Aims to achieve Net-zero emissions by 2040, how can VIBRABREW balance carbon impact with cost, service level, and feasibility?

T.N.A

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EXECUTIVE SUMMARY

OBJECTIVES

Reduce VIBRABREW's GHG emissions from Inbound Logistics and Warehousing to support its **net-zero goal by 2040**. This involves calculating emissions, identifying hotspots, and proposing solutions that balance emission impact, cost, service level, and feasibility.

KEY CHALLENGES

Lacks transportation optimization due to no route strategy or integrated planning, leading to inefficient vehicle use.

Relies on fossil fuel trucks and non-renewable warehouse energy, causing high emissions.

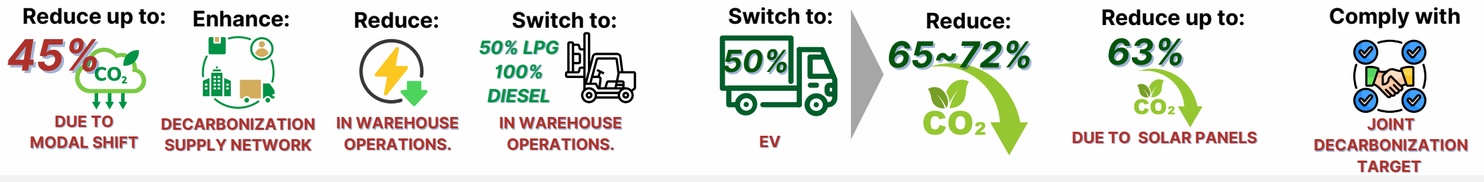
Limited supply chain integration and 3PL collaboration hinder distance reduction and green technology adoption.

DECARBONIZATION STRATEGY

SOLUTION

- **Modal Shift:** Shift long-haul freight from road to rail or water where feasible
- **Load Optimization:** Maximize truckload capacity, reduce "empty miles" with backhaul strategies and freight consolidation.
- **Route Optimization:** Cluster deliveries to reduce the number of trips.
- **Energy Efficiency:** Retrofit warehouses with LED lighting
- **Renewable Energy:** Install rooftop solar panels.
- **Supplier & 3PLs engagement:** Conduct quarterly ESG audits and provide training programs to help suppliers adopt sustainable practices

EXPECTED OUTCOME



VIBRABREW Co. PROFILE

SERVICES

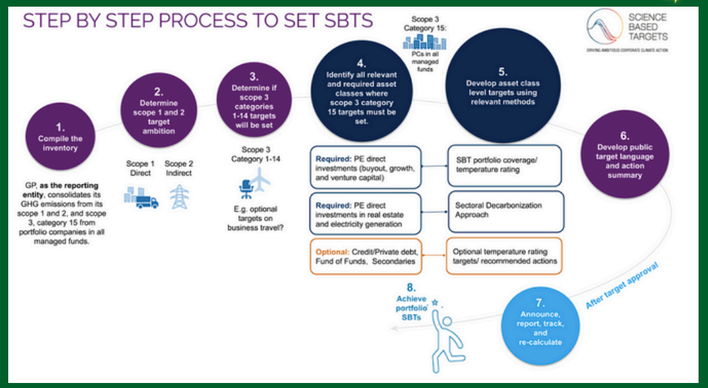
The company specializes in beer and beverage production, distributing through a complex supply chain.

OPERATING

Production sites located in HCM City, Da Nang, Hanoi, and Can Tho.

FOCUS

Reducing Scope 3 emissions in inbound logistics and warehousing through data-driven decarbonization strategies => aim to achieve net-zero emissions by 2040 in alignment with global SBTi guidelines.



ISSUE

LACK OF OPTIMIZATION IN TRANSPORTATION MANAGEMENT (INBOUND LOGISTICS)

- **Lack of route and vehicle optimization strategy:** VIBRABREW has not implemented logistics management systems to select appropriate vehicles or reduce shipments.
- **Lack of integrated transport planning:** Shipments are planned independently, without coordination to consolidate small loads or use larger vehicles for higher efficiency.

DEPENDENCE ON UNSUSTAINABLE VEHICLES AND ENERGY (INBOUND WAREHOUSE)

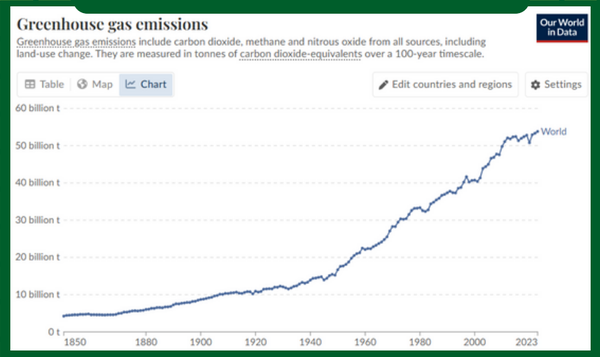
- **Lack of investment in green technology:** VIBRABREW has not planned to transition its fleet to electric.
- **Lack of use of renewable energy in warehouses:** Warehouses rely on fossil fuels (diesel) instead of renewable energy (solar, wind), contributing to high emissions.

LACK OF INTEGRATION AND COORDINATION IN THE SUPPLY CHAIN

- **Lack of an overarching supply chain strategy:** VIBRABREW has not integrated operations across plants, warehouses, and suppliers to achieve joint decarbonization.
- **Limited partnerships:** Lack of strategic collaboration with 3PLs for data sharing, route optimization, or green technology adoption.

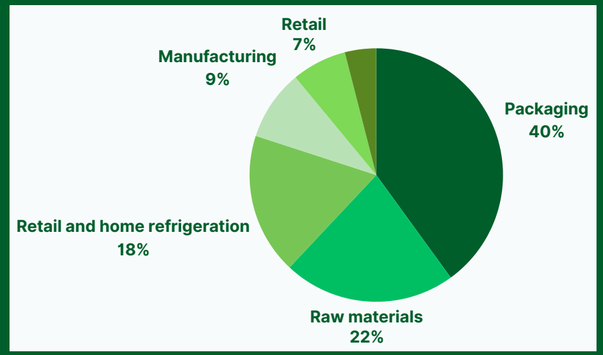
From global emission, ... beer industry emission..... best practices for decarbonization

GLOBAL GHG EMISSION



Rising GHG emissions urge gor action across industries

BEER INDUSTRY'S IMPACT



Producing 1L beer =0,5-1kg CO2e

CO2e in life cycle of beer

Key emitters

ABInBev

Carlsberg

Heineken

SUSTAINABILITY DRIVERS

Consumers show **preference for eco-friendly** products

Investors evalutate **ESG criteria**

Increasing **stringent regulation** on emissions, resource use and waste management

SUSTAINABILITY PRACTICES

- **Adopt renewable energy:** transitioning to solar, wind, or other renewables
- **Optimize packaging: prioritize:** reusable kegs or recyclable materials over single-use glass bottles
- **Improve waste management:** invest in CO2 recapture, spent grain repurposing and wastewater treatment to minimize emissions
- **Enhance supply chain efficiency:** source local ingredients and reduce transportation distances.

CHALLENGES

High energy intensity of brewing processes → high upfront costs for transitioning to renewable energy

Limited control over upstream suppliers

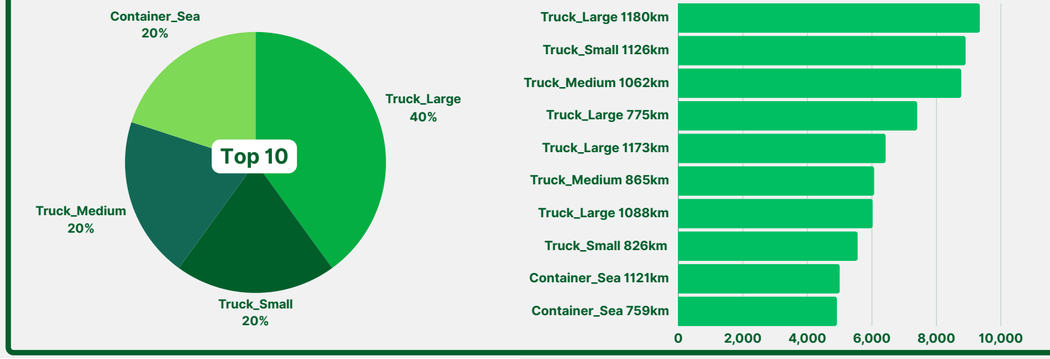
Reusable packaging requires **investment**

We count the GHG emission using Activity-based method .... and identify carbon hotspots....

Formula

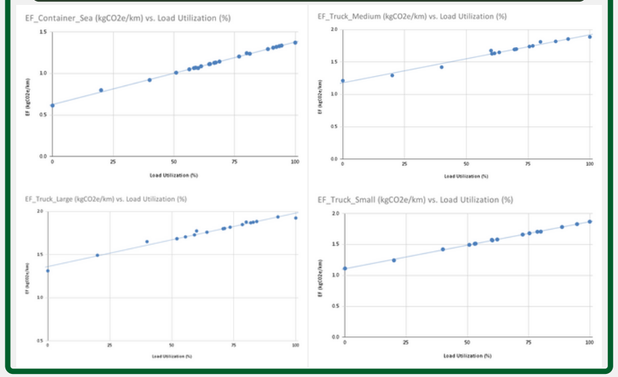
Weight Ratio (%)	=(Total_Load/Number_of_Shipment)/Max_Payload
EF (kgCO2e/km)	*Linear Forecasting Method (Excel Function)* =FORECAST.LINEAR(x,known_ys,known_xs)
Total GHG (kgCO2e)	= EF * Distance * Number_of_Shipment

TOP 10 EMISSION-CONTRIBUTING ROUTES

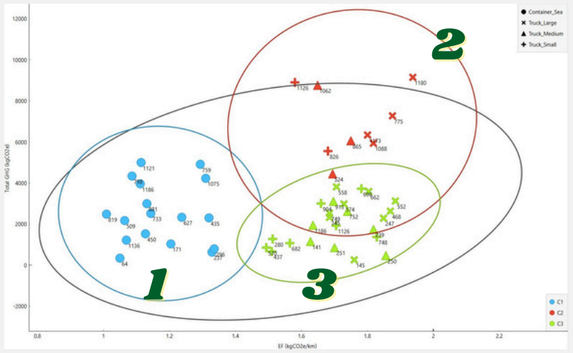


Reason

INTERPOLATE THE EMISSION FACTOR BASED ON LOAD RATIO



Vehicle Type	% Total Load	% Total GHG
Container_Sea	99.86%	27.55%
Truck_Large	**0.09%**	**34.13%**
Truck_Medium	0.04%	20.07%
Truck_Small	0.01%	18.25%



Appendix 1

→ **Truck_Large:** **largest source** of emissions among the analyzed transportation methods

→ **Truck_Small:** abnormally **high amount of GHG per ton** of cargo

→ **Container_Sea:** eco-friendly and efficient

→ **Weight Ratio is a key driver of emission**

Truck_Large
VERY HIGH
Large payload
Many trips
long distances

Truck_Small
HIGH
Low weight ratio
More trips needed

Truck_Medium
MEDIUM
Balanced for mid-distance routes

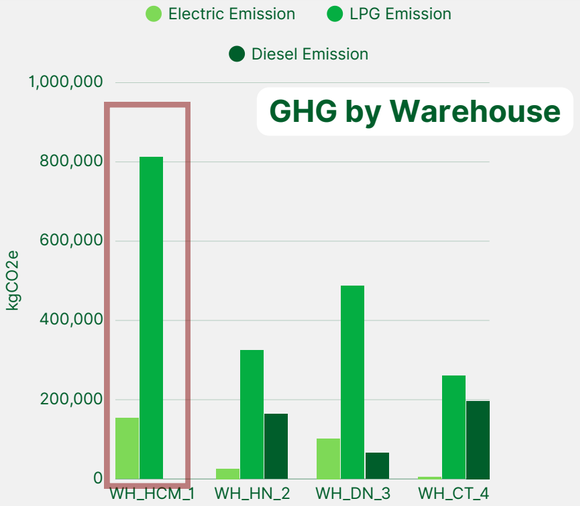
Container_Sea
LOW
Large load, low EF
→ Efficient transport

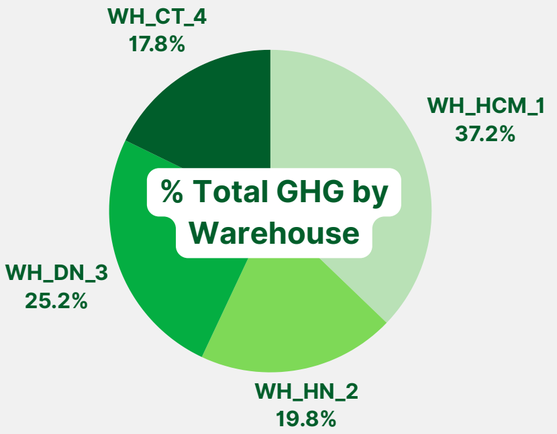
ACTION

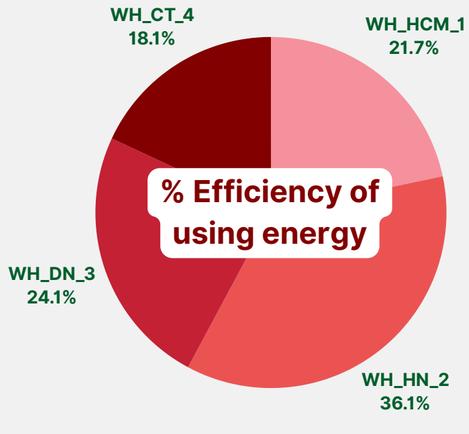
Minimize the usage of Truck_Small

Optimize routes and consolidate shipments

...Calculate GHG emissions of Inbound Warehouse using Fuel-based method, analyze and propose...







Comparison of Electric, LPG, and Diesel			
Factor	**Electric**	**LPG**	**Diesel**
suitable warehouse type	Ideal for indoor, high-throughput storage	Versatile for outdoor/indoor tasks, low automation, Quick refueling	Strong for heavy loads, outdoor storage. Suits remote warehouses but needs ventilation indoors.
Carbon Impact	0.511 kgCO2e/kWh	0.0707 (kgCO2e/MJ)	0.0918 (kgCO2e/MJ)
Operating Costs	Low Cheap electricity (~$0.10–$0.20/kWh), low maintenance	Moderate Fuel costs ~$3–$5/gallon, moderate maintenance. Tank swaps add labor.	High Fuel costs ~$4–$6/gallon, high maintenance (engine, filters). Fuel storage adds costs.
Initial Investment/Conversion	High cost for Forklifts, charger and infrastructure. Automation adds costs.	Moderate cost for tanks and ventilation.	Low-Moderate Cost for forklift, tanks and generators/ventilation
Conversion Time	Long 6–18 months (charging stations, electrical upgrades, training)	Moderate 3–6 months (forklifts, tanks, ventilation). Quick for small sites.	Short 2–6 months (forklifts, tanks, minimal upgrades). Fastest for off-site warehouses.

WAREHOUSE CHARACTERISTICS

- **Off-site Warehouses (WH_HCM_1, WH_DN_3):** Serve as storage facilities for raw materials or finished goods, supporting production plants. They have larger-scale operations with higher energy consumption due to extensive material handling.
- **Distribution Depots (WH_HN_2, WH_CT_4):** Focus on distributing goods to retail or end customers, with lighter logistics activities and typically lower energy use; Prioritize rapid inventory turnover.

→ **LPG Forklifts: Major Emission Source**

→ **High Diesel at Distribution Depots**

→ **WH_HCM_1: Top Emitting Warehouse**

Anheuser-Busch, Heineken } have implemented renewable energy in their supply chains, including warehouses, to achieve net-zero emissions goals

WAREHOUSE'S EMISSIONS PROFILE

		Electric Emission	LPG Emission	Diesel Emission	Efficiency of use
Off-site Warehouse	WH_HCM_1	Moderate (significantly lower than LPG) (16%)	The dominant emission source (84%)	No diesel usage, which is a positive aspect for reducing fossil fuel dependency	Highest efficiency, no diesel use, but high LPG consumption
	WH_DN_3	Higher than Distribution Depot (16%)	Dominate at 74.4%	Lower than Distribution Depot (10%)	Lowest efficiency, very high LPG consumption
Distribution Depot	WH_HN_2	Low electricity usage (5%)	The large contributor (63.2%)	Also has a significant share (31.9%)	Low efficiency, high electric consumption, significant diesel and LPG use.
	WH_CT_4	Electric emissions are negligible (1.1%), the lowest across all sites	The large contributor (56.3%)	Very high share (42.6%), the highest diesel contribution among all warehouses	Moderate efficiency, lowest LPG consumption, but uses diesel.

EFFICIENCY OF USE (MJ/FORKLIFT)

PROPOSED STRATEGY

- **Switch LPG to electric**, LED light
- **Install solar panels**, eliminate diesel.

- Convert part of LPG and diesel forklifts to electric
- Fully transition all diesel equipment to electricand optimize forklift transport routes to further reduce emissions.

ERX

DECARBONIZATION STRATEGIES

Cost Optimization | Environmental Compliance | Sustainability Goals

(1) Collaboration in Transport + (2) Energy + (3) Supplier Engagement

(0) Collect data on fuel consumption, energy use and freight volume.

KPI	**CO2 Saving**	**Renewable Energy Use:** The % of energy consumed by an organization or industry that comes from renewable sources	**Energy Efficiency:** How efficiently an organization or industry uses energy resources
PHASE	**SHORT-TERM OPERATIONAL (<1 YEAR)**	**LONG-TERM STRATEGIC (>3 YEARS AFTER)**	
PLAN	**(1) Collaboration in Transport** **MODAL SHIFT** **ROUTE OPTIMIZATION** **EV** **(2) Energy** **LED LIGHTS** **SWITCH ENERGY** **SOLAR PANELS** **(3) Supplier Engagement** **VENDOR EVALUATION CRITERIA** **ADVANCED CARBON REPORTING IN SUPPLIER SELECTION - SUPPLIER ALLIANCE**		**LONG-TERM CARBON OFFSETTING**
OUTCOME	Reduce up to: 45% CO_2 DUE TO MODAL SHIFT Enhance: DECARBONIZATION SUPPLY NETWORK Reduce: IN WAREHOUSE OPERATIONS. Switch to: 50% LPG 100% DIESEL IN WAREHOUSE OPERATIONS.	Switch to: 50% EV Reduce: 65~72% CO_2 Reduce up to: 63% CO_2 DUE TO SOLAR PANELS	Comply with JOINT DECARBONIZATION TARGET REDUCING EMISSIONS TOWARDS NET ZERO *While* OPTIMIZE OPERATIONS AND ENSURE COSTS *The amount of reduction and optimization is based on the situation of different VIBRABREW Co.*

(1) Collaboration in Transport

SHORT-TERM OPERATIONAL (<1 YEAR)

Colaboration - Modal Shift

Multi-modal Transport framework for Scalable CO_2 Reduction, proposed to 3PL & Supplier

- Group short-distance shipments → send to 1 hub.

👉 Apply Clustering (K-means) to find consolidation hubs.

- Use vehicle-by-vehicle EF table to select optimal truck.

👉 Use Solver to reassign vehicles & minimize CO_2.

- Redesign long routes >600 km with low fill rate using transshipment.

👉 Identify low-fill long routes → create a midpoint hub → reroute as short-haul (to hub) + long-haul (from hub) with optimal vehicle.

Conduct trial test for Supplier & 3PL	Review performance of trial test	Review Sustainability performance with Efficient Operations and Emissions Saving

Scenario	Vehicle Type	Max Payload (tons)	Number of Shipments	Total Load (tons)	Distance (km)	Weight Ratio (%)	EF (kgCO2e/km)	Total GHG (kgCO2e)
Nomal	Truck_Small	5	5	15.55	1126	62.20	1.582	8,904.038
Apply Modal Shift Planning	Truck_Small	5	5	21.25	400	85.00	1.756	3,512.499
	Truck_Large	25	1	21.25	726	85.00	1.890	1,371.801
							Total	4,884.300
							% GHG saving	45.15%

[Multiple Pickup Points] → Truck_Small (400km) → [Consolidation Hub]

[Central Warehouse / Customer] ← Truck_Large (726km) ↓

Based on our regression analysis (*Appendix 2*), each additional shipment increases emissions by 1,134 kg CO_2e.

👉 By reducing the number of shipments, this approach significantly cuts carbon emissions by 45.15%.

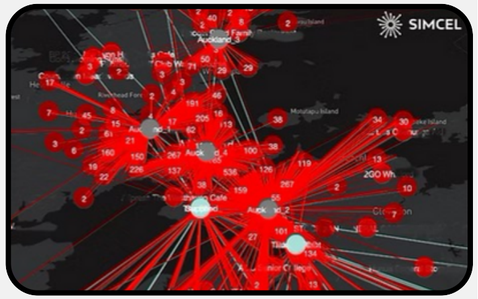
LONG-TERM STRATEGIC (>3 YEARS AFTER)

Route optimization - support Modal Shift

- Re-map high GHG routes (e.g. Truck_Small >800km) using CO_2e/km as optimization target, also involve 3PL & transport partners in redesign workshops.
- Cluster shipments by delivery region (K-means) → define optimal consolidation hubs.
- Use route optimization tools to automate daily route planning and reduce empty mileage & improve load utilization
- Create route logic:
  - Phase 1: Short-haul (≤250 km) → by Truck_Small / EV .
  - Phase 2: Long-haul (≥600 km) → by Truck_Large or Container.
- Optimize truck assignment with Solver & data sharing.
  - Share vehicle utilization & CO_2 data with 3PL.
  - Co-develop route plans to balance cost & emission.
- Deploy dashboard real time tracking emissions per route & vehicle type, shared access for suppliers, 3PL & internal team.

👉 Foundation for EV + Transshipment strategy

Example tool of route optimization or tutorial of ERX



EV

Year	Truck_Small	Suggested action for Suppliers & 3PL
Year 1	Transition 20% Target low-payload, short-haul routes	- Analyze routes for EV suitability - Identify EV suppliers and pilot 1-2 trucks - Train drivers and maintenance teams - Asssess charging infrastructure needs
Year 2	Increase to 35%	- Optimize delivery schedules for EVs - Evaluate pilot results and adjust strategy if needed
Year 3	Reach 50% transition	- Achieve full transition targets - Introduce EV/Hybrid for selected Truck_Small routes - Track GHG reduction and plan next phase

Engage suppliers and logistics partners (3PLs) in the transition to electric mobility

Data Transparency

Enable real-time shipment tracking → **Secure logistics data via blockchain** → **Sync transport data with ERP/SCM platforms** → **Provide shared dashboard access** → **Continuously analyze transport data**

Use IoT & GPS to monitor truck location, route progress, and delay alerts.

Store shipment ID, timestamp, vehicle & hub data on blockchain for tamper-proof transparency.

Link vehicle schedules, delivery status, and emissions data to internal systems for planning & reporting.

Let suppliers, 3PLs, and buyers view relevant data: ETA, emissions, utilization, and deviations.

Set up periodic reviews to detect low-load routes, delays, or high CO_2e, and optimize routing strategies.

Plan to reduce emission in warehouse...collaborate with suppliers...

(2) Energy

SHORT-TERM OPERATIONAL (<1 YEAR)

LED Lights

- Conduct a lighting audit to identify current wattage and bulb types
- Replace 90% of the lighting system with LED lights across all four warehouses.
- Use motion sensors in low-traffic areas to further reduce consumption.

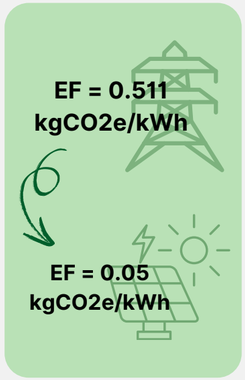
⚠*The number of replaced lighting will be addressed in Appendix 3*

Switch energy

- Audit warehouse energy use
- Map electricity to identify high-impact areas
- Evaluate panel capacity for electric forklifts/new equipment loads.
- WH_HCM_1, WH_DN_3: 50% LPG forklifts $\xrightarrow{\text{Replace}}$ electric forklifts
- WH_HN_2, WH_CT_4: 100% Diesel forklifts $\xrightarrow{\text{Replace}}$ electric forklifts
- Prepare Infrastructure for Renewable Energy Integration

LONG-TERM STRATEGIC (>3 YEARS AFTER)

Solar panels



Evaluate roof suitability at Off-site Warehouse → Check local climate → Confirm which warehouses are structurally and environmentally viable → Design a tailored solar photovoltaic (PV) system based on energy needs, roof space, and budget → Engage certified installers to minimize disruption and ensure quality → Implement real-time monitoring systems to track energy output, efficiency, and faults.

30% conversion → **Re-evaluate and convert 50%** → **70% conversion**

(3) Supplier Engagement

Vendor Evaluation Criteria

- **Assess** suppliers and classify into group A,B,C
- Group C: identify key **ESG compliance gaps** (e.g unreliable delivery performance) → co-design **6-month corrective action** plans. Focus improvement efforts on critical suppliers
- Group B: conduct **workshops/training** on ESG compliance → Co-develop **ESG improvement roadmaps** with a clear target to reach Score >80 within 12 months
- Cross-cutting initiatives (all groups): pilot a supplier **ESG scorecard system**, including quarterly performance reviews and feedback loops

Appendix 4

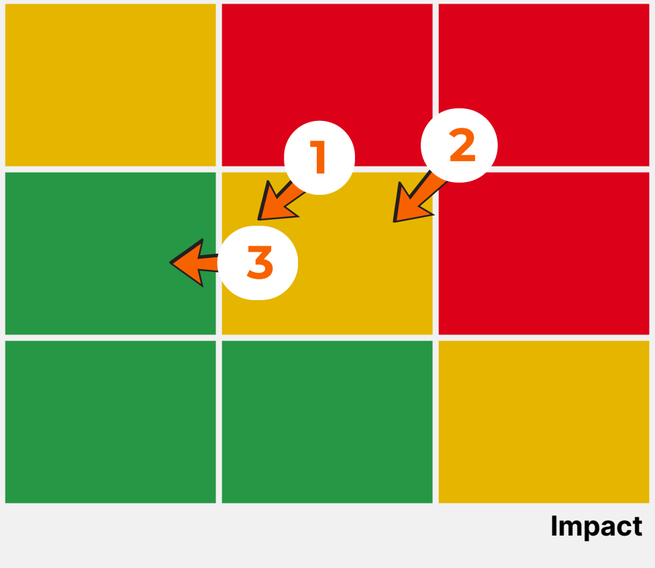
Advanced Carbon Reporting in Supplier Selection - Supplier alliance

COMPLY WITH DATA TRANSPARENCY AND JOINT DECARBONIZATION

Establish supplier selection criteria (based on Vendor Evaluation Criteria at phase short-term)

Collect emissions data from suppliers → **Integrate automated measurement systems** → **Score and evaluate suppliers** → **Optimize supplier portfolio**

To ensure a successful plan, we identify key risks...action to mitigate and evaluate optimization...



RISKS

1 — 3PL & supplier non-compliance with data and routing

Data disconnect and routing non-compliance from 3PL & suppliers undermine emission reduction efforts, hinder system-wide optimization, and create barriers to transparency and long-term decarbonization.

2 — Intermittency & Energy Storage Challenges

Impact on critical systems such as cooling, lighting, and security cameras. Reduced operational efficiency, potentially leading to financial losses due to unstable power supply.

3 — Limited charging stations

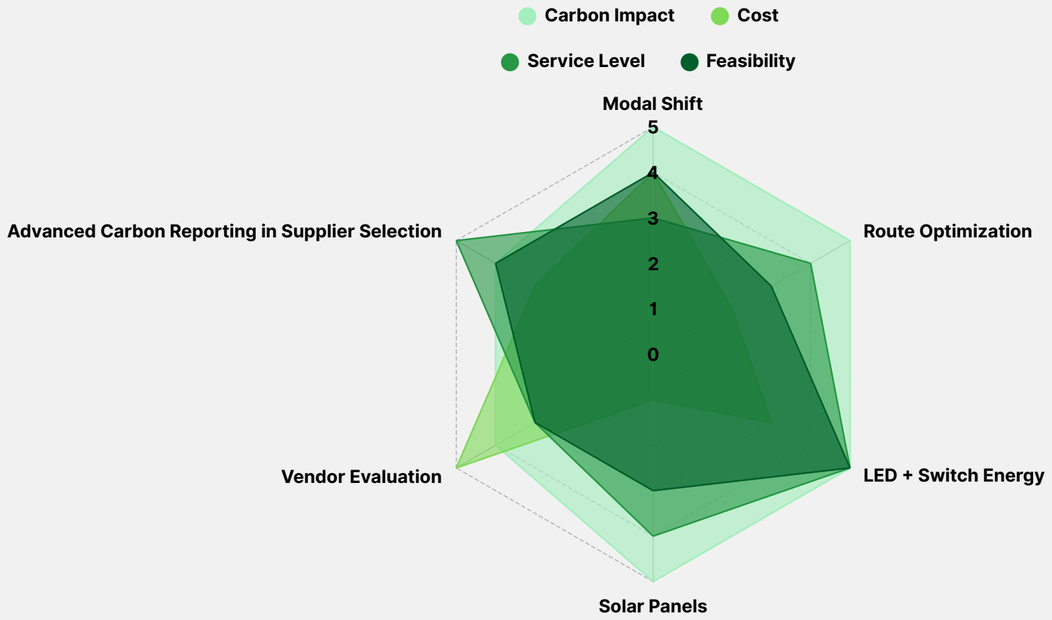
EV adoption may be hindered by insufficient EV charging stations, especially for routes up to 500km

MITIGATION ACTIONS

- Strengthen contractual terms with clear compliance clauses and penalty mechanism
- Regularly evaluate supplier/3PL performance and develop alternative sourcing plans

- Implement battery storage systems: Install lithium-ion or other batteries to store enough energy for non-sunny periods. Plan storage capacity based on daily energy consumption.

- Smart routing& scheduling: carefully plan delivery routes and schedule charging breaks effectively
- Battery swapping technology: Explore battery swapping stations as an alternative to traditional charging



Structure of the Radar Chart

- Four polygons representing four factors:
  - Carbon Impact: The extent of greenhouse gas emission reduction (tCO_2e).
  - Cost: Implementation cost and financial benefits.
  - Service Level: Impact on operational performance (delivery, reliability).
  - Feasibility: Practicality of implementation (technology, infrastructure, collaboration).
- Scoring scale: From 0 (lowest) to 5 (highest) on each axis.
- Each criteria is represented by a polygon, with vertices corresponding to scores on each axis.

Comment

- Modal Shift: Most balanced solution — high impact, feasible, and cost-effective.
- Route Optimization: Strong long-term value — needs solid data systems.
- LED + Switch Energy: Low-cost, easy to deploy — quick efficiency win.
- Solar Panels: High impact but costly — suitable for pilot rollout.
- Carbon Reporting & Vendor Evaluation: Support tools — essential for data transparency and accountability.

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APPENDIX

T.N.A

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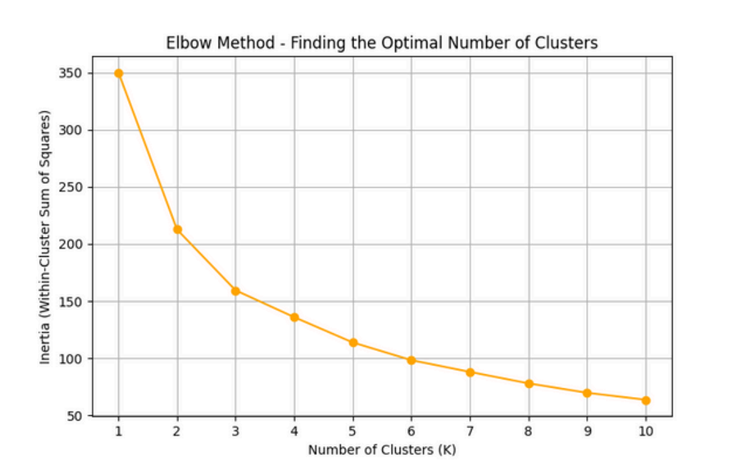
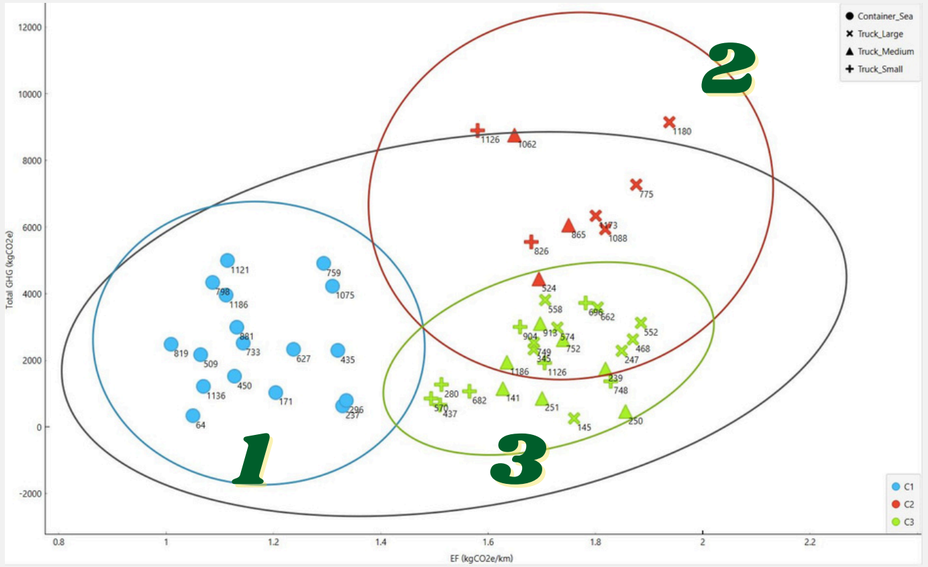
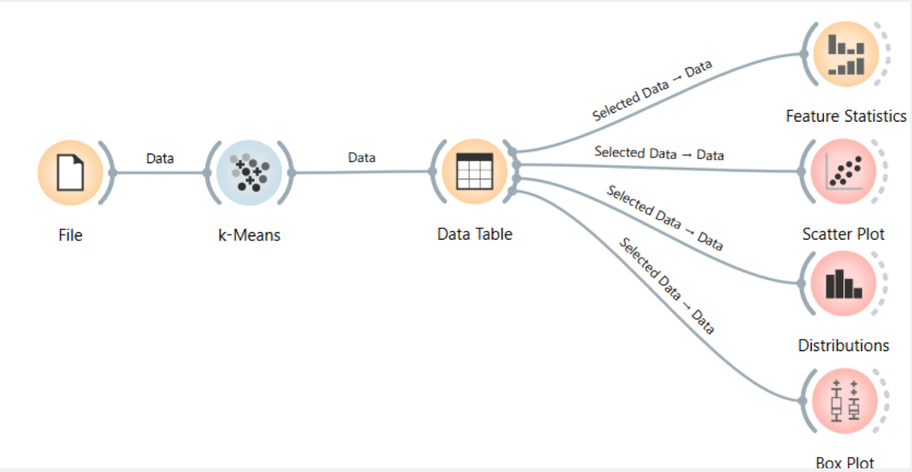
PYTHON CODING FOR ELBOW METHOD AND BUILDING ORANGE MODEL FOR K_MEANS CLUSTER




```python
# Step 3: Standardize the data
scaler = StandardScaler()
X_scaled = scaler.fit_transform(X)

# Step 4: Apply Elbow Method to determine the optimal number of clusters
inertia = []
K_range = range(1, 11)

for k in K_range:
    kmeans = KMeans(n_clusters=k, random_state=42, n_init=10)
    kmeans.fit(X_scaled)
    inertia.append(kmeans.inertia_)

# Step 5: Plot the Elbow Curve
plt.figure(figsize=(8, 5))
plt.plot(K_range, inertia, marker='o', color='orange')
plt.title("Elbow Method - Finding the Optimal Number of Clusters")
plt.xlabel("Number of Clusters (K)")
plt.ylabel("Inertia (Within-Cluster Sum of Squares)")
plt.xticks(K_range)
plt.grid(True)
plt.show()
```

```python
import pandas as pd
from sklearn.preprocessing import StandardScaler
from sklearn.cluster import KMeans
import matplotlib.pyplot as plt

# Step 1: Load the Excel file
df = pd.read_excel("SPSS_ready_data.xlsx")

# Step 2: Select numeric features for clustering
features = [
    "Max Payload (tons)",
    "Number of Shipments",
    "Total Load (tons)",
    "Distance (km)",
    "Load Utilization (%)",
    "EF (kgCO2e/km)",
    "Total GHG (kgCO2e)"
]

X = df[features]
```





SPSS - REGRESSION RESULT

Correlations

Correlations

		Total GHG (kgCO2e)	Distance (km)	Total Load (tons)	Load Utilization (%)	Number of Shipments
Total GHG (kgCO2e)	Pearson Correlation	1	.657**	-.114	.122	.525**
	Sig. (2-tailed)		<.001	.431	.400	<.001
	N	50	50	50	50	50
Distance (km)	Pearson Correlation	.657**	1	-.081	-.020	-.086
	Sig. (2-tailed)	<.001		.574	.888	.553
	N	50	50	50	50	50
Total Load (tons)	Pearson Correlation	-.114	-.081	1	.168	.332*
	Sig. (2-tailed)	.431	.574		.244	.019
	N	50	50	50	50	50
Load Utilization (%)	Pearson Correlation	.122	-.020	.168	1	.016
	Sig. (2-tailed)	.400	.888	.244		.914
	N	50	50	50	50	50
Number of Shipments	Pearson Correlation	.525**	-.086	.332*	.016	1
	Sig. (2-tailed)	<.001	.553	.019	.914	
	N	50	50	50	50	50

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	-5237.719	760.214		-6.890	<.001
	Distance (km)	4.708	.361	.694	13.038	<.001
	Load Utilization (%)	30.111	9.093	.178	3.312	.002
	Number of Shipments	1134.421	93.025	.686	12.195	<.001
	Total Load (tons)	-.028	.005	-.315	-5.519	<.001

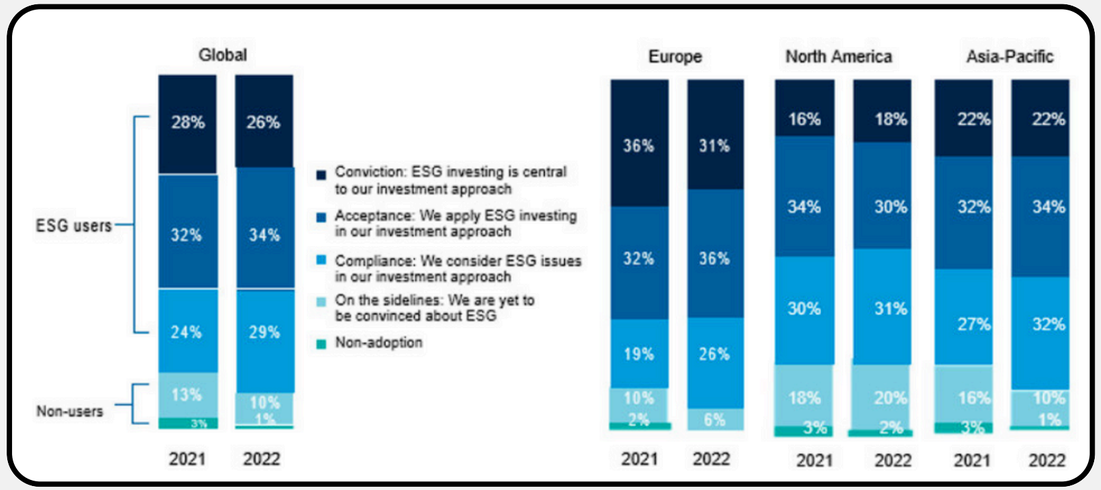
a. Dependent Variable: Total GHG (kgCO2e)

PLAN TO ADDRESS THE REPLACED LIGHTING

Remaining Useful Life - RUL	Recommended Action
< 20%	• Hand over to licensed electronic/industrial waste collectors. • Record the quantity and type of lights for environmental reporting if needed.
20% – 50%	Resell at low price for Small manufacturers, warehouses, or workshops with limited budget for LED upgrade.
> 50%	Resell for the following parties: • Small construction or M&E contractors: Often use second-hand lighting for temporary sites or budget-conscious projects. • Small factories or workshops: May need functional lighting but lack the budget for new LED systems. • Used electrical supply or second-hand equipment stores: These stores often buy in bulk and resell to individual customers.

VENDOR EVALUATION CRITERIA

Source: ESG Global Study 2022



McKinsey & Company (2019) analyzed 5 values that ESG can create for businesses:

- Top-line Growth
- Cost Reduction
- Regulatory and Legal Intervention
- Productivity uplift
- Investment and asset optimization

We will **evaluate suppliers based on ESG standards** to aim for sustainability, however, if we apply strict emissions saving standards to suppliers at the same time, we will not ensure customer service => we will **reduce the proportion and combine with other criteria**.

Criteria	Proportion	Score
Carbon Emissions	10	Meets Standard: Fully reports Scope 1 and 2 emissions with a reduction plan for 1-3 years. Needs Improvement: Partially reports or commits to reporting within 6 months. Fails: No reporting or commitment.
Sustainable Resource Use	10	Meets Standard: >50% of materials are sustainably sourced (e.g., organic barley, recycled packaging) with certifications (FSC, organic certification). Needs Improvement: 20-50% sustainable materials or has a plan to increase within 1 year. Fails: <20%, no plan to improve.
Waste and Pollution Management	10	Meets Standard: Has a waste management system (e.g., wastewater, solid waste) meeting standards. Needs Improvement: System is incomplete but commits to improvement. Fails: No system, causes pollution
Labor Conditions	15	Meets Standard: Ensures worker rights (wages, insurance, safety) per international standards (SA8000) or Vietnam's Labor Code. Needs Improvement: Minor violations but commits to remediation. Fails: Severe violations (e.g., unpaid wages, child labor).
Supply Reliability	20	Meets Standard: Meets 100% of demand on time, especially during peak seasons (e.g., Tet holiday). Needs Improvement: Meets 80-99% or has minor delays. Fails: Frequently fails to meet demand (<80%).
Transport Load Capacity Fulfillment	15	Meets Standard: Can prepare goods to meet ≥85% of the transport vehicle's load capacity per shipment, optimizing transport efficiency. Needs Improvement: Achieves 60-85% load capacity or commits to reaching ≥85% within 6 months. Fails: <60% load capacity, no commitment to improve.
Legal Compliance	10	Meets Standard: Fully complies with environmental and labor regulations (e.g., Vietnam's 2020 Environmental Protection Law, Labor Code). Needs Improvement: Minor violations but actively addressing them. Fails: Severe violations.
Transparency and Reporting	10	Meets Standard: Publicly discloses data on emissions, labor, and business operations. Needs Improvement: Discloses partially or commits to improving. Fails: Not transparent.

Detailed Action

Based on the total score (100 points), suppliers are classified into groups with appropriate support to encourage improvement:

Group A (Score >80): Meets standards, priority for long-term contracts.
Group B (Score 50-80): Needs improvement, target >80 within 6-12 months.
Group C (Score <50): At risk, needs improvement within 6 months or likely to need replacement.

Share evaluation results with each supplier, highlighting strengths and areas for improvement.

- **Training** for Group B and C suppliers on ESG topics.
- **Provide tools** and resources to calculate load utilization and Carbon Footprint (emissions tracking).

Request updated reports from Group B and C suppliers and re-score them.

- Suppliers still in Group C after 9 months receive a final warning or are gradually replaced.
- Suppliers improving to Group A or B continue collaboration.

Thank you.

T.N.A

Thuy Trang - Phuong Thao - Bao Anh - Quang Nhat