

# Demo Case Update

## From NTUA – National Technical University of Athens

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The National Technical University of Athens (NTUA) and the Athens Water Supply and Sewerage Company (EYDAP S.A.) are working closely in the framework of EU H2020 Fiware4Water project aiming at the upgrade of real-time operational management of the external raw-water supply system that serves the city of Athens, Greece (5.000.000 inhabitants). Towards this, two FIWARE-compliant web platforms will be built covering the quantitative and qualitative aspect of the raw-water conveyance system.

The key functionalities and requirements for the two applications were identified, and standardized in the form of specific user stories and use cases, through three workshops between NTUA and EYDAP, as part of the activities in WP1.

Particularly, via the water quantity platform, the system operation staff of EYDAP will be able to monitor in real-time the flow conditions in the conveyance system (e.g., water flow, water depth, flow velocity, volumes of water), obtain comparative information on the flow at different parts of the system and different time periods, and have a supervision on the operating conditions of sensors across the entire aqueduct. The platform will improve the response of EYDAP's staff to unusual flow conditions by raising warnings when an abnormal event is detected. The platform will also provide information on potential water losses from the conveyance system and estimations of future demand volumes that have to be met at the forthcoming periods, enabling the operation staff to be well-prepared and plan in advance the operational settings of the system. In a similar vein, the platform will comprise an advanced decision support system that provide advices on the optimal settings of sluice gates so as specific flow conditions to be attained in the conveyance system (depending on water demands, maintenance or malfunctioning of parts of the system etc.). This system will be based on a physically-based hydraulic model that is fed by real-time measurements from flow sensors to provide hydraulic solutions to what-if scenarios formulated by operators.

Moving to the second FIWARE-compliant platform, the water quality control staff of EYDAP will be able to monitor in real-time the water quality of raw water (turbidity, conductivity, temperature) at the different parts of the conveyance system via a web-based application. The platform provides also access to historical data which can be processed and analyzed via advanced smart analytics to provide meaningful insights on the qualitative regime of the conveyance system, also with respect to the underlying operational flow conditions. The platform will also contain a real-time early warning system to inform in advance the operational staff for unusual quality events in the conveyance system along with the time needed to reach the treatment plants, allowing the staff to make the suitable preparation in time.

The two web platforms will be demonstrated in Giona – Dafnoula aqueduct that covers a large part of the external raw-water conveyance system (see Figure). The existing legacy on-line monitoring system comprises 5 open channel flowmeters, 46 water level meters and 6 water quality meters, while a series of new flow and water depth meters are going to be installed within the project.

Along with the two above mentioned platforms, NTUA and EYDAP are working closely during the last 4 months on the design and development of the architecture that will support and implement the integration of the legacy system of the utility with FIWARE smart platform. This process is evolved at multiple levels in the framework of the following key activities: (a) the installation and testing of FIWARE Context broker (e.g., the Orion-LD Generic Enabler) and the relevant components (e.g., MongoDB database); (b) the design of data models tailored to the requirements of the two web applications and the characteristics of flow and quality sensors (in parallel with activities conducted in WP2); (c) preparation and set-up of the local “Data Warehouse” of EYDAP to gather the available data from the sensors of different vendors into a common system; (d) development of appropriate FIWARE-connectors to feed the data from the sensors through FIWARE Context broker; and (e) development of connectors to make the key NTUA-developed components, that will be employed in the two smart applications, FIWARE-compliant.

After the completion of these activities, and at the end of Fiware4Water project, EYDAP will be the first FIWARE-compliant Water Company in Greece with a fully operational FIWARE Context broker. This unfolds key advantages and opportunities for the utility having as general target the upgrade of its supervisory system and digital water strategy in the next 2 years. EYDAP will be empowered with a state-of-the-art solution that supports the easy and direct integration of sensors, already deployed in the aqueduct, from different vendors into a common system following the standardized FIWARE protocol. This also stands for the new metering devices that are to be installed in the future where the FIWARE communication protocol may serve as a reference one. At the same time, the developed solutions will support the seamless and straightforward integration of other FIWARE-compliant applications that are to be developed in the future by different developers, further to the water quantity and quality application developed within FIWARE4Water project.

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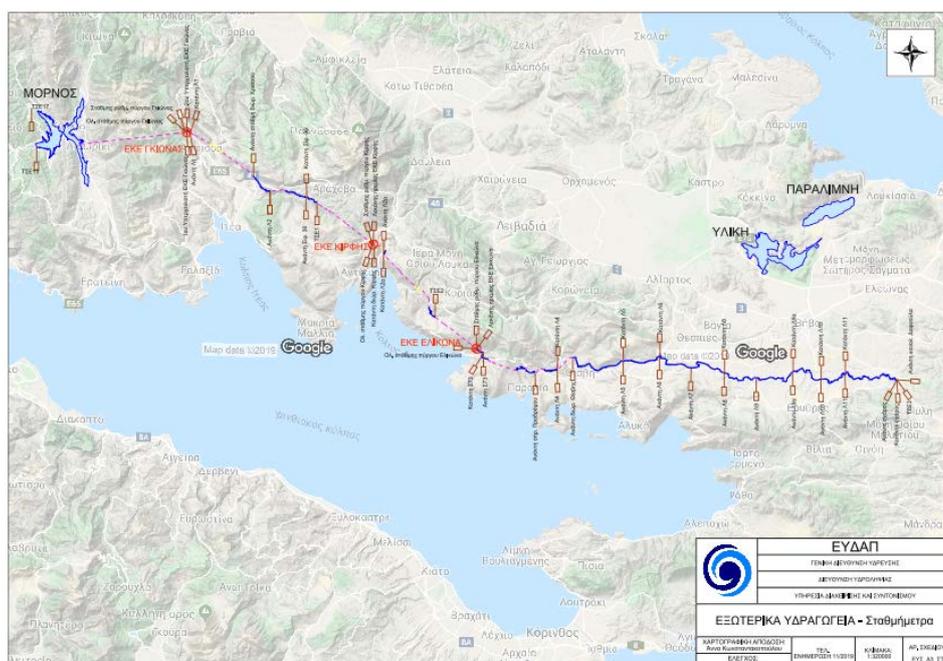


Figure 1: Part of the external raw water supply system of EYDAP (from Giona to Dafnoula) where the Fiware4Water solutions will be demonstrated.

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## Project Consortium



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