PAMEC.Energy Association

# Construction of a feasibility index for Salinity Gradient Energy (SGE) projects in the Colombian Caribbean region.

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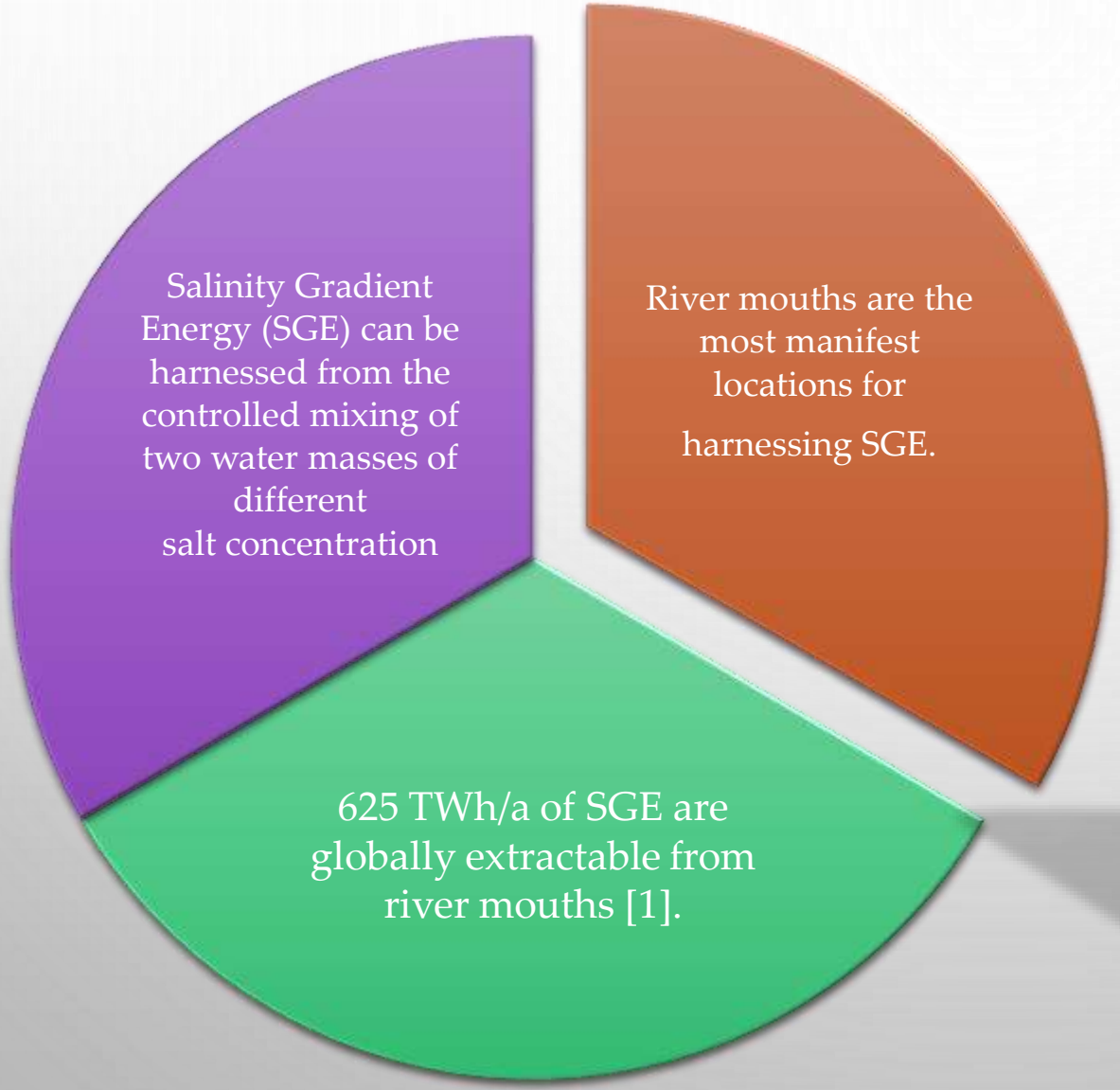
# MOTIVATION




The implementation of renewable energies faces technological, economic, political, and social considerations often described as barriers of implementation [2].

It is crucial to assess the feasibility of these technologies in different regions and climatic conditions [3].

# MOTIVATION

A large number of homes still don't have reliable access to electricity.

Most of the power produced in Colombia comes from Hydro and Thermoelectric plants.

The Colombian Caribbean Sea reveals suitable conditions for the generation of SGE [4].


Figure 1. Colombian Caribbean region and its departments.

# GOALS

TO DETERMINE WHICH AREAS IN THE COLOMBIAN CARIBBEAN REGION ARE MORE SUITABLE FOR SGE GENERATION CONSIDERING TECHNICAL, ENVIRONMENTAL, GOVERNMENTAL, ECONOMIC AND SOCIAL DIMENTIONS.

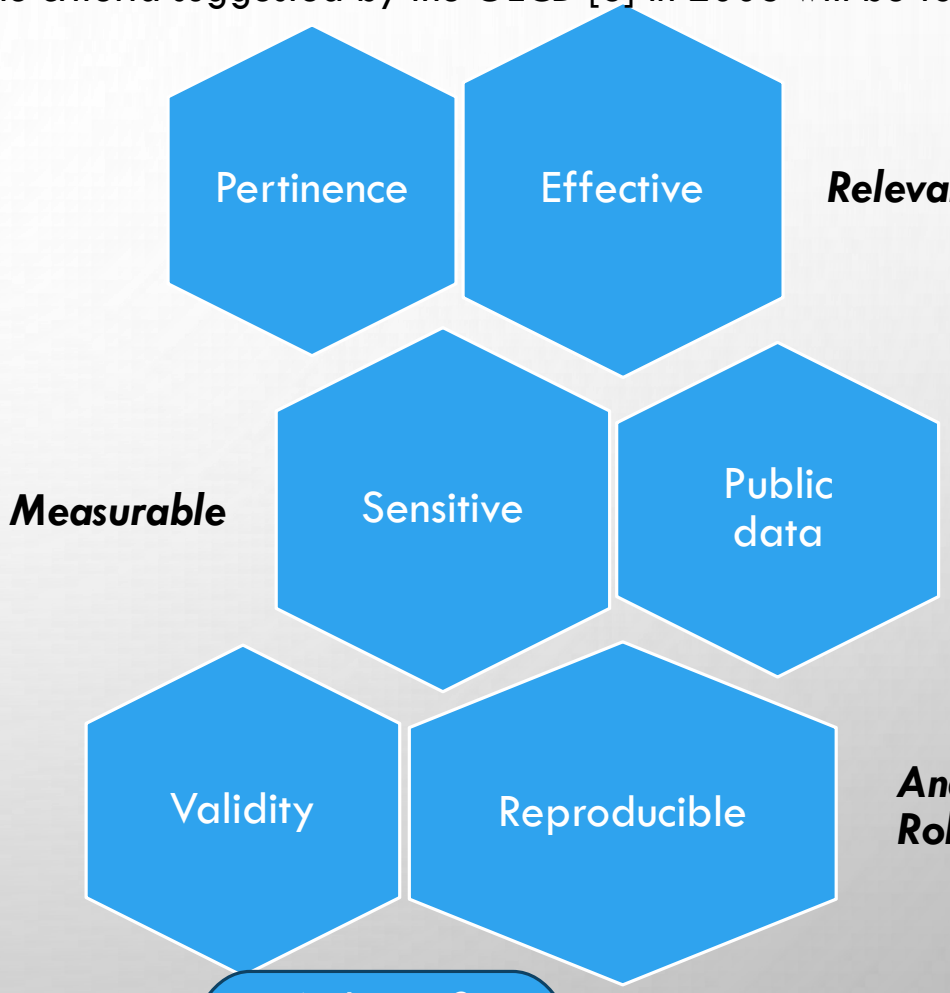
- TO DETERIMINE THE FACTORS CORRESPONDING TO EACH DIMENSION.
- TO APPLY A COLLABORATIVE METHODOLOGY THAT ALLOWS TO SELECT AND WEIGHT DIFFERENT CRITERIA AND SUBCRITERIA.
- TO DEVELOP INTERACTIVE MAPS FOR THE DIFFERENT FACTORS, DIMENSIONS AND FEASIBILITY.

# METHODOLOGY – *1. SELECTING FACTORS*

The criteria suggested by the OECD [6] in 2003 will be followed:

Multiple Criteria Decision Making (MCDM) tools are extensively used in different fields.

Analytic Hierarchy Process (AHP) is a theory of measurement through pairwise comparisons and relies on the judgements of experts to derive priority scales [5].




Quantifiable

Spatially Analizable

At least 2 factors per dimension

# METHODOLOGY – 2. *WEIGHTING FACTORS*

$$IF = (\sum_{j}^{5} W_j \left(\sum_{i}^{n} w_{i,j} * P_{i,j}\right) * 100)$$

Being:

IF = Feasibility Index

$W_j$ = Weight of each dimension

$w_{i,j}$ = Weight of each factor

$P_{i,j}$ = Score associated to each factor

Delphi methodology is used to receive input from a group of experts and assign weight to dimension and factors.

# METHODOLOGY – *3. MAPPING FEASIBILITY*

Official databases search

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Multi-Criteria Decision Analysis in GIS

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Thematic map generation

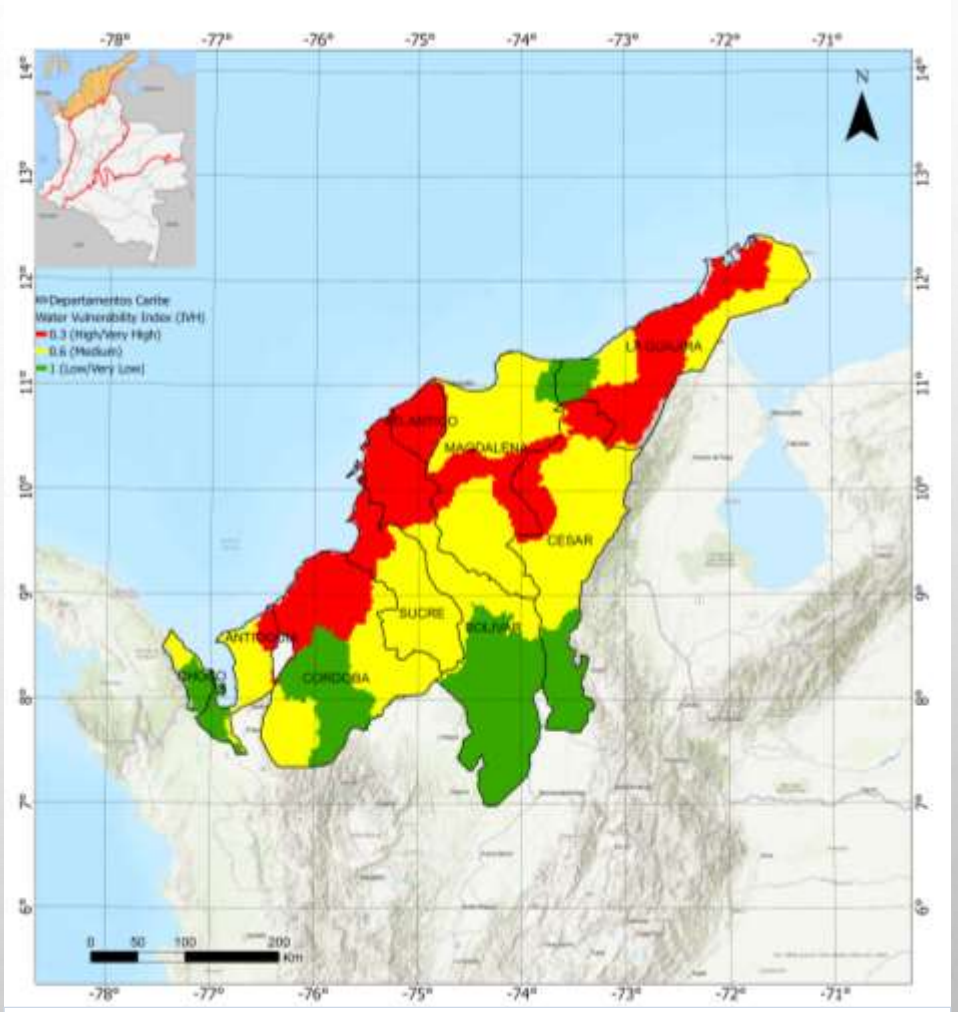
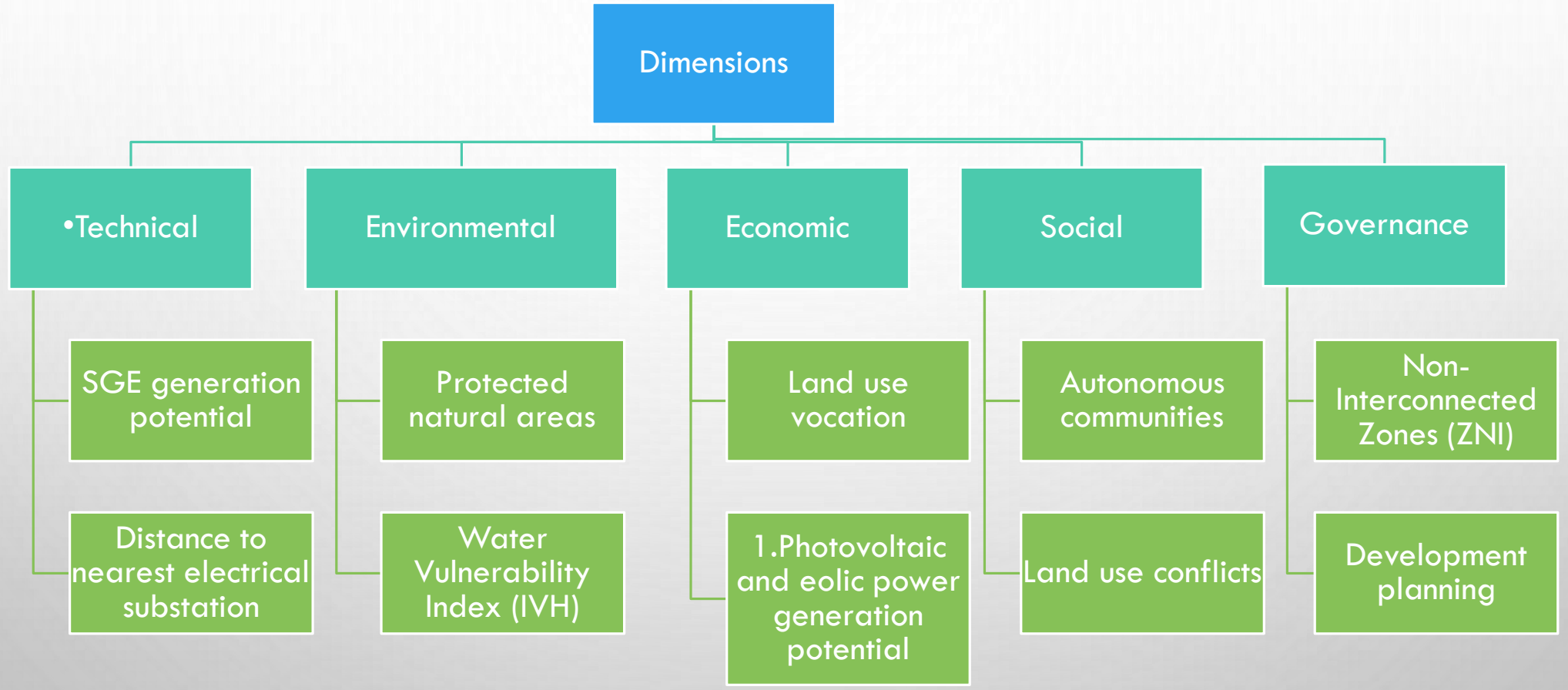



Figure 2. Map of the Water Vulnerability Index (IVH) of the Environmental Dimension

# RESULTS – *1. SELECTING FACTORS*



# RESULTS – 2. *WEIGHTING FACTORS*

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## Perception of Marine Renewable Energies (MRE) and criteria for site selection

Marine Renewable Energies (MRE) refers to those technologies that allow the extraction of energy from the ocean. There are primarily five MRE sources: the potential and kinetic energy of waves, the kinetic and potential energy of tides, the kinetic energy of ocean currents, the temperature difference between layers of the vertical column, and the energy released during the mixing of water masses with different salinities (Marin-Coria et al, 2020).

The objective of this research is to identify the most suitable sites for harnessing these energies in the Colombian Caribbean. This survey aims to gather the perception of various stakeholders regarding factors and evaluation criteria for prioritizing MRE implementation sites.

In this questionnaire, you will find 12 short questions related to the assessment of sites with potential for MRE generation in the Colombian Caribbean. The obtained results will be used to construct a feasibility index to support decision-making.

We appreciate your support and commitment to the research development.

Estimated response time: 7 minutes.

Perception of Marine Renewable Energies (MRE) and criteria for site selection

THANK YOU

# REFERENCES


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