Smart Water Management for Denpasar City, Bali

Country: Indonesia

City/region where project is based: Denpasar City, Bali

Population (of area where the project is based): 880,600

Key organisations /stakeholders involved in the project: Stakeholders
Ministry of Public Work and Housing of Indonesia under Directorate General Water Resources (DGWR),
1. City of Denpasar
2. PDAM (local water company) Denpasar City, Partners
3. K-Water, Wareco, Hankuk Engineering

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Water challenge

Denpasar City is one of the most famous tourist destinations on the island of Bali. Recent water balance studies show looming competition over a limited supply between tourism and other industries, agriculture, and drinking water. At the same time, there is a high level of non-revenue water (NRW), primarily due to leakage.

Project approach

The project is based on active non-revenue water (NRW) management using a zoning system, where the system as a whole is divided into a series of smaller, hydraulically isolated sub-systems, called DMAs (District Meter Areas) in which the volume of water loss can be calculated separately. DMAs are further subdivided into areas with pumping systems and those with gravity systems, and then into villages, to facilitate the effective and efficient management and control of the project. The existing potable water zones of PDAM Denpasar city use deep wells where the quality of water is excellent. Other key elements are real time monitoring using flow and pressure meters equipped with data loggers, Asset Management of existing pipe networks, and consumer communications.

Preparatory work in 2016 included carrying out a survey and data collection, assessing the existing water supply system, as well as reviewing the DMA and NRW programs. As of July 2018, the pilot project is being prepared, with plans to launch the main project in 2020, provided adequate funding is obtained.

Results and next steps

PDAM has successfully piloted a potable water zone in several neighbourhoods of Denpasar City, through establishing DMA Teras Ayung, Subita and Sarangan. Despite this success, the project has been unable to implement the DMAs properly, since the existing transmission and distribution network is connected with other zones which contain low pressure zones and old pipe networks. Future plans will be developed with consideration of water supply for the service area at high and low elevations, available pump and gravity systems, deep well availability and villages boundaries.

SWM: Potential and barriers

The scale of the Denpasar City SWM project is large, in terms of the investment cost required. The local government (city of Denpasar), PDAM Denpasar and even central government under Ministry of Public Work and Housing were not able to commit the required resources to support the project. Due to these fund limitations, PDAM Denpasar City has not yet fully applied Integrated Information Technology systems for monitoring existing DMAs.

However, its project managers are interested in introducing SWM tools, which they believe can help the DMA management in addressing the water shortage in Denpasar City through decreasing NRW and increasing leak detection efficiency. Establishing a series of automated DMAs not only targets NRW reduction but it also improves asset condition and customers service by improving water quality, providing adequate water pressure and maintaining asset life through pressure management, and helping to enable a continuous water supply. Specifically, the automation of DMA in Denpasar City neighbourhoods can reduce NRW from 36.5% to below 20% and generally improve the safety of water supplied.