



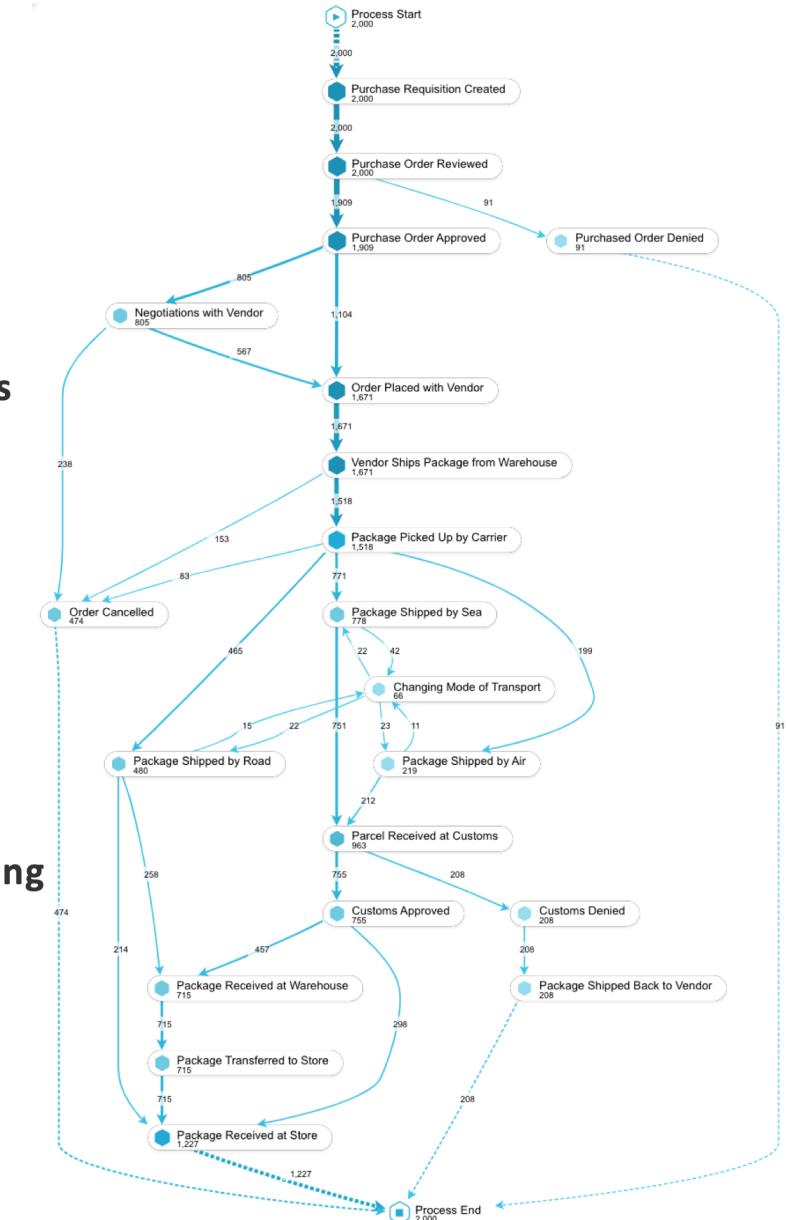
Emissions Analytics

Introduction

This presentation analyzes supply chain emissions for a large chemical manufacturer's data for:

- Vendors
- Transportation modes
- Operational factors

It identifies opportunities to optimize transportation selection, improve vendor efficiency, reduce canceled orders, and enhance peak season forecasting. Implementing these recommendations could lead to substantial carbon footprint reductions.



Project Overview & Business Question



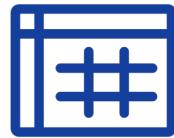
PROJECT GOALS

Analyze data using Celonis to help reduce throughput time, emissions, and wasted resources in their supply chain



STAKEHOLDERS

The key stakeholders involved in this initiative are the Sustainability managers, Supply chain managers and Procurement managers



DATA ANALYSIS

Establish an ideal process, analyze data to gain insights into emission harm, and undesired activity costs

HOW TO OPTIMIZE TRANSPORTATION TO REDUCE EMISSIONS & IMPROVE EFFICIENCY?
HOW TO IDENTIFY & MITIGATE EMISSIONS FROM VENDORS AND SEASONALITY?

Hypothesis and Questions

- **KEY HYPOTHESIS**

By analyzing data using Celonis, we can identify and mitigate emissions associated with transportation, vendors, and seasonality, thereby reducing throughput time, emissions, and wasted resources in the supply chain.

- **COST IMPACT QUESTION**

How can we reduce costs associated with emissions, throughput time, and wasted resources in the supply chain?

- **EFFICIENCY QUESTION**

How can we improve the efficiency of the supply chain by mining an ideal process?

- **VENDOR NEGOTIATION QUESTION**

How can we negotiate with vendors to reduce emissions and improve sustainability?

- **IDEAL PROCESS QUESTION**

How can companies design and implement an ideal supply chain process that minimizes throughput time, emissions, and wasted resources, and how can they measure and ensure conformance to this ideal process?

Business Benefits

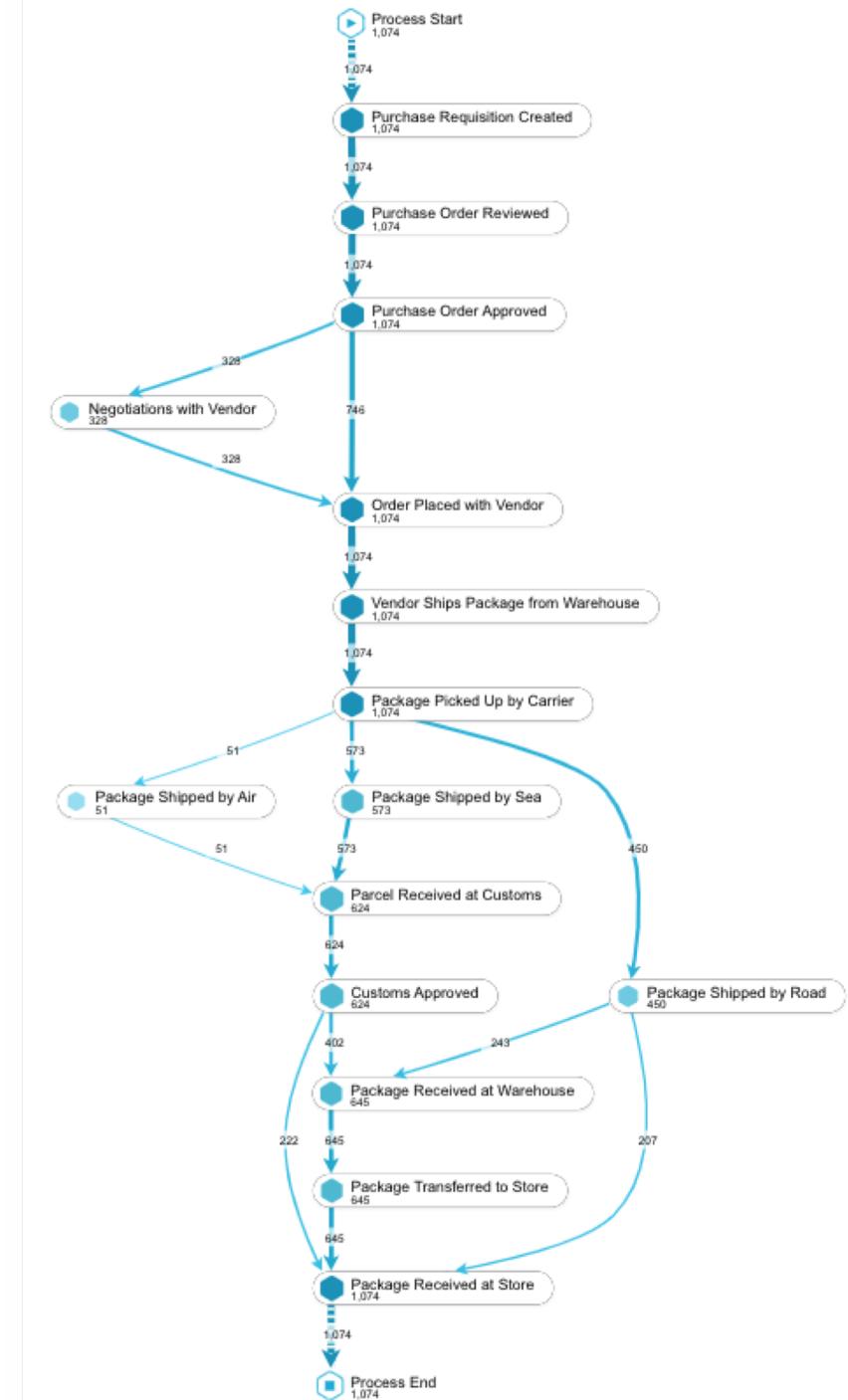
"Data drives benefits." *Thomas H. Davenport*

SUPPLY CHAIN EFFICIENCY AND PRODUCTIVITY ENHANCED.

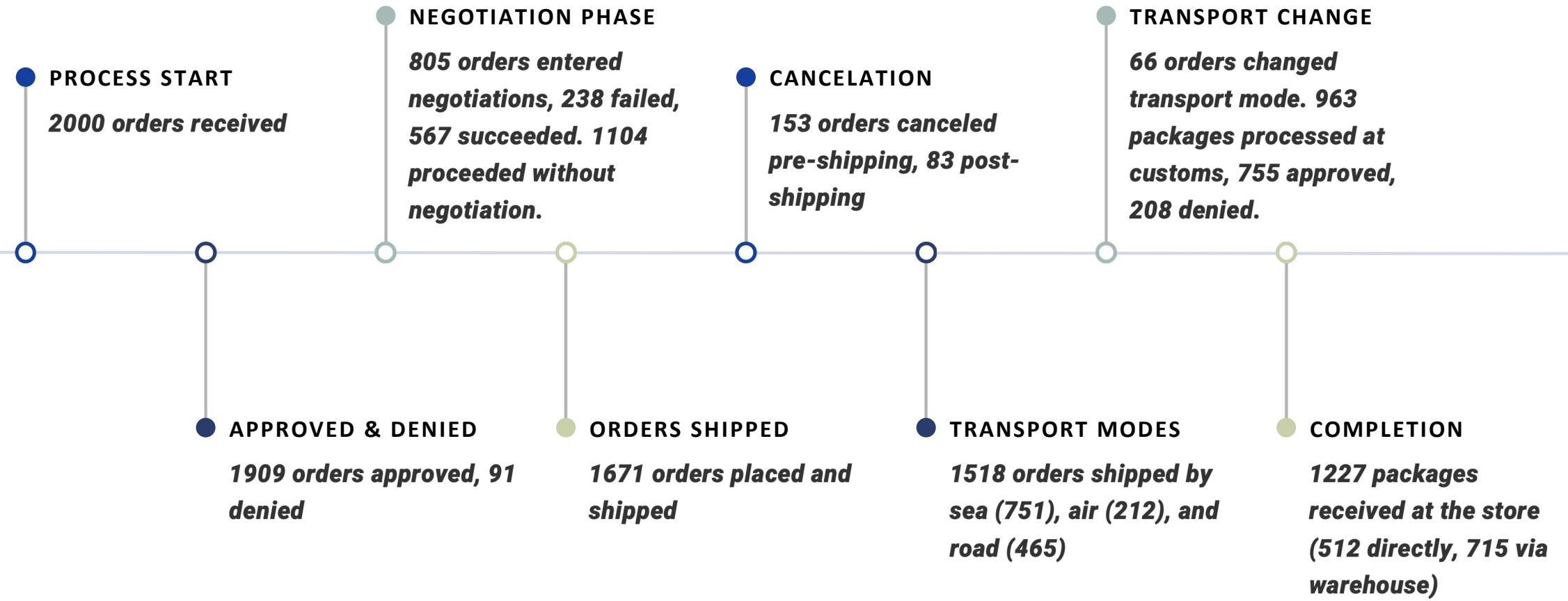
COSTS CUT IN EMISSIONS, THROUGHPUT, RESOURCES.

CUT EMISSIONS, BOOST SUSTAINABILITY.

IMPROVED DELIVERY, LESS IMPACT, HIGHER SATISFACTION.



Data Exploration



Analyzing Transportation Mode Tradeoffs



AIR TRANSPORTATION

Fastest option at 2 days for delivery but most harmful with 1866 KG CO2 emissions



SWITCHING TRANSPORTATION MODES

Changing the way goods are transported from one method to another



LAND TRANSPORTATION

Moderate emissions at 325 KG CO2 and speed at 3 days delivery, for domestic deliveries only



INCREASES EMISSIONS

Average increase of 1123 KG CO2 per shipment when changing transportation modes



SEA SHIPMENTS

Greenest option with 288 KG CO2 emissions but slowest at 15 days for delivery.



ADDS TIME

Changing transportation modes adds 2 days to throughput time on average

SWITCHING TRANSPORTATION MODES SIGNIFICANTLY INCREASES EMISSIONS AND TIME, SO SHOULD BE EVALUATED CAREFULLY BEFORE IMPLEMENTING

Analyzing Vendors



ColorPlus Manufacturing: highest total emissions (14,776,478 KG CO₂).



Pioneer Packaging: lowest total emissions (4,008,323 KG CO₂).



Sunlight Industries: most efficient in terms of emissions per order (18% EFM ratio).

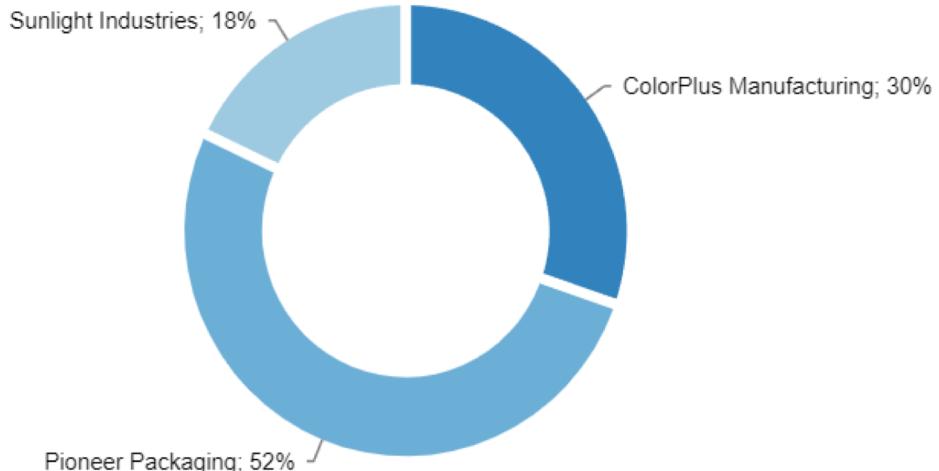


ColorPlus Manufacturing: second most efficient (30% EFM ratio).



Pioneer Packaging: least efficient in terms of emissions per order (52% EFM ratio).

EFM By Order Ratio



Total Vendor Emissions From Manufacturing

VENDOR	Emission from manufacturing
ColorPlus Manufacturing	14,776,478
Sunlight Industries	8,158,629
Pioneer Packaging	4,008,323

Analyzing Seasonality



High emissions: January (3,487.40 kg CO₂) to June 2021(4,181.46 kg CO₂)

****Notable peak at the beginning of the year.**



Constant emissions: March to May 2020 and 2021.



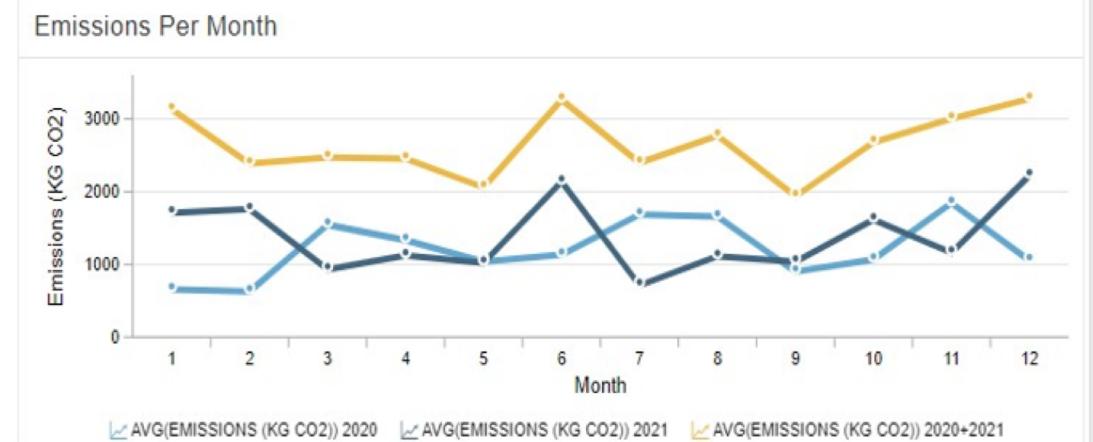
Significant reduction: February 2020 (1,260.20 kg CO₂) and March 2021 (1,911.64 Kg CO₂).

This decline implies intentional efforts or external factors contributing to emission reduction.



Fluctuating emissions: August 2020, November 2020, and August 2021.

Variations in emission are not as extreme as peak months.



Analyzing Cancelled Orders



474 cases ended up with canceled orders.

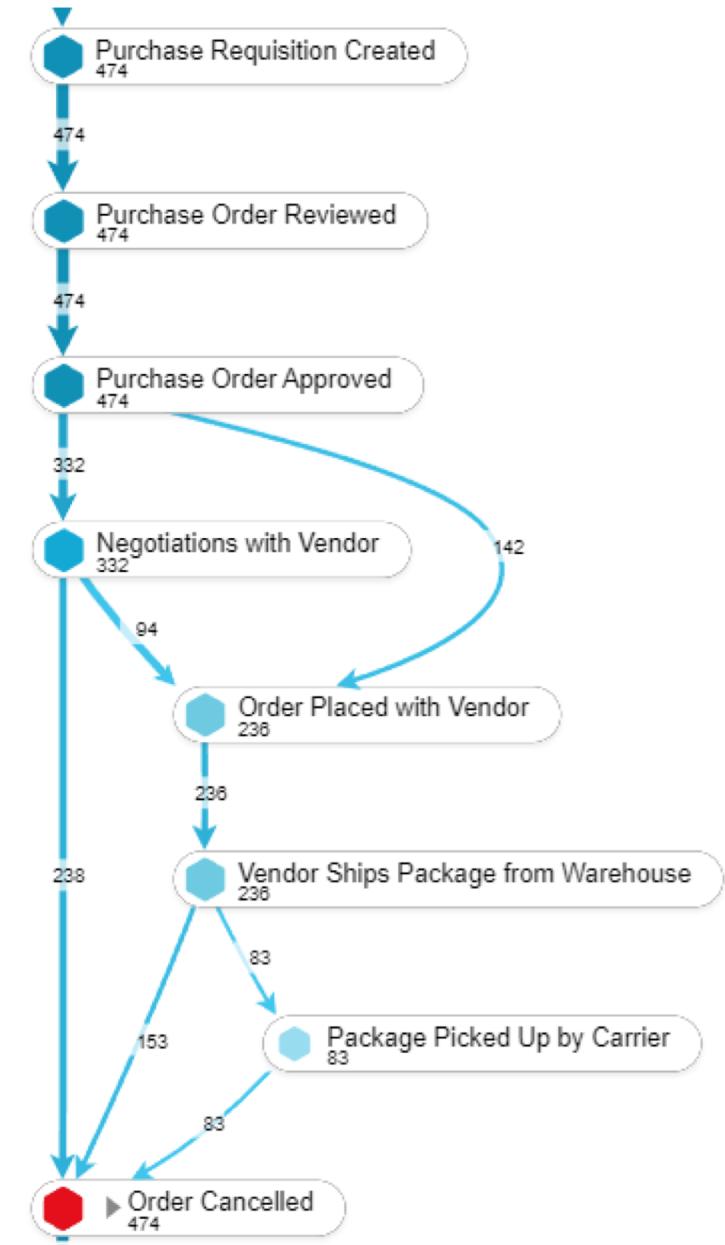
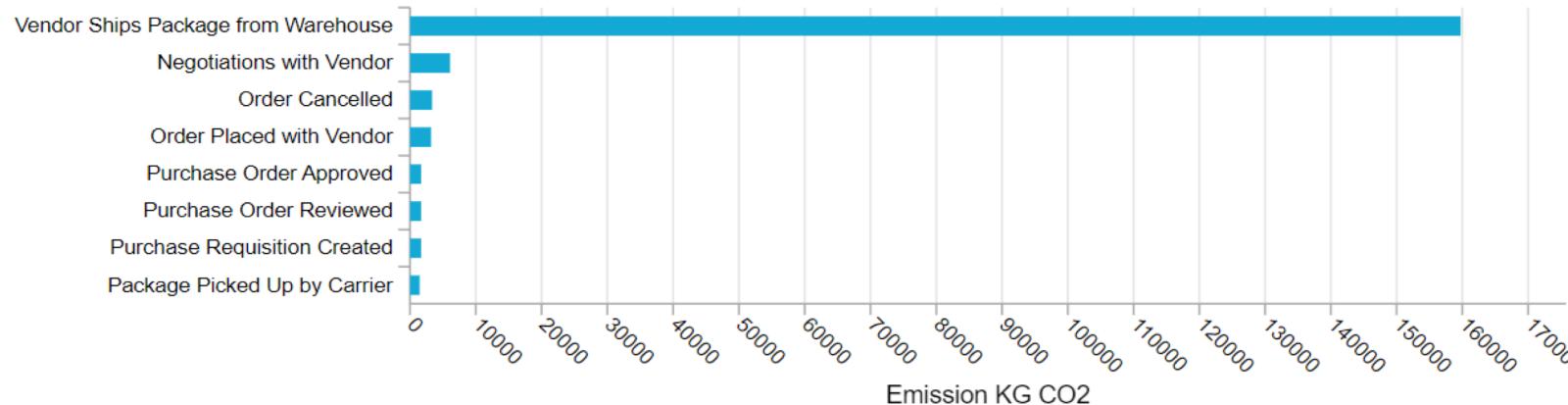


Emissions from several activities when orders are canceled.



Highest emissions when vendor ships packages from warehouse.

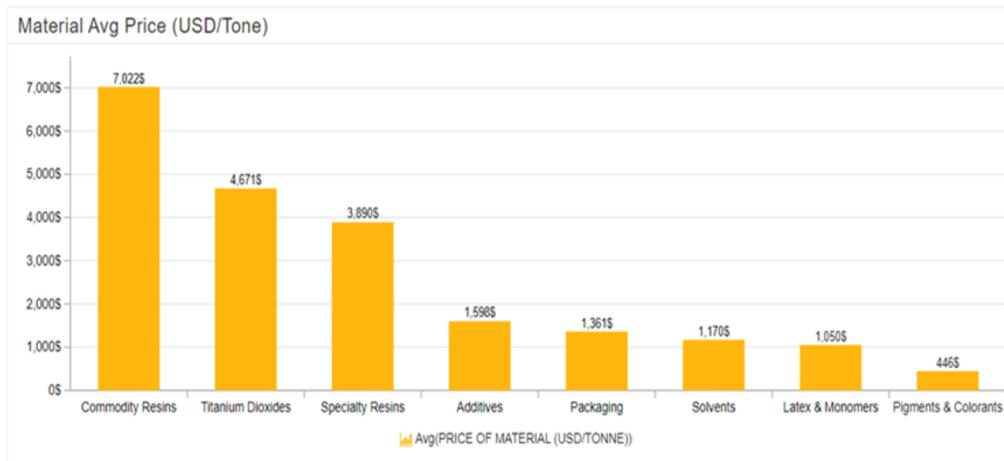
Emission From Activity



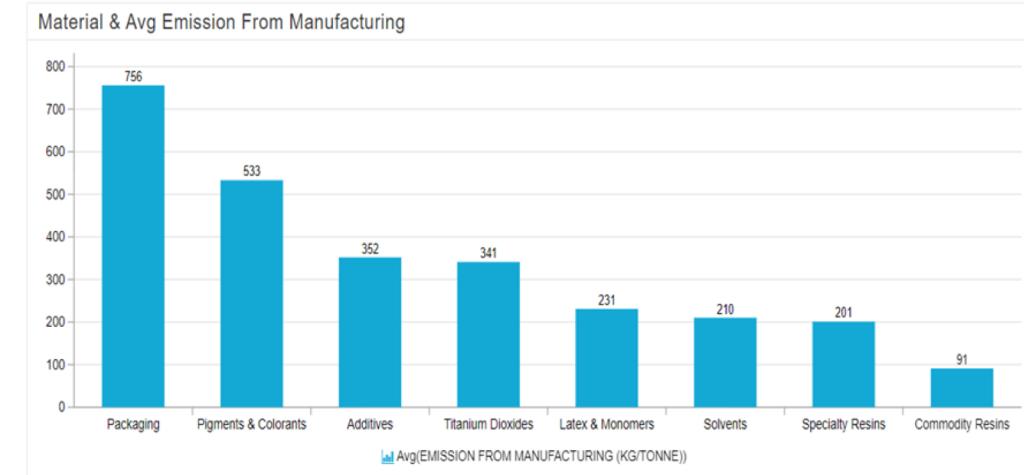
Emission Analysis Based on Vendor and Price



PACKAGING MATERIAL HAS THE HIGHEST AVERAGE EMISSION FROM MANUFACTURING.



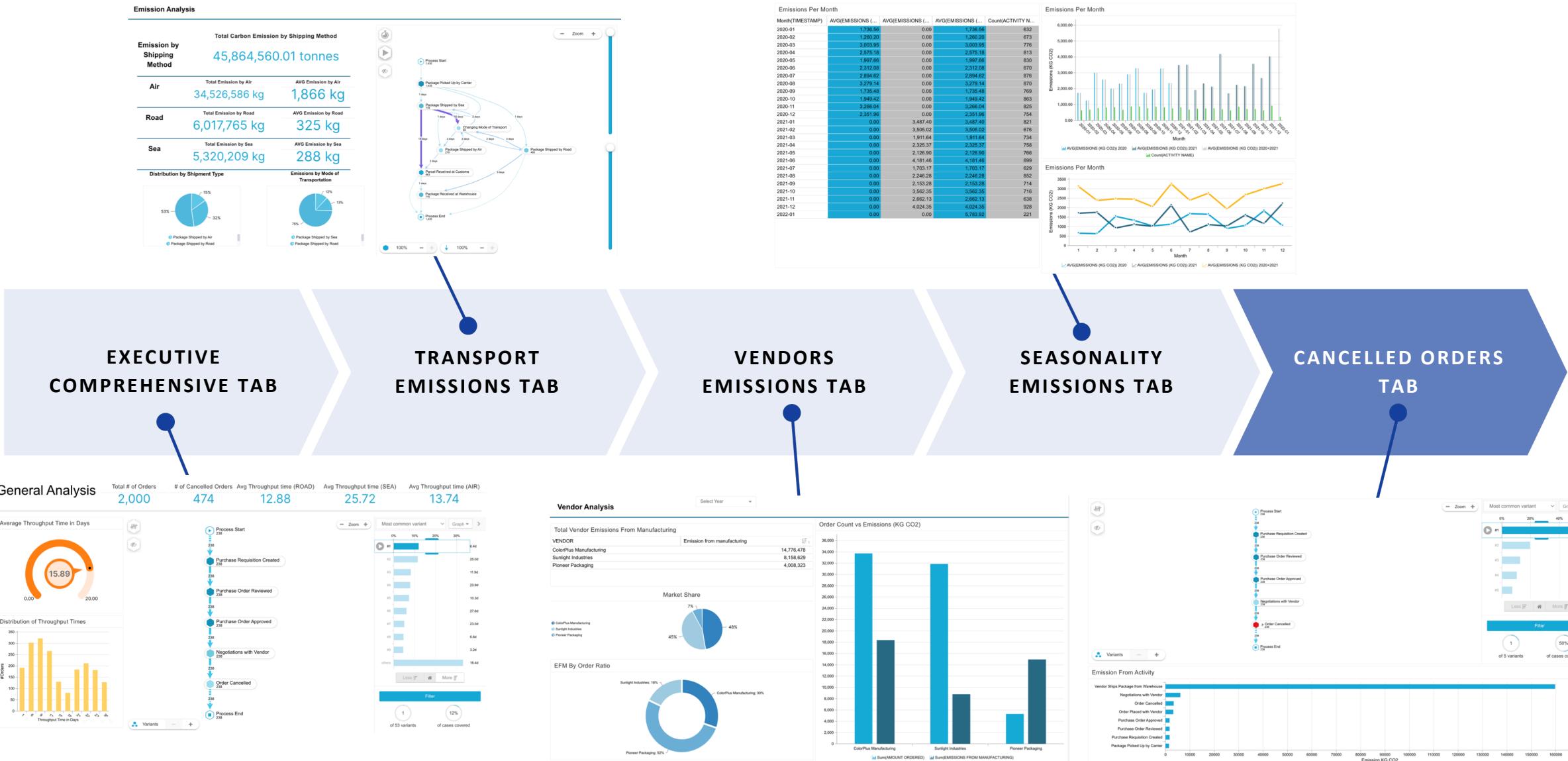
COMMODITY RESINS HAVE THE LEAST EMISSIONS.



HIGHER PRICED PRODUCTS GENERALLY HAVE LOWER EMISSIONS.

“Data is the key to
unlocking insights.”

Celonis Dashboard



Undesired Activity Calculation

The canceled orders and unnecessary shipping adjustments are factors in the emission production at the chemical company.

WASTE OF IN DAYS PER CASE

11.3 days

AVG EMISSIONS GENERATED INEFFICIENTLY PER CASE.

2,361.02 KG CO₂

WASTE OF IN STEPS PER CASE

7 steps

IDEAL PATH

Found

SOLUTION IMPLEMENTATION WILL RESULT IN

Reduced Canceled Orders, Avoid Mode Changes, Lower CO₂ Emissions, and Reduce Delivery Time

Recommendations



OPTIMIZE TRANSPORTATION MODE SELECTION

Prioritize lower emission transportation modes like Road or Sea



PARTNER WITH EFFICIENT VENDORS

Work with vendors that have lower supply chain emissions



REDUCE UNDESIRED ACTIVITIES

Minimize cancellations and customs denials to prevent excess emissions



ENHANCE MONITORING DURING PEAK SEASONS

Closely track emissions when they are highest to forecast and pre-ship

A DATA-DRIVEN APPROACH IDENTIFYING KEY AREAS LIKE LOGISTICS, VENDORS, AND PLANNING CAN SUBSTANTIALLY REDUCE SUPPLY CHAIN EMISSIONS AND ENHANCE SUSTAINABILITY.

Conclusion

- ANALYZED EMISSIONS FROM SUPPLY CHAIN PROCESSES ACROSS 2000 ORDERS
- CONDUCTED EMISSION ANALYTICS PROCESS USING CELONIS SOFTWARE
- KEY FINDINGS INCLUDE SUBSTANTIAL EMISSION DISPARITIES BETWEEN TRANSPORTATION MODES, SIGNIFICANT DIFFERENCES IN VENDOR EMISSIONS, FLUCTUATING EMISSIONS ACROSS SEASONS, AND UNDESIRED ACTIVITIES CONTRIBUTING TO EXCESS EMISSIONS
- RECOMMEND A MULTI-FACETED APPROACH TO REDUCING EMISSIONS BY OPTIMIZING TRANSPORTATION MODE SELECTION, PRIORITIZING EFFICIENT VENDORS, REDUCING UNDESIRED ACTIVITIES, AND ENHANCING MONITORING DURING PEAK SEASONS



Thank You

Thank you for taking the time to review our analysis. Your feedback and guidance has been invaluable in keeping our project on track and focused on achieving key milestones.
