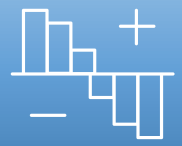
# Greenhouse Gas Emissions Inventory 2023

Institutional

Methodology



Results

Future Actions

# Madem

The Madem Group is among the fifteen largest forestry groups in Brazil and is a world leader in the manufacture of wooden reels for the electrical cable industry. In over 70 years of history, it has offered innovative and sustainable solutions for the industry.

The reels manufactured by the group use wood from renewable sources, demonstrating the group's commitment to preserving nature. The ISO 9001 and ISO 14001 certificates that the group holds attest to how quality and the environment are important aspects of the production process.

Madem products are exported to more than 150 customers in 40 countries. The company has 10 production facilities in six countries: Brazil, Spain, Bahrain, the United States, Mexico and Colombia.

# Our Numbers

**10**
Production Units

**100%**
Of the wood used is renewable

**700**
Employees

**75**
Years of history

Units in
**6**
countries

Export to
**40**
countries

# Methodology

The inventory is prepared based on the concepts, principles and guidelines established by the GHG Protocol methodology, using its specifications for accounting, quantification and publication of Corporate Greenhouse Gas Emissions Inventories.

Equations provided by the Intergovernmental Panel on Climate Change (IPCC) are also used to calculate emissions from certain sources and sinks ($CO_2$ removals by green areas).

The report structure follows the specifications of ISO 14.064:2007 – "Greenhouse Gas Management System" – International Organization for Standardization, 2007.

# Emissions Calculation

For Brazilian units, emission factors published by the Brazilian GHG Protocol Program (PBGHGP) were used through its calculation tool: "ferramenta_ghg_protocol_v2025.0.1". For the other units, emission factors specified in the following sources were used: "Emission Factors for Greenhouse Gas Inventories" (EPA, 2023), "UK Government GHG Conversion Factor for Company Reporting" (DEFRA, 2023), "European Residual Mixes" (AIB, 2023), Climate Transparency (2022), Carbon Footprint (2024) and UPME (2022).

The global warming potential used for the calculations is published in the IPCC Fifth Assessment Report: Climate Change 2013 (AR5).

Ecofinance Negócios is responsible for calculating GHG emissions and preparing this report. Madem is responsible for the activity data provided for the calculation of emissions.

# Reporting Period

This inventory covers emissions from activities carried out by Madem in 2023, covering all direct emissions (scope 1), emissions from the purchase of electricity (scope 2) and part of indirect emissions (scope 3), including all business units over which the group has operational control.

# Inventory Base Year

The base year of Madem's GHG emissions inventory is 2021, the year in which the group's first GHG emissions inventory was developed.

# Organizational Boundaries

Madem's emissions inventory follows the operational control accounting approach provided by the GHG Protocol methodology.

Under the operational control approach, 100% of emissions from business units over which the Group maintains control over the operation are accounted for, regardless of its shareholding in the source.

# Operational Boundaries

Madem accounts for all its scope 01 (direct) and scope 02 emissions.

**In scope 01,** the following sources are considered:

- Stationary: Stationary combustion for generation of electricity, steam, heat or power using equipment in a fixed location;
- Mobile: Mobile combustion for general transportation of vehicles owned or controlled by the company;
- Fugitive: Unintentional releases of substances, such as hydrofluorocarbon (HFC) emissions during the use of refrigeration and air conditioning equipment and $CO_2$ in fire extinguishers;
- Wastewater: From septic tanks present in business units;
- Agricultural Activities: timber harvesting in a pine plantation area.

# Operational Boundaries

**In scope 02,** emissions resulting from the **acquisition of electrical** energy are accounted for.

**In scope 03,** the following sources are considered:

- Transportation of raw materials: Mobile sources used by third parties to transportation of raw materials;
- Transportation of products: Mobile sources used by third parties to transportation of products;
- Wastewater: Emissions from wastewater treatment outside the organization's boundaries;
- Waste: Waste disposed of in landfills, incinerated or composted, in locations not controlled by the company;
- Air travels: Air travel undertaken by company employees.

# Operational Boundaries

The inventory also accounts for:

• Carbon Stock: Quantity of carbon not available in the atmosphere, being maintained, for example, in biomass above and below ground, in dead organic matter, in organic matter incorporated into the soil in areas controlled by the company.

• Biogenic Emissions: $CO_2$ emissions generated in the combustion of biomass (such as ethanol, biodiesel, wood residues) and in the suppression of planted forests, generating changes in the carbon stock. These emissions are not counted as GHG because they are neutralized in the growth process of the crop that originated the biomass.

• Biogenic Removal: Conversions in land use carried out by the company that resulted in an increase in carbon stocks (e.g., reforestation).

Corporative

Business Units

# Emissions by Source ($tCO_2e$)

In 2023, the Madem group's GHG emissions totaled **23,244.29 $tCO_2e$.**

In **scope 1,** emissions amounted to 2,438.01 $tCO_2e$ (**10.49%** of total emissions). In this category, stationary combustion was responsible for 1,493.75 $tCO_2e$, **where 1,474.54 $tCO_2e$** are emissions of $CH_4$ and $N_2O$ resulting from the use **of wood waste in boilers**. Mobile combustion emitted 922.80 $tCO_2e$, especially due to the use of diesel oil in mobile machines, tractors and operational vehicles and liquefied petroleum gas (LPG).

Emissions in **scope 2**, from electricity acquisition, represented 8.74%, totaling 2,031.68 $tCO_2e$.

In **scope 3**, scope with greater representation in total emissions **(80.7%)**, emissions from **Transportation of raw materials** (23.4%) and **products** undertaken by third parties (51.8%) stood out, corresponding to **75.32%** of total emissions.

| Emission Source | Total Emissions | |
|---|---|---|
| | $tCO_2e$ | % |
| **Scope 1** | **2.438,01** | **10,49%** |
| Stationary Combustion | 1.493,75 | 6,43% |
| Mobile Combustion | 922,80 | 3,97% |
| Fugitive Emissions | 3,80 | 0,02% |
| Wastewater | 17,66 | 0,08% |
| **Scope 2** | **2.031,68** | **8,74%** |
| Electricity Purchase | 2.031,68 | 8,74% |
| **Scope 3** | **18.774,60** | **80,77%** |
| Transportation of Raw Materials | 5.455,93 | 23,47% |
| Transportation of Products | 12.051,40 | 51,85% |
| Air Travels | 0,04 | 0,0002% |
| Wastewater | 15,11 | 0,07% |
| Waste | 1.252,12 | 5,39% |
| **Total** | **23.244,29** | **100%** |

# Emissions by Unit ($tCO_2e$)

| Units | Total Emissions (tCO2e) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Scope 1 | | | | Scope 2 | Scope 3 | | | | | Total | % |
| | Stationary Combustion | Mobile Combustion | Wastewater | Fugitive Emissions | Electricity Purchase | Transportation of Products | Transportation of Raw Materials | Waste | Wastewater | Air Travels | | |
| Rio Negro | 1.491,46 | 480,37 | 15,72 | 0,54 | 641,30 | 4.719,54 | 1.085,10 | 22,67 | 0,00 | 0,00 | **8.456,69** | 36,4% |
| Madem MooreCraft Reels EUA | 0,00 | 20,46 | 0,00 | 2,61 | 350,64 | 4.664,64 | 1.131,41 | 141,71 | 4,51 | 0,00 | **6.315,97** | 27,2% |
| Madem Gulf | 0,00 | 105,76 | 0,00 | 0,53 | 713,67 | 2.054,28 | 1.787,18 | 1.087,16 | 2,91 | 0,00 | **5.751,49** | 24,7% |
| EuroMadem Spain | 0,00 | 141,43 | 0,00 | 0,03 | 268,66 | 547,85 | 1.452,24 | 0,00 | 3,63 | 0,00 | **2.413,83** | 10,4% |
| Sorocaba | 0,00 | 33,31 | 0,00 | 0,00 | 1,96 | 63,52 | 0,00 | 0,00 | 1,37 | 0,00 | **100,15** | 0,4% |
| Mostarda Forestry | 1,23 | 82,49 | 1,04 | 0,04 | 0,34 | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 | **85,14** | 0,4% |
| Madem Carretas de Mexico | 0,00 | 23,12 | 0,00 | 0,00 | 50,74 | 0,00 | 0,00 | 0,00 | 2,14 | 0,00 | **76,00** | 0,3% |
| Barcarena | 0,00 | 22,77 | 0,00 | 0,00 | 0,45 | 1,57 | 0,00 | 0,00 | 0,36 | 0,00 | **25,14** | 0,1% |
| Garibaldi | 1,06 | 8,52 | 0,91 | 0,04 | 2,42 | 0,00 | 0,00 | 0,39 | 0,00 | 0,00 | **13,34** | 0,1% |
| Madem Carretas de Colombia | 0,00 | 4,57 | 0,00 | 0,02 | 1,51 | 0,00 | 0,00 | 0,19 | 0,20 | 0,04 | **6,53** | 0,0% |
| **Total** | **1.493,75** | **922,80** | **17,66** | **3,80** | **2.031,68** | **12.051,40** | **5.455,93** | **1.252,12** | **15,11** | **0,04** | **23.244,29** | **100,0%** |
| **%** | 6,43% | 3,97% | 0,08% | 0,02% | 8,74% | 51,85% | 23,47% | 5,39% | 0,07% | 0,00% | 94% | |

# Emissions by Unit ($tCO_2e$)

In 2023, Madem's **Rio Negro** unit recorded the highest volume of emissions, totaling **8,456.69 $tCO_2e$** (36.4% of the group's total emissions). At this unit, the main emitting source was the transportation of products in scope 3, responsible for **4,719.54 $tCO_2e$**. In scope 1, emissions resulting from the burning of wood waste (stationary combustion) stand out, totaling **1,491.46 $tCO_2e$.**

The second largest emitter was **Madem MooreCraft Reels EUA**, with **6,315.97 $tCO_2e$,** representing 27.2% of the company total. As in Rio Negro, transportation of products stood out as the largest source of emissions, totaling **4,664.64 $tCO_2e$**.

The third position was occupied by the **Madem Gulf unit**, with a total **5,751.49 $tCO_2e$**. **Transporte of products** was also the main emitting source, generating **2,054.28 $tCO_2e$**.

# Biogenic Emissions ($tCO_2e$)

| Units | Biogenic Emissions ($tCO_2e$) | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Scope 1 | | | Scope 3 | | | Total | % |
| | Stationary Combustion | Mobile Combustion | Agricultural Activities | Waste | Transportation of Raw Materials | Transportation of Products | | |
| Rio Negro | 86.790,88 | 31,88 | 12.795,18 | 0,22 | 129,57 | 403,61 | **100.151,34** | 51,59% |
| Mostarda Forestry | 0,00 | 10,32 | 93.927,69 | 0,00 | 0,00 | 0,00 | **93.938,01** | 48,39% |
| Madem MooreCraft Reels EUA | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 | **0,00** | 0,00% |
| Madem Gulf | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 | **0,00** | 0,00% |
| EuroMadem Spain | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 | **0,00** | 0,00% |
| Barcarena | 0,00 | 0,83 | 0,00 | 0,00 | 0,00 | 0,19 | **1,02** | 0,001% |
| Sorocaba | 0,00 | 1,45 | 0,00 | 0,00 | 0,00 | 7,58 | **9,04** | 0,005% |
| Madem Carretas de Colombia | 0,00 | 0,00 | 0,00 | 11,00 | 0,00 | 0,00 | **11,00** | 0,01% |
| Garibaldi | 0,00 | 1,92 | 0,00 | 0,00 | 0,00 | 0,00 | **1,92** | 0,001% |
| Madem Carretas de Mexico | 0,00 | 3,50 | 0,00 | 0,00 | 0,00 | 0,00 | **3,50** | 0,00% |
| **Total** | **86.790,88** | **49,91** | **106.722,87** | **11,22** | **129,57** | **411,38** | **194.115,84** | **100%** |
| **%** | 44,71% | 0,03% | 54,98% | 0,006% | 0,067% | 0,212% | **100%** | |

# Biogenic Emissions ($tCO_2e$)

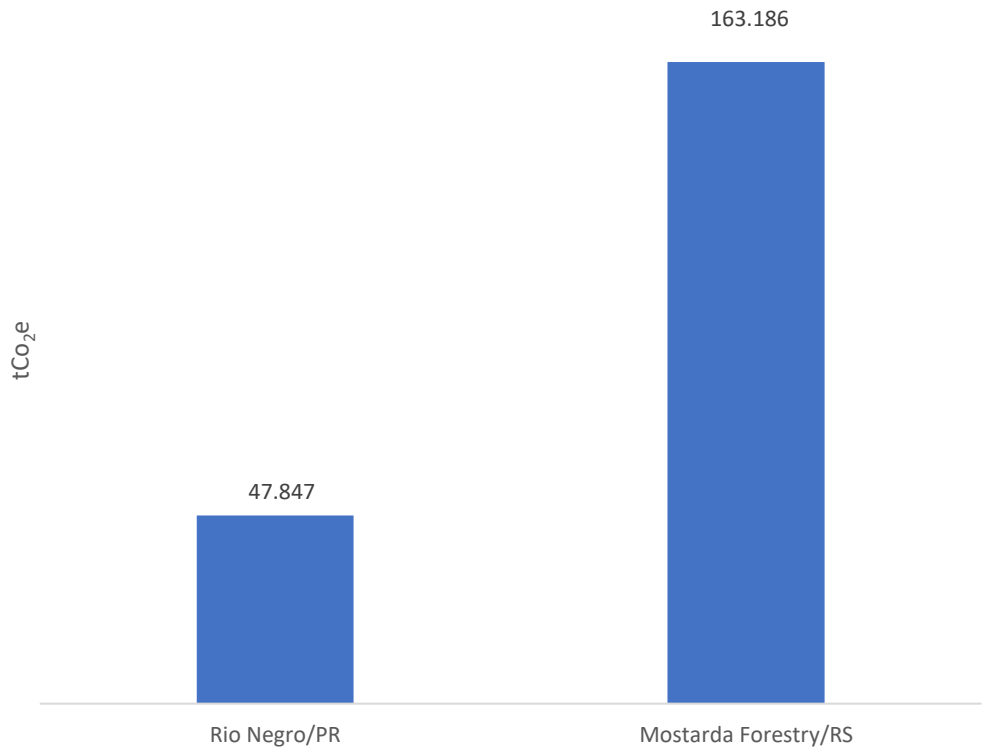
In 2023, **biogenic emissions** totaled **194,115.84 $tCO_2e$,** concentrated especially in agricultural activities and stationary combustion. **Rio Negro** was the Madem's unit with the highest biogenic emissions, with **100,151.34 $tCO_2e$** (51.59% of total).

**Agricultural Activities**, resulting from the harvesting of *Pinus spp* from planted forests, was the activity that emitted more biogenic $CO_2$, being responsible for **106,772.87 $tCO_2e$**, of which 93,927.69 $tCO_2e$ correspond to **Mostarda Forestry unit** and 12,795.18 $tCO_2e$ to **Rio Negro unit**.

**Stationary Combustion** was the second largest source of biogenic $CO_2$, due to the burning of wood waste in boilers at the **Rio Negro unit**, resulting in the emission of 86,790.88 $tCO_2e$.

# Carbon Removal ($tCO_2e$)

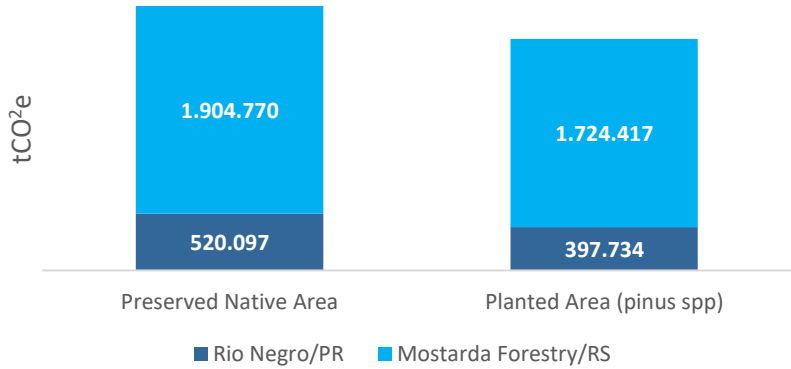
In 2023, the growth of *Pinus spp* forests planted by Madem provided $CO_2$ removal from the atmosphere. The **Mostarda Forestry unit** was responsible for **77%** of the carbon removal, while the **Rio Negro unit** represented **23%.**

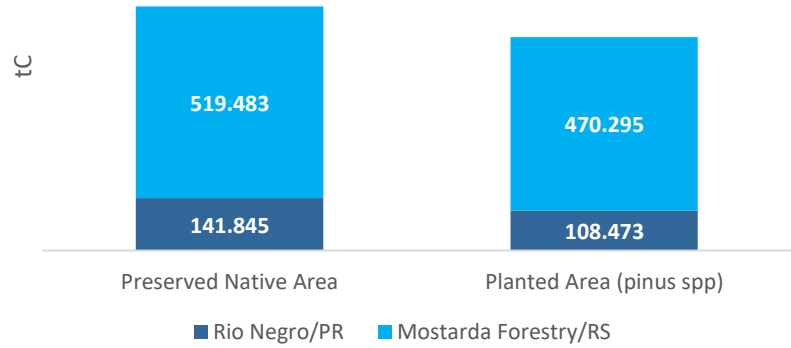


# Carbon Stock (in tC and $tCO_2e$)

Madem has **1,240,095.85 tons of carbon (C) stock** in preserved native forest areas (53.3%) and planted areas (46.7%), which is equivalent to **4,547,018.13 $tCO_2e$**.

The **Mostarda Forestry/RS unit** comprises **79.8%** of the group's carbon stock, with 3,138.3 hectares of preserved Atlantic Forest and 4,618.2 hectares of planted area. The **Rio Negro/PR unit** holds **20.2%** of the group's carbon stock, with 1,016.08 hectares of preserved Atlantic Forest and 1,360.4 hectares of planted area.



# Emissions by Source, in tGEE

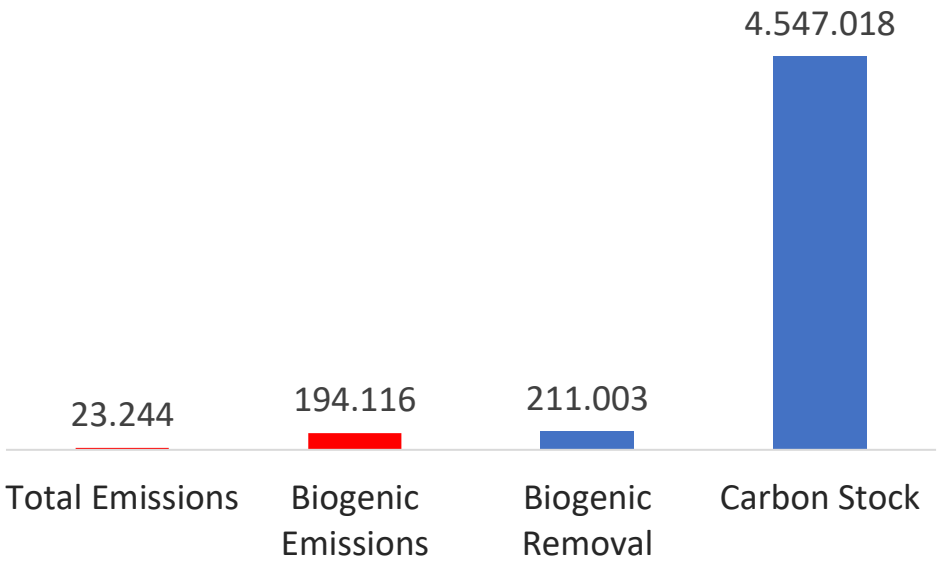
As recommended by the GHG Protocol methodology, the table below presents the emissions in metric tons of each GHG.

| Emission Source | Emissions by GHG (metric tons) | | | |
|---|---|---|---|---|
| | $CO_2$ (t) | $CH_4$ (t) | $N_2O$ (t) | HFCs (t) |
| **Scope 1** | **924,77** | **24,22** | **3,14** | **0,002** |
| Mobile Combustion | 904,37 | 0,31 | 0,04 | 0,00 |
| Stationary Combustion | 19,19 | 23,28 | 3,10 | 0,00 |
| Fugitive Emissions | 1,20 | 0,00 | 0,00 | 0,002 |
| Scope 1 – Wastewater | 0,00 | 0,63 | 0,00 | 0,000 |
| **Scope 2** | **2.031,68** | **0,00** | **0,00** | **0,00** |
| Electricity Purchase | 2.031,68 | 0,00 | 0,00 | 0,00 |
| **Scope 3** | **18.521,85** | **1,82** | **0,76** | **0,00** |
| Transportation of Raw Materials | 5.385,42 | 0,14 | 0,25 | 0,00 |
| Transportation of Products | 11.907,52 | 0,35 | 0,51 | 0,00 |
| Wastewater | 0,00 | 0,54 | 0,00 | 0,00 |
| Waste | 1.228,87 | 0,80 | 0,00 | 0,00 |
| Air Travels | 0,04 | 0,00 | 0,00 | 0,00 |
| **Total** | 21.478,30 | 26,05 | 3,90 | 0,002 |

# Synthesis 2023

In 2023, Madem's scope 1 and 2 **emissions**, added to emissions from reported scope 3 sources, totaled **23,244 $tCO_2e$,** while **biogenic emissions** reached **194,116 $tCO_2e$**. . On the other hand, **biogenic removal** from planted forests totaled **211,033 $tCO_2e$** Finally, the **carbon stock** in the group's native forest and planted forest areas totaled **4,547,018 $tCO_2e$**.

## Synthesis: emission, removal and stock ($tCO_2e$)



# 2022 x 2023

Between 2022 and 2023, the Madem group's **scope 1, 2 and 3** emissions grew by **306.7 $tCO_2e$**, an increase of **1.3%** compared to the previous year. Considering **scopes 1 and 2**, emissions increased by **3.2%.**

In absolute terms, the main variations occurred in the **Transportation of Raw Materials** (**increase of 1,319.5 $tCO_2e$**) and **Transportation of Products** (**reduction of 1,153.2 $tCO_2e$**), due to variations that occurred in the distances and cargo transported during this period.

In scope 1, the largest variation occurred in the **increase of 197 $tCO_2e$** emitted in **Stationary Combustion**, mainly due to the increase in the burning of wood waste (from 51,929 to 59,794 tons). **Scope 2** emissions **reduced** by **48.3 $tCO_2e$**, mainly due to the reduction in Brazil's emission factor between 2022 and 2023 (9.6%) and the reduction in the acquisition of electricity at the Rio Negro unit (-13.2%), mitigated by the increase in Bahrain's emission factor (26.2%).

| Emssion Source | Total Emissions | | | | Variation | |
|---|---|---|---|---|---|---|
| | 2022 | | 2023 | | 2022x2023 | |
| | $tCO_2e$ | % | $tCO_2e$ | % | $tCO_2e$ | % |
| **Scope 1** | **2.249,1** | **9,9%** | **2.438,0** | **10,5%** | **188,9** | **8,4%** |
| Mobile Combustion | 946,3 | 4,1% | 922,8 | 4,0% | -23,4 | -2,5% |
| Stationary Combustion | 1.296,7 | 5,6% | 1.493,7 | 6,4% | 197,1 | 15,2% |
| Fugitive Emissions | 6,2 | 0,03% | 3,8 | 0,02% | -2,4 | -38,7% |
| Scope 1 – Wastewater | 23,0 | 0,1% | 17,7 | 0,1% | -5,4 | -23,3% |
| **Scope 2** | **2.080,0** | **9,1%** | **2.031,7** | **8,7%** | **-48,3** | **-2,3%** |
| Electricity Purchase | 2.080,0 | 9,1% | 2.031,7 | 8,7% | -48,3 | -2,3% |
| **Scope 3** | **18.608,4** | **81,0%** | **18.774,6** | **80,8%** | **166,2** | **0,9%** |
| Transportation of Raw Materials | 4.136,5 | 18,0% | 5.455,9 | 23,5% | 1.319,5 | 31,9% |
| Transportation of Products | 13.204,6 | 57,5% | 12.051,4 | 51,8% | -1.153,2 | -8,7% |
| Wastewater | 15,4 | 0,1% | 15,1 | 0,1% | -0,3 | -2,1% |
| Waste | 1.251,9 | 5,5% | 1.252,1 | 5,4% | 0,2 | 0,0% |
| Air Travels | - | 0,0% | 0,04 | 0,0002% | 0,04 | - |
| **Total** | **22.937,55** | **100%** | **23.244,29** | **100%** | **306,7** | **1,3%** |

Rio Negro
Brazil

Madem MooreCraft Reels
EUA

Madem Gulf
Bahrain

EuroMadem
Spain


Sorocaba
Brazil

Floresta Mostardas
Brazil

Madem Carretes
Mexico

Barcarena
Brazil

Garibaldi
Brazil

Madem Carretes
Colombia

# Rio Negro - Brazil

The **Rio Negro unit** contributed the most to the Madem group's GHG emissions, totaling **8,456.69 $tCO_2e$**. The main emission sources were **Transportation of Products**, responsible for **55.81%** of emissions, followed by **Stationary Combustion** (**17.64%**) and **Transportation of Raw Materials** (**12.83%**).

In addition, the unit recorded the highest volume of **biogenic emissions**, totaling **100,151.34 $tCO_2e$**. This total was mainly influenced by the burning of wood waste in boilers, within the stationary combustion category, which represented **86.66%** of biogenic emissions. **Agricultural Activities**, especially the suppression of *Pinus* spp., accounted for 12.78% of this total

## Emissions by Source ($tCO_2e$)

| Emission Source | Total Emissions | | Biogenic Emissions | |
|---|---|---|---|---|
| | $tCO_2e$ | % | $tCO_2e$ | % |
| **Scope 1** | **1.988,08** | **23,51%** | **99.617,95** | **99,47%** |
| Stationary Combustion | 1.491,46 | 17,64% | 86.790,88 | 86,66% |
| Mobile Combustion | 480,37 | 5,68% | 31,88 | 0,03% |
| Fugitive Emissions | 0,54 | 0,01% | - | 0,00% |
| Agricultural Activities | - | 0,00% | 12.795,18 | 12,78% |
| Wastewater | 15,72 | 0,19% | - | 0,00% |
| **Scope 2** | **641,30** | **7,58%** | **-** | **0,00%** |
| Electricity Purchase | 641,30 | 7,58% | - | 0,00% |
| **Scope 3** | **5.827,31** | **68,91%** | **533,40** | **0,53%** |
| Transportation of Raw Materials | 1.085,10 | 12,83% | 129,57 | **0,13%** |
| Transportation of Products | 4.719,54 | 55,81% | 403,61 | **0,40%** |
| Wastewater | - | 0,00% | - | **0,00%** |
| Waste | 22,67 | 0,27% | 0,22 | 0,00% |
| **Total** | **8.456,69** | **100%** | **100.151,34** | **100%** |

# Madem MooreCraft Reels - EUA

In 2023, **Madem MooreCraft Reels**, in the United States, was the second largest GHG emitter in the Madem group, with a total of **6,315.97 $tCO_2e$**.

The main source of emissions at the unit was the **Transportation of Products** in **scope 3**, which represented **73.85%** of the total, followed by the **Transportation of Raw Materials (17.91%)**. In addition, the electricity purchase contributed to **350.64 $tCO_2e$**, corresponding to **5.55%** of emissions.

No biogenic emissions were recorded at the unit throughout 2023.

## Emissions by Source ($tCO_2e$)

| Emission Source | Total Emissions | |
|---|---|---|
| | $tCO_2e$ | % |
| **Scope 1** | **23,06** | **0,37%** |
| Mobile Combustion | 20,46 | 0,32% |
| Stationary Combustion | 0,00 | 0,00% |
| Fugitive Emissions | 2,61 | 0,04% |
| Agricultural Activities | 0,00 | 0,00% |
| **Scope 2** | **350,64** | **5,55%** |
| Electricity Purchase | 350,64 | 5,55% |
| **Scope 3** | **5.942,27** | **94,08%** |
| Transportation of Raw Materials | 1.131,41 | 17,91% |
| Transportation of Products | 4.664,64 | 73,85% |
| Wasteawater | 4,51 | 0,07% |
| Waste | 141,71 | 2,24% |
| **Total** | **6.315,97** | **100%** |

# Madem Gulf - Bahrain

**Madem Gulf**, located in Bahrain, was the third largest GHG emitter in the Madem group in 2023, totaling **5,751.49 $tCO_2e$**.

Most of the unit's emissions were in **scope 3**, predominantly attributed to the **Transportation of Products**, which represented **35.72%** of the total, and the **Transportation of Raw Materials**, responsible for **31.07%.**

No biogenic emissions were recorded at the unit throughout 2023.

## Emissions by Source ($tCO_2e$)

| Emission Source | Total Emissions | |
|---|---|---|
| | $tCO_2e$ | % |
| **Scope 1** | **106,29** | **1,85%** |
| Mobile Combustion | 105,76 | 1,84% |
| Stationary Combustion | - | 0,00% |
| Fugitive Combustion | 0,53 | 0,01% |
| Agicultural Activities | - | 0,00% |
| **Scope 2** | **713,67** | **12,41%** |
| Electricity Purchase | 713,67 | 12,41% |
| **Scope 3** | **4.931,54** | **85,74%** |
| Transportation of Raw Materials | 1.787,18 | 31,07% |
| Transportation of Products | 2.054,28 | 35,72% |
| Wastewater | 2,91 | 0,05% |
| Waste | 1.087,16 | 18,90% |
| **Total** | **5.751,49** | **100%** |

# EuroMadem - Spain

In 2023, the **EuroMadem unit** in Spain recorded total emissions of **2,413.83 $tCO_2e$**, with the majority (83.01%) coming from scope 3. The main sources were the **Transportation of Raw Materials**, responsible for **1,452.24 $tCO_2e$**, and the **Transportation of Products**, which generated **547.85 $tCO_2e$**.

In scope 2, the **electricity purchase** represented **11.13%** of the unit's emissions, totaling **268.66 $tCO_2e$**.

No biogenic emissions were recorded at the unit throughout 2023.

## Emissions by Source ($tCO_2e$)

| Emission Source | Total Emissions | |
|---|---|---|
| | $tCO_2e$ | % |
| **Scope 1** | **141,46** | **5,86%** |
| Stationary Combustion | 0,00 | 0,00% |
| Mobile Combustion | 141,43 | 5,86% |
| Fugitive Emissions | 0,03 | 0,00% |
| Agricultural Activities | 0,00 | 0,00% |
| **Scope 2** | **268,66** | **11,13%** |
| Electricity Purchase | 268,66 | 11,13% |
| **Scope 3** | **2.003,71** | **83,01%** |
| Transportation of Raw Materials | 1.452,24 | **60,16%** |
| Transportation of Products | 547,85 | **22,70%** |
| Wastewater | 3,63 | **0,15%** |
| Waste | 0,00 | 0,00% |
| **Total** | **2.413,83** | **100%** |

# Sorocaba - Brazil

The **Sorocaba** unit recorded a total of **100.15 $tCO_2e$** of emissions. The main emission source was the **Transportation of Products** in scope 3, representing **63.42%** of the total.

In scope 1, emissions were generated mainly by **mobile combustion**, which corresponded to **33.26%** of the unit's emissions, resulting from the consumption of LPG and gasoline in operational vehicles.

**Biogenic emissions** were mainly originated by the **transportation of products**, responsible for **83.94%** of the unit's total.

## Emissions by Source ($tCO_2e$)

| Emission Source | Total Emissions | | Biogenic Emissions | |
|---|---|---|---|---|
| | $tCO_2e$ | % | $tCO_2e$ | % |
| **Scope 1** | **33,31** | **33,26%** | **1,45** | **16%** |
| Mobile Combustion | 33,31 | 33,26% | 1,45 | 16,06% |
| Stationary Combustion | - | 0,00% | - | 0% |
| Fugitive Emissions | - | 0,00% | - | 0% |
| Agricultural Emissions | - | 0,00% | - | 0% |
| **Scope 2** | **1,96** | **1,95%** | **-** | **0%** |
| Electricity Purchase | 1,96 | 1,95% | - | 0% |
| **Scope 3** | **64,88** | **64,79%** | **7,58** | **84%** |
| Transportation of Raw Materials | - | 0,00% | - | 0,0% |
| Transportation of Products | 63,52 | 63,42% | 7,58 | 83,94% |
| Wastewater | 1,37 | 1,36% | - | 0,0% |
| Waste | - | 0,00% | - | 0% |
| **Total** | **100,15** | **100%** | **9,04** | **100%** |

# Mostarda Forestry – Brazil

The **Mostarda Forestry unit** emitted **85.14 $tCO_2e$**. The largest source of emissions was mobile combustion, mainly due to the use of diesel oil in tractors, which was responsible for 82.49 $tCO_2e$ (**96.90%** of the unit's total emissions).

In **biogenic emissions**, **agricultural activities** emitted a total of **93,927.69 $tCO_2e$**. **Mobile combustion** emitted **10.32 $tCO_2e$** due to the percentage of biodiesel present in the diesel oil used in tractors and gasoline in operational vehicles.

## Emissions by Source ($tCO_2e$)

| Emission Source | Total Emissions | | Biogenic Emissions | |
|---|---|---|---|---|
| | $tCO_2e$ | % | $tCO_2e$ | % |
| **Scope 1** | **84,80** | **99,60%** | **93.938,01** | **100,00%** |
| Mobile Combustion | 82,49 | 96,90% | 10,32 | 0,01% |
| Stationary Combustion | 1,23 | 1,45% | - | 0,00% |
| Fugitive Emissions | 0,04 | 0,04% | - | 0,00% |
| Agricultural Activities | - | 0,00% | 93.927,69 | 99,99% |
| Wastewater | 1,04 | 1,22% | - | 0,00% |
| **Scope 2** | **0,34** | **0,40%** | **-** | **0,00%** |
| Electricity Purchase | 0,34 | 0,40% | - | 0,00% |
| **Scope 3** | **-** | **0,00%** | **-** | **0,00%** |
| Transportation of Raw Materials | - | 0,00% | - | 0,00% |
| Transportation of Products | - | 0,00% | - | 0,00% |
| Wastewater | - | 0,00% | - | 0,00% |
| Waste | - | 0,00% | - | 0,00% |
| **Total** | **85,14** | **100%** | **93.938,01** | **100%** |

# Madem Carretes de Mexico

**Madem Carretes de Mexico** recorded total emissions of **76.0 $tCO_2e$**. The largest source of emissions was the **purchase of electricity**, responsible for **50.74 $tCO_2e$** , equivalent to 66.77% of the unit's emissions. **Mobile combustion** contributed **30.42%** of the total.

**Mobile combustion** in vehicles emitted **3.50 $tCO_2e$** of **biogenic emissions**.

## Emissions by Source ($tCO_2e$)

| Emission Source | Total Emissions | | Biogenic Emissions | |
|---|---|---|---|---|
| | $tCO_2e$ | % | $tCO_2e$ | % |
| **Scope 1** | **23,12** | **30,42%** | **3,50** | **100,00%** |
| Stationary Combustion | 0,00 | 0,00% | - | - |
| Mobile Combustion | 23,12 | 30,42% | 3,50 | 100,00% |
| Fugitive Emissions | 0,00 | 0,00% | - | - |
| Agriculture Activities | 0,00 | 0,00% | - | - |
| **Scope 2** | **50,74** | **66,77%** | **-** | **-** |
| Electricity Purchase | 50,74 | 66,77% | - | - |
| **Scope 3** | **2,14** | **2,81%** | **-** | **-** |
| Transport of Raw Materials | 0,00 | **0,00%** | **-** | **-** |
| Transport of Products | 0,00 | **0,00%** | **-** | **-** |
| Wastewater | 2,14 | **2,81%** | **-** | **-** |
| Waste | 0,00 | 0,00% | - | - |
| **Total** | **76,00** | **100%** | **3,50** | **100%** |

# Barcarena - Brazil

The **Barcarena unit** emitted **25.14 $tCO_2e$**. The largest emission source was **mobile combustion**, with **22.77 $tCO_2e$ (90.56% of the unit's total emissions**), due to the use of LPG and diesel oil in operational vehicles. **Transportation of Products** was responsible for **1.57 $tCO_2e$ (6.24% of the unit's total emissions).**

The largest source of biogenic emissions was mobile combustion in operational vehicles (0.83 $tCO_2e$).

## Emissions by Source ($tCO_2e$)

| Emission Source | Total Emissions | | Biogenic Emissions | |
|---|---|---|---|---|
| | $tCO_2e$ | % | tCO2e | % |
| **Scope 1** | **22,77** | **90,56%** | **0,83** | **81,67%** |
| Stationary Combustion | - | 0,00% | - | 0,00% |
| Mobile Combustion | 22,77 | 90,56% | 0,83 | 81,67% |
| Fugitive Emissions | - | 0,00% | - | 0,00% |
| Agricultural Activities | - | 0,00% | - | 0,00% |
| **Scope 2** | **0,45** | **1,77%** | **-** | **0,00%** |
| Electricity Purchase | 0,45 | 1,77% | - | 0,00% |
| **Scope 3** | **1,93** | **7,67%** | **0,19** | **18,33%** |
| Transportation of Raw Materials | - | **0,00%** | **-** | **0,00%** |
| Transportation of Products | 1,57 | **6,24%** | **0,19** | **18,33%** |
| Wastewater | 0,36 | **1,43%** | **-** | **0,00%** |
| Waste | - | 0,00% | - | 0,00% |
| **Total** | **25,14** | **100%** | **1,02** | **100%** |

# Garibaldi - Brazil

The **Garibaldi unit** had a total emission of **13.34 $tCO_2e$** and **mobile combustion** was the main emitting activity, accounting for **8.52 $tCO_2e$** (**63.89%**), due to the use of diesel oil and gasoline in operational vehicles.

The second largest source of emissions was the **acquisition of electricity**, with an emission of **2.42 $tCO_2e$**.

**Biogenic emissions** at the unit occurred due to the combustion of ethanol and biodiesel present in gasoline and diesel oil, used in vehicles (**1.92 $tCO_2e$**) .

## Emissions by Source ($tCO_2e$)

| Emission Source | Total Emissions | | Biogenic Emissions | |
|---|---|---|---|---|
| | $tCO_2e$ | % | $tCO_2e$ | % |
| **Scope 1** | **10,53** | **78,94%** | **1,92** | **100,00%** |
| Stationary Combustion | 1,06 | 7,92% | - | 0,00% |
| Mobile Combustion | 8,52 | 63,89% | 1,92 | 100,00% |
| Fugitve Emissions | 0,04 | 0,33% | - | 0,00% |
| Agriculture Activities | - | 0,00% | - | 0,00% |
| Wastewater | 0,91 | 6,80% | - | 0,00% |
| **Scope 2** | **2,42** | **18,17%** | **-** | **0,00%** |
| Electricity Purchase | 2,42 | 18,17% | - | 0,00% |
| **Scope 3** | **0,39** | **2,90%** | **-** | **0,00%** |
| Transportation of Raw Materials | - | **0,00%** | **-** | **0,00%** |
| Transportation of Products | - | **0,00%** | **-** | **0,00%** |
| Wastewater | - | **0,00%** | **-** | **0,00%** |
| Waste | 0,39 | 2,90% | - | 0,00% |
| **Total** | **13,34** | **100%** | **1,92** | **100%** |

# Madem Carretes de Colombia

**Madem Carretes de Colombia** emitted **6.53 $tCO_2e$**, in 2023 Its largest emission source was **mobile combustion**, in scope 1, which generated **4.57 $tCO_2e$**, due to the combustion of gasoline and LPG in operational vehicles.

The unit's biogenic emissions occurred exclusively due to the incineration of wood waste (11.00 $tCO_2e$).

## Emissions by Source ($tCO_2e$)

| Emission Source | Total Emissions | | Biogenic Emissions | |
|---|---|---|---|---|
| | $tCO_2e$ | % | tCO2e | % |
| **Scope 1** | **4,59** | **70,27%** | **-** | **0,00%** |
| Stationary Combustion | 0,00 | 0,00% | - | 0,00% |
| Mobile Combustion | 4,57 | 70,00% | - | 0,00% |
| Fugitive Emissions | 0,02 | 0,27% | - | 0,00% |
| Agriculture Activities | - | 0,00% | - | 0,00% |
| **Scope 2** | **1,51** | **23,17%** | **-** | **0,00%** |
| Electricity Purchase | 1,51 | 23,17% | - | 0,00% |
| **Scope 3** | **0,43** | **6,56%** | **11,00** | **100,00%** |
| Transportation of Raw Materials | - | **0,00%** | **-** | **0,00%** |
| Transportation of Products | - | **0,00%** | **-** | **0,00%** |
| Wastewater | 0,20 | **2,99%** | **-** | **0,00%** |
| Waste | 0,19 | 2,88% | 11,00 | 100,00% |
| Air Travels | 0,04 | 0,69% | - | 0,00% |
| **Total** | **6,53** | **100%** | **11,00** | **100%** |

# Future Actions

- Assess the possibility of **changing the fuel** used in **mobile machinery** to fuels that emit less emissions (e.g. electric forklifts)
- In Brazilian units, **generate renewable electricity** for **self-consumption** and/or purchase renewable energy through the **incentivized free market** (with a guarantee of 100% renewable energy sources), despite using electricity from the National Interconnected System – SIN. To evaluate similar alternatives for other countries.
- Regarding the fleet of vehicles used in operations, give preference to the use of **ethanol in flex-fuel vehicles** and check the possibility of replacing the fleet with more efficient vehicles that are less intensive in GHG emissions (e.g. electric or hybrid vehicles).
- To develop actions with **transporters of raw materials and products**, aiming at carbon reduction and mitigation initiatives.
- To associate the collected data (e.g. liters of diesel consumed) with the production data (by product) to create an indicator by product.
- Adherence to the Public Registry of the **GHG Protocol Brazil Program** and verification of the inventory by a third party to obtain the gold seal.
- To develop an **Action Plan**, in which reduction and compensation goals are established.