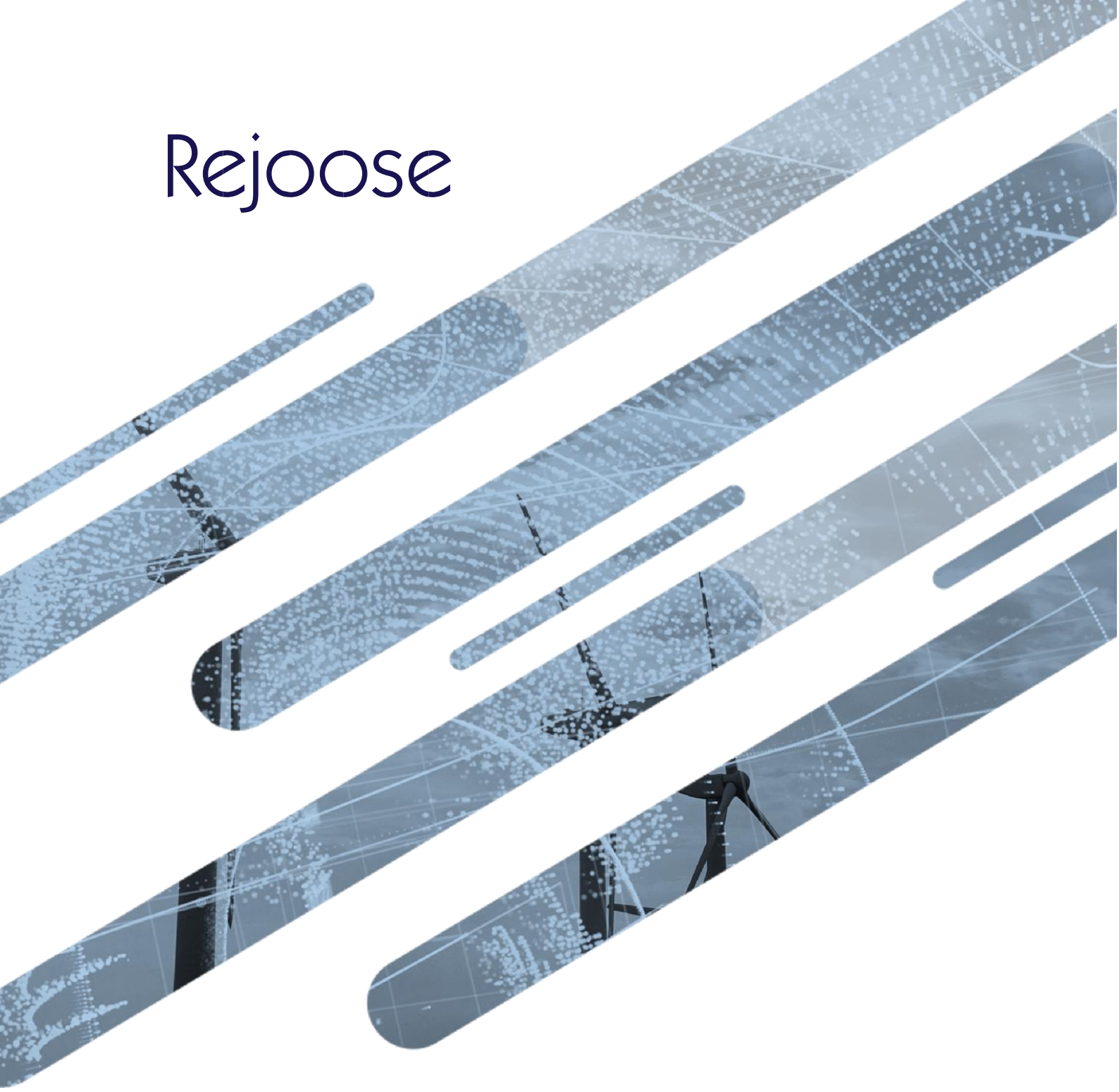
Rejoose



WHITE PAPER – DATA METHOD DESCRIPTIONS

Data for carbon accounting purposes

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Rejoose Data Methods

Introduction

This white paper provides definitions to data methods used by Rejoose.

The following defines how to differentiate between the 4 current data methods used by Rejoose. As a base, the Category average data method is used due to recommendations from the GHG protocol, but the decision will be yours to make – which data method is preferred, and each data set will be 'tagged' with the method used.

https://ghgprotocol.org/sites/default/files/standards_supporting/Chapter1.pdf

Motivation

Ability to make distinctions between different types of data and underlaying calculation principals are relevant in numerous user scenarios.

- Auditing purposes
- Foundation for further calculations
- Reader comprehension
- Due diligence
- Comparison
- Etc.

Delimitation

This White paper contains examples for each method/definition, and a short text to explain the methodology by which data has been derived/calculated. This is done to specify the Rejoose terminology and avoid any potential misconceptions or fact distortion due to misunderstandings or indistinctness.

Disclaimer

Rejoose provides carbon emissions data for carbon accounting purposes.

We align with manufacturers to ensure the correct use of their Product Carbon Footprint (PCF) data. PCF values follow manufacturer-specific methodologies and may not be directly comparable across brands.

When using Manufacturer-Specific (MS) data, refer to the original manufacturer documentation. For Category Average (CA) and Configurable Average (CA+) data, Rejoose follows GHG Protocol guidelines. For further guidance, consult Rejoose whitepapers and your preferred carbon accounting firm.

Rejoose assumes no liability for misuse or misinterpretation of PCF figures.

Data for all methods are always including the 4 phases of IT product:

	Phase	GHG Scope
-	Manufacturing	Scope 3
-	Transportation	Scope 3
-	Use-phase	Scope 2
-	End of life	Scope 3

Scope 3 calculated per phase and with the given per attribute(s).

Heres' an example from defining a CA+ LCA data set for tablets:

$$Tablet_{Screen\ size}\ x\ Embodied_{GWP/Inch} + Tablet_{Storage}\ x\ Allocation_{GWP/GB} + Tablet_{Use\ phase}$$

Repeated for each phase, manufacturing, Transportation, End of Life

The average emissions for storage are derived from Apple PFC reports by analyzing the increase in emissions between low-capacity and high-capacity models. The Scope 3 emissions are calculated as 0.057 kg CO_2e per GB and 9.4 kg CO_2e per inch.

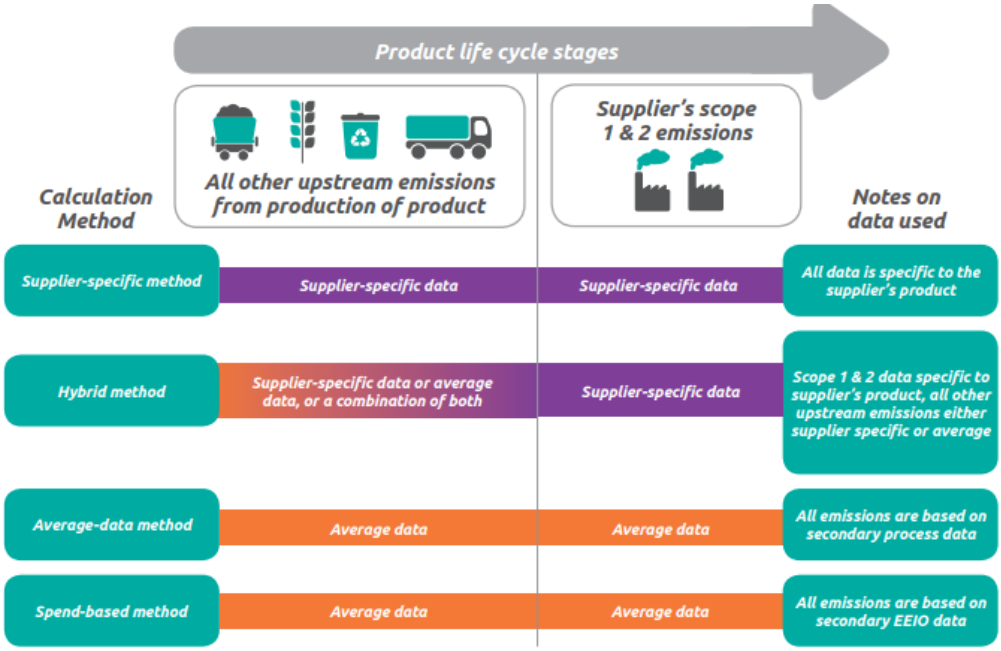
Model	Size [inches]	Storage [GB]	EF[kg CO2eq/kWh]	Energy [kWh]	Scope 3 [kg CO2eq]	Scope 2 [kg CO2eq]	Total [kg CO2eq]
iPad Pro	11	1024	0.103	11.74	161.77	3.63	165.40
iPad Air	13	1024	0.103	13.4	180.57	4.14	184.71
Surface Go 3	10.5	64	0.103	13.45	102.35	4.16	106.50
Tab Lenovo Plus	11.5	128	0.103	5.12	115.40	1.58	116.98
Galaxy Tab S9	11	128	0.103	15.01	110.70	4.64	115.33

The results are based on a 3-year usage phase.

Rejoose can deliver even more specific data, as data for e.g. Use-phase is both country and customer use case specific. As well as the possibility to utilize refurbishment for End-of-life, instead of traditional recycle.

All general data is tagged with date stamps, and data will be used to define Category averages within the same year. So, CA data can be changing, as more units are coming to the market with data hence changing the Category average – but within Rejoose we make sure the category averages is calculated on models from the same period (year).

Please refer to GHG protocol Chapter 1 for information on below data methods. With the current data sets, Rejoose can support all but the Spend based method. The reason for not supporting spend-based, is that we want to promote the customers to transition into activity based reporting.



Source: https://ghgprotocol.org/sites/default/files/standards_supporting/Chapter1.pdf

Disadvantages of the Spend-Based Method

- Might generate data that do not accurately reflect a company's specific activities.
- Does not account for operational changes and investments made to reduce emissions.
- Could be challenging when quantifying emission reductions from specific actions.
- May limit the ability to track progress towards emission reduction targets due to its inherent lack of precision.

Spend based is great when you don't have access to more specific data. However, it will also mean that if the company invests more in a more efficient and climate-friendly solution, it will show the exact opposite when it comes to spend based carbon emissions. Higher price = higher emissions.

So, both companies and their suppliers will benefit from transitioning to an activity-based method. Both data and the automated solution to do this is already here.

Data category descriptions and examples

- MS - Manufacturer Specific Data (GHG reference: Average-data method or Hybrid data method.)
    - Description: Manufacturer specific data refers to the instances where a manufacturer/brand of a certain product or service provides an Environmental Product Description (EPD) that addresses a unique product ID with Carbon calculations based on a product or service unique set of characteristics, material composition and processing.
    - The Manufacturing entity is the named- and official publisher of the EPD for the dataset to be characterized as Manufacture Specific Data in the Rejoose terminology.
    - Rejoose will utilize the manufacturer data for all Scope 3 phases, and for scope 2 Use-phase, instead the country and company specific data is added.

- CA+ - Category Average data with attributes (GHG reference: Average-data method)
  - CA+ is next level vs. standard CA, as each product has unique specs, and the primary factors of climate impact in these specs, will be utilized to make a more product relevant set of climate data.
  - Description: If a product category (e.g Tablet) has a CA Carbon-footprint of X kg CO2e, Rejoose will add attributes to further refine the average data of the products carbon-footprint. For Tablets, the screen is a primary part of the carbon impact as well of the SSD capacity – which means Rejoose will use the Screen size and GB SSD capacity as attributes for CA+ for the tablets Category.
  - Example: A small laptop have a 13'' screen and 256GB SSD, has a category average Carbon footprint of X kg CO2e. Another laptop B with a 12'' screen and 512GB SSD, will then have a different carbon footprint. So there will be a base part which is the same, and a correcting factor E.g. being the screen size and SSD capacity, which changes the data.

$$Tablet_{Screen\ size}\ x\ Embodied_{GWP/Inch} + Tablet_{Storage}\ x\ Allocation_{GWP/GB} + Tablet_{Use\ phase}$$

Repeated for each phase, manufacturing, Transportation, End of Life

  - The use phase of the products is handled and added separately according to use country and use pattern of the end-customer.

- CA - Category Average data (GHG reference: Average-data method)
  - Description: Rejoose collects data from all brands, and segment data into categories and subcategories. The data average across brands, within each category, for the given production year, will then be used to define the Category Average data.
  - If a product category (e.g small laptops) has been assessed to have a Carbon-footprint of X kg CO2e via average from all products within this category – all laptops within this category will be labeled with a Carbon-footprint of X kg CO2e.
  - The use phase of the products is handled and added separately according to use country and use pattern of the end-customer.

- PS – Product specific data (GHG reference: Supplier-specific method)
  - Description: Product specific data refers to the instances where a supplier/vendor of a certain product or service provides an Environmental Product Description (EPD) that has been produced by a 3rd party. (Typically, an expert consultancy company). The 3rd party EPD addresses a unique product ID with CO2 calculations based on a product or service unique set of characteristics, material composition and processing.
  - The 3rd party entity is the named- and official publisher of the EPD for the dataset to be characterized as Manufacture Specific Data in the Rejoose terminology.
  - The use phase of the products is handled and added separately according to use country and use pattern of the end-customer.

As reporting company, you can choose to utilize more than one method for reporting. If you combine 1 or more methods, you are using the hybrid method as defined on Page 21.

Due to below facts stated by GHG protocol, we support all activity-based methods, and we let the supplier and customer decide which methods is the best match.

The difference between data specificity and data accuracy

"In fact, data collected from a supplier may actually be less accurate than industry-average data for a particular product."

Source: https://ghgprotocol.org/sites/default/files/2022-12/Chapter1.pdf page 22

Data validation

Data Methodology: Ensuring Consistency, Quality, and Value

At Rejoose, our mission is to enable partners and companies to transition to high-quality, activity-based carbon data for informed decision-making. We collaborate closely with manufacturers, leveraging their data and enriching it with advanced methodologies to provide the best available insights.

1. Data Validation Process

Rejoose takes proactive steps to ensure the integrity and reliability of carbon data submitted by manufacturers. This process respects the work of manufacturers while introducing safeguards to maintain data consistency across categories.

- Category-Based Thresholds:
  Each product category has defined data validation thresholds. These thresholds are based on observed industry norms and ensure that data aligns with expected values.
  - For example, in the **Notebooks** category, typical carbon footprints range from 230 to 350kg CO_2e. We set a lower threshold of **200kg CO_2e** and an upper threshold of **400kg CO_2e**.
  - Products falling outside these limits undergo **manual verification**. Until validated, these products are assigned **Category Average (CA)** or **Category Average Plus (CA+)** data as a temporary measure.

This validation process ensures consistent and credible data while facilitating manufacturers' participation without undue scrutiny or burden.

2. Collaboration with Manufacturers

Manufacturers typically provide Life Cycle Assessment (LCA) data based on **Category Average** or **Hybrid Standards** as outlined in the GHG Protocol. Rejoose enriches this data by offering

enhanced methods like CA+, ensuring that the data not only meets but often exceeds the required standards.

- CA+ Data Enrichment:
  CA+ data builds upon manufacturers' LCA data, adding granularity by incorporating:
  - Configuration-specific insights (e.g., variations in RAM, storage, etc.).
  - Validation against datasets from other manufacturers in the same category.

This approach highlights the **strength and versatility of manufacturer data** while enabling companies to make decisions based on enriched, actionable insights.

3. Transitioning from Spend-Based to Activity-Based Data

Many companies currently rely on the **spend-based method** for carbon accounting, which provides broad estimates based on financial data. Transitioning to **activity-based methods** (like CA or CA+) represents a significant leap in data quality:

- Benefits of Activity-Based Data:
  - Enhanced granularity allows for optimization at the product or category level.
  - Better alignment with the GHG Protocol, ensuring compliance and accuracy.
  - Provides actionable insights for reducing carbon footprints across IT procurement.

4. Practical Example: Understanding CA+ Data

Consider an LCA report for a product family with a **footprint deviation of ±34kg CO_2e**. This variation results from configuration-specific factors (e.g., type of RAM, storage). CA+ data accounts for these variables by combining:

- Component-level insights.
- Validation against category-wide data from other manufacturers.

This method delivers a precise, configuration-based footprint estimate, offering a more nuanced view than traditional averages while maintaining consistency with GHG Protocol standards.

Our Commitment to Transparency and Quality

Rejoose is committed to providing robust, reliable carbon data that empowers companies to make sustainable IT purchasing decisions. While we strive for accuracy, our publication acknowledges inherent complexities and evolving standards.

We respect manufacturers' contributions as critical collaborators in this journey and aim to amplify their efforts through our advanced data methodologies.

By choosing Rejoose, companies and partners can confidently transition to superior data methods, enabling sustainability-driven decision-making for a better future.

Enriching Manufacturer LCA Data

with Country- and Company-Specific Use Phase Calculations

Rejoose adds significant value to manufacturer-provided LCA data by refining the **use phase carbon footprint**. While many LCA datasets rely on regional averages, Rejoose goes a step further, leveraging **product-specific power use data** from multiple trusted sources to calculate carbon footprints tailored to a company's operational specifics and the country of use.

Rejoose sources power use data from:

1. Energy Star certifications
2. ECO Declarations
3. Manufacturer data sheets and power calculation tools
4. IT content syndicators
5. Direct power measurements conducted by independent third parties

Using this data, Rejoose identifies the **typical operating modes, power consumption in kWh**, and product-specific usage hours. These insights are then multiplied by the **company specific lifespan of the product** and the **carbon intensity of the electricity grid** in the use country, resulting in a more accurate and location-specific use phase carbon footprint.

This enriched methodology not only enhances the precision of the data but also enables companies to align their sustainability reporting and optimization efforts with local energy realities, ensuring a better understanding of the true carbon impact of their IT operations

Overview of accessible Data methods per IT category

Rejoose: Providing Comprehensive Carbon Data Across IT Categories

At Rejoose, we deliver up to **four distinct data methods** for each IT product category: **Manufacturer Specific (MS)**, **Category Average Plus (CA+)**, **Category Average (CA)**, and **Partner Specific (PS)**. These data methods ensure flexibility and precision, enabling companies and partners to choose the most suitable data for their reporting and decision-making needs.

With coverage spanning **over 500 IT product categories**, including everything from laptops and servers to accessories and data center equipment, our database is continually evolving. Every day, new categories are added, and existing data is refined with greater granularity. This ensures that the most commonly used IT products globally are supported with accurate, up-to-date carbon footprint insights.

While MS, CA+, and CA data are widely available across categories, the **Partner Specific (PS)** method is tailored to specific use cases and individual partner requirements, making it a bespoke option for specialized needs.

This dynamic and ever-expanding approach reflects Rejoose's commitment to providing the best possible data for IT sustainability, empowering organizations to make informed, sustainable decisions.

At Rejoose, we understand that every organization has unique requirements, and certain IT categories or data methods might occasionally be missing from our database. To address this, we offer a **custom data request process**.

If a category is not yet available, or if additional data methods are needed, partners and companies can submit a request. These requests are prioritized based on factors such as:

- **Volume of products sold** in the requested category.
- Similar requests from other organizations.
- The potential impact and relevance of the requested data.

This ensures that we focus on delivering the most relevant and widely used data first, while still addressing specialized needs over time. By continually expanding and enhancing our database, we help organizations access the carbon data that matters most to them.