

Circular Water Economy: Closing the Loop to Achieve Sustainable Water Systems

Robert C. Brears

Water scarcity and pollution pose significant challenges globally, necessitating innovative management solutions. The circular water economy represents a transformative approach, emphasizing the reuse and recycling of water resources to enhance sustainability. This article delves into the circular water economy's principles, advantages, and its successful application in Singapore.

By Robert C. Brears

The circular water economy is a system that mimics the natural water cycle, using technology and infrastructure to capture, treat, and reuse water. In a circular water system, water is treated and purified to a high standard and reused for various purposes, such as irrigation, industrial processes, or drinking water. The goal of the circular water economy is to create a closed-loop system in which water is continuously reused and recycled, minimising waste and reducing the need for freshwater resources.

Benefits of the Circular Water Economy

The circular water economy offers several benefits. Firstly, it can help to address water scarcity challenges. By reusing and recycling water, the circular water economy can reduce the demand for freshwater resources, preserving them for other uses. Additionally, the circular water economy can help to reduce the impact of droughts and water shortages by creating a resilient and flexible water system.

Secondly, the circular water economy can help to address water pollution challenges. By treating and purifying water to a high standard, the circular water economy can reduce the discharge of polluted water into waterways, protecting ecosystems and human health. Additionally, the circular water economy can reduce the demand for energy and resources associated with water treatment and distribution, leading to cost savings and environmental benefits.



Case Study: NEWater System in Singapore

Singapore's NEWater project recycles treated wastewater into ultra-clean, high-grade reclaimed water, enhancing the city-state's water resilience and sustainability. Initiated in the 1970s, feasibility studies paved the way for its launch in 2003, leveraging advanced membrane technologies to ensure safety and reliability. NEWater undergoes a rigorous three-stage treatment process: microfiltration or ultrafiltration removes particles and bacteria, reverse osmosis filters out contaminants, and ultraviolet disinfection eliminates microorganisms, guaranteeing purity. Mainly serving industrial needs and air-con cooling, NEWater also supplements drinking water supplies by blending into reservoirs during dry spells. This approach has set a global benchmark in water reclamation, with NEWater's quality consistently exceeding international drinking water standards, as verified by annual audits involving international experts.

The Take-Out

The circular water economy offers a viable solution for overcoming water scarcity and pollution, optimizing the use of freshwater supplies, and building sustainable, robust water infrastructures.

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