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Environmental Study of the Use of the Water Network in Small and Medium Municipalities

Understanding the patterns of consumption of water and electricity in water supply networks is needed to determine which factors influence the environmental impacts reduce its environmental burdens. The article presents a statistical analysis of a sample of 50 small and medium municipalities in Spain, including general information and defining models for estimating variables such as power consumption or the length of the network in other municipalities.

The supply of drinking water is a basic need for any municipality; in Spain, each citizen consumes 126 L daily. For this reason, the sustainability of the water supply is crucial, as well as the reduction of its environmental impacts. These impacts are generated mainly with the water pumping throughout the distribution network, since the electricity consumption entails emissions such as greenhouse gases. In this sense, analyzing the consumption of water and electricity for the distribution of potable water can provide relevant information for better management of these networks.

The article presents a statistical analysis of the patterns of consumption of water and electricity for drinking water distribution networks. In addition, the environmental impacts of water pumping have been considered calculating the greenhouse gas emissions derived from electricity consumption.

The study provides data about the environmental burdens of general water supply. The distribution of drinking water in the municipalities included in the sample implies emitting 5.53 kg CO_2 equivalent emissions per year, and an annual water consumption of 73.9 m^3 per inhabitant.

The results also reveal that size is an important factor; small municipalities (with less than 10,000 inhabitants) consume on average 14 times more electricity per inhabitant than medium ones (between 10 and 50,000 inhabitants). Density is another factor related to the electricity consumption per capita (less density, more consumption). In contrast, other factors such as proximity to the sea or the weather did not affect the power consumption of the municipalities.

These relationships between electricity and water consumption and the characteristics of the municipalities, such as size or density, have allowed defining different models for the estimation of such consumption. Thus, it is possible to obtain an approximate value of the energy consumption required to transport water to a house in a certain town.

The study was conducted within the framework of the European LIFE + AQUAENVEC, the main aim of which is to assess the environmental impacts of the entire water cycle in cities, including the transport and treatment of drinking water, sewerage and wastewater treatment. The results obtained by these systems will be integrated in order to get an overview of the environmental impacts throughout the water cycle. This project aims to create an online application for calculating the environmental impacts of the urban water cycle.

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David Sanjuan Delmás
Sostenipra
david.sanjuan@uab.cat

References

Sanjuan-Delmás, D.; Petit-Boix, A.; Gasol, C. M.; Farreny, R.; Villalba, G.; Suárez-Ojeda, M. E.; Gabarrell, X.; Josa, A.; Rieradevall, J. Environmental assessment of drinking water transport and distribution network use phase for small to medium-sized municipalities in Spain. *Journal of Cleaner Production*. 2015, vol. 87, p. 573-582. doi: 10.1016/j.jclepro.2014.09.042.

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