

Media Relations:

Mitsubishi Electric Turkey PR Agency
Inomist Communication Consultancy
Sibel Selvi Arslantürk sibel@inomist.com
0216 639 60 16 / 0533 441 80 33

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Mitsubishi Electric's smart software solution Aquatoria® delivers energy saving with pump optimization in urban water distribution networks

Optimised municipal water management by artificial intelligence

Artificial intelligence dominates every field of the industry with its capabilities in processing very high data and automation systems. While the management of water in cities is of critical importance due to climate change and increasing population, artificial intelligence-based solutions developed also play a vital role for the future of water resources. Mitsubishi Electric, the global giant of technology, optimizes city water management with artificial intelligence with Aquatoria®, which it has developed to solve the main problems in the field of water. Consisting of a process management, visualization and control package built on Mitsubishi Electric's MAPS solution, Aquatoria® balances water pressure and saves energy with pump optimization throughout the city water distribution network.



The supply, collection and management of water resources bring challenges, especially in cities with large networks. Artificial intelligence, data analytics, regression models and various algorithms make it possible to neutralize the difficulties in the water management process and to manage the process effectively. Applying automation technologies in system components such as pumping centers and valves and implementing a control platform that optimizes all these resources makes it possible to achieve the desired efficiency and profitability.

Mitsubishi Electric, which paves the way for the most efficient use of limited resources by digitizing water management in cities, offers rational solutions in accordance with the dynamics and needs of the system with Aquatoria®. The system, which stands out with its features that

increase the operational efficiency of the water distribution network, provides the necessary conditions for the water network operator to provide customers with a homogeneous usage experience, to control operating costs and to keep maintenance needs at a minimum.

Intelligent algorithm that reduces energy consumption, water leakages and maintenance requirements

Providing precise control for urban water systems, Aquatoria® aligns the pumping station with consumer demand, eliminating excess pressure, automating the selection of the optimum pumping unit set at each station. The system, which harmonizes the pressure in the water with the relevant standards, reduces the load and water leaks in the water distribution system. The system, which automatically diagnoses the work in the pump unit, provides immediate action through predictive algorithms and provides efficient network management with less personnel.

Provides operational excellence in city water management

Mitsubishi Electric's advanced technology brings a timeless perspective to water management in cities. The company, which ensures that water management equipment is managed in coordination with the software layer that connects each other within a smart network, uses sensors as well as smart devices such as inverters and PLCs for this. Artificial intelligence, on the other hand, visualizes the entire network or system in detail, providing the data and feedback needed for precise real-time control. Combining operational advantages, Aquatoria® also minimizes water leaks by controlling the system pressure. This significantly reduces the total cost of ownership of the water network.



Proactive use with automated monitoring and reporting, efficient management

The efficient management of the water network in cities is only possible by taking the water and process data streams simultaneously and monitoring the system in real time. An effectively structured communication system between the facilities and the control room also plays an important role in managing distribution control

systems in situations such as energy consumption, water leak detection and asset management. Automated monitoring processes and reporting make it possible to involve water network personnel in proactive development processes, freeing them from monotonous manual analysis tasks. Providing a strong infrastructure for these developments, Aquatoria® offers Mitsubishi Electric SCADA-based software platform, which stands out with its flexibility to adapt to different application scenarios. The system, which easily modifies the data to reflect the changes in the infrastructure, also displays the graphical user interfaces (GUI) on the control room screens.

With different modules, it becomes easier to perform different tasks

Aquatoria® has many different modules to perform different tasks quickly and efficiently. One of them, the "Configuration Module", is used to add or modify assets, while the "Pumping Selection Module" allows manual interventions on pump assets to strike a balance between duty, efficiency and service life. The automatic online evaluation of the working conditions of

the pumping stations as well as the entire water supply process is carried out with the "Analytic Report Module". The system works in collaboration with the "Infrastructure Diagnostics Module", which allows users to evaluate the causes of poor quality in communication channels and identify problematic locations. In case of demand, the "Geo Module", which is built on an extra interactive map, helps to manage and control the facilities by locating them. Flexible settings provide maximum visibility while eliminating confusing information on the operator screen.

With artificial intelligence, a minimum of 15 percent energy saving is achieved.

Mitsubishi Electric's Aquatoria® algorithm, which integrates water, the main source of life, into technology, provides management and optimization in the system with artificial intelligence. Artificial intelligence works within the "Adaptive Control Module", which is one of the six different software modules that make up the system. The advanced cognitive intelligence of the system enables better results to be produced, especially in scenarios where more than one variable plays a role. For example, while a series of deep well pumps serving the pipeline do not work well when managed with fixed mathematical models, a minimum of 15 percent energy savings can be achieved when harmonizing with Aquatoria® fuzzy logic algorithms.

Signing reference projects in world cities

Mitsubishi Electric, which has implemented reference projects in different cities of the world; In addition to the city of Minsk with a population of 1.9 million in Belarus, it has been a solution partner in the water management of many different cities. Again, in Belarus, the company, which provides public services with the smart water management systems it has installed in the cities of Mogilev, with a population of 360 thousand, Gomel with a population of 510 thousand and Orsha with a population of 116 thousand, significantly increased the working performance of the networks and reduced leakages and energy use.

About Mitsubishi Electric Corporation

Experienced for 100 years in manufacturing of reliable and highest quality products, Mitsubishi Electric Corporation is a well-known global leader in manufacturing, marketing and sales of IT and communication systems, space development and satellite communications, consumer electronics, industrial technologies, and electric and electronic components used in energy and transport and heavy-duty equipment and vehicles. Mitsubishi Electric continues enriching the community with its technologies driven by the spirit of "Changes for the Better". Company realized a consolidated group sales of 4,191.4 billion yen (37.8 billion dollar) in the financial year ended on 31 March 2021.*

For further information: www.MitsubishiElectric.com

*Calculated at the 1 USD = 111 yen published by Tokyo Forex Market on 31 March 2021.

About Mitsubishi Electric's Operation in Turkey

Standing out with cutting-edge technologies in many different industries from "home to space", the technology giant Mitsubishi Electric has operations in Turkey in the fields of air-conditioning systems, industrial automation systems, advanced robot technologies, mechatronics CNC systems as well as elevator and escalator systems. Believing in the potential and strength of Turkey and accordingly positioning it as a major manufacturing base, Mitsubishi Electric manufactures high-energy saving and eco-friendly air-conditioners at its Manisa digital factory, being the brand's first residential air-conditioner factory in the Europe. Striving for integration of Turkish industry into the digital transformation process of the factories, Mitsubishi Electric attracts attention with automation technologies as well as the Marmaray project which has the world's deepest immersed tube tunnel. Playing a role in many fields in Turkey such as automotive equipment, semi-conductors, transportation and energy system, Mitsubishi Electric applies the radar technology in Antalya Airport, which it developed for the airports in order to enhance the flight and aircraft security as part of the public system operations. A world's pioneering manufacturer in the space research and development systems, Mitsubishi Electric is the manufacturer of the Türksat 4A and 4B satellites which contributed in the communication and broadcasting infrastructure of Turkey and neighboring countries. For detailed information; tr.mitsubishielectric.com



About Mitsubishi Electric Turkey Factory Automation Systems

Mitsubishi Electric Turkey Factory Automation Systems provides added value to Turkey's leading industrial companies in terms of rapid integration, productivity, flexibility and efficiency in various fields such as automotive, food, packaging, metal and PVC processing machinery. It responds to the new industry phase, also called "Industry 4.0", with the concept of e-F@ctory, the digital factory. Offering a vast range of automation and processing technologies, including controllers, drive products, power distribution and control products, electrical discharge machines, laser processing machines, computerized numerical controllers, and industrial robots, Mitsubishi Electric helps bring higher productivity and quality to the factory floor. In addition, our extensive service networks around the globe provide direct communication and comprehensive support to customers. For detailed information; tr.mitsubishielectric.com/fa

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