Multicriteria decision analysis for the selection of a small drinking water treatment system

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ABSTRACT

The selection of a small drinking water treatment system for a hydro-electrical plant is addressed within a multicriteria and participatory decision analysis process. As a first step, based on problem constraints, we identified and retained three water treatment systems alternatives. In close collaboration with the stakeholders, we then defined and obtained weights for criteria that take into account public health, costs, system impacts and perception issues. The ELECTRE II method was used to aggregate the alternatives evaluations in order to obtain a ranking of the three water treatment systems. The process revealed that the system which combines NF and UV disinfection is ranked first for all the different stakeholder weightings. The sensitivity analysis of the aggregation parameters and evaluations reinforced that conclusion. This study provides useful information for conducting similar analysis on industrial or municipal water treatment systems.

Keywords: decision analysis; decision making; drinking water; multicriteria; small systems; water treatment