Background

The Edison Cars AG has been facing a significant change in demand in recent years. With increasing end-consumer demand for low-emission vehicles and the EU ban on the sale of new petrol and diesel cars by 2035, the company had to adapt to these changes to remain competitive in the market. The Board of Edison Cars AG made the strategic decision to abandon their current combustion-engine-based cars and switch to the production of electric cars. The shift towards electric cars is a bold move for the company, but it is necessary to stay ahead of the competition and meet the growing demand for eco-friendly vehicles.

The transformation of production is a significant undertaking for the company, and the company is putting a lot of effort into transforming the manufacturing process. The department is working on developing new production lines that can accommodate the production of electric cars. This involves sourcing new materials and equipment that are required for the production of electric cars.

The development of a new product is also a significant focus for the procurement department. The department is working to identify reliable and sustainable suppliers who can deliver the required resources on time and at a reasonable cost. It is essential to consider the ecological and social implications when choosing suppliers for the new production lines. The CEO explicitly asked the Procurement department to not only base their choice on economic factors but also consider the environmental impact and social responsibility of the suppliers. This means that the department needs to identify suppliers who prioritize sustainable practices and fair labor conditions.
The production of the new electric car model is set to start in five years. This means that the procurement department has a tight timeline to source and secure the necessary resources and suppliers for the production lines. The department needs to ensure that the suppliers can meet the quality and quantity requirements while staying within the fixed budget that has been set by the company management for procurement activities. The data for the prices of steel from 01.01.2014 to 31.12.2022 are at hand. There are three providers to choose from.

Suppliers

East Metal Co. is the largest producer of steel in China and accounts for approximately half of the global steel production. However, the company has been struggling to comply with labor rights standards and reports of labor exploitation in the steel industry are not uncommon. There have also been several cases of corruption reported in the past. Despite these challenges, *East Metal Co.* remains the cheapest provider of steel due to its large-scale production and efficient supply chain. However, this comes at a cost to the environment, as carbon emissions from steel production are significant. The carbon emissions in China's steel industry are around 2.6 tons of CO_2 per ton of steel produced. In recent years, the Chinese government has made efforts to improve labor rights and reduce carbon emissions in the steel industry. However, progress has been slow and there is still much work to be done to ensure that the production of is both sustainable and ethical.

Sakura Steelworks is one of the world's leading producers of steel from Japan, with a strong focus on regulation of both the production and governing processes. The country has stringent standards for the production of steel, which are enforced to ensure that the industry operates in an environmentally responsible and sustainable manner. As a result of these regulations, carbon emissions from steel production by *Sakura Steelworks* are comparatively lower than in other countries. The carbon emissions in *Sakura Steelworks* steel production are around 1.91 tons of CO_2 per ton of steel produced, which is significantly lower than the global average. Despite the challenges of operating in a highly regulated environment, *Sakura Steelworks* has remained

competitive on the global stage. The industry has invested in research and development to improve efficiency and reduce emissions, while also continuing to produce high-quality steel products.

Black Forest Steel Co. is one of the largest producers of steel in Germany as well as Europe and has a strong focus on regulation of both the production and governing processes. The company has stringent standards for the production of steel, which are enforced to ensure that the industry operates in an environmentally responsible and sustainable manner. One of the key regulations in *Black Forest Steel Co.* is the requirement for suppliers to buy CO_2-certificates, which help to offset the carbon emissions produced during the production process. This is in addition to the carbon reduction measures that are implemented by the company to reduce its overall carbon footprint. As a result of these regulations, carbon emissions from steel production are comparatively lower than in other companies. The carbon emissions from *Black Forest Steel Co.* are around 1.81 tons of CO_2 per ton of steel produced, which is significantly lower than the global average. Despite the challenges of operating in a highly regulated environment, *Black Forest Steel Co.* has remained competitive on the global stage. The industry has invested in research and development to improve efficiency and reduce emissions, while also continuing to produce high-quality steel products.

Task

Predict the daily prices for steel for the next 5 years, i.e. for the period from 01.01.2023 to 31.12.2027 by performing a time series analysis of the data provided. Perform the analysis for one of the three suppliers of steel. Predict the prices for each day.

Input

For this task, you will be provided with the following:
- Time series of steel price data of the three suppliers as a CSV file:
  - Daily prices of steel in $ per tonne
- Code sample to read the data, make a naive prediction and output the result as a CSV file You can use and extend the file. You can also create a solution on your own in a common programming language if you prefer. However, make sure you use the correct output format.
- Further information for time series analysis and machine learning:
  - These are possible approaches that have different advantages and disadvantages. Of course, you can also use other approaches and resources:
    - Code quality: browserstack.com
    - Times Series Analysis: simplilearn.com
    - Linear Regression: kaggle.com
    - SARIMA: machinelearningmastery.com
    - XGBoost: machinelearningmastery.com
    - Neural Network: towardsdatascience.com

Keep in mind

The content provided here serves only as a starting point. Feel free to use your own approaches and algorithms to get the best possible prediction.

Use only the pricing data provided.