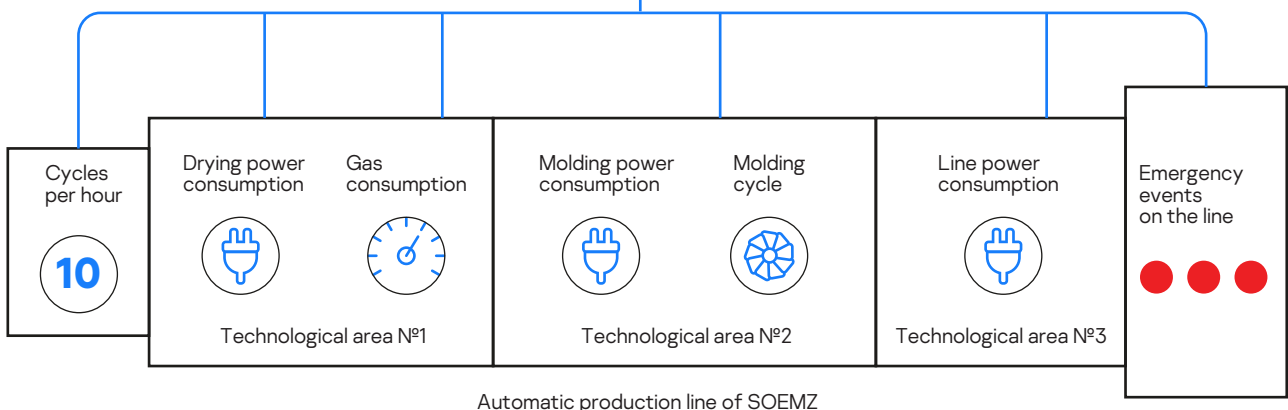
Connected equipment
Secure collection and transfer of data

HTTPS

**Kaspersky IoT
Secure Gateway 100**

OPC UA

**PLC (Siemens
SIMATIC S7-1200)**

Technological parameters from line operations

Cycles
per hour

10

Drying power
consumption

Gas
consumption

Technological area №1

Molding power
consumption

Molding
cycle

Technological area №2

Line power
consumption

Technological area №3

Emergency
events
on the line

Automatic production line of SOEMZ

Project results:
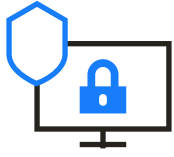
It took Aprotech three days to build an end-to-end digital service for SOEMZ. The plant immediately began to reap the gains from connecting line equipment to the cloud platform, and greatly benefited from the additional parameters configured for the service within the project scope:

- The time of molding cycle allows to identify delays

- The gas consumption parameter reports current and total gas consumption, bursts and overruns on drying operations

- Information about starting up lines and about emergency events helps to visualize downtime scenarios

- Molding and drying energy consumption helps to analyze current and total consumption and identify inefficient consumption scenarios

- The number of released products shows the overall picture of line performance

To gather new parameters, SOEMZ does not need to change the solution architecture (e.g., by acquiring additional equipment). Instead, these parameters can be simply entered into the controller and configured as required. They will then also be displayed in the MindSphere platform.

Prospects of using the service:

SOEMZ took its first step toward Industry 4.0 and reaped the benefits from Aprotech's IIoT solution as early as the pilot project phase. Now the company plans to expand the solution for the purposes of digital transformation, which will include the following:

- Flexible and planned connection of other production lines to the cloud platform;

- Creating own industrial ecosystem and building services based on trusted data.

Project participants

СОЭМЗ

Solnechnogorsk Experimental Mechanical Plant (SOEMZ) is Russia's first and only enterprise engaged in the production of items and packaging from pulper cardboard. With a capacity for recycling up to 40 tonnes of waste paper per day, it is the largest company of its kind in the CIS and Europe. The company has received international awards for the production and design of packaging, including the Red Dot Award 2019 and WorldStar 2020.

aprotech

Adaptive Production Technologies LLC (Aprotech) is a subsidiary of Kaspersky that helps enterprises efficiently and securely complete their own digital transformation 4.0. This transformation is facilitated by the company's cutting-edge Cyber Immune IoT gateways that enable data transport in end-to-end digital services developed together with partners to accomplish the business tasks of clients. The assistance by Aprotech, including consulting and audit, R&D and training, streamlines the cybersecure transition to new technologies.

ADAPTIVE PRODUCTION
TECHNOLOGIES LLC

**Contact us, and we'll start
digitalization together!**

start@aprotech.ru
+7 (495) 970-71-17

**aprotech.online
os.kaspersky.com**