



**I N F O R M A T I O N  
S Y S T E M S & S T R A T E G I E S**

# **SEM.Next**

**IoT**

**Platform**

**Energy Management  
solution**

**Smart Things**

**Robotization**

**Business  
intelligence**

**Business automation  
and optimization**

**Big Data collecting  
and analysis tools**



Dear friends, colleagues, partners,  
existing and prospect customers and clients!

Once again the civilization has reached a point of development that will change the lifestyle known today. We, Information Systems and Strategies, are not a passive observer of this endeavor.

Another industrial revolution, the results of which are to change the world as we know it, is already happening. From our perspective, artificial intelligence, automation and robotization will help humanity set free their own intellectual resources and get a clearer view on the issues they haven't been able to concentrate on because of the routine.

In this datasheet we would like to tell you about our company and its role in the Fourth Industrial Revolution. We will outline how the automation systems and cloud AI, developed and installed by our company can serve mankind, businesses and the society.

You can find all the details on our website: [www.infsys.ru](http://www.infsys.ru) and join us on [facebook.com/sem365](https://facebook.com/sem365).



ИНФОРМАЦИОННЫЕ  
СИСТЕМЫ И СТРАТЕГИИ

The company was established in 2003. We specialize in creation and integration of automation systems for enterprise customers. At the moment plenty of our solutions are used at the federal level, uniting clients companies' departments and branches all over Russian Federation and CIS into unified manageable infrastructure clusters.

### Competences and implemented projects

- Development and installation of monitoring and remote control systems;
- Installation of service and incident management systems;
- Development and installation of centralized systems of data gathering;
- Development of unique controllers and sensors;
- Development of mobile applications;
- Development and installation of management and dispatching centers;
- Development and installation of cloud services.

Our competences and development in the Internet of Things direction of has turned to be the organic growth of the company. Automation, robotization, eliminating human factor from the global businesses management as well as small business management allow the client simplifying the control and understanding of the processes in their company and provide tools for more robust monitoring and management.

As a result, client companies reach a higher level of management and optimize plenty of direct and hidden costs, which they used to take as an inevitable part of their business.

ISS has developed an **IoT Platform** software solution and a **cloud service** for it, a **Controller** interacting with the cloud as a local intelligent agent and has launched the production of controllers and related equipment.

At a certain point of our development, the capabilities and competences of the company became so broad that a new approach to management and organization was required. We needed precise department specialization, calculations of engagement levels, perfectly set goals. We established subsidiary companies which received the solutions of ISS and which develop them within the general strategy of the parent company.



Resident of Skolkovo innovation center , Inspark continues to develop the IoT Platform – a software solution, uniting hundreds of thousands of the client devices into unified manageable environments.



Equipment designed and produced in a SmartThings Lab - ISS Lab – serves as a bridge between cloud and «ground».



ISS Plus is the company that follows the direction of ISS in the field of integration of third party software with the IoT Platform. ISS+ has by now worked out several solutions to be integrated with the Platform. They are global data statistics and analytics tools.

Information Systems and Strategies  
is the main parent company.



# IoT Platform

SEM.Next is a modern software platform of IoT/IIoT for gathering, aggregating, processing and presenting information.

SEM.Next Platform enables communication between various devices, application and data so that users can apply the results without extra integration.

The architecture of SEM.Next correspond to all the trends of IoT platforms known today. They are developed using open code only. Though they are at the first level of their development, by their functional and technical characteristics meet all the requirements necessary for an IoT solutions platforms.

## Basic capabilities

- [Connectivity management](#) of systems, detectors and devices;
- Data aggregation and storage — [IoT Core](#);
- [Applications support](#) — IoT Analytics and Application.

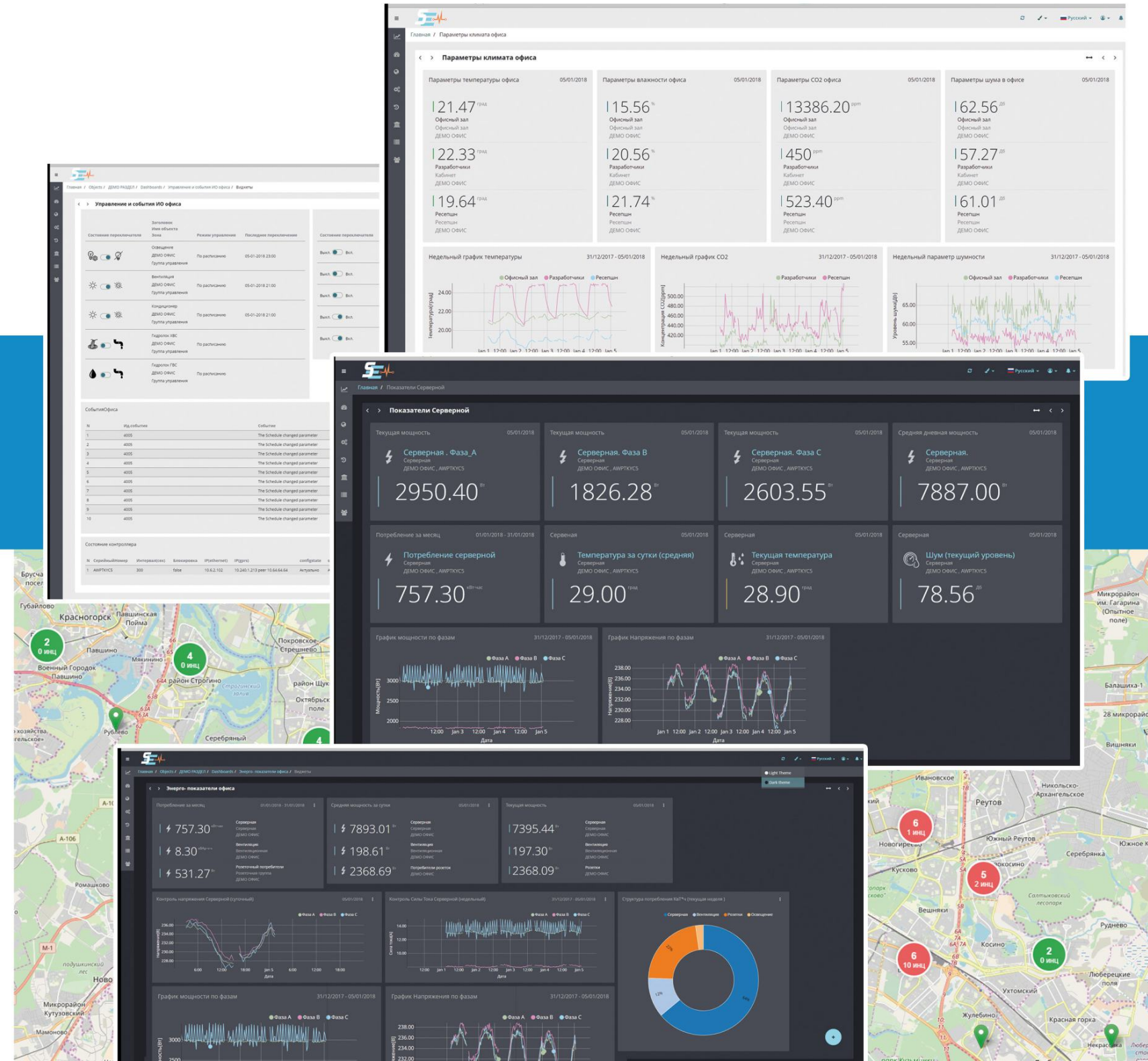
## Web applications

Web applications provide all the necessary tools for devices management and configuration, showing results in [dashboards](#), analyzing data behavior with [graphs](#) and tracking devices state on [geographical maps](#).

SEM.Next Platform uses the Edge Computing or Fog Computing architecture. The platform has a key important element – the controller (Edge) which brings architectural elements of the platform closer to the management objects (Things). In addition, SEM.Next delegates the Edge-level part of important functions connected to analysis and decision-making for the management of Things. The architecture provides a number of technological advantages compared to classical hardly-centralized systems.

- Faster reaction to the behavior of the objects;
- Independence from the network connection state with the server component;
- Selective interaction with the server (by necessity, on event, on specific rules etc.)

The platform does not have points of failure and can be scaled to the configuration allowing to process millions of controllers.



# Controller

Controller is an element of the general architecture of SEM.Next. It provides the functions of monitoring and management for the objects incompatible with IoT protocols. Objects are managed by the controller locally and does not require interaction with server components of the program.

Software for the controller is an independent element of the platform. It allows to preprocess data, execute actions on devices by schedule or on certain logic and to interact with the platform for data collection or transmission.

## The following software components are installed on the controller:

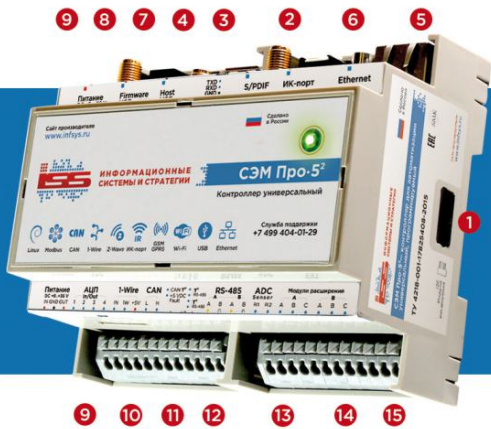
- **Master control program** ensures the collection, processing and transmission of information from the controller to the data collection server of the platform as well as the management of the controller (autonomously or by means of using the platform). MCP consists of the following components:
  - **Monitor**, which collects, converts to the needed format and sends data to the data collection server of the platform.
  - The **scheduler**, that ensures autonomous execution of actions by schedule or on certain events.

Both the monitor and the scheduler get all the managing command with their operation modes as well as the parametric data from the platform.

- **Queue server** of the controller provides other components with information interaction tool by using MQTT protocol. Apart from that, it interacts with the MQTT queue server on the data collection server for data transmission between the controller and the collection server.
- **Device drivers** are responsible for the hardware capability of the controller and the function of external connected devices. They transmit their state to the MQTT queue in the form of a specific messages. In addition, these drivers receive messages from the queue and give orders to the corresponding devices.



SEM controller is a management device based on Linux OS for monitoring automation and engineering systems management. The controller manages equipment by customizable scripts and enables the user to carry out remote observations and management. The controller questions counters and detectors and, using the received information, gives commands to the connected devices.



In 2018 we launched a new version of the programmable controller – SEM Pro: Next Generation. This solution came into physical existence with the help of cooperation with our partners from China. The united R&D has done its best to make the price-quality even more attractive for our partners and clients.

The international inheritor of SEM supports most protocols and smart devices currently used in the industry and can be integrated and successfully manage any infrastructure: RS-485, RS-282, ZWave, Wi-Fi, CAN, I2C, GSM, USB, Ethernet, 1-Wire, IR-devices, analogue devices.

- |  |  |
|--|--|
| <b>1 15</b> <b>I2C bus gateway</b> supports up to 8 external plug-ins. Slots for internal pug-ins – support of up to 8 plug-ins by each port.                    | <b>8</b> <b>USB-port</b> with interruptible power for working with flash drives, printers and other USB devices.                         |
| <b>2</b> <b>GSM-module and SIM-card slot</b><br>Channel of communication with a remote server.   | <b>9</b> <b>Power ports</b><br>From 7 to 36 V DC. Backup power input. Separate output for 5 V.   |
| <b>3</b> <b>Wi-Fi module.</b> Controller can serve as an access point to its web interface or as a Wi-Fi client.   | <b>10</b> <b>ADC</b> – Analogue-to-digital converter<br>Measuring and managing low voltage of 0-31 V.                                    |
| <b>4</b> <b>RF-module.</b> Radiomodule 433MHz for working with <b>Z-Wave</b> and <b>Noolite</b> devices.   | <b>11</b> <b>1-Wire</b><br>Ensures work with 1-Wire detectors of different use.  |
| <b>5</b> <b>Ethernet.</b> Ethernet port 10/100 for IP network and Internet connections. TCP/IP, UDP, HTTP(S), Modbus TCP, SNMP, MQTT, KNX IP. Passive PoE Power. | <b>12</b> <b>CAN</b><br>Industrial connection standard port aimed to uniting different executive devices and detectors into one network. |
| <b>6</b> <b>IR-port.</b><br>Receiving and transmission of signals to IR-devices.   | <b>13</b> <b>RS-485</b><br>Two RS-485 ports. Modbus RTU, meters and detectors as well as other Modbus devices supported.                 |
| <b>7</b> <b>S/PDIF</b><br>Interface of digital audio transmission between devices without converting to analogue signal.   | <b>14</b> <b>Analogue sensors</b><br>Two inputs for resistive detectors.   |

**Real time clock**  
**Built-in zoomer** — a local alert device.  
The **autonomous battery** of backup power ensures up to 4 hours of autonomous work.

# Cloud service

# User objects



Platform to controllers  
Data exchange

Allows simultaneous monitoring and control of millions of objects without significant server capacity load.

Data collection and storage

Statistics, analytics

Controller management,  
massive update

Interaction with the user

## Controller

- Observation and control of environment parameters: temperature, humidity, illumination, CO2, noise
- Observation and control of input electricity parameters
- Observation of correct functioning and management of electrical appliances
- Integration with local security systems
- Custom security system complements: doors, items, access and staff control
- Interaction with any counters, detectors and other devices required by users.

Currently  
**1600+**  
objects on the territory  
of the Russian Federation

Separate object

User

Business analytics tools

The idea of integration with BI is to give managers an opportunity to start working with BI tools quickly without experience in statistics and baseline data analysis. They should also be able to make their own enquiries with corporate data sets without the mediation with IT departments.

Big Data analysis is the field where independent BI is boosting. This is a brand-new solution in databases area, which underlies rapid growth and innovation. A descriptor is a more suitable name as Big Data usually works with huge amounts of data which ordinary tools cannot process.

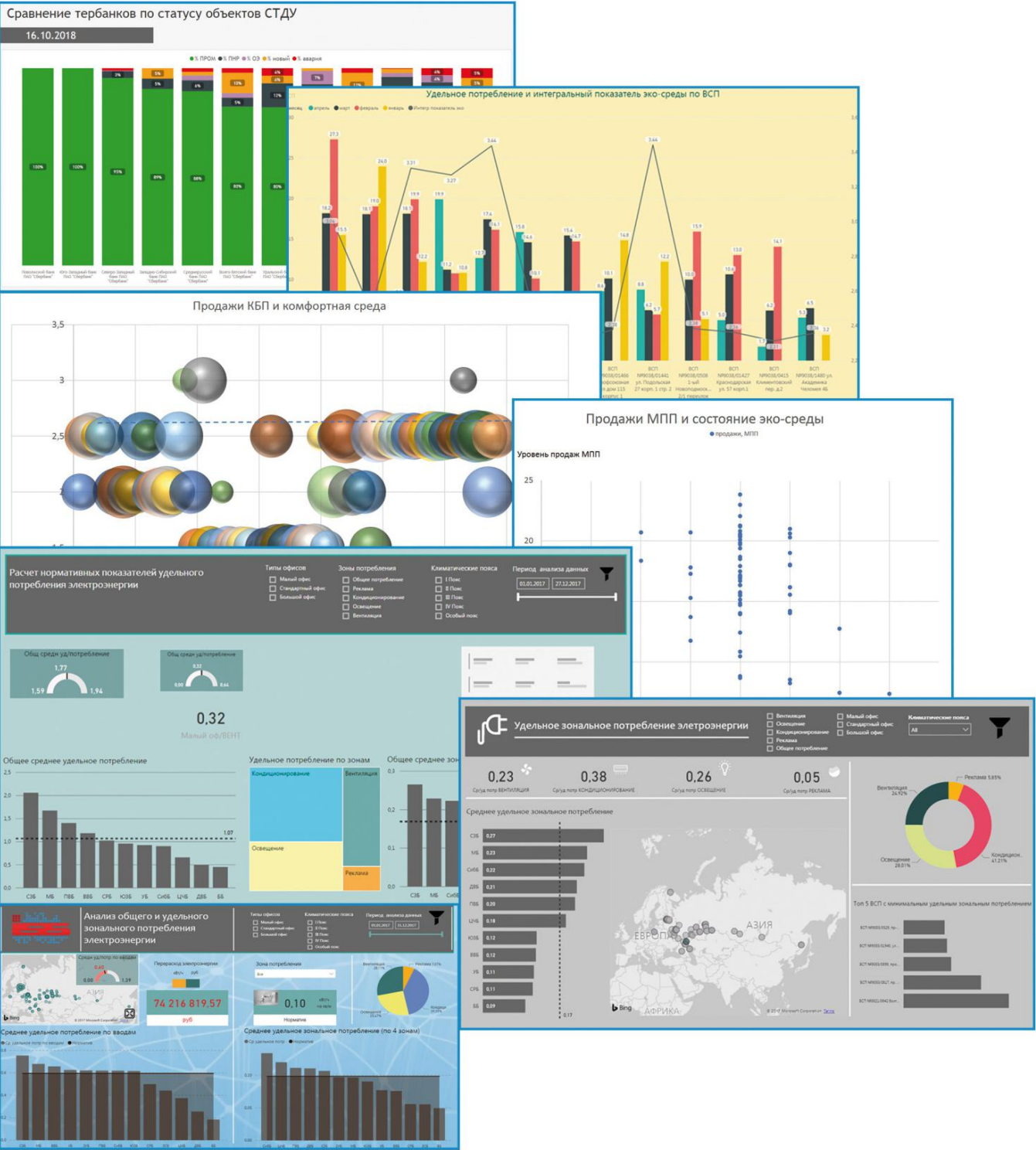
We have created a set of tools analyzing big data collected by SEM since the start of operations. The tools help analyze statistics and make various predictions. Business actions can be planned basing on statistical data, targeted to optimization of infrastructure and interaction with service departments policies as well as action taken to increasing client and staff loyalty.

Department comparison as a tool for consumption anomaly detection

System output based on the results of monitoring sales offices results basing on their comfort level

Forecasting future consumption and consumption norms development made by the system

Benchmarking of own departments and competitors



Business intelligence

BigData analysis



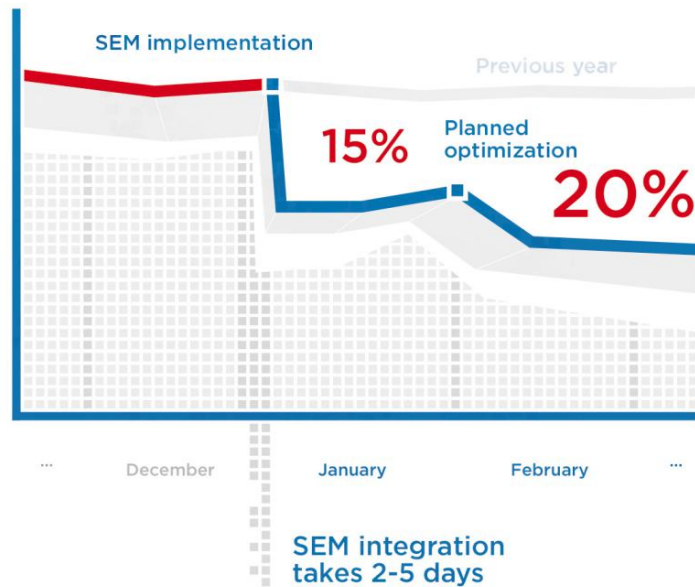
## Results of ISS SEM introduction

500 distributed offices

3 months after implementation

### Energy consumption reduced

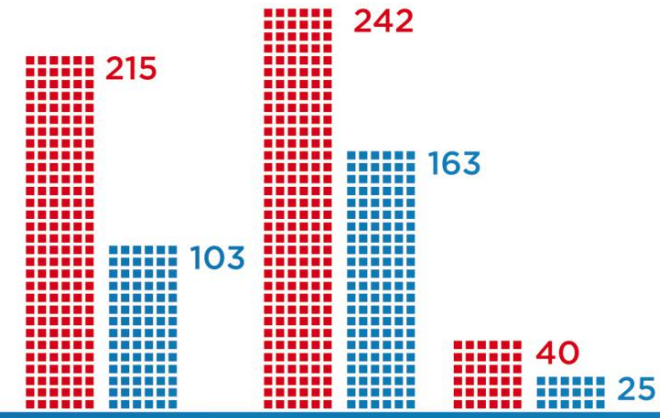
All offices, I quarter ■ 2015 ■ 2016



Energy consumption reduced by **€ 134K**

### Incidents reduced

I quarter ■ 2015 ■ 2016



Regulation and fixing of ventilation and air conditioning systems 107 39

Regulation and fixing of heating systems 31 25

Fixing of water supply and sanitation systems 85 49

Economy on life-support systems fixing by **€ 23K**

Electrical equipment fixing 274 181

### Particular cases of economy and accidents

Following the schedule of equipment and devices working regimes without human participation **€ 50K**

Excessive consumption due to malfunction of electronical appliances and networks **€ 19K**

Inefficient operation of climate systems, simultaneous operation of systems with opposite functions (heating vs. cooling) **€ 61K**

External connections to power networks were found on 3 objects.

2 floods were prevented.

2 hidden leaks and a hidden basement flood were found

Excessive concentration of CO<sub>2</sub> in 30 branch offices was detected

Other violations of environmental parameters (temperature, illumination, noise) were found in 120 branch offices.

In 10 offices advertisement illumination problems were found.

**€ 130K**

## Results:

Saved costs on electricity and other utility bills

Saved costs on fixing, service and replacement of electrical appliances and networks

Better climate conditions in offices, following the regulations

Fast informing and faster reaction to events

Realtime managed and observed processes

Automation of routine actions of staff, eliminating human factor

Security of offices improved

Total calculated savings after 3 months of SEM functioning:

**€ 287 000**

Estimated return of investment:  
**2 years**



# Devices produced by ISS



## Relay output module

The module has 8-, 12- and 16-channel sets. The controller manages power relays via ROM by switching on and off power, groups of appliances and separate appliances.

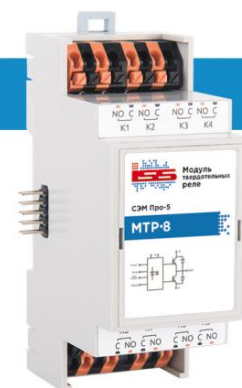
The nominal current is 1 A, voltage up to 250 V. It has built-in protection from sparking contacts. Connects to the controller using the common [I2C bus](#).



## Module of discrete inputs

The module has 8 inputs ensuring the collection of information from “dry contacts” of detectors (reed switches, impulse meters, IR-, photodetectors, security system outputs). The module channels are protected from overload.

The module connects to the controller using the common [I2C bus](#).



## Solid-state relay module

The module has 8 independent contacts. It can be applied with the load of up to 30 V and 400 mA and with “dry contact” devices inputs

Module channels are protected from power surges when commutating inductive load. Connects to the controller using the common [I2C bus](#).

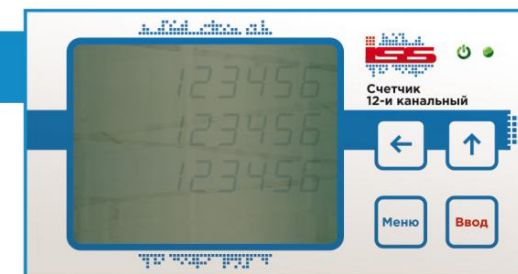
## Multichannel electricity counter

The counter logs the consumption of 12 power lines. Instant parameters of current, voltage and power (kWt, kVA, kVAR) are measured.

It can replace 4 three-phase or 12 single-phase counters.

Data exchange with the controller is carried out via connection interface [RS-485](#).

Does not require power disconnection for setup with the use of separable current transformer. External separable transformers for current up to 400 A.



## Voltage control module

The module has 8- and 16-channel sets. Can be used to control the work of contactors and circuit continuity. Can determine the persistence of 220 V. The voltage of input response is 50-250 V.

The module connects to the controller using the common [I2C bus](#).



## Detectors and sensors

**Multidetectors** for wall and DIN-rail installation can be installed on walls in different places. The counter consists of a basis and optionally integrated detectors: temperature and humidity, illumination, sound pressure, CO<sub>2</sub>. The detector is connected to the controller via [RS-485](#) port. The detector has [1-Wire](#) port and can retranslate data for other detectors, e.g. an output temperature detector.

**The leak detector** is to register the presence of water and prevent floods. It is usually installed together with a water-stopping rebar.

## Examples of third-party devices with ability of integration



### «Milur» electricity counters

Static single- and three- phase electricity counters can log active and reactive energy consumed in the two-wire line of alternating current of 50 Hz frequency.

Counters work via connection interface [RS-485](#), registering electricity consumption. Reflects data on the consumed electricity on an LCD indicator.

Built-in relay enables power disconnection management.



### Water counters, heat counters etc.

Logging of hot and cold water with data transmission to the [impulse channel](#). External magnetic field sensor, inductive data collection. **Water meter** transfers the data to the controller via [impulse output](#).

**Heat meters** are used for logging the heating energy per unit of time. A heat counter measures the temperature and volume of the transferred fluid in the supplying and reverse pipelines, calculates the used heat. An additional function is the measurement of water volume if its temperature exceeds the given point. Data exchange with the controller via connection interface [RS-485](#).

### Contactors, smart sockets

**Contactors** are used for managing the power of systems with the voltage exceeding management modules.

[DeKraft](#): 25 A, 40 A, 63 A  
[ELKO](#), with the switch: 25 A, 40 A, 60 A

**The smart socket** transmits the information about the fact of consumption to the controller. Allows the controller or a distance operator switch the power on and off.



### Signal and interface devices

**Message displays** for reflecting current measurements, functional and emergency messages from connected devices on a touch screen. Common access to all devices. Data exchange with the controller via connection interface [RS-485](#).

**Signal lamps** serve for informing about situations that need attention, e.g. gates and barriers, moving mechanisms in manufacturing areas, various alarms.

**Sirens and sound notifiers** give sound signals of various volume, so that they differ from manufacturing and background noises and can be heard well.

Data exchange with the controller via ISS Modules.



### Water-stopping rebar and smart water tap

**The water-stopping rebar** allows the controller or a remote operator to stop water supply. Can be used both independently and together with the **leak detector**. Water stops immediately, the supply can be renewed manually. Data exchange with the controller via ["dry contact"](#) output.

**Manageable tap** for working in heating regulation systems, hot and cold water supply, remote management and control of fluids. Two temperature detectors, position sensor, flood detector. Data exchange with the controller via connection interface [RS-485](#).



### Detectors, sensors

**Bluetooth trackers, GPS tags, radio detectors.** Track location and position of objects and staff. Extremely low energy consumption.

**Motion detectors, smoke detectors etc.**

**Magnetic notifiers (reed switches, contact opening detectors)** for objects of various sizes.

**IR-detectors, solar cells.**

# IoT technologies

Whatever sphere your business specializes in, we provide the opportunity to make it more ergonomic and efficient.

Smart things and cloud technologies that we develop can be integrated with any activity. Wherever the energy is consumed, there is a place for energy management. Wherever people do routine actions, automation can offer help. Wherever human is, comfort and security without worries need to be implemented.

Our solutions have already been integrated into many companies:

- Banks, business centers, shopping centers, separate offices;
- Schools, kindergartens, hospitals and other municipal institutions;
- Shopping malls, discount retailers, medical centers;
- Industrial enterprises and factories;
- Chains of petrol stations, restaurants, shops, pharmacies.

You can find all the details on our website: [www.infsys.ru](http://www.infsys.ru) and join us in a social network: [facebook.com/sem365](https://facebook.com/sem365).

**Saved expenses**

**Timely alerts**

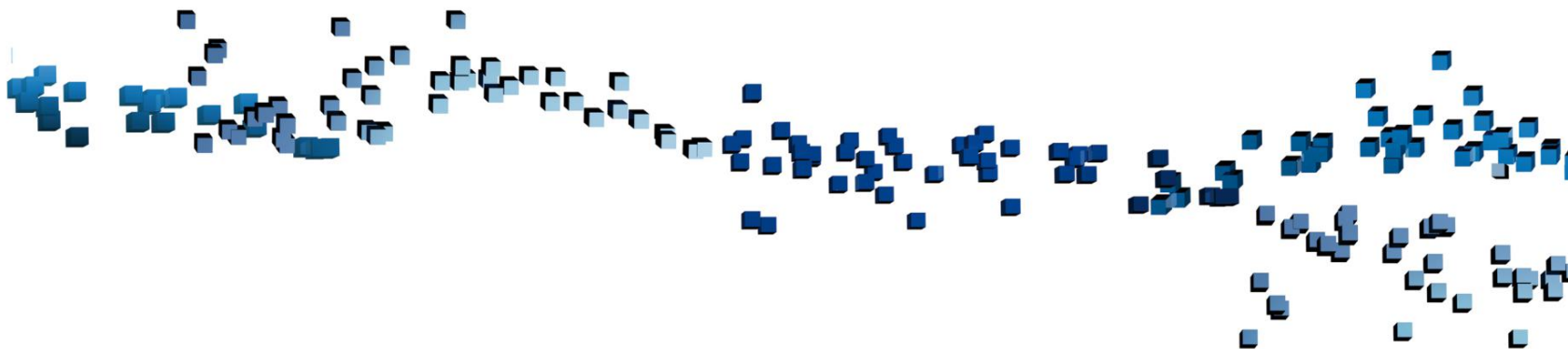
**Automation**

**Real-time control  
and observation**

**Human factor  
elimination**

**Business  
transparency**

**Comparison  
with competitors**



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129515, 8A, Akademika Korolyova str.,  
Moscow, Russia



+7 495 780-08-95