



# Intelligence and Energy Conservation Reach New Heights at the Federation Tower, Moscow Tower

The construction of one of the largest business complexes, “Moscow City”, and especially its most striking object – the “Federation” Tower, has drawn the attention of experts, not only because of the size of the overall project, but also because of the high-tech solutions which were used. The experts believe that the “Federation” Tower project will be one of the most “intelligent” projects in Russia, as it represents the newest achievements in the area of intelligent buildings. For the Russian building industry, it is not merely the only one, but it is also the most concrete example of standardized automation of all technical building service systems in a single building. One of the goals is to substantially reduce operating costs and energy consumption.

## New Level of Advancement

The “Federation” complex, which is being built by the Mirax Group, is not only the largest aboveground construction project in the business center area “Moscow City”, but in the whole of Russia. After its completion, the building will consist of two towers, “West” and “East”, whose heights will be 243 meters and 360 meters, respectively. The height of the central needle, together with the antennae mast, will be 435 meters. The total area of the towers will amount to more than 420,000 square meters. It is planned to accommodate offices, apartments, and restaurants as well as business and entertainment centers.

The hallmark of this project is the application of a comprehensive intelligent building control system. In the “Federation” Tower, all technical building systems are automated: ventilation, air conditioning, heating, water supply, sewage system, electricity supply, fire alarm, etc.

In the West Tower alone, more than 7500 units of technical equipment from different manufacturers will be installed upon completion. The total number of connection points from the different devices to the automation system will amount to 16,800 and the total length of wiring will reach dozens of kilometers. The “saturation” of the building with so many different technical devices leads to the question of the appropriate building control system. The experts from the ARMO Group, who designed the

already completed “West” Tower, decided on the Building Management System (BMS) standard. For example, in this building, the SCADA system, Metasys 5, from Johnson Controls was used. The advantage of this system is the multi-layer architecture, which makes it possible to combine all the building’s important systems into one standardized infrastructure.

The control system has three levels: the first level consists of the controllers, which are joined into field networks; the second level forms the network processors, which collect the data, and the third level unites the server and work stations, which control the technical building equipment, as well as administer data and alarm archives.

On the management level, the BACnet protocol is used, but on the field level, it was decided to use the very prevalent standard, LONWORKS. Via LONWORKS networks, for example, data from heating and electricity meters are transferred to a central management station.

“This technology is very helpful for the building owner, who can see all the signals from the technical building equipment without a problem arranged in a standardized pattern. This makes it possible to control the devices as he likes,” says Artur Aleksandrov, Construction Director of the “Federation” complex.

## Complex Technology – Simple Advantages

Automation of the entire technical building service systems in the “Federation” Tower is more than showcasing the latest in high-tech solutions; it is also the result of economic considerations. According to data from the Federation of Swiss Heating and Ventilation Companies, a modern automation system can account for up to 15% of the total cost of the building. The use of an automation system leads to a 20-30% reduction in



electricity, water and heat consumption; therefore, such a system will have paid for itself in 3-5 years.

A good example of the advantages of an automation solution is the automated meter system, which supplies heating and electricity to the apartments in the West Tower at the level of the 51st to 56th floors and is installed in a total area of 9000 square meters. A total of 82 MULTICAL® ultrasonic heat meters and 41 electricity meters from Kamstrup were installed. These simultaneously register and evaluate the consumption of all resources.

The meters were selected in the project planning phase and based on criteria such as: accuracy, compact structure, long life span and simple assembly. The device brand played a deciding role as did the highly-qualified technical support and above all the possibility of transmitting the data into a common system over the LON protocol. The meter is automatically read by the system in real-time. If necessary, via the monitor, the operator can follow the dynamics and distribution of resource consumption as well as control the serviceability of each individual system. For example, if a leakage or burst pipe occurs, the incorrect volume difference between the feed and the return pipe is recognized immediately by the MULTICAL® ultrasonic heat meter and signalled to the central management station. The controller then receives the appropriate signal and closes the valve in the segment concerned. "Each leakage or loss is recognized immediately and eliminated in the shortest time possible," – comment the engineers from the ARMO Group. "This is particularly important when taking into consideration that the Federation Tower apartments are elite real estate and have very expensive interior fittings."

In order to control the whole building, only a few people are needed. "The central management station is attached to an uninterruptible power supply, which is able to carry on working in every possible situation" – explains Pavel Peka, a specialist for power supply and automation of the Federation project. "In order to ensure more security, it is intended to allow two management stations to work at the same time, so that, if for any reason one is out of operation, the second one will continue to control all processes."

The real profit from the application of high-tech intelligent solutions in the Federation Tower can only be assessed after its start-up. However, one can already say that the realization of this project will set a new yardstick for energy efficiency and automation in the entire Russian business construction industry for many years to come.

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