Emerson Greenhouse Gas Reduction Program

MS in Business Analytics Capstone Project

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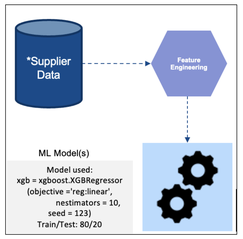
ABSTRACT

As part of Emerson's Environmental Sustainability journey, Emerson is looking for accurate and innovative approaches to calculate CO_2 emissions and identify opportunities to achieve their Net Zero objectives. We analyzed their data, conducted market research and developed newer methods and Machine Learning models for emission predictions. We also built data stories and what-if scenarios to demonstrate the 'art of possible'.



INTRODUCTION

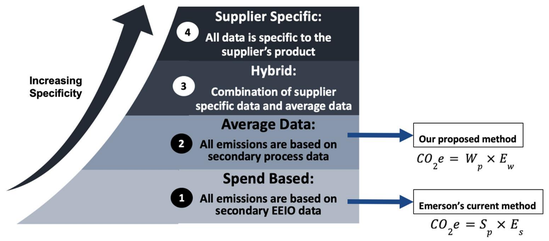
Emerson is on a path of driving innovation in its products and processes that will make the world healthier, safer, smarter, and more sustainable. To make progress along this journey, the Emerson Supply Chain organization has been tasked with driving greenhouse gas (GHG) reduction programs throughout its network of suppliers.

The goal of this project is to develop a new model for emission calculation and a process to identify suppliers that have the highest potential of implementing meaningful GHG reduction programs.

METHODS AND MATERIALS

Average-data method: The CO_2 emissions are calculated based upon "Scope 3 Greenhouse Gas Protocol Technical Guidance for Calculating Scope 3 Emissions", version 1.0. The standard lists several methods to calculate emissions.

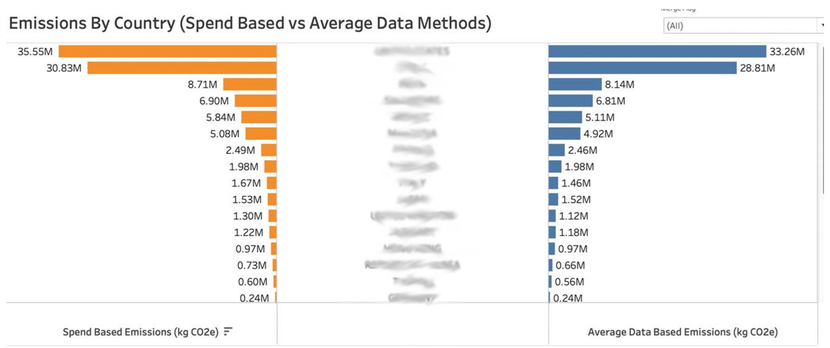
Based on the supplier data available to Emerson, the "Average-data method" will yield the highest degree of specificity possible. An added country of manufacture emissions penalty has been added for certain products where data is available, such as steel and aluminum.

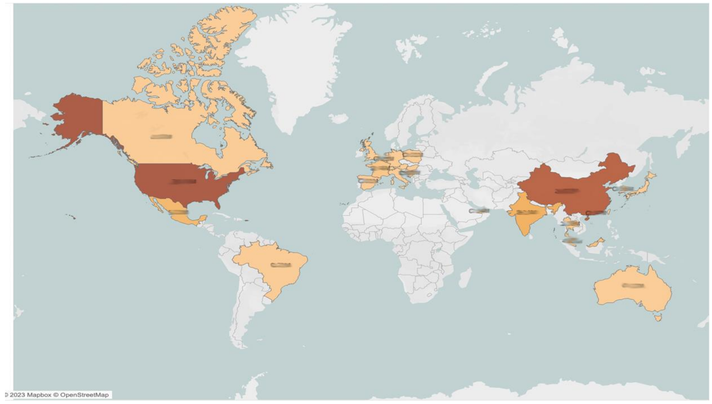


RESULTS

In addition to the calculations, we used linear regression models from XGBoost and used supplier information, part weights, quantity, emission factors to predict emissions for each supplier transaction.

The new 'average data' based method yields a more representative estimate of the emissions because it considers each region's power grid carbon intensity. Data models and hierarchies are built to enable analysis at a granular level.





DISCUSSION

Having specificity in the data will yield accurate results. As the data specificity increases the emissions results will be more accurate.

Regression model seem to predict the results with high accuracy (assuming the data is not biased, and the labels are accurate).

The complexity exist in preparing the data for the models. Currently no single source available to ingest emission factors and its important to establish the authentic source for emission factors at the commodity level.

CONCLUSIONS

As Emmerson continues their Environmental Sustainability journey – clean and accurate data is essential to predict and forecast emissions.

Working with the supply network to get supplier specific emission attributes will largely improve the accuracy of emission calculations.

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REFERENCES

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