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Assessment of hydropower potential in wastewater systems and application to Switzerland

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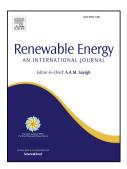
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13 Abstract

- Energy recovery through local hydropower generation is a way of coping with high electricity 14 expenditures in wastewater systems (WWS). Installing small hydropower plants within WWS is 15 16 already in some countries eligible for incentive policy mechanisms to renewable energy production. 17 Some examples exist of hydropower units operating in wastewater treatment plants, showing that there 18 is an interest for this type of small-hydro, but there is still a lack of awareness of its potential. This 19 study presents a methodology to assess the potential for hydropower in wastewater systems, either 20 upstream or downstream of wastewater treatment plants (WWTP). An algorithm was developed in two 21 phases, first to estimate the annual electricity production in selected areas based on GIS data and the 22 inflows to each WWTP and second to carry out an economic evaluation of the feasibility of each 23 scheme considering local investment costs and local electricity sell tariffs. The developed method was applied to the case study of Switzerland, covering more than 41'000 km² and approximately 8 million 24 inhabitants. Nineteen profitable sites were identified in the country with cumulated 9.3 GWh/year of 25 potential energy production. Among these sites, six are already equipped for hydropower production 26 representing 3.5 GWh/year and validated the proposed methodology. 27
- **Keywords:** wastewater systems; wastewater treatment plant; hydropower; potential, economic value.

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