



Water to tap

ABB's ACS 1000 medium voltage drives and Industrial IT prove their worth in Bangkok

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When people in Bangkok open a tap, they probably take the flow of clean water for granted, but supplying a city of 11 million is no easy task. The fluctuating demand must be met uncompromisingly and equipment must perform as expected. ABB technology is keeping the water flowing.

Domestic water supplies in Thailand are provided by water service facilities in urban areas and by wells in rural areas. At the provincial level, domestic water supply coverage is about 47% of all households. Domestic water supply for farm households is from piped schemes (56.8%), wells (37.2%) and rivers (6.4%). Overall, 62% of rural households consume water from unprotected sources, such as rainfall collection, rivers, canals and ponds. The

majority of piped schemes for farm households are operated and managed by village communities. Nationwide, potable water supplies are generally provided by two agencies: the Metropolitan Waterworks Authority (MWA) and the Provincial Waterworks Authority (PWA).

The drinking water for Bangkok's 11 million plus citizens ² is supplied by the Metropolitan Water Works Authority (MWA), a state enterprise charged with operating the biggest tap water treatment plant in the world. MWA takes this responsibility very seriously. Mr. Pratin Pholdee, Director of Eastern Distribution Pumping Station Division and responsible for 10 pumping stations on what he calls the 'East Bank', explains that MWA today has a total treatment capacity of 4.3 million cubic meters per day. The treated water is distributed by three transmission pumping stations and 20 distribution pumping stations through a 22,000 km pipe line network to people in the cities of Bangkok, Nonthaburi and

Bangkok's Lumpini Park with its lakes and waterways is a centre of calm in a busy city.

Samutprakarn, a service area coverage of 1,515 square kilometers.

One of the first distribution pumping stations, Lumpini pumping station, came into operation in 1979. It is located next to the Bangkok's Lumpini park (left), a popular center of relaxation in the heart of the city and itself replete with lakes and waterways.

In 2001, after careful evaluation and feasibility studies, ABB Thailand signed a contract with the Metropolitan Water Authority of Thailand to supply the first two units of ABB's ACS 1000 medium voltage drives and automation system. The objective of the contract was to update the 25-year-old Lumpini pumping station by improving its pumping efficiency and raising its reliability, whilst at the same time reducing energy costs.

The challenge for the ABB engineers was to remove the two outdated eddy current coupling drives, make the necessary modifications to the electrical control panel, and construct the new pump foundations without causing any interruption to the round the clock operation of the pumping station.

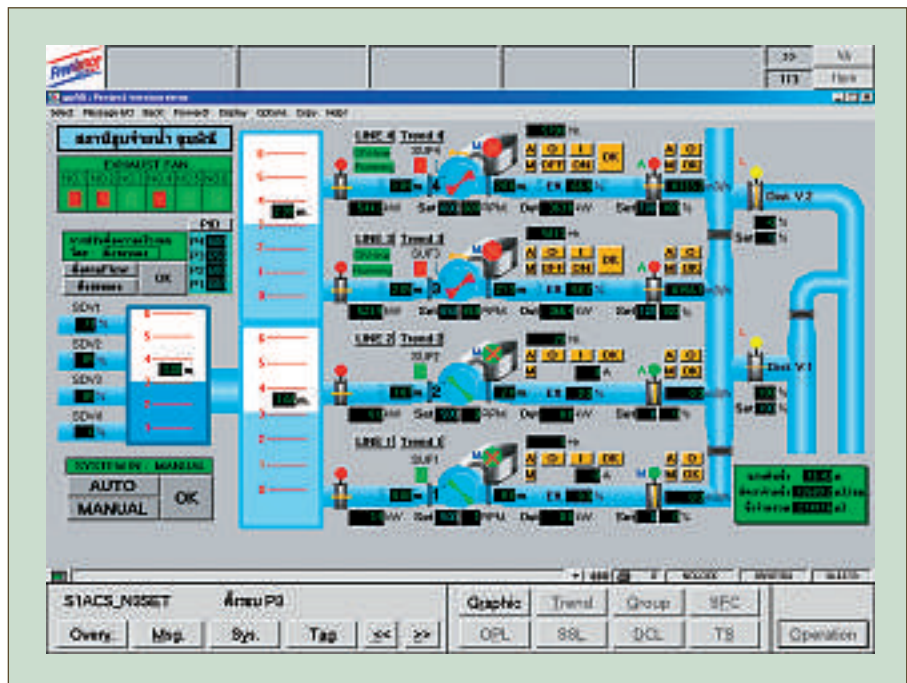
Two new ACS 1000 medium voltage drives, two new isolated transformers and one new automation system are now installed at the Lumpini pumping station. Today the pumps operate at optimum efficiency under a variety of flow conditions in response to actual needs.

This important work was completed by the ABB Thailand Utility Automation, Water Plants and Networks Business Unit ahead of time and immediately paid dividends for the cost and efficiency conscious MWA.

Increased efficiency

As the new ACS 1000 medium voltage drives replaced the old eddy current coupling drives and became operational, it was clear that MWA had achieved the

1 The pumping station can be monitored and controlled from a single PC.



efficiency it had been seeking. Depending on the required operating speed, the overall system efficiency had been increased by 15 to 30%.

Wider range and more precise speed control

The old eddy current coupling drive pumps operated within a limited speed range of 504–730 rpm, irrespective of the actual water requirement. The installation of the new ACS 1000 drives allows the speed to be regulated to match demand variations precisely.

The upgraded Lumpini pumping station is more efficient, has increased pump operation flexibility and is easier to maintain.

Manual control replaced by an automated system

The previous system used only manual control of the pumping station, with no IT system to monitor, control and

analyze the performance of the pumping equipment. A comprehensive ABB Industrial IT system has been installed into this pumping station. It is linked to all major elements of the pumping system; motors and pumps, the ACS 1000 drives, supply and exhaust fans, field instruments, motor control panels, switchgear, suction and discharge

valves. These can all be monitored and controlled from a single PC, the on-line delivery of performance information relating to each

pumping unit with the additional provision for examination and analysis of historical data.

Additional benefit of the ABB Industrial IT system

The ABB IT system offers PID speed control for each pump allowing for the



Most citizens of Bangkok take potable water for granted. ABB helps meet their expectations.

option of the pumping operation to be performed entirely manually through the PC interface, or completely automatically. The new system enables automatic flow control, ensuring that flow meets demand. It permits a weekly pumping schedule to be preset for every pump. An easy to read daily production report is also available.

Increased lifetime of motor and pump

Variable speed drives act as soft starters, avoiding starting current peaks. This reduces stress on electrical and mechanical equipment.

Easier maintenance

The replacement of the eddy current coupling minimized system maintenance. Mechanical alignment was very complex with eddy current coupling whenever pump or motor were removed for maintenance.

The example of the Lumpini pumping station has clearly demonstrated the wisdom of investing in a comprehensive upgrade of systems and equipment. In the first year of their operation, the first

two ACS 1000 medium voltage drives at Lumpini pumping station have contributed more than US\$ 120,000 to energy cost savings. This figure does not take into account any additional savings from improved maintenance.

The early handover of the system also provided the customer an additional four months of unanticipated savings of almost US\$ 40,000. Vital also to MWA, is the payback period: In the case of the Lumpini station, this could be as short as three to five years.

For the average Bangkok householder, the upgrading of the Lumpini pumping station no doubt means very little. Few would be aware even of its existence and will have given little thought to how their tap water is delivered. In most of the metropolitan area the supply is now regular and water is safe to drink. For the end-user taking a shower or washing the family car, water, like so many taken-for-granted necessities, only becomes an issue when the supply dries up.

To Bangkok's planners and administrators however, the generally unseen but

indispensable pumping station that now hums away more quietly than ever across from the city's much loved Lumpini Park represents a practical example of part of their vision for the country's capital in the 21st century. A key phrase of that vision is 'Energy Saving City'. Part of that vision focuses on environmental conservation: "Public parks are necessary for the conservation of air quality, recreation and the natural context of life in the urban development."

Meanwhile the upgraded Lumpini pumping station, complete with ABB ACS 1000 medium voltage drives supported by ABB Industrial IT continues to make its own contribution to environmental conservation with its greater efficiency, 15–30% energy savings, and a quieter operation. Other practical plusses are a more flexible pump operation, increased lifetime of motors and pumps, easier maintenance, and full automatic control.

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