Background Report

CO_2e Reports by Local Spirits ApS

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LOCAL SPIRITS

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Contents

Introduction

At Local Spirits ApS (founded in 2016) we distribute organic and locally produced spirit brands across Denmark. With a portfolio of over 300 products from more than 25 Danish producers, we supply hotels, bars, and festivals. As a licensed partner of ecoSPIRITS, we aim to lead sustainability efforts within the industry by enabling refillable spirits containers at venues such as Scandic Hotels, helping reduce both carbon emissions and packaging waste.

Aligned with our sustainability ambitions, we offer our customers CO_2e Reports with the carbon footprint of their purchases.

Report Details

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Purpose with Our CO2e-reports

The primary purpose of these CO_2e reports is to support our current customers with their GHG reporting. By providing activity-based emission data, the reports enable customers to assess the carbon footprint of their purchases, identify emissions hotspots, and make informed, data-driven decisions that align with their sustainability goals.

The reports are intended for use in professional procurement and sustainability contexts. Key use cases include integration into scope 3 accounting (GHG-reporting) and informing decision-making processes related to selection of spirit types and climate strategies.

The intended audience includes hotels, restaurants, and organizers of events such as festivals and concerts.

The reports are not designed for commercial communication and should not be used for public product labelling or end consumer marketing.

Scope of The Carbon Footprints

The scope of the reported carbon footprints is from cradle-to-grave and includes all GHG-emissions in the whole life cycle with a consequential LCA approach (C-LCA).

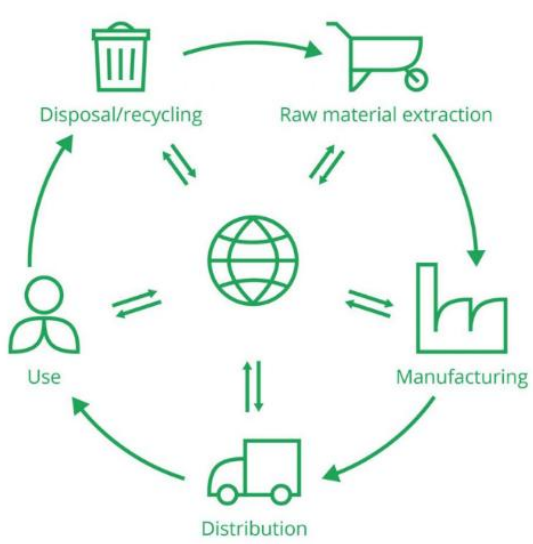

Figure 1: Life Cycle Figure

Data Sources

Emission Factors

Product emission factors stem primarily from *Den Store Klimadatabase version 1.2* published by CONCITO, who are an independent Danish think-tank focused on climate change and green transition.

Packaging emission factors stems both from *Den Store Klimadatabase version 1.2*, suppliers of Local Spirits ApS and the packaging partner ecoSPIRITS.

To ensure that the reporting remains up to date, emission factors are evaluated at least annually and updated if necessary.

Inventory Data

The inventory data consists of activity-based information such as purchased volumes, which serve as the basis for applying emission factors from CONCITO and other sources. This data originates from internal systems that store procurement and operational information, and which are also used across other business areas.

Methodology

Main method

The method for quantifying the carbon footprints is based on an activity-based approach (ref. GHG Protocol). Inventory data such as the volume and mass of purchased items are analysed. Local Spirits ApS already categorises all items as part of their price list structure. Based on this general categorisation, an emission factor is automatically assigned using internally developed logic as described below.

For some items, product-specific emission factors for packaging exist and are applied. For others, a generic scenario is used. Additionally, a volume-based logic has been developed internally to assign packaging emission factors automatically.

It is important to note that this methodology does not generate product-specific carbon footprints. The emission factors are primarily generic, although packaging factors may in some cases be specific to the product. Therefore, comparisons within a given spirits category should only be made when evaluating differences in packaging. Broader comparisons between different types of spirits may still provide useful general insights.

Method Behind the Main Emission Factors

The majority of the emission factors are derived from *Den Store Klimadatabase version 1.2*. The database provides average climate footprints for more than 500 common food products on the Danish market and is based on a consequential life cycle assessment (C-LCA) combined with a hybrid input-output analysis. This methodology ensures that the emission values reflect the forward-looking global climate impact of changes in food consumption. It includes emissions from agriculture, processing, packaging, transport, and retail, as well as the effects of indirect land use change (ILUC).

All emissions are expressed in CO_2 equivalents (CO_2e) per kilogram (net weight), and account for major greenhouse gases such as CO_2, methane (CH_4), and nitrous oxide (N_2O).

QA Process

As part of the quality assurance process, the emission factors applied to the different item categories of Local Spirits ApS have been cross-checked against other relevant literature. Some emission factors have been adjusted because of this process to better reflect the actual emissions associated with the respective item categories.

Discussion of Method

The GHG Protocol encourages the use of supplier-specific carbon footprints for reporting purposes. However, such footprints are typically expected to follow an attributional life cycle assessment (A-LCA) approach with a cradle-to-gate scope.

In contrast, the carbon footprints provided in our CO_2e reports are based on a consequential life cycle assessment (C-LCA) with a cradle-to-grave scope. This means that the reported emissions reflect the full downstream impact of consumption and are typically higher than those conducted using attributional method with cradle-to-gate scope.

While the activity data used are supplier-specific, the emission factors applied are generic. As such, the results are not product-specific in the strictest sense but reflect averaged values tied to procurement data.

At present, we primarily apply emission factors from *Den Store Klimadatabase*, version 1.2. Although the methodology of this database is not fully aligned with the GHG Protocol, it offers broad coverage of the items we sell and ensures consistency across categories. Relying on a single source also reduces the need to identify and update emission factors from multiple databases, a process that would otherwise be resource-intensive and could undermine consistency.

Assumptions

The following key assumptions underpin the methodology used in the CO_2e Reports:

- **Emission factors are based on marginal processes and economic allocation:** The emission factors applied are generic, average values sourced primarily from Den Store Klimadatabase version 1.2. These reflect future emissions that result from a change in consumption on the Danish market and do not account for specific producer practices.
- **Activity data reflects actual procurement:** Reported emissions are based on internal purchasing records (e.g. volumes, product categories) that are assumed to accurately represent the products delivered to customers.
- **Packaging weights and volumes are consistent across items:** Packaging-related emissions are calculated using volume-based logic and predefined weight estimates, assumed to be representative of standard packaging formats.
- **Transport Upstream:** Transport from suppliers to the Local Spirits warehouse is included and is calculated based on the road distance from supplier to warehouse, the mass transported, and an emission factor for EURO6 lorries of unspecified sizes, expressed in kg CO_2e per ton-kilometer (t*km).
- **Transport Downstream:** Transport from the Local Spirits warehouse to the customer is reported separately and is calculated based on the road distance from warehouse to customer, the mass transported, and an emission factor for EURO6 lorries of unspecified sizes, expressed in kg CO_2e per ton-kilometer (t*km). Each delivery is assumed to include 1 kg of generic packaging material and one EUR-pallet.

Limitations

The CO_2e Reports are intended to provide indicative emissions estimates to support decision-making and for GHG reporting. The following limitations apply:

- **Lack of product-level specificity:** The results do not represent exact carbon footprints for specific products or batches, as emission factors are not linked to individual producers, farms, or facilities.
- **Not suitable for product labelling or consumer marketing:** Due to the use of generic emission factors, the results should not be used for external communication, comparative claims, or public labelling.
- **Data quality depends on internal procurement systems:** Any inaccuracies or inconsistencies in the underlying activity data (e.g. incorrect categorisation or missing entries) may affect the validity of the results.
- **No third-party verification:** The methodology and results have not been subject to independent verification or audit.
- **Consequence-based results may differ from standard corporate GHG reporting:** As the CO_2e Reports are based on a consequential life cycle assessment (C-LCA) with cradle-to-grave scope, the results may differ significantly from those generated using attributional LCA with cradle-to-gate approach, as typically applied in corporate GHG Protocol reporting. However, the reported carbon footprints are considered to be conservative estimates. This is because C-LCA typically yields higher estimates due to its inclusion of full system-wide impacts, and because the cradle-to-grave scope accounts for all life-cycle stages, not only cradle-to-gate.

Statement from the Advisor

This background report has been prepared in collaboration between Local Spirits ApS and Quantified Impacts ApS and outlines the methodology behind the CO_2e Reports that Local Spirits provides to their customers on request.

Quantified Impacts ApS has provided support in clarifying the methodological approach, structuring the documentation, and writing the background report, including descriptions of emission data sources and calculation principles. However, Local Spirits ApS is solely responsible for the development, implementation, and application of the CO_2e Reports, including the calculation engine and data logic.

The CO_2e Reports are based on generic emission factors from *Den Store Klimadatabase version 1.2* in combination with internally sourced activity data and categorisation logic. The emission factors are based on a consequential life cycle assessment (C-LCA) with a cradle-to-grave scope, providing general, decision-supporting estimates of carbon footprint, but not product- or supplier-specific calculations.

Quantified Impacts assumes no responsibility for any errors, omissions, or technical aspects related to the use of the CO_2e Reports.

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Valby, 16. September 2025

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Appendices

Appendix 1: Overview of emission factors applied

Description	Unit	Total kg CO2e/unit	Type LCA*	Soruce
Sherry, dry (Ra00185)	kg	2,91	C-LCA	Concito Den Store Klimadatabase v1.2, September 2024
Liqueur, coffee with cream (Ra00186)	kg	3,56	C-LCA	Concito Den Store Klimadatabase v1.2, September 2024
Beer, pilsner, 4.4% vol., can (Ra00017)	kg	0,68	C-LCA	Concito Den Store Klimadatabase v1.2, September 2024
Beer, light, 1.7% vol., can (Ra00018)	kg	0,68	C-LCA	Concito Den Store Klimadatabase v1.2, September 2024
Beer, strong, 7.6% vol., can (Ra00019)	kg	0,68	C-LCA	Concito Den Store Klimadatabase v1.2, September 2024
Bitter, Gammel Dansk Bitter Dram (Ra00305)	kg	3,57	C-LCA	Concito Den Store Klimadatabase v1.2, September 2024
Cognac (Ra00306)	kg	5,76	C-LCA	Concito Den Store Klimadatabase v1.2, September 2024
Vodka (Ra00307)	kg	3,57	C-LCA	Concito Den Store Klimadatabase v1.2, September 2024
Snaps, 40% vol. (Ra00308)	kg	3,57	C-LCA	Concito Den Store Klimadatabase v1.2, September 2024
White wine (Ra00375)	kg	1,65	C-LCA	Concito Den Store Klimadatabase v1.2, September 2024
Rosé wine (Ra00376)	kg	1,65	C-LCA	Concito Den Store Klimadatabase v1.2, September 2024
Red wine (Ra00377)	kg	1,65	C-LCA	Concito Den Store Klimadatabase v1.2, September 2024
White wine, sparkling, champagne (Ra00378)	kg	1,74	C-LCA	Concito Den Store Klimadatabase v1.2, September 2024
Alcoholic soda, 4% vol. (Ra00399)	kg	1,65	C-LCA	Concito Den Store Klimadatabase v1.2, September 2024
Cider 4.5% vol. (Ra00426)	kg	1,15	C-LCA	Concito Den Store Klimadatabase v1.2, September 2024
Fruit juice, mixed, plastic bottle (Ra00117)	kg	2,52	C-LCA	Concito Den Store Klimadatabase v1.2, September 2024
Potato chips (crisps) (Ra00364)	kg	4,24	C-LCA	Concito Den Store Klimadatabase v1.2, September 2024
Iced tea, peach, carton (Ra00397)	kg	0,94	C-LCA	Concito Den Store Klimadatabase v1.2, September 2024
Soft drink, added sugar, unspecified (Ra00183)	kg	0,59	C-LCA	Concito Den Store Klimadatabase v1.2, September 2024
Dark chocolate (Ra00324)	kg	7,86	C-LCA	Concito Den Store Klimadatabase v1.2, September 2024
Agave proxy (Ra00307+20%)	kg	4,28	C-LCA	Quantified Impacts, June 2025
Gin proxy (Ra00307+5%)	kg	3,75	C-LCA	Quantified Impacts, June 2025
Rum proxy (light) (Ra00307+10%)	kg	3,93	C-LCA	Quantified Impacts, June 2025
Rum proxy (dark, aged) (Ra00307+20%)	kg	3,93	C-LCA	Quantified Impacts, June 2025
Whisky proxy (Ra00307+30%)	kg	7,49	C-LCA	Quantified Impacts, June 2025
50-75 cl glass bottle	pcs.	0,55	A-LCA	ecoSPIRITS, june 2025
ecoTOTE 4,5L (150 cycles)	pcs.	0,25	A-LCA	ecoSPIRITS, 2024
10L Bulk	pcs.	1,51	A-LCA	Supplier of bulks, 2024
1L glass bottle	pcs.	0,96	A-LCA	Assumed with 1,75 bottles of 50-75 cl glass bottle
Transport, freight, lorry, all sizes, EURO 6	t*km	Cannot be published	A-LCA	Ecoinvent, database version 3.11, IPCC2021

*C-LCA = consequential LCA; A-LCA = attributional LCA.

Appendix 2: Formulas for Calculation

CO_2e Calculation Formula (For scope 3.1 reporting)

$$CO_2e_{total3.1} = (M_{product} \times EF_{product}) + (M_{product} \times D_{transport} \times EF_{transport})$$

Whereas,

$M_{product}$ = mass or volume of purchased product (e.g. kg or liters)

$EF_{product}$ = emission factor of the product (e.g. kg CO_2e per kg spirit)

$D_{transport}$ = transport distance from supplier to WH (km)

$EF_{transport}$ = emission factor for transport (kg CO_2e per ton*km)

CO_2e Calculation Formula (For scope 3.4 reporting)

$$CO_2e_{total3.4} = M_{product} \times D_{transport} \times EF_{transport}$$

Whereas,

$M_{product}$ = mass or volume of purchased product (e.g. kg or liters)

$D_{transport}$ = transport distance from WH to customer (km)

$EF_{transport}$ = emission factor for transport (kg CO_2e per ton*km)

Appendix 3: Glossary

CO_2e (Carbon Dioxide Equivalent): Unit for reporting GHGs, representing the warming impact of CO_2, CH_4, N_2O, etc.

Activity-based approach: Method of calculating emissions by linking activity data (e.g. volume, mass, distance) to emission factors.

C-LCA (Consequential Life Cycle Assessment): A life cycle assessment approach focusing on system-wide and future-oriented impacts of changes in production or consumption.

Attributional LCA (A-LCA)
Life cycle assessment that allocates average environmental burdens to a product, usually with cradle-to-gate scope.

CO_2e (Carbon Dioxide Equivalent): A unit that expresses the combined effect of greenhouse gases (CO_2, CH_4, N_2O, etc.) in terms of the equivalent amount of CO_2.

Emission factor (EF): A coefficient expressing the emissions associated with a given activity or product per unit (e.g. kg CO_2e per liter spirit, or per ton-km transport).

GHG Protocol: The Greenhouse Gas Protocol provides standards and guidance for companies to measure and manage greenhouse gas emissions.

Scope 3.1 (Purchased Goods and Services): GHG Protocol category covering emissions from the production of purchased goods and services.

Scope 3.4 (Upstream Transport and Distribution): GHG Protocol category covering emissions from transport of goods between suppliers, warehouses, and distribution.

EURO 6 lorries: Heavy-duty vehicles compliant with EU emission standards, used as basis for transport emission factors.

Appendix 4: References

CONCITO (2024). Den Store Klimadatabase, version 1.2. Copenhagen: CONCITO.

Ecoinvent Association (2021). Ecoinvent Database, version 3.11. Zürich, Switzerland.

GHG Protocol (2013). Technical Guidance for Calculating Scope 3 Emissions (version 1.0). World Resources Institute and World Business Council for Sustainable Development.

IPCC (2021). Climate Change 2021: The Physical Science Basis. Contribution of Working Group I to the Sixth Assessment Report of the IPCC. Cambridge University Press.

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