Assessing policies for the growth of the Green Hydrogen in Chile

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Abstract

This paper examines factors such as production, installed capacity and price for green hydrogen and impacts on the local Chilean economy. Green hydrogen is the production of hydrogen using renewable energy sources like solar energy, wind energy and hydropower energy, for being used in transport, electricity sector and industry. Green hydrogen production has some barriers that will be analyzed in this paper such as production prices and lack of policies.

Regarding of production, storage and distribution of green hydrogen can change the way to produce energy and become a way to decrease the CO2 emission. In addition, it can be a new way to increase the income of growing industries and developing countries such as Chile. Chile has a big opportunity due to its location and policies can lead to increase green production and reduce fossil fuel energy dependency.

Keywords: green hydrogen production, wind energy, Chile, solar energy.

General objective

Build a computational simulation model to assessing policies for green hydrogen market in Chile.

Specific objectives

* To Design the computational market model based on current information and existing studies.
* To Analyze the scenarios, power line implications and policies that may affect green hydrogen in a maximum of 15 years in Chile.
* To Evaluate indicator such as price, installed capacity and CO2 emissions in green hydrogen production and use.

Introduction

The need of energy is growing and the necessity of energy at the lowest cost possible is a must, one of those projects is green hydrogen generation. In the last decade the increasing of researches in this area have been growing. Researchers suggest that an increasing in green energy production will lead to big CO2 emissions reduction and can change the current logistics systems or even change the production of primary energy. [1]

The potential role of Chile, being a pioneer in the area could be relevant soon. The Chile government is making progress implementing a national strategy to start production green hydrogen soon as possible using electrolysis, being 2050 the final objective to a non-carbon economy in Chile also the overproduction of green hydrogen could be used to increase the income of the country making Chile one of the most valuable countries in South America. [5]

Methods

In this paper a computational model using Python is built.

Computational model

The way we can evaluate a project or determine if a project is viable in the long term is by making simulations with known variables and unknown interferences, simulating values, and predicting with historical values. [8]

Variables

The variables are the factors we will predict in our simulation, in this case: price and production.

Develop environment

For making these simulations we will use Python as our language in his version 3.11.X and libraries such as SciPy.

Training

The computational model needs training to predict with certain level of accuracy, usually the percentages of data disposed to training is 70% and 30% to verification.

Validation and verification

When the model is trained, we need to make sure the data is accurate and close to reality, of course we have a bias that we cannot control but we can measure it and gain control of the trust of the results.

Results

Based on the state of the art of green hydrogen and old simulations [5], we can assume that the improvement of this technology will affect the price of the green hydrogen in the diverse levels of society. [1,2,3,4] our expected results are:

* Be able to predict prices and production of green hydrogen in Chile.
* Simulate multiple scenarios for a maximum of 15 years in the future.
* Conclude, if the investment in this environment has significance in economy.

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