

POTENTIAL APPLICATION OF BRINE FROM REVERSE OSMOSIS PLANTS AS THERMAL ENERGY STORAGE SYSTEMS

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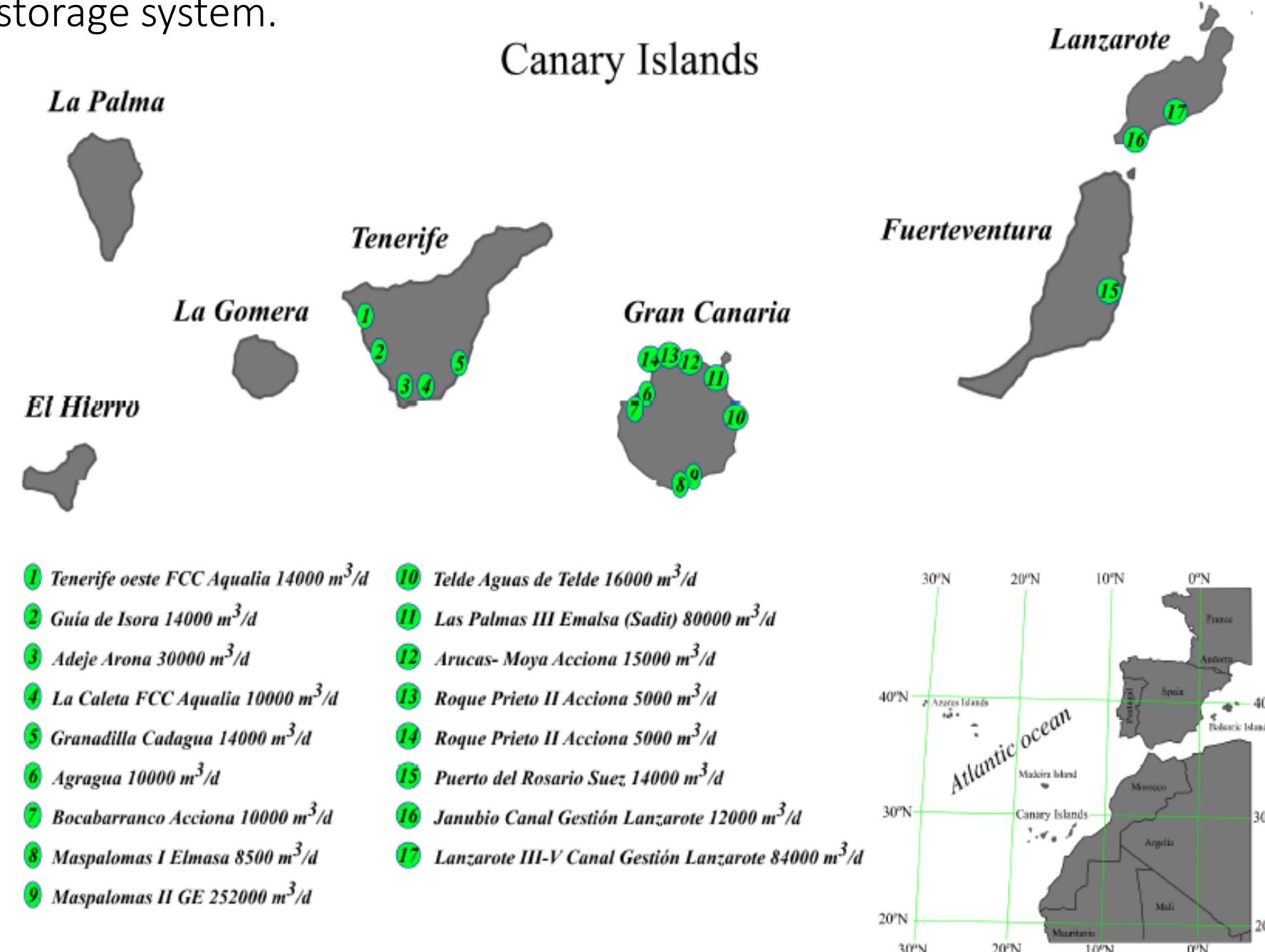
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Abstract

The production of desalinated drinking water in island environments such as the Canary Islands represents a generation of 660 dam³ per day, and a brine production of 810 dam³ per day from more than 320 desalination plants of different types, which constitutes a waste with an appreciable impact on the environment as it has a salt concentration of at least 80% higher than the seawater. On the other hand, electricity production represents approximately one fifth of the world's final energy consumption and more than one third of all energy-related CO₂ emissions. Representing in the Canary Islands emissions of 0.584 tCO₂/MWh electricity and being the penetration of renewable energies 15.9% of the total demand. Large-scale and low-cost thermal energy storage can be considered an alternative for the decarbonization of conventional power generation systems and its applicability in equipment and facilities that require this type of storage demand. This paper investigates the potential application of brine from existing desalination plants in the Canary Islands as a thermal storage material.

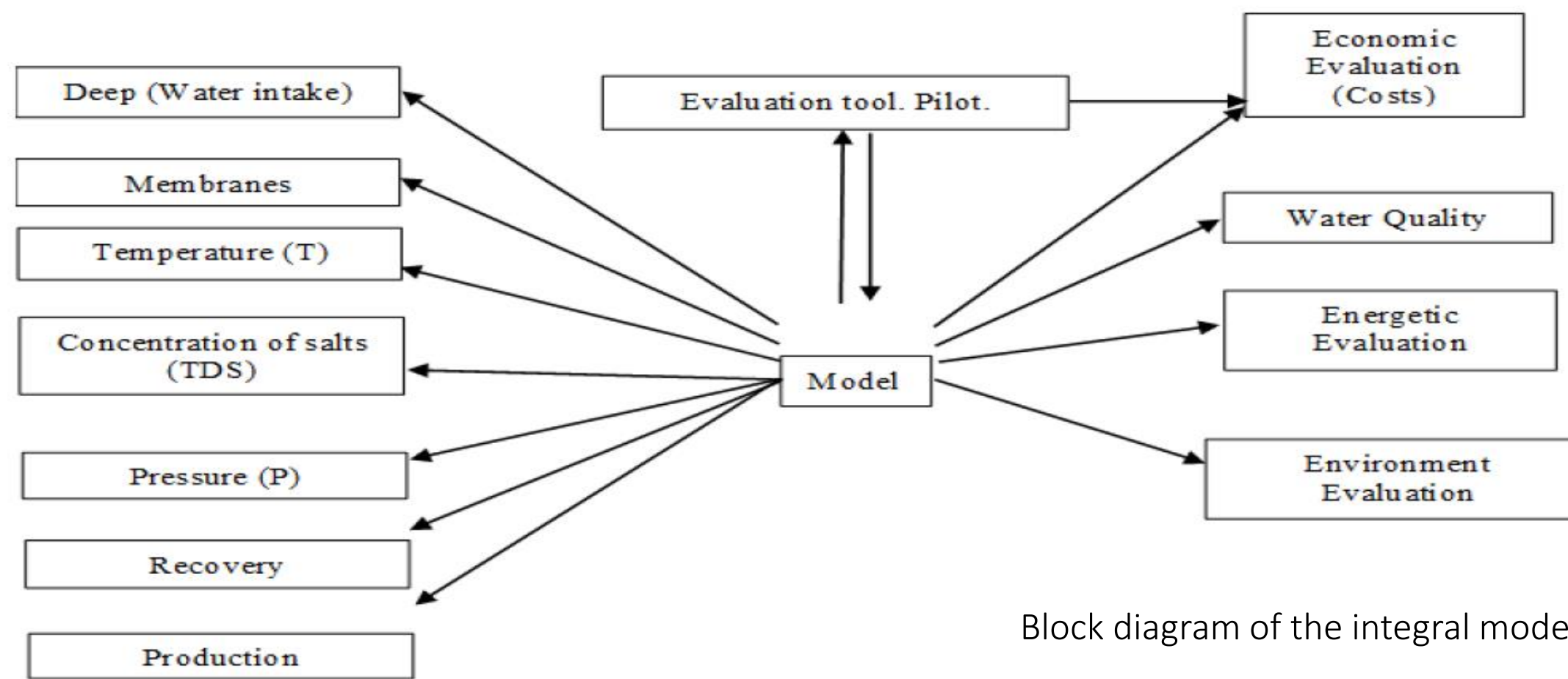
Objective

The aim of this paper is to analyze the inventory and potential of brine from desalination systems as a feedstock for a thermal energy storage system.



Brine composition		
Ions	Conc	%
Ca	822.30	0.908%
Mg	2,480.00	2.737%
Na	20,796.00	22.952%
K	765.00	0.844%
NH4	0.93	0.001%
HCO3	278.80	0.308%
Cl	38,290.00	42.259%
SO4	3,879.00	4.281%
F	3,341.00	3.687%
Br	213.00	0.235%
B(Boron)	7,150.00	7.891%
SiO2	0.93	0.001%
CO3	11,172.00	12.330%
CO2	1,418.00	1.565%
TDS	67,547.00	
Islad	Nº of desalination plants	
LANZAROTE	67.00	
FUERTEVENTURA	87.00	
GRAN CANARIA	127.00	
TENERIFE	35.00	
EL HIERRO	5.00	
LA GOMERA	1.00	
TOTAL	322.00	

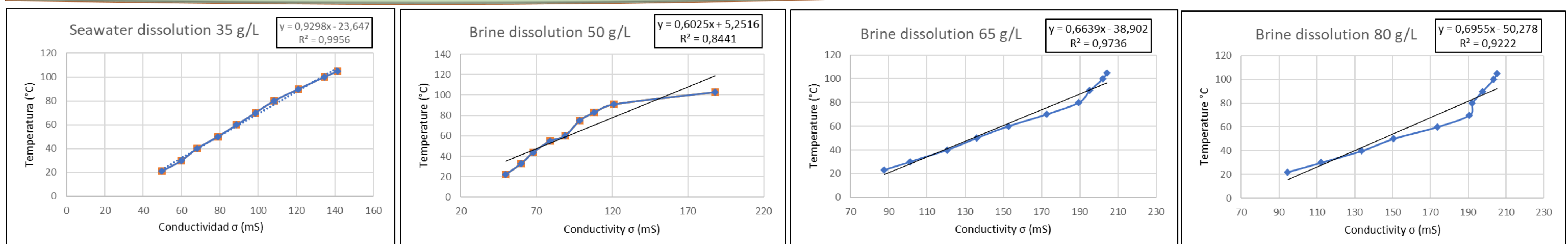
Methodology



Block diagram of the integral model.

The methodology followed has consisted of the study of the different concentrations of brine according to desalination technology and according to production island, determining the specific characteristics for the potential study, making a subsequent study of its integration into a system Ready for use as energy storage.

Results



References

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