

METU Water Treatment Facility

Ankara, Turkey



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METU (the Middle East Technical University) is located in Ankara, the capital city of Turkey. It includes a technopark for R&D companies. The maintaining of open green areas in the technopark and the university is an important issue, which is however costly. In order to decrease the irrigation costs and increase water efficiency, a water treatment facility was constructed at the campus. The operation of this system helps to treat wastewater and to reuse it for irrigation. This system saves 150,000 € annually for the technopark [1].

The project has started as a research project coordinated by METU and TUB (Berlin Technical University). The benefits of the facility have been investigated during the research period and in the meantime it started to be used as a primary water resource for irrigation [2].

Country/ City Profile



Country	City
Population (2014) 78 million [3]	Population (2013) 5 million (metropolitan) [5]
Land area (km ²) 783,562	Land area (km ²) 25,437 [5]
GDP per capita (2014, US\$, at purchasing power parity) 10,830 [4]	GDP per capita (2011, US\$, at purchasing power parity) 12,259 (metropolitan) [5]
Region Europe, Asia	Region Anatolia

City's physical geography

Location	<ul style="list-style-type: none"> ✓ Located in the middle of Turkey, Anatolia Region ✓ Capital city of Turkey
Climate	<ul style="list-style-type: none"> ✓ Cold, snowy winters, dry hot summers ✓ High temperature differences between day and night ✓ The highest temperature reaches 31°C in August, the lowest reaches -6°C in January

Initiating context

Population increase around the world and urbanization are main pressures on water resources. In Turkey the urban population increases rapidly. Supplying water for a growing population is a significant challenge. It is obvious that technologies that use water only once and dispose the water wastes should be abandoned. The new circular systems appear as a solution reusing waste water and creating larger water resources [2].

The water treatment facility project at METU started in 2004 as a research project coordinated by METU and TUB. AVR (Vacuum Rotation Membrane) unit for water treatment was supplied by a German company. In 2004 the VRM unit was in the stage of development and first experiments and tests were made for the equipment of this project. A similar facility was constructed at the TUB as well [2].

Project description

The project aims to decrease the cost for irrigation of open green areas by reusing waste water. It is a leading project for sustainable water management and creating new water resources in case of droughts. It was implemented at a university campus where it creates opportunities for university students to get to know a new technology and to experience its operation. Therefore, this project is a part of the education for future generations. It also contributes to research on water treatment technologies [1].

The treated water is sterile and can be used for any purpose except drinking. The bacteria purification efficiency is 99.9%. The performance of the VRM unit is higher than other classical treatment systems [2].

Implementation process

The infrastructure for the VRM was constructed in 2005 and it started operating as an experiment in the beginning [6]. In this stage the VRM system was tested, as soon as the system performed well enough, the METU technopark administration took the project one step further and invested in water collecting tanks for treated water and irrigation system infrastructure. A water collecting tank of 800 m³ capacity was constructed. The irrigation system started operating in 2007 [1]. Back then, the facility treated 200 m³ waste water daily, supplying sterile, clean water. In 2009 an additional 16,000 m³ capacity water collecting tank was constructed. Now, the system supplies most (but not all) of the green open spaces irrigation need. [1].

METU rectorship and technopark administration supported the project financially. Additionally, being a research project also TUBITAK, the Technological Research Council of Turkey, provided additional financing [2].

Projects implementation details

Process	<ul style="list-style-type: none">✓ German company HUBER AG supplied the VRM in 2005✓ The infrastructure for treatment facility was constructed✓ The VRM was assembled in 2005✓ A water collecting tank was constructed in 2007 (800 m³)✓ The irrigation system started to be operated in 2007✓ The capacity was increased with a new water collecting tank in 2009 (16,000 m³)
Leadership	<ul style="list-style-type: none">✓ METU✓ Partners: German Company HUBER AG✓ Berlin Technical University
Financing	METU technopark administration
Involved stakeholders	METU and technopark, TUBITAK

Results

METU used to pay 3.5 €/m³ to the Ankara municipality for water used for irrigation of open green spaces. After the implementation of the water treatment facility, METU saved 150,000 € annually. The saving is used to develop the technopark and for a scholarship for students [6].

The facility is the first example of treatment and reuse of waste water in Turkey which helps to increase awareness for water management. It increases the resilience of society to drought as well. After the development of the VRM treatment facility at METU, other companies used this technology for their businesses (with METU leadership). Moreover, also municipalities started to use this technology for waste water treatment in cities. The system offers a new water resource which is clean and reusable. This technology creates an infinite water resource especially for those suffering from water scarcity [1].

Lessons learned

The system decreased water costs and created a large amount of water resources. Therefore, METU plans to increase the capacity of the facility and to use the treated water not only for the irrigation of open green spaces but also for toilets of buildings. The project has been very successful during operation and inspiring for other companies and municipalities. All feedbacks from the project have been positive [1].

References

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