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*Hosted by School of Urban & Environmental Engineering*

## Efficient Operation Strategy for SWRO Desalination Plant

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Climate change has affected the global hydraulic cycle and thus aggravate the regional freshwater accessibility. Membrane-based desalination technology typified by reverse osmosis (RO) is widely recognized as a promising solution for water shortage and already utilized worldwide. Desalinated water cost is varied by the plant location, energy cost, and other site-specific characteristics, however, mostly more expensive than conventional-treated water. The operation and maintenance (O&M) costs hold 35-65% of the total necessary expense indicates that development of O&M cost-saving technologies is key factor to enhance the feasibility. To do so, K-water has been developing the efficient operation strategies for SWRO desalination plants and making a package program for the 1,000 m<sup>3</sup>/d pilot plant which will be constructed in UAE as a mission of the KORAE research team. The program includes the following functions; suggestion of the optimal dissolved air flotation process operating conditions such as coagulant dosing rate, saturator pressure, and recycling ratio according to the change of raw water conditions, determination of the optimal cleaning-in-place (CIP) timing for ultrafiltration process by data-based transmembrane pressure prediction, optimization of CIP and membrane replacement timing RO process, and energy monitoring/mapping of total plant. By utilizing these techniques, improvement of efficiency and stability of the desalination plant is expected; subsequently, it would be possible to keep the increase of annual energy consumption and O&M cost less than 5%.