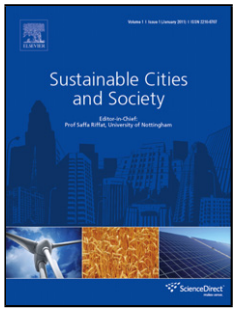

Title: A methodology for assessing the impact of salinity gradient power generation in urban contexts

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A methodology for assessing the impact of salinity gradient power generation in urban contexts

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Highlights

- The paper presents a methodology to assess the potential impact of salinity gradient technology in urban contexts.
- The methodology combines two different simulation tools.
- Different scenarios are considered for assessing the effectiveness of the technology applied to an urban centre.
- The paper shows how to calculate the power rating and the yearly energy production of the SGP system.

***Abstract* —** The paper proposes a methodology to assess the potential impact of salinity gradient power technology in urban contexts. The idea to employ such energy source in urban contexts derives from the observation that, among the energy districts outputs, low-salinity treated wastewater can be used to produce electricity if a suitable source of high salinity feed (seawater of a salt-works) is also available.

The methodology uses the HOMER software for assessing the district's electric energy production, consumption and exchange with the main grid. Then, starting from the total gross surface and the number of inhabitants of the district, some possible realistic scenarios characterized by different wastewater flow rate are defined. Finally, for each scenario the size and the yearly energy production of the salinity gradient power system are calculated thanks to a simulator carried out by the same authors.

An application example, considering three different scenarios, shows that urban density plays a crucial role in the process and that the most promising realistic scenarios are those including treated wastewater and brine and unlimited seawater and brine.

The economic feasibility of the salinity gradient power technology is evaluated by a comparison with classical renewable technologies such as photovoltaic and wind systems.

Keywords — Salinity gradient power; Urban energy hub; Sustainable cities; Distributed Generation; HOMER.