SustAInability

Verifying Product Carbon Footprints (sine foundation)

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S — I — N — E

How can we increase
data quality and transparency
in sustainability initiatives?

Key problems

Greenwashing

- Misreporting or manipulating data to present a more positive environmental image

- Double accounting by entering mitigating data multiple times

- Manipulation of metrics by using non-standardized units or choosing metrics that downplay environmental impact

Data complexity

- Massive datasets from various sources, including suppliers, production processes, and distribution channels

- Supply chains are intricate networks involving multiple companies and locations

- Unstructured data, such as qualitative information from stakeholder reports

How can AI help us tackle these problems?

- AI algorithms can process vast amounts of data at unparalleled speeds

- Machine learning excels at identifying patterns and anomalies

- AI enables real-time data verification, providing instant feedback
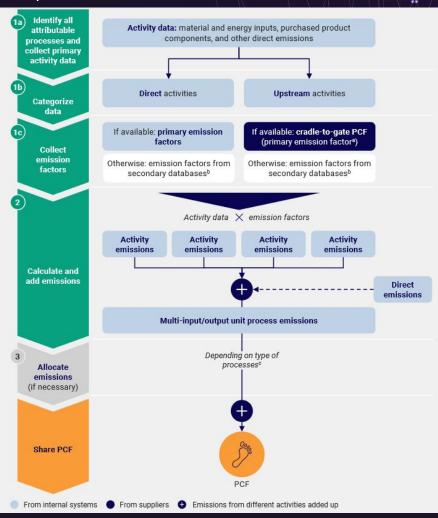
Data

Product Carbon Footprint (PCF):
Total carbon emissions generated by a product over the different stages of its life cycle.

- Direct activities: relevant activity data and emissions based on company's own processes

- Upstream activities: relevant material and energy input flows from suppliers upstream

- Emission factors: representative values that quantify the environmental impact of products and processes

https://www.carbon-transparency.com/media/jpslsuin/pathfinder-framework.pdf

Our solution

- Benchmarking: Compare the Product Carbon Footprint of a product against industry standards or similar products

- Ranking: Rank products based on their PCF, allowing users to make informed decisions

Comparative Analysis Algorithms

Comparative analysis algorithm example

product_data: Dictionary containing data for the product (e.g., materials, energy inputs, components, manufacturing, transportation)

weights: Dictionary containing weights for different factors affecting the carbon footprint

total_score: overall weighted carbon footprint score for the product

```python
def calculate_carbon_footprint_score(product_data, weights):

    total_score = 0

    for factor, value in product_data.items():
        if factor in weights:
            total_score += value * weights[factor]

    return total_score


def rank_products(products_data, weights):


    product_scores = []

    for product_data in products_data:
        score = calculate_carbon_footprint_score(product_data, weights)
        product_scores.append((product_data['product_name'], score))

    # Sort products based on their scores in descending order
    ranked_products = sorted(product_scores, key=lambda x: x[1], reverse=True)

    return ranked_products
```
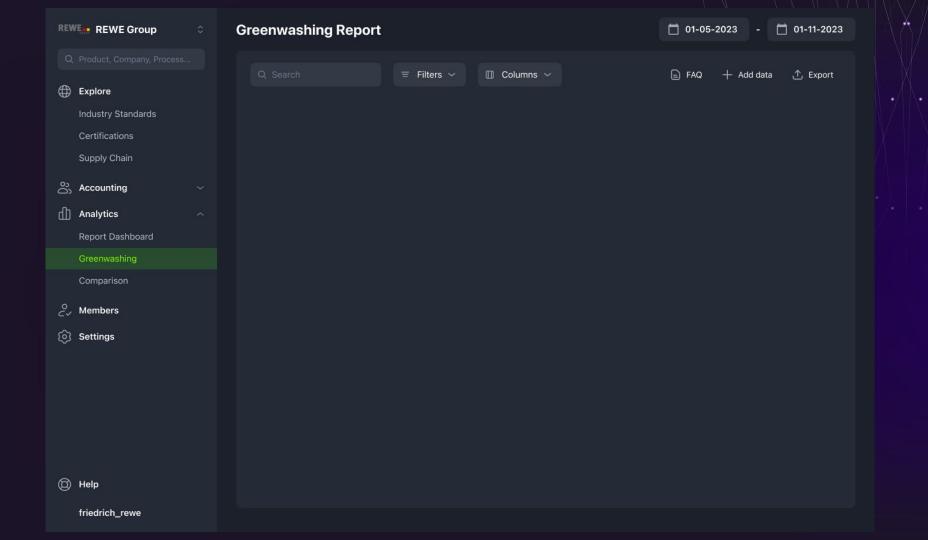
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Greenwashing Report

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Schladerer

Filters

Columns

FAQ   Add data   Export

#	Name	Score	Type	CO2	
1	Alfred Schladerer Schwarzwälder Hausbrennerei GmbH	75	Manufacturer	2,600 kg	⋯
2	Schwarzwälder Kirschwasser	89	Product	500 kg	⋯
3	Williams Birne	80	Product	1,100 kg	⋯

1   of 1 pages   Rows per page   12

Greenwashing Report - Alfred Schladerer Schwarzwälder Hausbrennerei GmbH

01-05-2023 - 01-11-2023

⚠ **Potential greenwashing detected**

Our AI system has detected some inconsistencies, view separate reports for full information

Analysis

Materials:
Discrepancies in the reported types and quantities of materials used.

View full report

Transportation:
Reported emissions strongly differ from industry averages

View full report

Recommendations

- **Request and verify detailed data with manufacturer and supplier**
- **Investigate and rectify data inconsistencies**

Overall score: 74

Top 5 contributions to   Climate Change ⌄

- 0.086 kg CO_2 eq: manufacturing process
- 0.085 kg CO_2 eq: raw materials
- 0.063 kg CO_2 eq: packaging
- 0.030 kg CO_2 eq: transportation
- 0.019 kg CO_2 eq: distribution
- 0.088 kg CO_2 eq: other

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Transportation:
Reported emissions strongly differ from industry averages

Comparison of reported emissions from transportation to industry averages:

Industry average emissions: 0.070 kg CO2 per unit

Reported emissions from transportation: 0.030 kg CO2 per unit

The reported transportation methods do not correspond to expected emission disparity.

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🔍 Williamsbirne

🔍 Kümmel

Freihof [Williamsbirne]

Transparent and Green

🌿 Our AI system has not detected any meaningful discrepancies. Sustainability certification was detected.

Overall score: 92

Materials:
Responsibly sourced organic fruits and grains.

Manufacturing:
Utilizes renewable energy sources; zero waste policy.

Distribution Channels:
Direct-to-store model; reduced carbon footprint.

View full report

Transparency: **95%**
Sustainable Sourcing: **90%**
Manufacturing Efficiency: **93%**
Transportation Practices: **92%**
Packaging Eco-Friendliness: **94%**
Distribution Sustainability: **91%**

Helbing [Kümmel]

Greenwashing detected

❗ Our AI system has detected major inconsistencies and lack of data, view separate reports for full information

Overall score: 54

Materials:
Inconsistent reporting

Transportation:
Lack of transparency;
inconsistent reporting;
potential exaggeration of eco-friendly transportation methods

Sustainability Certification:
No sustainability certification was detected, despite claims of eco-friendliness.

View full report

Transparency: **68%**
Sustainable Sourcing: **75%**
Manufacturing Efficiency: **72%**
Transportation Practices: **70%**
Packaging Eco-Friendliness: **67%**

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Greenwashing Report - Freihof [Williamsbirne]

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View full report

Overall score: 92

Certifications

Certified Sustainably Grown®

Water Conservation

Rainforest Alliance

Ingredient were grown on farms certified to the Rainforest Alliance Sustainable Agriculture Standard

Learn more

Learn more

Demonstration

AI Sustainability

AI impact

Large language models such as GPT3 have a CO_2 footprint of over 500 tonnes CO2eq

Patterson et al 2021, Luccioni et al. 2022

Greenwashing impact

French multinational oil and gas company "Total" greenwashed at least 10 million tonnes of CO_2 in 2020

https://www.clientearth.org/projects/the-greenwashing-files/total/

Thank You
For Your Attention!

S — I — N — E

Quellen

- Patterson et al. 2021, S. 6; Luccioni et al. 2022, S. 7

- Total. (2022, 18. November). ClientEarth. https://www.clientearth.org/projects/the-greenwashing-files/total/

- World Business Council for Sustainable Development. (o. D.). Guidance for the Accounting and Exchange of Product Life Cycle Emissions. Pathfinder Framework, 22. https://www.carbon-transparency.com/media/jpslsujn/pathfinder-framework.pdf