



Ensuring water availability with complete urban water modelling

Evangelos Rozos and Christos Makropoulos

National Technical University of Athens, Department of Water Resources and Environmental Engineering, Athens, Greece
(vrozos@yahoo.gr)

Increasing water scarcity, caused by either climate change or increasing consumption or both, has drawn attention to climate-sensitive adaptive strategies. These strategies include the possibility of re-engineering the urban water cycle to implement water recycling and reuse practices. For this reason a new generation of decision support tools capable of coping with these challenges is needed. UWOT (Urban Water Optioneering Tool) answers to this request by modelling the total urban water cycle and assessing its sustainability through a set of indicators. UWOT can support the planning of adaptive strategies for existing or new developments. Existing developments, for example, may include the installation of retrofit technologies (e.g. low flush toilets, in house water treatment units etc). In this case, UWOT can be used along with optimization algorithms to identify the optimum trade-off between the potable water demand reduction and the required cost (including energy). For new developments, more radical solutions (like central grey/rain water treatment units) can be adopted to manage the available water resources more efficiently. In this case, UWOT can help in the preliminary study of the required investment providing a rough dimensioning and an estimation of the pay-back period. Another issue that UWOT can help with is the investigation of the influence of climatic trends on the efficiency of water saving technologies. Rainwater harvesting, for example, directly depends on climatic conditions. UWOT can be used along with a stochastic model to provide a probabilistic approach for studying this uncertainty. Furthermore, UWOT can be used to examine a health issue related with the prolonged storage of harvested rainwater. Long periods of storage may result in significant degradation of the water quality rendering imperative the implementation of measures to maintain quality standards. UWOT can be used to investigate the necessity of such measures by calculating the Residence Time Index that characterizes the operation of a tank.