Liquid Intelligent Technologies and Africa Data Centre Carbon Footprint Report

FY2023

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1. Introduction

This report presents the Liquid Intelligent Technologies' (Liquid) greenhouse gas (GHG) inventory for the financial year 2023 (FY2023), for the Africa, United Kingdom and Mauritius operations. Liquid's financial year runs from 1 March 2022 to 28 February 2023.

The inventory encompasses the direct and indirect emissions generated by Liquid's operations. The computations detailed in this report are provided within a corresponding Excel document that incorporates the necessary inputs, assumptions, and emission factors.

The purpose of this assessment report is to compile the GHG emissions inventory specifically for corporate reporting. The intended audience of this report includes company executives, shareholders, customers, and other interested or affected parties.

2. Approach and Methodology

The corporate GHG inventory for FY2023 was undertaken and compiled in accordance with the following standards:

- The Greenhouse Gas Protocol Corporate Standard (GHG Protocol) as developed by the World Business Council for Sustainable Development and the World Resources Institute.

- The ISO 14064-1, 2nd edition. The ISO standard for measuring and reporting GHG emissions, ISO 14064-1:2006, was revised by the ISO in 2018 and a new edition, ISO 14064-1:2018, was released. A comparison between the old version of the standard, ISO 14064-1:2006, which is in alignment with the GHG Protocol standard, and the new ISO 14064-1:2018 categories is presented in Appendix 2: Comparison between the old ISO14064-1:2006 and new ISO 14064-1:2018 Standard.

By using these internationally recognised standards in a complementary way, the GHG inventory's environmental integrity is enhanced, corporate risk management is supported, and the development of a GHG management strategy is facilitated. The GHG protocol principles for the accounting of this GHG inventory are detailed in **Table 1**.

Table 1: Principles for GHG accounting and reporting.

Principle	Description
Relevance	Ensure the GHG inventory appropriately reflects the GHG emissions of Liquid Intelligent Technologies and serves the decision-making needs of both internal and external stakeholders.
Completeness	The GHG inventory accounts for all significant GHG emission sources within Liquid Intelligent Technologies' chosen inventory boundary.
Consistency	Utilise consistent methodologies to enable meaningful comparisons of emissions over time within Liquid Intelligent Technologies.
Transparency	Address all relevant issues in a factual and coherent manner, based on a clear audit trail specific to Liquid Intelligent Technologies. Disclose any relevant assumptions and provide appropriate references to the accounting and calculation methodologies as well as data sources used.

Principle	Description
Accuracy	Ensure that the quantification of GHG emissions for Liquid Intelligent Technologies is systematically neither overestimated nor underestimated to the best of our judgment, while reducing uncertainties as far as practicable.

The first step in the quantification of a GHG inventory is the selection of reporting boundaries. These boundaries are important as they identify the GHG sources (activities that emit GHGs) that are to be included in the inventory calculation. Two types of GHG inventory boundaries need to be set – an organisational boundary and an operational boundary.

2.1. Organisational Boundary

The organisational boundary refers to a grouping of activities or facilities over which an organisation exercises operational or financial control. It determines which facilities or operations are included in the organisation's GHG inventory for reporting purposes. Two approaches can be used to set the organisational boundary: the control approach and the equity share approach.

Under the control approach, a company accounts for 100% of the GHG emissions from facilities or operations that it has direct control over. This approach considers both financial control and operational control. Financial control is established when a company has the authority to direct the financial and operating policies of an operation, allowing them to gain economic benefits from it. Operational control, on the other hand, is determined by the company's full authority to introduce and implement operating policies at an operation.

The equity share approach, in contrast, considers a company's GHG emissions based on its share of equity in an operation. In this approach, the company accounts for its proportionate emissions based on its ownership stake in the operation.

By establishing the organisational boundary, organisations can accurately determine which facilities or operations to include in their GHG inventory. This ensures the comprehensive reporting of emissions for the purposes of measuring and managing the organisation's carbon footprint and implementing effective emission reduction strategies.

Liquid has adopted an *operational control approach* for determining the organisational boundary for their GHG reporting. This means that Liquid accounts for GHG emissions from all facilities over which they have full authority to introduce and implement operating policies. Therefore, the emissions reported in this document pertain to all of Liquid's activities and operations within the following countries:

1. South Africa
2. Kenya
3. Uganda
4. Rwanda
5. South Sudan
6. Tanzania
7. Zanzibar
8. Botswana
9. Democratic Republic of Congo (DRC)
10. Zambia
11. Zimbabwe
12. Nigeria
13. United Kingdom (UK)
14. Mauritius

Liquid groups some of the countries together in regions and denotes their sites within these countries as Operations. The subdivisions of the company are also divided into ADC or Liquid. The list of Liquid's Operations included in the operational boundary of the GHG inventory is the following:

Region	Country	Business Division
South Africa Region	South Africa	Liquid
East Africa Region	Kenya	Liquid
	Uganda	Liquid
	Rwanda	Liquid
	South Sudan	Liquid
	Tanzania	Liquid
	Zanzibar	Liquid
Central Africa Region	Botswana	Liquid
	DRC	Liquid
	Zambia	Liquid
	Zimbabwe	Liquid
ADC	Nigeria	ADC
	Kenya	ADC
	South Africa	ADC
Liquid Corporate	UK	Liquid
	Mauritius	Liquid

2.2. Data and Emission Sources

The inputs, resources, and activities associated with running Liquid's operations have emission-related impacts. It is crucial to identify the relevant activity data sets to calculate the company's carbon footprint for the FY2023.

The activity data sets used for the carbon footprint calculations were provided by the various regional managers of Liquid's regions and have been included in the GHG inventory calculations for FY2023. While no verification or assurance of the data sources or results has been conducted by a third party, efforts have been made to ensure data accuracy and integrity. The following data sets were considered in the carbon footprint calculations:

- Direct emissions from combustion of fuels in stationary and mobile equipment.

- Direct emissions of fugitive gasses associated with the leakage of refrigerant gasses.
- Indirect emissions from purchased electricity consumed by Liquid's operations.
- Indirect emissions associated with employee commuting of Liquid UK's employees.
- Emissions from business travel, including flights, train journeys, and accommodation of Liquid's operations.
- Indirect emissions from the treatment and disposal of waste generated within the operations.
- Indirect emissions associated with water consumption, considering the energy required for water treatment and distribution within the operations.
- Emissions from other ancillary activities or operations identified as significant contributors to Liquid's carbon footprint.

2.3. Significance Criteria

The data sets provided by Liquid and the resulting emissions were assessed in terms of their significance, considering the impact on Liquid's carbon footprint. The significance assessment, outlined in Table 2, ensures that the carbon footprint boundary includes emission sources that are considered significant. The outcomes of the significance assessment are contained in Table 3. This boundary setting becomes crucial for setting emission reduction targets, which Liquid may consider in the future.

Companies are responsible for establishing their own criteria to determine the significance of their indirect emissions, taking into consideration the purpose of the GHG inventory. ISO 14064-1:2018 does however provide guidance for companies to establish their significance criteria for determining the significant emission sources within their indirect emissions. In accordance with the ISO 14064-1:2018 standard, Liquid has employed a significance assessment to identify the most material sources of emissions in its carbon footprint. This assessment serves as a guideline for future carbon footprint reporting by Liquid, ensuring that the identified emissions are appropriately addressed.

The criteria used to determine the significant emissions sources include:

- **Magnitude**: These indirect emissions sources have a quantitatively substantial impact. This criterion focuses on emissions sources that contribute significantly to a company's overall carbon footprint.
- **Level of influence**: Evaluates the extent to which a company can monitor and reduce emissions associated with specific activities. This criterion considers factors such as energy efficiency measures, eco-design practices, customer engagement initiatives, and terms of reference that the exertion of control over emissions.
- **Risk or opportunity**: Indirect emissions that expose a company to climate-related risks and opportunities. This criterion considers factors such as financial, regulatory, supply chain, product and customer risks, as well as opportunities for new markets or business models.
- **Sector-specific guidance:** A company should consider sector-specific guidance when determining the significance of GHG emissions within their industry. This criterion ensures alignment with industry norms and best practices when selecting significant emissions.
- **Outsourcing:** Consider indirect emissions resulting from outsourced activities that are typically core business activities. This criterion recognises the emissions associated with outsourced operations and includes them in the assessment of significant emissions.
- **Employee engagement:** Evaluate indirect emissions that have the potential to motivate employees to reduce energy use and foster a collective commitment to addressing climate change. This criterion includes initiatives such as energy conservation incentives and carpooling programs.

By employing these significance criteria, Liquid ensures a comprehensive evaluation of its indirect emissions, focusing on emission sources that have the most significant impact on its carbon footprint.

This approach enables Liquid to prioritise its reporting and mitigation efforts, align with industry standards, and engage stakeholders effectively.

The table below outlines the framework used to assess the significance of emissions sources and determine the inclusions in Liquid's GHG inventory based on recommended thresholds.

Table 2: Significance criteria and thresholds for inclusion

Significance criteria	Definition
1. Magnitude	**Significant if** emissions account for 1% or more of Liquid's total carbon footprint are considered quantitatively substantial and significant.
2. Level of influence	**Significant if** Liquid has direct control of emission sources and can implement measures to monitor and reduce the emissions associated with these activities.
3. Risk and opportunity	**Significant if** indirect emissions contribute to Liquid's exposure to significant climate-related risks or opportunities. This could include emissions associated with activities that contribute to at least one of the following: increase in regulatory risk, increase in supply chain risk, or expansion into a new market opportunity.
4. Sector-specific guidance	**Significant if** there are sector-specific guidance, benchmarks or targets for indirect emissions that are relevant to Liquid in the telecommunications sector.
5. Outsourcing	**Significant if** indirect emissions result from outsourced activities that are core business activities. For example, transportation of products by third-party logistics providers.
6. Employee engagement	**Significant if** employees' activities (e.g. travel/commuting) result in a significant contribution to Liquid's indirect emissions.

The emission sources which have been included in Liquid's GHG inventory are detailed in Table 3. Further details on the significance assessment are contained in Appendix 3: Significance Assessment.

In accordance with the corporate GHG standards, the emissions from Liquid's operations are categorised as either direct or indirect emission sources. The reporting of direct emissions, also known as Scope 1 emissions, as well as energy indirect emissions, known as Scope 2 emissions, are mandatory to report according to the GHG protocol and the ISO 14064-1 standards. However, the reporting of other indirect emissions, referred to as Scope 3 emissions, is considered voluntary in the GHG Protocol and is at the discretion of the company whether to report on these emissions. The ISO 14064-1:2018 provides guidance in the form of significance criteria which should be used to determine what indirect emissions sources should be included in the GHG inventory.

The emission sources included in the boundary of this assessment are presented below, categorised according to the respective categories used by both the GHG Protocol and the ISO 14064-1:2018 standard. These categories align with the different scopes referenced in the GHG Protocol. These emission sources have been carefully evaluated for their significance and inclusion within Liquid's carbon footprint boundary. The assessment ensures transparency, accuracy, and comparability in reporting, allowing for future reference and the establishment of emissions reduction targets.

As Liquid continues to develop and mature its carbon footprint calculations, the emission sources and their boundary may evolve. The identification and justification of emission sources are essential components of the formal emissions target-setting procedure, providing a solid foundation for Liquid's sustainability efforts.

Table 3: Emissions sources and categorisation in Liquid's FY2023 GHG inventory

Emission Sources	ISO 14064:2018		ISO 14064:2006		Inclusion in GHG Inventory
	Category	Description	Category	Description	
Emissions that occur from sources that are controlled or owned by Liquid such as: • Stationary Diesel/Petrol Combustion • Mobile Diesel/Petrol Combustion • Fugitive Emissions	1	Direct GHG emissions and removals	Scope 1	Energy direct emissions	**Included:** as required by SANS 14064-1:2021 and ISO 14064-1:2006.
Emissions associated with the purchasing of electricity, or the generation of renewable energy.	2	Indirect GHG emissions from imported energy	Scope 2	Energy indirect emissions	**Included** as required by SANS 14064-1:2021 and ISO 14064-1:2006. **Included based on significance assessment**: Indirect GHG emissions from electricity use are significant due to the **magnitude** in Liquid's emissions.
Emissions related to the production of fuels and energy purchased and consumed by Liquid in the reporting year such as: • Upstream emissions of purchased fuels • Upstream emissions of purchased electricity • Transmission and Distribution losses			Scope 3, category 3	Fuel- And Energy-Related Activities	**Included based on significance assessment**: Indirect GHG emissions from fuel- and energy-related activities are significant due to the **magnitude** of the emissions.
Emissions from the transportation and distribution activities throughout	3	Indirect GHG emissions from transportation	Scope 3, category 4	Upstream Transportation	**Excluded as no upstream transport and distribution has**

Emission Sources	ISO 14064:2018		ISO 14064:2006		Inclusion in GHG Inventory
	Category	Description	Category	Description	
the value chain: • Water transport • Road transport • Air transport				and Distribution	**been reported by Liquid.**
Emissions from business travel such as: • Air travel • Rail travel • Bus travel • Automobile travel (e.g., business travel in rental cars or employee-owned vehicles other than employee commuting to and from work) • Accommodation • Travel claims			Scope 3, category 6	Business Travel	**Included based on significance assessment:** Emissions related to business travel are significant due to Liquid having the ability to **influence** the methods of corporate logistics and business travel, as well as **Sector-specific**[1] guidance that states the emissions associated with business travel activities can be a significant source of emissions for telecommunication companies.
Emissions from employee commuting such as: • Automobile travel • Bus travel • Rail travel • Air travel Other modes of transportation (e.g., subway, bicycling, walking)			Scope 3, category 7	Employee Commuting	**Included based on significance assessment:** Emissions related to employee commuting are significant due the Liquid having the **opportunity** to **engage employees** to reduce their emissions resulting from commuting.
Emissions from downstream transportation and distribution from transportation/storage of sold			Scope 3, category 9	Downstream Transportation and	**Included based on significance assessment:** Emissions related to downstream

[1] Science Based Targets. 2020. Guidance for ICT companies setting Science Based Targets. Available online at: [20200227-Guidance-ICT-companies-report.PDF (itu.int)].

Emission Sources	ISO 14064:2018		ISO 14064:2006		Inclusion in GHG Inventory
	Category	Description	Category	Description	
products in vehicles/facilities not owned by Liquid, such as: • Air transport • Road transport				Distribution	transport and distribution are significant due the Liquid having the **influence** to reduce their emissions resulting from transport and according to **sector-specific**[1] guidance if this is related to outbound transport to customers it is a core business activity which should be included.
Products include both goods (tangible products) and services (intangible products) such as: • Water • Stationary • Office equipment	4	Indirect GHG emissions from products used by organisation	Scope 3, category 1	Purchased Goods and Services	**Included based on significance assessment:** Indirect GHG emissions relating to goods used by Liquid are significant due to the level of **influence** Liquid has over the type of goods that can be purchased and according to **sector-specific** guidance for core business operations.
Emissions from the use of capital goods by the company, such as: • Equipment • Machinery • Buildings • Vehicles			Scope 3, category 2	Capital Goods	**Not applicable as no capital goods were reported in Liquid's GHG emissions.**
Emissions from processing of sold intermediate products by third parties (e.g., manufacturers) subsequent to sale by the company	5	Indirect GHG emissions associated with the use of products from the organisation	Scope 3, category 10	Processing of Sold Products	**Not applicable as Liquid is a service provider and therefore product emissions are not reported in Liquid's GHG emissions.**
Emissions from the use of goods and services sold by the company in the reporting year.			Scope 3, category 11	Use of Sold Products	
Emissions from the waste disposal			Scope 3, category 12	End-Of-Life	

Emission Sources	ISO 14064:2018		ISO 14064:2006		Inclusion in GHG Inventory
	Category	Description	Category	Description	
and treatment of products sold by the reporting company such as: • Landfilling • Incineration • Recycling				Treatment of Sold Products	
Waste treatment activities may include: • Disposal in a landfill • Recovery for recycling • Incineration • Composting (Food Waste) • Electronic waste	6	Indirect GHG emissions from other sources	Scope 3, category 5	Waste Generated in Operations	**Included based on significance assessment:** Indirect GHG emissions from waste generation are significant due to the level of **influence** Liquid has over how much waste is generated, and the **risk and opportunities** electronic waste disposal or recycling may have.
Operation of assets that are leased by the reporting company in the reporting year such as: • Vehicles • Equipment • Generator			Scope 3, category 8	Upstream Leased Assets	**Not applicable as no leased assets were reported in Liquid's GHG emissions.**
Assets that are owned by the reporting company (acting as lessor) and leased to other entities in the reporting year such as: • Vehicles • Equipment • Generator			Scope 3, category 13	Downstream Leased Assets	
Emissions from the operation of franchises not included in scope 1 or scope 2.			Scope 3, category 14	Franchises	**Not applicable as Liquid does not utilise a franchise model.**
Emissions associated with the reporting company's investments in			Scope 3, category 15	Investments	**Not applicable as no investment activities were reported in this**

Emission Sources	ISO 14064:2018		ISO 14064:2006		Inclusion in GHG Inventory
	Category	Description	Category	Description	
the reporting year such as: • Equity investments • Debt investments • Project finance • Managed investments and client services.					**boundary of Liquid's GHG emissions.**

2.4. Calculation Methodology

The methodology used to calculate the GHG inventory entails multiplying the GHG activity data by an appropriate emission factor.

Activity data x Emission Factor = Quantity of GHG Emissions

The total GHG emissions produced by Liquid's operations annually are determined by adding up the GHG emissions quantities calculated for each activity data source using the above equation.

2.5. Assumptions, Emission factors and Conversion Factors

The calculations of Liquid's FY2023 GHG inventory rely on a range of assumptions, emission factors, and conversion factors, which have been carefully selected and applied to ensure accuracy and reliability. These factors are provided in the accompanying Excel spreadsheet and are also available in Appendix 1: Assumptions and Emission /Conversion Factors of this report.

The selection of these factors follows the guidance provided by ISO 14064-1:2018, ensuring that they meet the necessary criteria for robust emissions quantification. The factors employed in the calculation process should satisfy the following requirements:

- Recognised Source: All factors used originate from reputable and recognised sources within the field of greenhouse gas accounting and reporting.
- Appropriate for GHG Sources: Each factor is specifically chosen to be appropriate for the greenhouse gas source being assessed. This ensures that the calculations accurately reflect the emissions associated with each activity.
- Up to date: The selected factors are up to date as of the time of quantification, considering the most recent available data and scientific knowledge. This ensures that the inventory calculations capture the current understanding of emissions and reflect the latest information.
- Consideration of Uncertainty: The chosen factors consider the quantification uncertainty associated with each emission source. They are calculated with methodologies that provide accurate and reproducible results, minimising uncertainties and ensuring the reliability of the inventory.
- Alignment with Intended Use: The factors align with the intended use of the GHG inventory, which is to provide a comprehensive and accurate representation of Liquid's emissions. They are specifically chosen to suit the purpose of the inventory and facilitate effective decision-making based on the results.

By adhering to these criteria, Liquid ensures that the calculations of its GHG inventory are based on reliable and relevant information. The transparent inclusion of these assumptions, emission factors, and conversion factors allows for traceability and facilitates the understanding and verification of the reported emissions.

During the calculation of Liquid's GHG inventory for FY2023, several key assumptions were made to ensure the completeness and accuracy of the emissions assessment. The following assumptions were taken into consideration:

- Electricity Consumption: In cases where electricity consumption data was not provided directly, the payment amount for each location was utilised along with known electricity consumptions to calculate an intensity factor. This intensity factor was then used to estimate the missing electricity consumption data for accurate inventory calculations.

- The purchased electricity data provided for the Liquid South Africa operations were consolidated into single values per month, even though the facility is shared between Liquid South Africa and ADC South Africa subdivisions. To allocate the electricity consumption accurately, it was assumed that ADC South Africa utilizes 75% of the electricity, while Liquid South Africa consumes the remaining 25%. These estimates were based on the information provided by Liquid and were used to apportion the electricity consumption between the two subdivisions.

- Transmission and Distribution Losses: In cases where accurate and up-to-date country-specific transmission and distribution loss percentages were not available, we adopted a conservative approach by assuming an approximate loss percentage of 10%. This assumption was made to account for the energy losses that occur during the transmission and distribution of electricity. To derive a reasonable estimate, we used the transmission and distribution loss percentage applicable to South Africa, which served as a representative value for countries where specific data was unavailable. While acknowledging that transmission and distribution losses can vary across regions, adopting a conservative estimate helps to ensure a prudent approach in our calculations.

- Purchased Goods:

  - The emissions associated with purchased goods, specifically purchased computers, were determined by using a large computer manufacturer's total Scope 1 and Scope 2 emissions divided by their total revenue. This calculation provided an emission factor based on costs that were applied to the purchased computers to estimate their emissions contribution.

  - To estimate water consumption for operations where specific data was not available, we employed an average water intensity factor. This factor was derived by aggregating the comprehensive water consumption data from ADC Kenya, Botswana, Zambia, and DRC and dividing it by the total headcount across these regions. This calculation allowed us to determine the average water consumption per person per year. Subsequently, we applied this intensity factor to the employee headcount of each operation that lacked water data for FY23. By using this approach, we were able to provide an estimation of water consumption associated with the respective operating facilities.

- Business Travel Distances: For unknown business travel distances, approximations were made using Google Maps. These estimations allowed for the calculation of emissions based on the distance travelled for business purposes.

- Employee Travel Claims: The emissions associated with employee travel claims were approximated by utilising the company’s reimbursement rates provided. By using these rates, the kilometres travelled for business purposes were calculated and multiplied by the relevant DEFRA emissions factors, enabling the estimation of emissions associated with employee travel mode.

- Employee Commuting: The activities associated with employee commuting was only available for Liquid UK which was included in the GHG inventory as it would have a substantial impact in the future when all the operations can provide the data. For Liquid UK’s commuter data, the following assumptions were applied:

  - Emission factors for mixed employee commuting were derived by averaging the known emission sources associated with various commuting modes. This provided a

representative average emission factor that was applied to estimate emissions for employees with unknown commuting details.

- To account for employees who did not complete the survey or provide commuting data, the available employee commuting data was extrapolated to represent all employees. This allowed for a more comprehensive estimation of emissions associated with employee commuting.

- Measurement Units: In cases where data was provided for all activities included in the GHG inventory, but the unit of measure was not specified, we assumed that the standard unit of measure for the respective activity would apply. This allowed for consistency and ensured that the data could be accurately aggregated and analysed across the inventory. Wherever possible, we sought clarification and confirmation of the units to maintain accuracy and reliability in our reporting.

These assumptions were made to ensure a reasonable estimation of GHG emissions in cases where direct data was unavailable or incomplete. It is important to note that these assumptions were based on available information and industry best practices. As more accurate or specific data becomes available, these assumptions can be refined in future reporting cycles to further enhance the accuracy and reliability of Liquid's GHG inventory calculations.

The calculation of the GHG emissions for Liquid's carbon footprint relied on the use of reliable and up-to-date emission factors obtained from various trusted sources. The UK Department of Environment Food and Rural Affairs (DEFRA[2]) and the Methodological Guidelines for Quantification of Greenhouse Gas Emissions[3] played a significant role as the primary sources for emission factors related to Liquid's activities. The DEFRA and Methodological Guidelines' emission factors are widely recognised and accepted within the industry, ensuring the reliability and relevance of the data for Liquid's context.

3. Results for Corporate Reporting

This section provides an overview of the FY2023 GHG inventory for Liquid, intended for corporate reporting purposes. The inventory has been prepared following the reporting formats outlined in the GHG Protocol, ISO 14064-1:2006 standard and the recently updated ISO 14064-1:2018 standard. The inventory reported under the GHG Protocol and the ISO 14064-1:2006 standard is reported in the following section. The inventory reported under the ISO 14064-1:2018 standard can be found in Appendix 4: ISO 14064-1:2018 Standard Reporting.

3.1. Results as per GHG Protocol and ISO14064-1:2006

Table 4 is a summary of Liquid's GHG inventory for FY2023, following the reporting structure outlined by the GHG Protocol and the ISO14064-1:2006 standard. The inventory covers direct emissions (Scope 1), energy indirect emissions (Scope 2) and other indirect emissions (Scope 3).

[2] The UK Department of Environment Food and Rural Affairs. Greenhouse gas reporting: conversion factors 2022 - GOV.UK (www.gov.uk)

[3] Department of Forestry, Fisheries and the Environment. 2022. *Methodological Guidelines for Quantification of Greenhouse Gas Emissions.*

Table 4: FY2023 GHG inventory according to the GHG Protocol and ISO14064-1:2006

Scope	Description	ADC FY2023 Emissions	Liquid FY2023 Emissions	Total FY2023 Emissions
SCOPE 1	Stationary Combustion Sources	6 137.73 tCO_2e	6 524.11 tCO_2e	12 661.83 tCO_2e
	Mobile Combustion Sources	0 tCO_2e	3 326.35 tCO_2e	3 326.35 tCO_2e
	Fugitive Emissions	0 tCO_2e	1 024.77 tCO_2e	1 024.77 tCO_2e
Total SCOPE 1		**6 137.73 tCO_2e**	**10 875.23 tCO_2e**	**17 012.96 tCO_2e**
SCOPE 2	Purchased Electricity	71 790.87 tCO_2e	37 278.48 tCO_2e	109 069.34 tCO_2e
Total SCOPE 2		**71 790.87 tCO_2e**	**37 278.48 tCO_2e**	**109 069.34 tCO_2e**
SCOPE 3	Purchased Goods and Services	0.16 tCO_2e	0.39 tCO_2e	0.55 tCO_2e
	Fuel- and Energy-related Activities	9 373.94 tCO_2e	5 072.09 tCO_2e	14 446.03 tCO_2e
	Waste Generated in Operations	22.30 tCO_2e	50.92 tCO_2e	73.22 tCO_2e
	Business Travel	0 tCO_2e	1 162.46 tCO_2e	1 162.46 tCO_2e
	Employee Commuting	0 tCO_2e	37.07 tCO_2e	37.07 tCO_2e
	Downstream Transportation & Distribution	0 tCO_2e	738.09 tCO_2e	738.09 tCO_2e
Total SCOPE 3		**9 396.40 tCO_2e**	**7 061.03 tCO_2e**	**16 457.43 tCO_2e**
Total Emissions (Scope 1, 2 & 3)		**87 324.99 tCO_2e**	**55 214.74 tCO_2e**	**142 539.73 tCO_2e**

In FY2023, Liquid's GHG inventory captured the direct and indirect emissions associated with their operations. The direct emissions, which include emissions from stationary and mobile fuel combustion as well as fugitive emissions from refrigerant gas leakage, amounted to 17 012.96 tCO_2e. The energy indirect emissions, resulting from the purchased electricity used in Liquid's operations, accounted for 109 069.34 tCO_2e. Liquid also reported on its other indirect emissions (Scope 3), which encompass a range of activities beyond its direct operational control. The calculated Scope 3 emissions for FY2023 totalled 16 457.43 tCO_2e. These emissions originate from diverse sources such as the purchasing of goods, fuel- and energy-related activities, business travel, employee commuting, and downstream transportation and distribution. By including these emissions, Liquid recognises the broader impact of its activities and extends its environmental transparency.

It is important to acknowledge that the emissions attributed to waste and employee commuting in this reporting year do not represent the entirety of Liquid's activity data for these sources. However, Liquid has undertaken efforts to address this issue by implementing monitoring measures that will commence from this year onwards. These measures aim to accurately account for emissions from waste and employee commuting, ensuring a more comprehensive understanding of Liquid's carbon footprint.

Liquid has taken steps to enhance waste management practices and implement monitoring measures to capture data from all types of waste generated by its operations. Additionally, employee commuting surveys have been initiated to account for employees' commuting habits, enabling a more accurate assessment of associated emissions.

By continually improving its data collection and monitoring processes, Liquid is actively working towards a more robust and comprehensive GHG inventory, enabling informed decision-making, targeted emissions reductions, and the development of sustainable practices across its operations.

4. Conclusion and Recommendations

In this section of the FY2023 carbon footprint report for Liquid, valuable insights into the organisation's greenhouse gas emissions are provided. The data collected and analysed in accordance with the GHG Protocol and ISO 14064-1:2006 highlights the significant sources of emissions, offering valuable insights for future carbon footprint reporting and management strategies. These findings emphasize the need for targeted efforts to reduce emissions in these areas.

4.1. Conclusion

The total emissions for Liquid's FY2023 carbon footprint are summarised in Table 5, following the ISO 14064-1:2006 and GHG Protocol standards.

Table 5: Summary of FY2023 results according to ISO14064-1:2006 and GHG Protocol

GHG Inventory according to ISO14064-1:2006 and GHG Protocol	ADC FY2023 Emissions	Liquid FY2023 Emissions	Total FY2023 Emissions
Scope 1: Direct GHG emissions and removals	6 137.73 tCO_2e	10 875.23 tCO_2e	17 012.96 tCO_2e
Scope 2: Indirect GHG emissions from imported energy	71.790.87 tCO_2e	37 278.48 tCO_2e	109 069.34 tCO_2e
Scope 3: Other indirect emissions that occur in the value chain	9 396.40 tCO_2e	7 061.03 tCO_2e	16 457.43 tCO_2e
Total emissions	**87 324.99 tCO_2e**	**55 214.74 tCO_2e**	**142 539.73 tCO_2e**

The total carbon footprint for FY2023 amounts to 142 539.73 tCO_2e. The largest contributor is Scope 2 energy indirect emissions at 109 069.34 tCO_2e, which contributes to 76.52% of the total GHG emissions, representing the emissions associated with the purchasing of electricity. Scope 1 the direct emissions, contributed as the second largest source of Liquid's GHG emission at 17 012.96 tCO_2e, which represents 11.94% of Liquid's total GHG emissions. The scope 3 other indirect emissions amounted to 16 457.43 tCO_2e, of which the fuel- and energy-related activities emissions contributed to the most as 14 446.03 tCO_2e, followed by the emissions associated with business travel.

In conclusion, Liquid's carbon footprint for FY2023 reveals important insights into the organisation's emissions sources. Identifying the major emission sources highlighted in this report can serve as a foundation for informed decision-making, setting emission reduction targets, and developing sustainability strategies. By addressing transportation-related emissions and expanding monitoring efforts to include all waste streams, employee commuting and minimising the assumptions made on water consumption, Liquid can continue its journey towards a more sustainable and environmentally responsible future. The total emissions of 142 539.73 tCO_2e underscore the need for ongoing mitigation measures and the implementation of sustainable practices across various categories.

4.2. Recommendations

The following recommendations are discussed under two categories, namely emission reduction opportunities and suggestions for improving the quantification of Liquid's carbon footprint data to achieve more accurate emissions data.

Emission reduction opportunities:

To reduce emissions it is recommended that Liquid considers the following measures:

- Reduce Emissions from Purchased Electricity Consumption: To reduce Scope 2 emissions, Liquid can make strategic investments in renewable energy sources. By transitioning to renewable energy, such as solar, wind, or hydroelectric power, Liquid can significantly reduce their reliance on fossil fuel-based electricity generation. This directly reduces greenhouse gas emissions associated with electricity use, thereby lowering Scope 2 emissions. Additionally, investing in renewable energy demonstrates Liquid's commitment to sustainable practices and positions the company as a leader in the transition to a low-carbon economy. The installation of on-site renewable energy systems or the procurement of renewable energy from external sources can further enhance Liquid's environmental stewardship and contribute to possible long-term sustainability goals.

- Waste Management and Recycling: Although general waste monitoring was not in place for the reporting year, Liquid should continue implementing measures to monitor and manage all waste streams in the future. This can involve setting up recycling programs for various waste materials and promoting waste reduction initiatives. By prioritising waste reduction and recycling, the company can reduce its emissions and environmental impact.

- Water consumption: To improve accuracy in the water consumption data, Liquid should establish a robust monitoring and reporting system for water consumption. This can involve collecting data on water usage across different operations and regularly tracking and reporting progress. Accurate monitoring allows for identifying areas of high water consumption and implementing targeted strategies for improvement. Liquid can explore opportunities for water recycling and reuse within its operations. This can involve treating and reusing wastewater for non-potable purposes like landscaping or industrial processes. By minimising the demand for freshwater, water-related emissions can be reduced.

- Business Travel Optimisation: Encourage the use of virtual meetings and remote collaboration tools to reduce the need for extensive business travel. Implementing a clear travel policy that highlights the preference for video conferencing over air travel can be beneficial. This policy might emphasise the importance of making travel decisions based on clear justifications and the necessity of the trip. By requiring employees to provide a clear reason for travel, such as client meetings, essential site visits, or in-person training sessions, unnecessary travel can be minimised.

- Set emissions reduction targets: Setting targets to reduce emissions can provide Liquid with a roadmap to achieve its sustainability goals. Targets should be ambitious but realistic and should cover all scopes of emissions. Regular monitoring and reporting of progress against these targets can also help drive continued improvement.

- Continuous Monitoring and Reporting: Regular monitoring ensures that data collection processes are consistent and up to date, providing a comprehensive understanding of Liquid's environmental impact. By monitoring all activity data sources, including energy consumption, waste generation, water usage, and transportation, Liquid can identify areas of inefficiency and implement targeted measures to reduce emissions. It is essential to establish robust data collection systems, employ automated monitoring tools where possible, and engage relevant stakeholders to ensure the completeness and quality of the data. By prioritising regular monitoring of all activity data sources, Liquid can proactively manage its environmental performance, make informed decisions, and drive continuous improvement in its sustainability efforts.

Recommendations for future Liquid carbon footprint quantification:

We continue to encourage Liquid to:

- Align future carbon footprints to the ISO 14064-1:2018 standard:
  - The significance criteria will need to be applied to each emission source recorded in the footprint boundary.
  - Periodically reassess the significance of emission sources, against the criteria in the ISO 14064-1:2018 standard

- Enhanced Data Collection:
  - Strengthen data collection processes to ensure comprehensive and accurate data on emissions sources. This can involve implementing automated systems for data collection, integrating emission tracking tools into operational processes, and establishing clear guidelines for data reporting from various departments.

- Scope 3 Emissions Assessment:
  - Expand the scope of emissions assessment to include a more detailed analysis of Scope 3 emissions.
  - Collaborate with suppliers and partners to collect data on upstream and downstream emissions associated with the company's value chain. This will provide a complete picture of the company's carbon footprint and identify opportunities for emission reductions.

- Regular Carbon Footprint Assessments:
  - Conduct carbon footprint assessments on a regular basis, such as quarterly or biennially, to track progress and identify trends over time. This will enable Liquid to monitor the effectiveness of emission reduction initiatives, set targets, and adjust strategies accordingly.
  - Regularly review and update the inventory to include new emission sources that may arise from changes in operations, product lines, or business expansion.

- Independent Verification:
  - Engage a third-party auditor or verification body to independently review and verify Liquid’s carbon footprint calculations and reporting. This will enhance the credibility and reliability of the reported emissions data and demonstrate transparency to stakeholders.

- Stakeholder Engagement:
  - Engage with stakeholders, including customers, suppliers, and investors, to understand their expectations and incorporate their input into the carbon footprint quantification process. This will help identify additional areas of focus, foster collaboration, and enhance the credibility of the Liquid's sustainability efforts.

Appendix 1: Assumptions and Emission /Conversion Factors

Item	Value	Unit	Source	Notes
SCOPE 1 - EMISSION FACTORS				
Stationary Combustion – Global (Diesel)	0.00264	tCO_2e/Litre	Calculated by Promethium	Calculated using the global warming potential multiplied by the default combustion emission factor of each GHG respectively, multiplied by the net calorific value of diesel.
Stationary Combustion – South Africa (Diesel)	0.00266	tCO_2e/Litre	Calculated by Promethium	Calculated using the global warming potential multiplied by the default combustion emission factor of each GHG respectively, multiplied by the net calorific value of diesel. The country specific combustion emission factor for CO_2 was used here instead of the default value.
Mobile Combustion – Global (Diesel)	0.00293	tCO_2e/Litre	Calculated by Promethium	Calculated using the global warming potential multiplied by the default combustion emission factor of each GHG respectively, multiplied by the net calorific value of diesel.
Mobile Combustion – Global (Petrol)	0.00231	tCO_2e/Litre	Calculated by Promethium	Calculated using the global warming potential multiplied by the default combustion emission factor of each GHG respectively, multiplied by the net calorific value of petrol.
Mobile Combustion – South Africa (Diesel)	0.00295	tCO_2e/Litre	Calculated by Promethium	Calculated using the global warming potential multiplied by the default combustion emission factor of each GHG respectively, multiplied by the net calorific value of diesel. The country specific combustion emission factor for CO_2 was used here instead of the default value.
Mobile Combustion – South Africa (Petrol)	0.00241	tCO_2e/Litre	Calculated by Promethium	Calculated using the global warming potential multiplied by the default combustion emission factor of each

Item	Value	Unit	Source	Notes
				GHG respectively, multiplied by the net calorific value of petroll. The country specific combustion emission factor for CO_2 was used here instead of the default value.
R22 Refrigerant	1 810	tCO_2e/Tonne	DEFRA GHG conversion factors 2022 - 'Refrigerant & other' tab	
R410a Refrigerant	2 088	tCO_2e/Tonne	DEFRA GHG conversion factors 2022 - 'Refrigerant & other' tab	
R407c Refrigerant	1 774	tCO_2e/Tonne	DEFRA GHG conversion factors 2022 - 'Refrigerant & other' tab	
R134a Refrigerant	1 430	tCO_2e/Tonne	DEFRA GHG conversion factors 2022 - 'Refrigerant & other' tab	
SCOPE 2 - EMISSION FACTORS				
GRID EMISSION FACTORS				
South Africa	1.04	tCO_2e/MWh	Factor 2 in Eskom's 2022 Integrated Annual Report. See page 79 of the pdf	
Kenya	0.58	tCO_2e/MWh	IGES 2022 Grid Emission Factors document - Combined Margin Emission Factors	
Uganda	0.49	tCO_2e/MWh	IGES 2022 Grid Emission Factors document - Combined Margin Emission Factors	
Rwanda	0.65	tCO_2e/MWh	IGES 2022 Grid Emission Factors document - Combined Margin Emission Factors	
South Sudan	0.31	tCO_2e/MWh	IGES 2022 Grid Emission Factors document - Combined Margin Emission Factors	
Tanzania	0.50	tCO_2e/MWh	IGES 2022 Grid Emission Factors document - Combined Margin Emission Factors	
Zanzibar	0.50	tCO_2e/MWh	Assumed to be same as Tanzania	As Zanzibar is an Island off the coast of Tanzania and does receive electricity from Tanzania, it was

Item	Value	Unit	Source	Notes
				assumed that Zanzibar would have the same grid emission factor.
Botswana	1.04	tCO_2e/MWh	Assumed to be same as South Africa	Southern African Power Pool (SAPP Grid)
Democratic Republic of Congo	0.25	tCO_2e/MWh	U4E – Country Savings Assessment[4]	
Zambia	0.96	tCO_2e/MWh	IGES 2022 Grid Emission Factors document - Combined Margin Emission Factors	
Zimbabwe	0.36	tCO_2e/MWh	U4E – Country Assessment[5]	
Nigeria	0.57	tCO_2e/MWh	IGES 2022 Grid Emission Factors document - Combined Margin Emission Factors	
UK Grid Emission Factor	0.19	tCO_2e/MWh	DEFRA GHG conversion factors 2022 - 'UK Electricity' tab	
Mauritius	0.97	tCO_2e/MWh	IGES 2022 Grid Emission Factors document - Combined Margin Emission Factors	
Renewable Energy Sources	0	tCO_2e/MWh		All renewable sources are owned by Liquid.
SCOPE 3 - EMISSION FACTORS				
3.1 PURCHASED GOODS AND SERVICES				
Water Consumption	0.149	$kgCO_2e/kilolitre$	DEFRA GHG conversion factors 2022 - 'Water Supply' tab	
Laptops Purchased Emissions Intensity Factor	0.0000025	tCO_2e/GBP	Calculated by Promethium	This value was calculated using the revenue and total scope 1 + 2 emissions from a major computer manufacturer
3.3 FUEL- AND ENERGY-RELATED ACTIVITIES				
South Africa – Transmission & Distribution Losses	0.13	tCO_2e/MWh	Calculated by Promethium	Calculated as the reciprocal of 1 minus the transmission and distribution loss percentage, minus 1, multiplied by the

[4] United for Efficiency. 2022. Country Savings Assessment. Available online at: [united4efficiency.org/wp-content/uploads/2022/08/COG_U4E-Country-Saving-Assessment_Jul-22.pdf]

[5] United for Efficiency. 2022. Country Assessment. Available online at: [Zimbabwe - United for Efficiency (united4efficiency.org)]

Item	Value	Unit	Source	Notes
				Country Specific Emission Factor multiplied.
South Africa Transmission & Distribution Loss Percentage	10.9	%	Eskom IAR2022 page 144	
Kenya – Transmission & Distribution Losses	0.14	tCO_2e/MWh	Calculated by Promethium	Calculated as the reciprocal of 1 minus the transmission and distribution loss percentage, minus 1, multiplied by the Country Specific Emission Factor multiplied.
Kenya Transmission & Distribution Loss Percentage	19.5	%	International Trade Administration – Country Commercial Guides[6]	
Uganda – Transmission & Distribution Losses	0.02	tCO_2e/MWh	Calculated by Promethium	Calculated as the reciprocal of 1 minus the transmission and distribution loss percentage, minus 1, multiplied by the Country Specific Emission Factor multiplied.
Uganda Transmission & Distribution Loss Percentage	4.1	%	Electricity Regulatory Authority[7]	
Rwanda – Transmission & Distribution Losses	0.14	tCO_2e/MWh	Calculated by Promethium	Calculated as the reciprocal of 1 minus the transmission and distribution loss percentage, minus 1, multiplied by the Country Specific Emission Factor multiplied.
Rwanda Transmission & Distribution Loss Percentage	18.1	%	Rwanda Energy Group[8]	
South Sudan – Transmission & Distribution Losses	0.04	tCO_2e/MWh	Calculated by Promethium	Calculated as the reciprocal of 1 minus the transmission and distribution loss percentage, minus 1, multiplied by the Country Specific Emission Factor multiplied.

[6] International Trade Administration. 2022. Kenya – Country Commercial Guide. Available online at: [Kenya - Energy-Electrical Power Systems (trade.gov)]
[7] ERA – Electricity Regulatory Authority. 2022. Energy Purchases, Sales and Losses. Available online at: [Energy Purchases, Sales and Losses (era.go.ug)]
[8] Rwanda Energy Group. 2022. Annual Report. Available online at: [reg.rw/fileadmin/user_upload/REG_Annual_report_2021-2022.pdf]

Item	Value	Unit	Source	Notes
South Sudan Transmission & Distribution Loss Percentage	10.9	%	Assumed to be same as South Africa	Used South Africa's value as an approximation to calculate transmission and distribution losses.
Tanzania – Transmission & Distribution Losses	0.06	tCO_2e/MWh	Calculated by Promethium	Calculated as the reciprocal of 1 minus the transmission and distribution loss percentage, minus 1, multiplied by the Country Specific Emission Factor multiplied.
Tanzania Transmission & Distribution Loss Percentage	10.9	%	Assumed to be same as South Africa	Used South Africa's value as an approximation to calculate transmission and distribution losses.
Zanzibar – Transmission & Distribution Losses	0.06	tCO_2e/MWh	Calculated by Promethium	Calculated as the reciprocal of 1 minus the transmission and distribution loss percentage, minus 1, multiplied by the Country Specific Emission Factor multiplied.
Zanzibar Transmission & Distribution Loss Percentage	10.9	%	Assumed to be same as South Africa	Used South Africa's value as an approximation to calculate transmission and distribution losses.
Botswana – Transmission & Distribution Losses	0.13	tCO_2e/MWh	Calculated by Promethium	Calculated as the reciprocal of 1 minus the transmission and distribution loss percentage, minus 1, multiplied by the Country Specific Emission Factor multiplied.
Botswana Transmission & Distribution Loss Percentage	10.9	%	Assumed to be same as South Africa – Southern Africa Power Pool	Used South Africa's value as an approximation to calculate transmission and distribution losses.
DRC – Transmission & Distribution Losses	0.20	tCO_2e/MWh	Calculated by Promethium	Calculated as the reciprocal of 1 minus the transmission and distribution loss percentage, minus 1, multiplied by the Country Specific Emission Factor multiplied.
DRC Transmission & Distribution Loss Percentage	44.5	%	U4E – Country Savings Assessment[4]	
Zambia – Transmission & Distribution Losses	0.12	tCO_2e/MWh	Calculated by Promethium	Calculated as the reciprocal of 1 minus the transmission and distribution loss percentage, minus 1, multiplied by the

Item	Value	Unit	Source	Notes
				Country Specific Emission Factor multiplied.
Zambia Transmission & Distribution Loss Percentage	10.9	%	Assumed to be same as South Africa – Southern Africa Power Pool	Used South Africa's value as an approximation to calculate transmission and distribution losses.
Zimbabwe – Transmission & Distribution Losses	0.04	tCO_2e/MWh	Calculated by Promethium	Calculated as the reciprocal of 1 minus the transmission and distribution loss percentage, minus 1, multiplied by the Country Specific Emission Factor multiplied.
Zimbabwe Transmission & Distribution Loss Percentage	10.9	%	Assumed to be same as South Africa – Southern Africa Power Pool	Used South Africa's value as an approximation to calculate transmission and distribution losses.
Nigeria – Transmission & Distribution Losses	0.05	tCO_2e/MWh	Calculated by Promethium	Calculated as the reciprocal of 1 minus the transmission and distribution loss percentage, minus 1, multiplied by the Country Specific Emission Factor multiplied.
Nigeria Transmission & Distribution Loss Percentage	8.69	%	Energy MRC Group[9]	
Electricity Transmission & Distribution Losses	0.02	tCO_2e/MWh	DEFRA 2022 - 'Transmission and distribution' tab	
Mauritius – Transmission & Distribution Losses	0.07	tCO_2e/MWh	Calculated by Promethium	Calculated as the reciprocal of 1 minus the transmission and distribution loss percentage, minus 1, multiplied by the Country Specific Emission Factor multiplied.
Mauritius Transmission & Distribution Loss Percentage	7.08	%	Central Electricity Board Mauritius[10]	
3.5. WASTE GENERATED IN OPERATIONS				

[9] EMRC. 2022. NERC 2022 Half-Year Report. Available online at: [NERC 2022 Half-Year Report (Q1/Q2) – EMRC (energymrc.ng)]

[10] Central Electricity Board Mauritius. 2022. Transmission and Distribution (Facts & Figures). Available online at: [CEB: TRANSMISSION AND DISTRIBUTION (FACTS & FIGURES)]

Item	Value	Unit	Source	Notes
Waste to Landfill	0.46701	tCO_2e/tonne	DEFRA GHG conversion factors 2022 - 'Waste Disposal' tab	
E-Waste Disposed	0.00888	tCO_2e/tonne	DEFRA GHG conversion factors 2022 - 'Waste Disposal' tab	
Recyclable Waste	0.02128	tCO_2e/tonne	DEFRA GHG conversion factors 2022 - 'Waste Disposal' tab	Assumed Average Plastic Waste
E-Waste Recycled	0.02128	tCO_2e/tonne	DEFRA GHG conversion factors 2022 - 'Waste Disposal' tab	
Hazardous Waste	0.00888	tCO_2e/tonne	DEFRA GHG conversion factors 2022 - 'Waste Disposal' tab	Assumed to be E-Waste disposed after confirming waste type with Liquid
Recycled Mixed Paper	0.02128	tCO_2e/tonne	DEFRA GHG conversion factors 2022 - 'Waste Disposal' tab	
3.6 BUSINESS TRAVEL				
FLIGHTS				
Domestic UK	0.24587	$kgCO_2e$/passenger.km	DEFRA 2022 – 'Business Travel – Air' tab	Emission factors used include a radiative forcing uplift.
Economy to/from UK (Short haul)	0.15102	$kgCO_2e$/passenger.km	DEFRA 2022 – 'Business Travel – Air' tab	Emission factors used include a radiative forcing uplift.
Business to/from UK (Short haul)	0.22652	$kgCO_2e$/passenger.km	DEFRA 2022 – 'Business Travel – Air' tab	Emission factors used include a radiative forcing uplift.
Economy to/from UK (Long haul)	0.14787	$kgCO_2e$/passenger.km	DEFRA 2022 – 'Business Travel – Air' tab	Emission factors used include a radiative forcing uplift.
Premium Economy to/from UK (Long haul)	0.23659	$kgCO_2e$/passenger.km	DEFRA 2022 – 'Business Travel – Air' tab	Emission factors used include a radiative forcing uplift.
Business to/from UK (Long haul)	0.42882	$kgCO_2e$/passenger.km	DEFRA 2022 – 'Business Travel – Air' tab	Emission factors used include a radiative forcing uplift.
First to/from UK (Long haul)	0.59147	$kgCO_2e$/passenger.km	DEFRA 2022 – 'Business Travel – Air' tab	Emission factors used include a radiative forcing uplift.
Economy to/from non-UK	0.14063	$kgCO_2e$/passenger.km	DEFRA 2022 – 'Business Travel – Air' tab	Emission factors used include a radiative forcing uplift.
Premium Economy to/from non-UK	0.22500	$kgCO_2e$/passenger.km	DEFRA 2022 – 'Business Travel – Air' tab	Emission factors used include a radiative forcing uplift.
Business to/from non-UK	0.40781	$kgCO_2e$/passenger.km	DEFRA 2022 – 'Business Travel – Air' tab	Emission factors used include a radiative forcing uplift.
First to/from non-UK	0.56251	$kgCO_2e$/passenger.km	DEFRA 2022 – 'Business Travel – Air' tab	Emission factors used include a radiative forcing uplift.
RAIL				

Item	Value	Unit	Source	Notes
Eurostar Economy Class	0.0060	$kgCO_2e$/passenger.km	Eurostar website help centre[11]	
Eurostar Business Class	0.0060	$kgCO_2e$/passenger.km	Eurostar website help centre[11]	
Eurostar Premium Class	0.0060	$kgCO_2e$/passenger.km	Eurostar website help centre[11]	
First Class	0.0355	$kgCO_2e$/passenger.km	DEFRA 2022 'Business Travel – land' tab	Assume National Rail
Standard Class	0.0355	$kgCO_2e$/passenger.km	DEFRA 2022 'Business Travel – land' tab	Assume National Rail
ACCOMMODATION				
Burkina Faso	23	$kgCO_2e$/night	GreenView Hotel Footprinting Tool[12]	
Egypt	44.2	$kgCO_2e$/night	DEFRA 2022 'Hotel Stay' tab	
France	6.7	$kgCO_2e$/night	DEFRA 2022 'Hotel Stay' tab	
Kenya	19.1	$kgCO_2e$/night	GreenView Hotel Footprinting Tool[12]	
Mali	23	$kgCO_2e$/night	GreenView Hotel Footprinting Tool[12]	
Mexico	19.3	$kgCO_2e$/night	DEFRA 2022 'Hotel Stay' tab	
Netherlands	14.8	$kgCO_2e$/night	DEFRA 2022 'Hotel Stay' tab	
Qatar	86.2	$kgCO_2e$/night	DEFRA 2022 'Hotel Stay' tab	
Rwanda	22.3	$kgCO_2e$/night	GreenView Hotel Footprinting Tool[12]	
Senegal	32.4	$kgCO_2e$/night	GreenView Hotel Footprinting Tool[12]	
Singapore	24.5	$kgCO_2e$/night	DEFRA 2022 'Hotel Stay' tab	
UK	10.4	$kgCO_2e$/night	DEFRA 2022 'Hotel Stay' tab	
UK (London)	11.5	$kgCO_2e$/night	DEFRA 2022 'Hotel Stay' tab	
United Arab Emirates	63.8	$kgCO_2e$/night	DEFRA 2022 'Hotel Stay' tab	
United States	16.1	$kgCO_2e$/night	DEFRA 2022 'Hotel Stay' tab	
EMPLOYEE CLAIMS				
Travel Claims	0.170480	$kgCO_2e$/km	DEFRA 2022 'Business Travel – land' tab	Assume Average Petrol Vehicle
3.7 EMPLOYEE COMMUTING				
Average Diesel Car	0.17082	$kgCO_2e$/km	DEFRA 2022 'Business Travel – Land' tab	
Bus	0.09650	$kgCO_2e$/km	DEFRA 2022 'Business Travel – Land' tab	

[11] Eurostar Website: What is the Co2 emission factor per kilometer when using Eurostar? - Eurostar Help Centre
[12] GreenView Hotel Footprinting Tool: Hotel Footprint Calculator (hotelfootprints.org)

Item	Value	Unit	Source	Notes
Taxi	0.20826	kgCO_2e/km	DEFRA 2022 'Business Travel – Land' tab	
Train	0.03549	kgCO_2e/passenger.km	DEFRA 2022 'Business Travel – Land' tab	
Bicycle	0.00000	kgCO_2e/km	DEFRA 2022 'Business Travel – Land' tab	
London Underground	0.02781	kgCO_2e/passenger.km	DEFRA 2022 'Business Travel – Land' tab	
Mixed: Car, train & walk	0.06877	kgCO_2e/km	Calculated by Promethium	Average value of mixed transportations
Mixed: Train & bus	0.06600	kgCO_2e/km	Calculated by Promethium	Average value of mixed transportations
Mixed: Train, bus & Taxi	0.11342	kgCO_2e/km	Calculated by Promethium	Average value of mixed transportations
Mixed: Underground, Bus & Taxi	0.11086	kgCO_2e/km	Calculated by Promethium	Average value of mixed transportations
Mixed: Car & Train	0.10316	kgCO_2e/km	Calculated by Promethium	Average value of mixed transportations
3.9 DOWNSTREAM TRANSPORTATION AND DISTRIBUTION				
Average Petrol Car	0.17048	kgCO_2e/km	DEFRA GHG conversion factors 2022 - 'Business travel - land' tab	
Average Diesel Car	0.17082	kgCO_2e/km	DEFRA GHG conversion factors 2022 - 'Business travel - land' tab	
Leased Petrol Vehicles	2.368	kgCO_2e/km	Calculated by Promethium	Dividing Average Petrol Car emission factor by Global average fuel consumption.
Leased Diesel Vehicles	2.373	kgCO_2e/km	Calculated by Promethium	Dividing Average Petrol Car emission factor by Global average fuel consumption.
CONVERSION FACTORS AND ASSUMPTIONS				
Km/mile conversion	1.609344	Km/mile	Constant	
Pence/GBP conversion	100	Pence/GBP	Constant	
FUEL COMBUSTION DEFAULT EMISSION FACTORS				
Stationary Diesel Combustion – CO_2 Emission	74 100	kgCO_2/TJ	Methodological Guidelines - Annexure A, Table A.1 IPCC Default emissions factors	
Stationary Diesel Combustion – CH_4 Emission	3	kgCH_4/TJ	Methodological Guidelines - Annexure A, Table A.1 IPCC Default emissions factors	
Stationary Diesel Combustion – N_2O Emission	0.6	kgN_2O/TJ	Methodological Guidelines - Annexure A, Table A.1 IPCC Default emissions factors	

Item	Value	Unit	Source	Notes
Stationary Diesel Combustion – CO_2 Emission	74 100	$kgCO_2/TJ$	Methodological Guidelines - Annexure A, Table A.2 IPCC Default emissions factors	
Stationary Diesel Combustion – CH_4 Emission	4.15	$kgCH_4/TJ$	Methodological Guidelines - Annexure A, Table A.2 IPCC Default emissions factors	
Stationary Diesel Combustion – N_2O Emission	28.6	kgN_2O/TJ	Methodological Guidelines - Annexure A, Table A.2 IPCC Default emissions factors	
Stationary Diesel Combustion – CO_2 Emission	69 300	$kgCO_2/TJ$	Methodological Guidelines - Annexure A, Table A.2 IPCC Default emissions factors	
Stationary Diesel Combustion – CH_4 Emission	3.5	$kgCH_4/TJ$	Methodological Guidelines - Annexure A, Table A.2 IPCC Default emissions factors	
Stationary Diesel Combustion – N_2O Emission	5.7	kgN_2O/TJ	Methodological Guidelines - Annexure A, Table A.2 IPCC Default emissions factors	
SOUTH AFRICA SPECIFIC COMBUSTION EMISSION FACTORS				
Diesel Combustion – CO_2 Emission	74 638	$kgCO_2/TJ$	Methodological Guidelines - Annexure A, Table A.3	
Petrol Combustion – CO_2 Emission	72 430	$kgCO_2/TJ$	Methodological Guidelines - Annexure A, Table A.3	
FUEL COMBUSTION NET CALORIFIC VALUES				
Diesel NCV	35.5	MJ/Litre	Methodological Guidelines - Annexure D, Table D.1	
Petrol NCV	32.5	MJ/Litre	Methodological Guidelines - Annexure D, Table D.1	
GLOBAL WARMING POTENTIALS				
CO_2 GWP	1	$kgCO_2/TJ$	Methodological Guidelines - Annexure G	
CH_4 GWP	23	$kgCH_4/TJ$	Methodological Guidelines - Annexure G	
N_2O GWP	296	kgN_2O/TJ	Methodological Guidelines - Annexure G	
ASSUMPTIONS				

Item	Value	Unit	Source	Notes
Liquid UK reimbursement rate	45	Pence/mile	Received from Liquid on 2023-06-06 from Natalie Rush via email	
Converted reimbursement rate	0.28	GBP/km	Calculated	
Global Average Fuel Consumption	7.2	Litres/100km	IEA – Fuel Economy in Major Car Markets[13]	
Global Average Fuel Consumption	13.89	km/litre	Calculated by Promethium	
Computer Manufacturer Total Revenue	81 796 924 000	GBP	Dell ESG Report[14]	
Computer Manufacturer Total Scope 1 + 2	203 700	tCO_2e	Dell ESG Report[14]	
Average Electricity Price for Liquid UK	0.6070	£/kWh	Calculated	
Water Intensity Factor	2 391.39	Litres/person.year	Calculated by Promethium	Calculated average based on full total data sets (ADC Kenya, CAR Botswana, CAR Zambia, CAR DRC) divided sum of the regions' Headcounts

[13] IEA. 2019. Fuel Economy in Major Car Markets. Available online at: [Fuel Economy in Major Car Markets: Technology and Policy Drivers 2005-2017 – Analysis - IEA]

[14] Dell ESG report. FY22 ESG Report | Dell USA

Appendix 2: Comparison between the old ISO14064-1:2006 and new ISO 14064-1:2018 Standard

ISO 14064:2018		ISO 14064:2006	
Category	Description	Scope and Category	Description
1	Direct GHG emissions and removals	Scope 1	Direct GHG emissions
2	Indirect GHG emissions from imported energy	Scope 2	Energy indirect emissions
		Scope 3, category 3	Fuel- And Energy-Related Activities
3	Indirect GHG emissions from transportation	Scope 3, category 4	Upstream Transportation and Distribution
		Scope 3, category 6	Business Travel
		Scope 3, category 7	Employee Commuting
		Scope 3, category 9	Downstream Transportation and Distribution
4	Indirect GHG emissions from products used by organisation	Scope 3, category 1	Purchased Goods and Services
		Scope 3, category 2	Capital Goods
5	Indirect GHG emissions associated with the use of products from the organisation	Scope 3, category 10	Processing of Sold Products
		Scope 3, category 11	Use of Sold Products
		Scope 3, category 12	End-Of-Life Treatment of Sold Products
6	Indirect GHG emissions from other sources	Scope 3, category 5	Waste Generated in Operations
		Scope 3, category 8	Upstream Leased Assets
		Scope 3, category 13	Downstream Leased Assets
		Scope 3, category 14	Franchises
		Scope 3, category 15	Investments

Appendix 3: Significance Assessment

Source of indirect emissions	Significance criteria				Recommendation
	Magnitude	Level of influence	Risk or opportunity	Employee engagement	
Indirect Emissions - Purchased electricity	**Medium** – these emissions form more than 1% of the overall indirect emissions.	**Medium** – can influence these emissions by generating own renewables or use a different electricity provider.	**Low** – Some risk of electricity disruptions or increase in rates.	**Low** – some change in these emissions could come from engaging with employees on responsible energy consumption.	**Include in inventory due to magnitude and influence.**
Purchase of goods and services	**Low** – these emissions form less than 1% of the overall indirect emissions.	**Medium** – some possibilities for switching to other suppliers or goods with lower emissions.	**Medium** – risk of supply disruptions from climate change related events.	**Low –** employees are not responsible for procurement of goods or services.	**Include in inventory due to influence and risk.**
Fuel- and Energy-related activities	**Low** – these emissions form less than 1% of the overall indirect emissions.	**Low** – can influence emissions through selection of less emission intensive options such as biofuels and renewable energy sources	**Medium** - risk of energy security and supply disruptions from climate change related events. There is also an opportunity to change these emissions by using renewables.	**Low** – can influence these emissions by generating own renewables.	**Include in inventory due to risk.**
Waste generated in operation	**Low** – these emissions form less than 1% of the overall indirect emissions.	**Medium** – some operational changes could result in waste minimization or possible to implement recycling initiatives.	**Low** - there is some risk in disruptions to the waste disposal due to climate change related events.	**Low** – few changes in these emissions could come from engaging with employees on responsible disposal of general waste.	**Include in inventory due to influence**
Employee commuting	**High** – these emissions form more than 1% of the overall indirect emissions.	**Low** – can influence emissions through employee engagement programmes	**Low** - there is some risk in disruptions to the commuting of employees due to climate related events such as flooding	**High** – these emissions could be changed through carpooling, public transport, working from home, and other employee engagement programmes	**Include in inventory due to magnitude and employee engagement.**

Source of indirect emissions	Significance criteria				Recommendation
	Magnitude	Level of influence	Risk or opportunity	Employee engagement	
Business travel	**High** – these emissions form more than 1% of the overall indirect emissions.	**Medium** – can influence emissions through selection of less emission intensive options, or implement virtual meetings and conferences to reduce travel emissions.	**Low** - there is some risk in disruptions to transport due to climate related events such as flooding.	**Medium** – these emissions could be changed through lower emission intensive strategies or employee engagement programmes	**Include in inventory due to magnitude, level of influence and employee engagement.**
Downstream Transportation and Distribution	**Low** – these emissions form less than 1% of the overall	**Medium** – can influence the emissions by outsourcing deliveries or prioritizing visits to cover entire location in fewer trips.	**Medium** – risk of supply disruptions from climate change related events.	**Low** – few changes in these emissions could come from engaging with employees as they do not have control over transportation and distribution requirements.	**Include in inventory due to level of influence and sector specific guidance.**

Appendix 4: ISO 14064-1:2018 Standard Reporting Results

While Liquid currently utilises the GHG Protocol and the ISO14064-1:2006 standards for carbon reporting, Promethium strongly recommends that the company transition to the latest ISO 14064-1:2018 standard for its GHG inventory accounting. The ISO 14064-1:2018 standard represents the most up-to-date and internationally recognised approach for measuring and reporting greenhouse gas emissions. By adopting this standard, Liquid can ensure alignment with best practices and enhance the accuracy, consistency, and comparability of its GHG reporting. With the aim of facilitating a transition to the ISO 14064-1:2018 standard, the following table presents a summary of the FY2023 GHG inventory in accordance with this updated standard.

Table 6: FY2023 GHG inventory according to ISO 14064-1:2018

Category	Description	ADC FY2023 Emissions	Liquid FY2023 Emissions	Total FY2023 Emissions
Category 1: Direct GHG emissions and removals	Stationary Diesel Combustion	6 137.73 tCO_2e	6 524.11 tCO_2e	12 661.83 tCO_2e
	Mobile Combustion	0 tCO_2e	3 326.35 tCO_2e	3 326.35 tCO_2e
	Fugitive Emissions	0 tCO_2e	1 024.77 tCO_2e	1 024.77 tCO_2e
Total CATEGORY 1		**6 137.73 tCO_2e**	**10 875.23 tCO_2e**	**17 012.96 tCO_2e**
Category 2: Indirect GHG emissions from imported energy	Energy Indirect Emissions	71 790.87 tCO_2e	37 278.48 tCO_2e	109 069.34 tCO_2e
	Fuel- and Energy-related Activities	9 373.94 tCO_2e	5 072.09 tCO_2e	14 446.03 tCO_2e
Total CATEGORY 2		**81 164.80 tCO_2e**	**42 350.57 tCO_2e**	**123 515.37 tCO_2e**
Category 3: Indirect GHG emissions from transportation	Business Travel (Including Accommodation)	0 tCO_2e	1 162.46 tCO_2e	1 162.46 tCO_2e
	Employee Commuting	0 tCO_2e	37.07 tCO_2e	37.07 tCO_2e
	Downstream Transportation & Distribution	0 tCO_2e	738.09 tCO_2e	738.09 tCO_2e
Total CATEGORY 3		**0 tCO_2e**	**1 937.62 tCO_2e**	**1 937.62 tCO_2e**
Category 4: Indirect GHG emissions from products used by organisation	Purchased Goods and Services	0.16 tCO_2e	0.39 tCO_2e	0.55 tCO_2e
Total CATEGORY 4		**0.16 tCO_2e**	**0.39 tCO_2e**	**0.55 tCO_2e**

Category	Description	ADC FY2023 Emissions	Liquid FY2023 Emissions	Total FY2023 Emissions
Category 6: Indirect GHG emissions from other sources	Waste Generated in Operations	22.30 tCO_2e	50.92 tCO_2e	73.22 tCO_2e
TOTAL CATEGORY 6		**22.30 tCO_2e**	**50.92 tCO_2e**	**73.22 tCO_2e**
Total EMISSIONS (Category 1-6)		**87 324.99 tCO_2e**	**55 214.74 tCO_2e**	**142 539.73 tCO_2e**

Upon reviewing the data presented in the table above, it becomes apparent that the primary driver of emissions, accounting for 86.7% of the total emissions, falls within Category 2 indirect GHG emissions from imported energy. This category encompasses all purchased electricity and fuel- and energy-related activities. In comparison, Category 1, which represents direct emissions from the combustion of fuels and fugitive emissions, constitutes a smaller yet significant portion, contributing 11.9% to the overall emissions.

Furthermore, considering the ISO 14064-1:2018 standard, the carbon footprint for FY2023 is categorised as shown in Table 7.

Table 7: Summary of FY2023 results according to ISO 14064-1:2018

GHG Inventory according to ISO14064-1:2018	ADC FY2023 Emissions	Liquid FY2023 Emissions	Total FY2023 Emissions
Category 1: Direct GHG emissions and removals	6 137.73 tCO_2e	10 875.23 tCO_2e	17 012.96 tCO_2e
Category 2: Indirect GHG emissions from imported energy	81 164.80 tCO_2e	42 350.57 tCO_2e	123 515.37 tCO_2e
Category 3: Indirect GHG emissions from transportation	0 tCO_2e	1 937.62 tCO_2e	1 937.62 tCO_2e
Category 4: Indirect GHG emissions from products used by organisation	0.16 tCO_2e	0.39 tCO_2e	0.55 tCO_2e
Category 6: Indirect GHG emissions from other sources	22.30 tCO_2e	50.92 tCO_2e	73.22 tCO_2e
Total Emissions (Category 1-6)	**87 324.99 tCO_2e**	**55 214.74 tCO_2e**	**142 539.73 tCO_2e**

In FY2023, Liquid's carbon footprint, as per ISO 14064-1:2018, comprises various emission categories. The most substantial sources of emissions are found in Category 2, where energy-related activities account for 123 515.37 tCO_2e. Included in this category, purchased electricity contributes 103 069.34 tCO_2e, followed by fuel- and energy-related activities with 14 446.03 tCO_2e. Additionally, Category 1, direct emissions, play a significant role, with 17 012.96 tCO_2e associated with fuel combustion activities.