Carbon Chain

Gryphon Digital Mining - CCF Report FY2022-23

Version History

Version	Date	Author	Contact
1.0	18 January 2023	Grace Kelbel	Grace@carbonchain.com

CarbonChain reserves the right to issue new versions of this report in accordance with material methodological improvements and new or updated data sources.

Abbreviations

ASIC	Application-specific Integrated Circuit
CO_2e	Carbon Dioxide Equivalent
BTC	Bitcoin
CCF	Corporate Carbon Footprint
GDM	Gryphon Digital Mining
GHG	Greenhouse Gas
GWP	Global Warming Potential
IPCC	Intergovernmental Panel on Climate Change
pkm	Person Kilometer
tkm	Tonne Kilometer

Executive summary

Gryphon Digital Mining (GDM) is a bitcoin mining company based in the US. The production of Bitcoin entails finding the solution to mathematical problems, a process known as hashing. Providing the solution to these problems allows new transactions to be added to the blockchain, yielding profit to the miner. Mining is typically performed with chips specifically designed for the purpose (ASICs). As a mining company, GDM's operational model is relatively simple. GDM purchases ASICs from Asia and installs them in data centers operated by a third party. The electricity used by those ASICs, in general, constitutes the largest source of emissions associated with Bitcoin.

CarbonChain compiled this comprehensive corporate carbon footprint (CCF) for GDM for the Fiscal Year 2023 (FY2023 – 1 October 2022 to 3 September 2023). This carbon footprint comprises Scope 1 (direct energy), Scope 2 (indirect energy emissions), and Scope 3 (other indirect) emissions for a total of **1,791** tCO_2e. In this period, 801.94 Bitcoin (BTC) were mined. This equates to a carbon intensity of 2.23 tCO_2e/BTC. Figure 1 provides an overview of GDM's corporate footprint for the FY2023 period. In FY2023, GDM wound down CoreScientific mining operations of on average of 35 miners at the facility in Marble, NC but had full operations of on average 72 miners in Dalton GA, and CoinMint was fully running on average 7,249 miners at the Massena, NY facility.

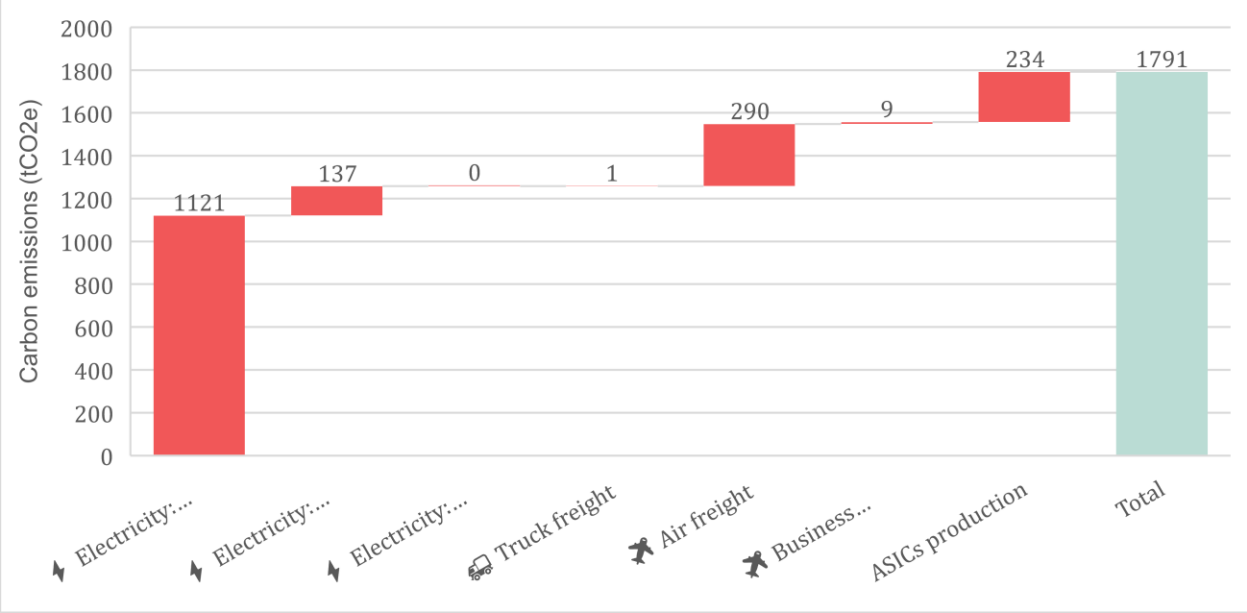

Figure 1. GDM annual corporate carbon footprint, by source of emissions.

Overall, FY2023 emissions decreased by 4,053 tCO2e (70%) from FY2022 period, largely due to the reduction in new miners this year, thereby avoiding Scope 3 emissions from the embodied carbon of the miners and freight transport. An increase of 114 tCO2e (10%) in Scope 2 electricity emissions in FY2023, due to the ramped up operations at GDM's mining facilities.

All the Scope 2 emissions originate from the CoreScientific mining facilities based in Dalton and Marble. The CoinMint Massena facility does not incur electricity emissions due to the direct line to the Moses-Saunders (St Lawrence) Hydroelectric Dam.

1. Results and analysis

This section details the corporate carbon footprint of Gryphon Digital Mining, broken down by scope.

1.1 Scope 1

Scope 1 emissions are direct emissions from owned or controlled sources including boilers, furnaces, vehicles, etc. These emissions include those from the on-site combustion of fuels and emissions from chemical production, for example. GDM was not responsible for any Scope 1 emissions in this reporting period.

1.2 Scope 2

Scope 2 emissions are those arising from the consumption of electricity, steam, cooling or heating. GDM's electricity usage occurs across three sites: Massena, NY (operated by CoinMint), and Dalton, GA and Marble, NC (both operated by CoreScientific). Table 1 provides an overview of GDM's Scope 2 emissions in FY2023. The Massena, NY facility has a direct line to the St Lawrence hydroelectric dam, whilst the Dalton, GA and Marble, NC facilities draw from their respective local grids.

Table 1: Overview of GDM's Scope 2 electricity emissions

Operator	Location	Power Source	Electricity consumption (kWh)	Emissions (tCO_2e)
CoreScientific	Dalton, GA	SERC South	3,235,362	1,061.78
CoreScientific	Marble, NC	SERC Virginia/Carolinas	439,686	129.32
CoinMint	Massena, NY	St Lawrence Dam	206,396,580	0.00
		Total	**210,071,6278**	**1,191**

Electricity consumption increased by by 97,110,156 kWh (46%) from FY2022. The majority of this increase was due to increased mining operations. This increase was especially evident at the CoinMint location in Massena, NY where consumption increased by 96,759,000 kWh (88%). This increase in consumption, however, does not result in increased emissions, as no Scope 2 emissions are associated with the St Lawrence hydroeletric dam supplying this CoinMint location. Electricity consumption at both CoreScientific locations remained similar to last year, increasing by 320,736 kWh (11%) in Dalton, GA and 30,420 kWh (7%) in Marble, NC.

Figure 2 provides a comparison of annual electricity consumption at each location in 2022 and 2023. Furthermore, Figure 3 provides an overview of daily electricity consumption over each reporting period (October 2021 to Septmeber 2023).

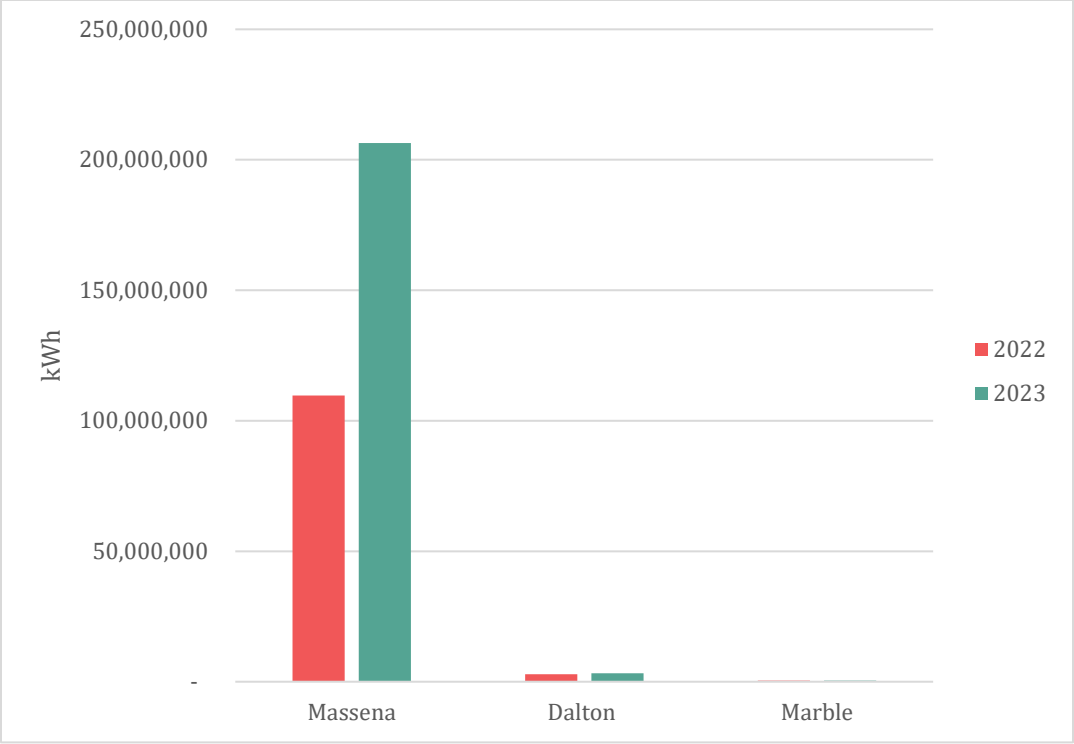

Figure 2: Total electricity usage comparison from FY2023 and FY2022, by site

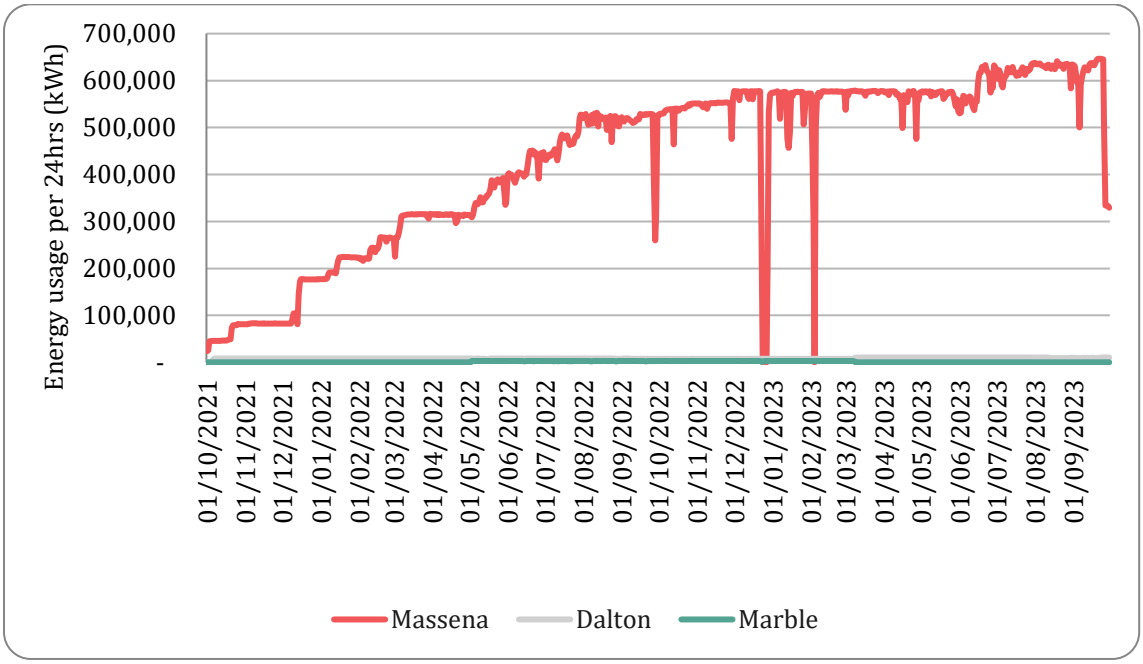

Figure 3. Daily electricity consumption, 1 Oct 2021 – 30 Sep 2023, by site

1.3 Scope 3

Scope 3 incorporates all other indirect emissions occurring off-site across the GDM value chain. This includes the emissions associated with the production and transportation of the Application-Specific Integrated Circuits (ASICs)

(the units that mine Bitcoin), business travel, and the emissions associated with the transmission and distribution of the electricity consumed on-site (the direct emissions from this electricity are included in Scope 2). The carbon emissions from each of these sources are detailed below.

1.3.1 Category 1. Purchased goods and services

Category 1 emissions include emissions arising from the production of products purchased. Products may be tangible (goods) or intangible (services). GDM's emission sources under Scope 3 Category 1. Purchased goods and services consist of ASIC production. GDM purchased 876 ASIC miners across the FY2023 period, compared to 7,200 in FY2022. Table 2 details how the emissions for ASIC production were allocated based on purchase location.

Table 2. Purchased ASIC emissions by location.

Operator	Location	Number of ASICS	Emissions (tCO_2e)
CoreScientific	Dalton, GA	0	0
CoreScientific	Marble, NC	0	0
CoinMint	Massena, NY	876	233.79
	Total	**876**	**233.79**

Emissions from ASIC production decreased by 1,615.89 tCO2e (87%), largely due to less ASICS being purchased. No ASICs were recorded as purchased for either of the CoreScientific sites.

1.3.2 Category 3. Upstream energy-related emissions

Category 3 emissions include those resulting from the production of fuel and energy purchased and consumed. GDM's emission sources under Scope 3 Category 3. Upstream fuel-and energy-related activities include those related to electricity production. Table 3 provides an overview of Category 3 emissions at each location.

Table 3. Overview of GDM's Category 3 emissions

Operator	Location	Power Source	Electricity consumption (kWh)	Emissions (tCO_2e)
CORE Scientific	Dalton, GA	SERC South	3,235,362	59.42
CORE Scientific	Marble, NC	SERC Virginia/Carolinas	439,686	7.92
CoinMint	Massena, NY	St Lawrence Dam	206,395,580	0.00
		Total	210,071,6278	66.66

As expected, the emissions from the transmission and distribution of electricity reported here are a fraction (approximately 5%) of the emissions that occur from the direct production of the electricity (reported under Scope 2). Emissions in this category increased by 9.56 tCO_2e (17%) due to the increase in electricity consumption as noted in section 1.2.

1.3.3 Category 4. Upstream transportation and distribution

Category 4 emissions include emissions resulting from the transportation and distribution of purchased products including air, road, rail, and marine transport. GDM's emission sources under Scope 3 Category 4. Upstream transportation and distribution consist of truck and air freight required for ASIC transportation. ASICs are produced

in Taiwan and are freighted via air through Malaysia to arrive in JFK (CoinMint ASICs). From there, the ASICs are transported via truck to their final destinations. Table 4 provides details of the specific transport routes and loads for both air and truck freight.

Table 4. Emissions from ASIC transportation by mode, load, and route

Route	Number of ASICS	Weight (tonnes)	Distance (km)	Emissions (tCO_2e)
Air freight				
Taiwan -> Malaysia	876	11.56	3,318.89	71.89
Malaysia -> JFK	876	11.56	15,262.44	217.81
Truck freight				
JFK -> Massena, NY	876	11.56	600.71	0.84
			Total Air	**289.71**
			Total Truck	**0.84**
			Total	**290.54**

Similar to Category 1 emissions, Category 4 emissions from the upstream transportation of ASICs decreased by 2,172.92 tCO2e (88%). Again, this corresponds to a decrease in the number of ASICs purchased.

1.3.4 Category 6. Business travel

Category 6 emissions include emissions resulting from the transportation of employees for business related activities. For GDM, business travel emissions resulted from air travel. Over the FY2022-23 period, 12 flights were made for business purposes by GDM staff. The same number of flights were taken in the FY22 reporting period. Table 5 provides a breakdown of each flight taken by a member of GDM staff.

Table 5. Business travel by GDM staff during the reporting period

Date	Departure airport	Destination airport	Class	Distance (p.km)	Emissions (tCO_2e) [1]
24/04/2023	YYZ	EWR	Business	560.00	0.25
28/04/2023	LGA	YYZ	Business	574.00	0.26
16/05/2023	YYZ	MIA	Economy	1,985.00	0.31
22/05/2023	MCO	YYZ	Economy	1,699.00	0.27
04/06/2023	YYZ	LAX	Business	3,501.00	1.58
08/06/2023	LAX	YYZ	Business	3,501.00	1.58
20/06/2023	YYZ	LAS	Economy	3,127.00	0.49
22/06/2023	LAS	YYZ	Business	3,127.00	0.49

[1] Emission Factor Business travel air: International with RF (radiative forcing), plus Well-to-Tank of fuel: International with RF

Date	Departure airport	Destination airport	Class	Distance (p.km)	Emissions (tCO_2e) [1]
25/07/2023	YYZ	MIA	Economy	1,985.00	0.31
27/07/2023	MIA	YYZ	Economy	1,985.00	0.31
10/09/2023	YYZ	EWR	Business	560.00	0.25
14/09/2023	LGA	YYZ	Business	574.00	0.26
				Total	**9.35**

Category 6 emissions increased by 4.91 tCO_2e (111%). This increase is largely due to an increase in business class flights, which are more carbon intensive than economy. A total of 7 business class flights were taken in this reporting period, while 3 were taken in the FY22 period.

1.4 Emissions Breakdown

1.4.1 Emissions by scope

Overall, 1,191.11 tCO_2e (66%) resulted from Scope 2 emissions while 600.34 tCO_2e (34%) resulted from Scope 3 emissions for a total corporate footprint of 1,791 tCO_2e. Figure 4 provides a visual of the share of GDM FY23 emissions by scope.

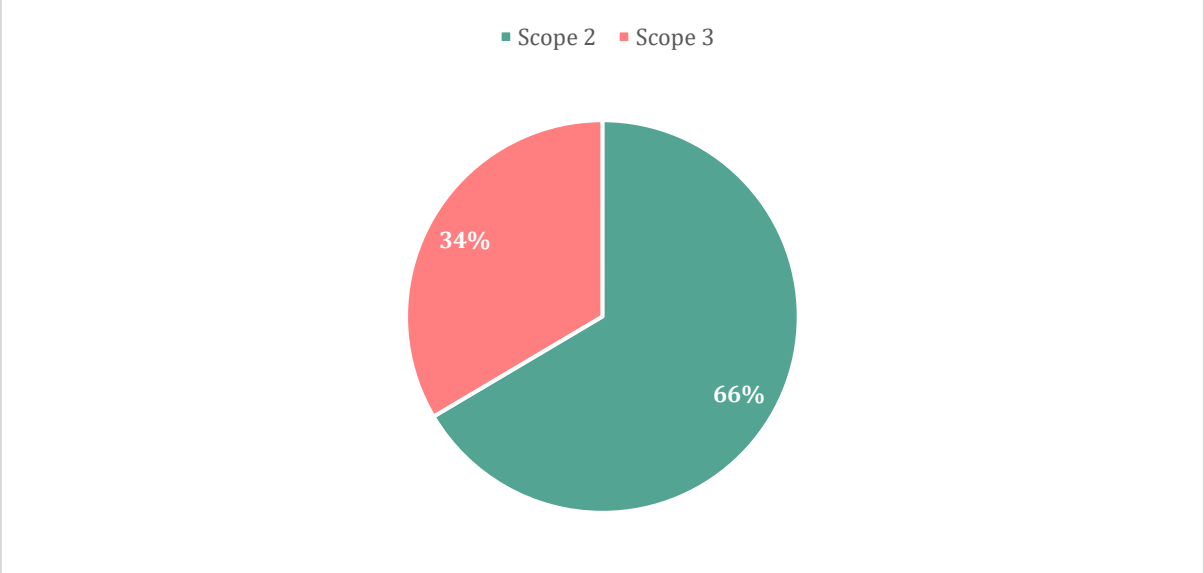

Figure 4. GDM corporate carbon footprint, by scope of emissions

The majority (48%) of Scope 3 emissions arose from Category 4 during the transportation of ASICs to CoinMint in Massena, NY from Taiwan at 290.54 tCO_2e. Following Category 4, 233.79 tCO_2e resulted from Category 3 ASIC production which was responsible for 39% of total emissions. Category 3 upstream energy emissions made up 11% of total emissions at 66.66 tCO_2e. Finally, Category 6 business travel made up 2% of total emissions at 9.35 tCO_2e. Figure 5 provides a breakdown of Scope 3 emissions by percent share.

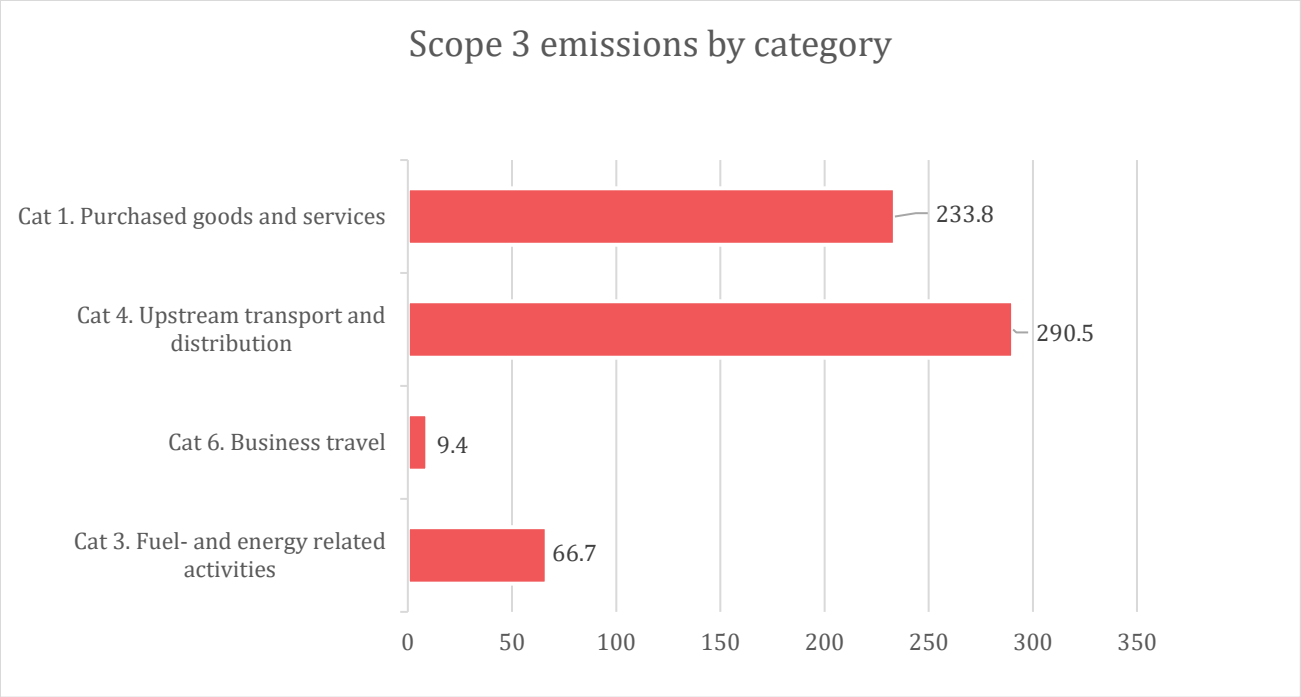

Figure 5. Overview of Scope 3 emissions

1.4.2 Emissions intensity

In addition to reporting GDM's absolute emissions, an emissions intensity can also communicate emissions relative to a company's operations and allow for year-on-year comparisons. Over the course of the 1 Oct 2022 - 30 Sep 2023 period, a total of 801.94 bitcoin were mined, 145.94 more than the previous year representing an increase of 22%. GDM's emissions intensity year-on-year is provided in Table 6. Note that this is not considered an emissions intensity of the bitcoin product itself, but rather a company's annual emissions as an intensity metric.

Table 6. GDM emissions intensity

Scope	GDM emissions intensity (tCO_2e/BTC)
2022/23	2.23
2021/22	8.91

There was a 74% decrease in emissions intensity from the previous reporting period. As discussed, this decrease is mainly due to the decrease in number of ASICS purchased in FY2022-23 period (6,324 fewer ASICs than in FY2021-22). This results in less embodied carbon from the ASICS (Category 1. Purchased goods and services) and a decrease in the corresponding transportation emissions associated with transporting the ASICS to the bitcoin mining facilities (Category 4. Upstream transportation and distribution).

2. Methods

This section sets out the methodology used to calculate GDM's corporate carbon footprint, as well as the data sources used. Note that this corporate carbon footprint aligns with the methodology and guidelines set out in the GHG Protocol Corporate Standard[2].

2.1 Boundaries

This section describes the GDM operations, and the boundaries for inclusions and exclusions of entities and emission sources within the GDM CCF.

2.1.1 Temporal boundary

This report covers the Fiscal Year 2023 (FY2022-23) period from 1 Oct 2022 - 30 Sep 2023.

2.1.1 Organizational boundary

GDM is a standalone entity without a parent company or subsidiaries. An operational control approach was used to identify emissions over which GDM had direct control. Figure 6 provides a visual of GDM's organization.

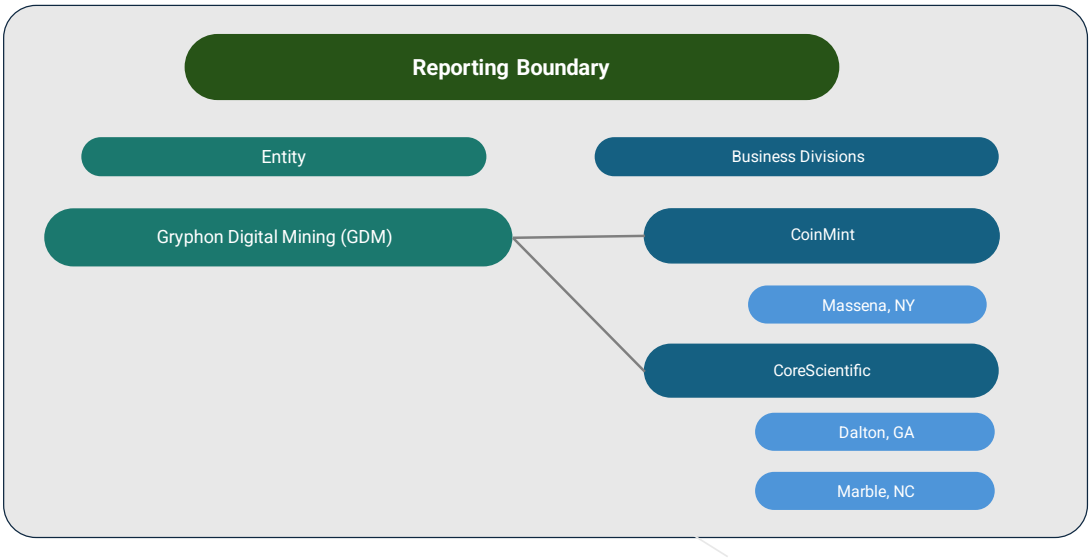

Figure 6. GDM's organizational boundary for the FY2023 reporting period

[2] https://ghgprotocol.org/corporate-standard

2.1.2 Reporting boundary

Figure 7 describes the boundary of this report, including non-quantified and excluded categories.

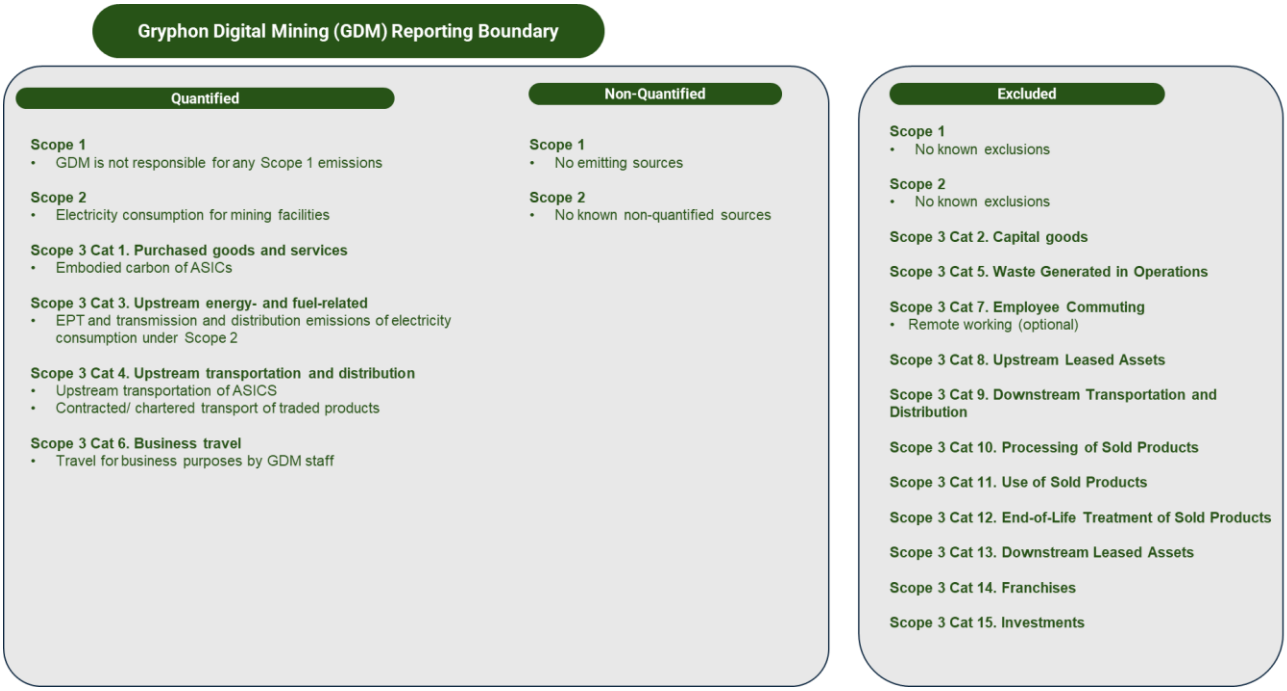

Figure 7. Overview of GDM's reporting boundary

The majority of the excluded categories do not apply to GDM; GDM does not produce physical products for sale, it has no capital goods, leased assets, franchises or investments, and all its employees work from home and have no commute. In the case of Category 5: Waste Generated in Operations, very little waste is generated, and the emissions associated with this waste are insignificant when compared with other aspects of their corporate operations.

For Category 6 Business Travel, the emissions from business related flights are included in this corporate carbon footprint. Emissions from other aspects of these business trips (transport to and from the airport, hotel stays, etc.) do not reach the threshold for significance, and are excluded from this study.

2.2 Data Sources

This section details the data used in this corporate carbon footprint study, the sources of the data, and any assumptions made.

2.2.1 Power consumption, transmission and distribution

GDM provided power consumption logs for the Massena, NY, Dalton, GA, and Marble, NC facilities, sourced from data center records.

2.2.2 ASICs production

GDM provided product specifications that detailed the weight of each ASIC and its key components. The total ASICs installed at each site was also provided. For CoreScientific facilities, the number of ASICs was sourced from raw data from the facilities.

2.2.3 Details of shipments

GDM provided waybills and invoices covering the shipments of ASICs from source to facility. As shown in Figure 8, ASICs originated in Taiwan and were flown to the USA via Malaysia.

These specified end locations (i.e. facility) but we could not deduce the exact supply chain, because waybill numbers had expired at the point of analysis. As such, we assumed a journey across the waypoints specified by GDM, based on the prior reporting period's routes.

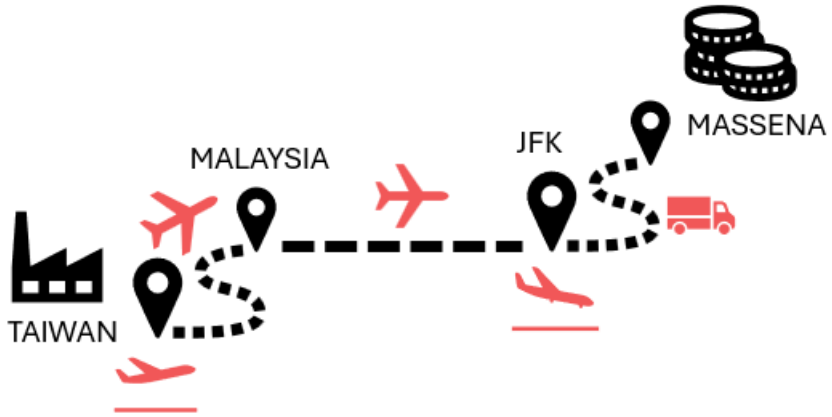

Figure 8. Freight journeys of ASICs

Once ASICs arrive in the USA at JFK, they are trucked to CoinMint in Massena, NY.
Freight assumptions are:

1. All ASICs originate in Taiwan
2. 100% are then shipped to Malaysia
3. ASICs for Massena, NY are flown to JFK
4. ASICs are then trucked to their final destination

Google Maps was used to approximate the driven distance between locations, and great-circle route was used to approximate flight distances.

2.2.4 Business travel records

GDM provided a list of business flights with dates, class of travel, and origin and destination airports. Great-circle distances were used to approximate distance between airports.

2.3 Emission factors sources

Table 7 provides a summary of the emission factors used in the quantification of GDM's FY2022-23 CCF.

Table 7. Emission factor sources

Scope and Category	Emission Source	Emission Factor Source
Scope 1	No known scope 1 sources.	
Scope 2	Massena, NY	Direct emissions from hydroelectric generation from IPCC (2018)[3]
	Dalton, GA	EPA eGrid, SERC South Region[4] (2023)
	Marble, NC	EPA eGrid, SERT Virginia/Carolinas Region[5] (2023)
Scope 3 Cat 1 Purchased goods and services	ASIC production	EcoInvent Database[6]
Scope 3 Cat 3 Fuel and energy-related activities	Massena, NY	Direct emissions from hydroelectric generation from IPCC (2018)
	Dalton, GA	EPA eGrid, SERC South Region (2023)
	Marble, NC	EPA eGrid, SERC Virginia/Carolinas Region (2023)
Scope 3 Cat 4 Upstream transportation and distribution	Truck freight	DEFRA (2023)[7]
	Air freight	DEFRA (2023)[8]

[3] Technology-specific Cost and Performance Parameters
[4] EPA eGRID
[5] EPA eGRID
[6] Emission Factor: computer production, desktop, without screen
[7] https://www.gov.uk/government/publications/greenhouse-gas-reporting-conversion-factors-2023
[8] https://www.gov.uk/government/publications/greenhouse-gas-reporting-conversion-factors-2023