



# Analysis carbon markets contribution to meeting climate goals.

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## Highlights

- Predict the total CO2 produced by 2050 using the LFTM neural network
- Obtain the amount of CO2 reduced (or increased) per year determined by the number of credits issued or withdrawn the previous year.
- Information on the impact of carbon dioxide emissions compared to the rebate market and behavior by industry sector and over time

## Background

The impact of this analysis is to know if the generation of carbon credits in the voluntary market has effectively contributed to changing the emission trajectories in the countries that host the projects and if the differentiation of the projects could explain the quality or robustness of the projects. The questions we will solve with this analysis are as follow:

1. In which sectors do carbon credits have a greater, lesser or no impact?
2. Is there a relationship between the issuance of carbon credits and greenhouse gas emissions?
3. In which regions, sectors or countries it is possible to see a better understanding of the impact?

## Data

The two databases (Berkeley and World Bank) were analyzed and a connection was made between them, obtaining a single usable database for the continuity of the project.

## Model

Different prediction models were explored, including an ARIMA model, an LSTM network (Long short term memory) and an LSTM network combined with a CNN (Convolutiona neural network).

The best results were presented with the CNN LSTM network.

Two models were trained, one for the global time series and the other for the Colombia time series and the prediction of CO2 emitted until 2044 was made (25 years of prediction since the last year available in the time series).

- Global prediction

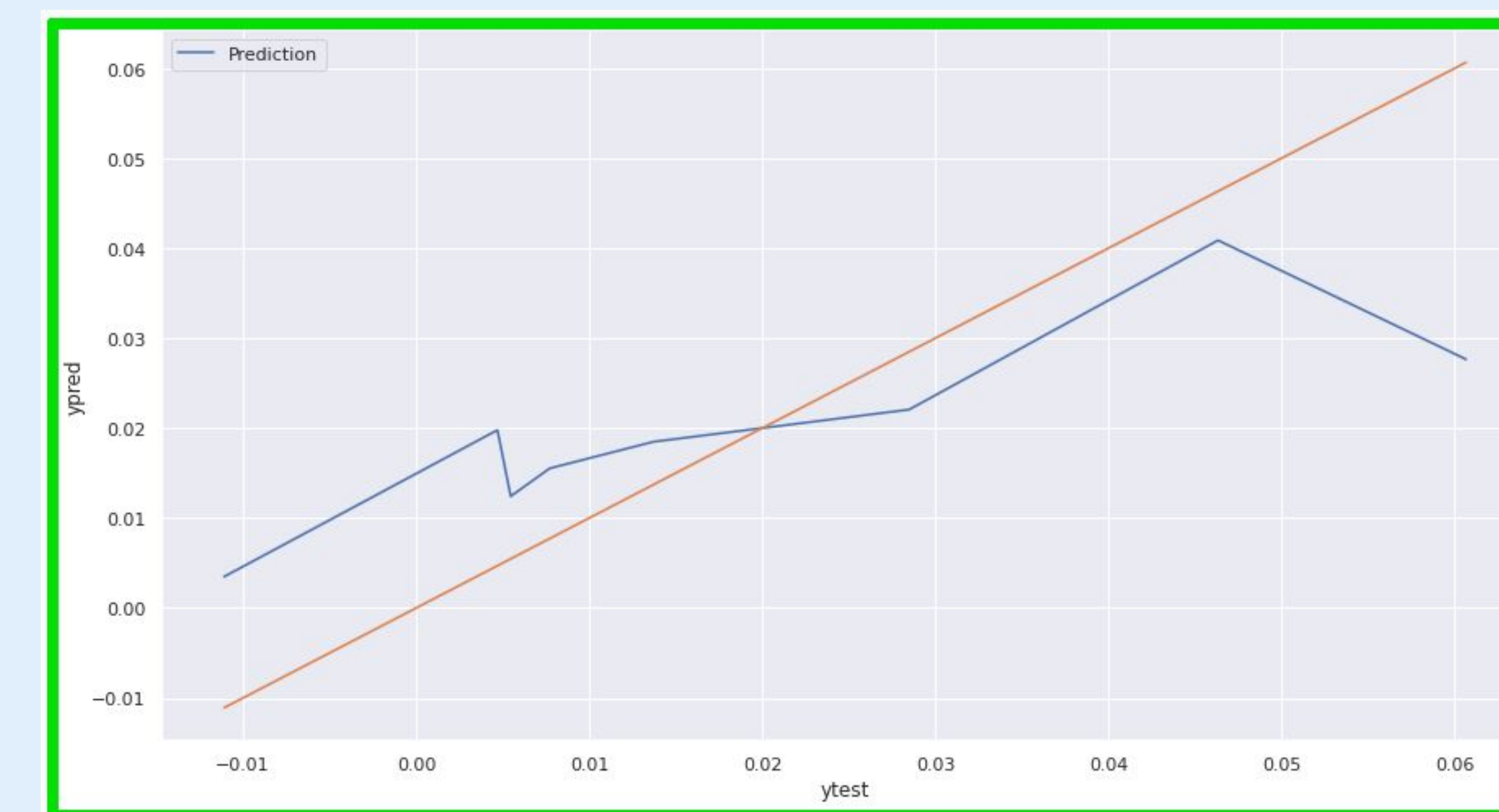


- Colombia Prediction



The global prediction also shows the cumulative CO2 limit that can be emitted to the atmosphere since 2014, which according to Green Peace and WWF is 350 billion tons and according to the IPCC and the Word Resource Institute is 485 billion; limits which will be reached in 2024 and 2027, respectively, if continued at the current rate.

A regression Machine Learning (SVR) model is proposed that allows us to determine the percentage change in CO2 emissions according to the percentage of participation of renewable energies, as a basis for making decisions regarding the global CO2 reduction



For exploratory data analysis, interactive graphs were made for more detailed analysis

