

## Ecological-Economics Evaluation of Water Treatment Systems

**Authors :** Hwasuk Jung, Seoi Lee, Dongchoon Ryou, Pyungjong Yoo, Seokmo Lee

**Abstract :** The Nakdong River being used as drinking water sources for Pusan metropolitan city has the vulnerability of water management due to the fact that industrial areas are located in the upper Nakdong River. Most citizens of Busan think that the water quality of Nakdong River is not good, so they boil or use home filter to drink tap water, which causes unnecessary individual costs to Busan citizens. We need to diversify water intake to reduce the cost and to change the weak water source. Under this background, this study was carried out for the environmental accounting of Namgang dam water treatment system compared to Nakdong River water treatment system by using emergy analysis method to help making reasonable decision. Emergy analysis method evaluates quantitatively both natural environment and human economic activities as an equal unit of measure. The emergy transformity of Namgang dam's water was 1.16 times larger than that of Nakdong River's water. Namgang Dam's water shows larger emergy transformity than that of Nakdong River's water due to its good water quality. The emergy used in making 1 m<sup>3</sup> tap water from Namgang dam water treatment system was 1.26 times larger than that of Nakdong River water treatment system. Namgang dam water treatment system shows larger emergy input than that of Nakdong river water treatment system due to its construction cost of new pipeline for intaking Namgang dam water. If the Won used in making 1 m<sup>3</sup> tap water from Nakdong river water treatment system is 1, Namgang dam water treatment system used 1.66. If the Em-won used in making 1 m<sup>3</sup> tap water from Nakdong river water treatment system is 1, Namgang dam water treatment system used 1.26. The cost-benefit ratio of Em-won was smaller than that of Won. When we use emergy analysis, which considers the benefit of a natural environment such as good water quality of Namgang dam, Namgang dam water treatment system could be a good alternative for diversifying intake source.

**Keywords :** emergy, emergy transformity, Em-won, water treatment system

**Conference Title :** ICCEIE 2016 : International Conference on Civil, Environmental and Infrastructure Engineering

**Conference Location :** Kyoto, Japan

**Conference Dates :** November 10-11, 2016