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Energy auditing as a tool for improving service efficiency of water supply systems

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Abstract

The current paper aims at presenting a standardized auditing scheme for assessing energy efficiency in water supply systems. The proposed scheme has been developed based on the existing methodologies and International Water Association (IWA) water balance principles. The main innovation is the direct link to the water auditing in order to encourage water utilities to carry out the joint management of water losses and related energy efficiency. Key energy efficiency performance indices are calculated based on the energy auditing without the need of using hydraulic modelling. Two case-studies are explored and discussed. This paper shows that specific energy consumption and pump efficiency are not sufficient to evaluate the energy efficiency of a given system. The energy balance proposed herein allows the development of a preliminary diagnosis and the identification of the critical areas in terms of energy efficiency, and thereby, supports the tactical and operational management of water supply systems.

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Keywords: Energy auditing; energy assessment; system efficiency; energy efficiency indices

1. Introduction

Water supply systems consume energy through individual assets (treatment and pumping equipment) and dissipate it in the transmission process. Since an important part of operational costs are energy-related, there is a clear motivation for reducing energy consumption. Notwithstanding, utilities tend to focus only either on pump

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