

Carbon Accounting APIs

A companion guide for the Carbon Performance Engine application in IBM
Environmental Intelligence Suite

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1. Overview

Calculate your internal carbon emissions and your supply chain emissions by using the Carbon Accounting APIs. The APIs that are listed in Table 1 are provided with Carbon Performance Engine application in IBM Environmental Intelligence Suite.

Carbon Performance Engine calculates several types of emissions for an organization, including the emission that fall under the following scope categories as defined by the [GHG protocol](#):

- **Scope 1:** Direct greenhouse gas (GHG) emissions that can be directly controlled by an organization. The source of the emissions comes from sources that are owned by the organization, for example, fossil fuel.
- **Scope 2:** Indirect GHG emissions that can be indirectly controlled by an organization, such as the purchase of electricity.
- **Scope 3:** Indirect GHG emissions from upstream or downstream in the value chain of a company, for example, business travel or transportation of goods.

Table 1 - API endpoints

Emission type	Endpoint	Scope level	Description
Stationary endpoint	POST carbon/stationary	Scope 1	Calculate emissions from comfort heating or combustion of fuels in stationary combustion sources.
Fugitive endpoint	POST /carbon/fugitive		Calculate emissions from leaks of greenhouse gasses (GHG) from refrigeration or air conditioning units.
Mobile endpoint	POST /carbon/mobile		Calculate emissions from fleet fuel consumption.
Location endpoint	POST /carbon/location	Scope 2	Calculate emissions from electricity grids that are providing an organization with energy.

Market end point	POST /carbon/market	Scope 2	Calculate emission hotspots in the supply chain from resources and entry risks in the chain.
Transport endpoint	POST /carbon/transportation_and_distribution	Scope 3	Calculate emissions from business-related employee travel, employee commuting, and freight transport.

2. Getting started

Complete these steps to get started with the Carbon Accounting APIs.

Before you begin

Generate a JSON Web Token (JWT) to access the Carbon Accounting endpoints.

1. Ask your administrator for your `API_Key` for the Carbon Accounting APIs.
2. Generate a JWT token. Enter the following CURL command and replace `API_Key` with your key.

```
curl --request POST --url https://auth-b2b-twc.wsitrader.com/Auth/GetBearerForClient --header 'Content-Type: application/json' --header 'cache-control: no-cache' --data '{"apiKey":"<API_KEY>", "clientId":"ibm-agro-api"}'
```

About this task

To access the APIs, use the production environment URL:

<https://foundation.agtech.ibm.com/v2/carbon>.

The Swagger documentation is available from

https://foundation.agtech.ibm.com/v2/swagger/#/Carbon_Accounting_Engine

Each call to an API endpoint is made up of 2 parts, namely, context data and the activity data.

The context data in Table 2 provides details about the organisation, site, and client. Table 2, Table 3, Table 4, and Table 5, define the parameters that provide extra details about the activity, such as the location and the time period. The activity parameters are defined under each endpoint section.

Table 2 - Context data

Parameter	Required	Description
Request Type	Required	Indicates whether the API call is based on real or actual data or simulated data. Valid values are ACTUAL and SIMULATED.
Location	Required	Geographic location that is associated with the activity data.

		For a location, specify country, state or province, zip or post code, and city.
Time period	Required	The period that relates to the activity data. Enter year or year and month.
Custom Identifier	Optional	An identifier for a third party identifier for reference purposes. For example, the custom identifier might reference the asset number of an air conditioning unit.
Organisation	Optional	A division of a company. For organisation, specify the department ID and the department name.
Site	Optional	A subdivision of an organisation. Typically, a facility or plant where worked is performed. For a site, specify site ID, site name, building ID, and the building name.
On Behalf of Client	Optional	A client of the organisation. Specify the client ID.

Table 3 – Context data definitions

Parameters	Required	Definitions
country	Required	Refers to the country that is associated with the activity data. See Table 4 for valid values.
stateProvince	Optional	Refers to the state or province that is associated with the activity data. See Table 5 for valid values..
zipPostCode	Optional	Enter a zip code value for US. Enter a post code for other countries.
city	Optional	Refers to the city that is associated with the activity data.

Table 4- Required parameter - country

Valid values
'Argentina', 'Armenia', 'Australia', 'Austria', 'Bangladesh', 'Belgium', 'Belize', 'Benin', 'Botswana', 'Brazil', 'Bulgaria', 'BurkinaFaso', 'Côte d'Ivoire', 'Cambodia', 'Canada', 'Cape Verde', 'China', 'Croatia', 'Cyprus', 'Czech Republic', 'Democratic Republic of the Congo (DRC)', 'Denmark', 'Dominican Republic', 'Ecuador', 'Estonia', 'Finland', 'France', 'Gambia', 'Georgia', 'Germany', 'Ghana', 'Greece', 'Grenada', 'Guyana', 'Honduras', 'Hungary', 'Iceland', 'India', 'Ireland', 'Italy', 'Jamaica', 'Laos', 'Laos PDR', 'Latvia', 'Lesotho', 'Lithuania', 'Luxembourg', 'Malaysia', 'Mali', 'Malta', 'Mauritius', 'Mexico', 'Mongolia', 'Mozambique', 'Namibia', 'Netherlands', 'New Zealand', 'Niger', 'Nigeria', 'Norway', 'Peru', 'Philippines', 'Poland', 'Portugal', 'Romania', 'Russian', 'Rwanda', 'Sao Tome and Principe', 'Saudi Arabia', 'Senegal', 'Singapore', 'Slovakia', 'Slovenia', 'South Africa', 'Spain', 'Sri Lanka', 'Sudan', 'Swaziland', 'Sweden', 'Switzerland', 'Thailand', 'Togo', 'Turkey', 'Uganda', 'UK', 'United Arab Emirates', 'USA', 'Vietnam', 'Zambia', 'Zimbabwe', 'Colombia', 'Egypt', 'Hong Kong', 'Indonesia', 'Israel', 'Japan', 'Republic of Korea', 'Pakistan', 'Uruguay', 'Venezuela', 'Costa Rica', 'Taiwan', 'Chile'

Table 5- Optional parameter - stateProvince

Valid values
<u>For US:</u> 'Alabama', 'Alaska', 'American Samoa', 'Arizona', 'Arkansas', 'California', 'Colorado', 'Connecticut', 'Delaware', 'District of Columbia', 'Federated States of Micronesia', 'Florida', 'Georgia', 'Guam', 'Hawaii', 'Idaho', 'Illinois', 'Indiana', 'Iowa', 'Kansas', 'Kentucky', 'Louisiana', 'Maine', 'Marshall Islands', 'Maryland', 'Massachusetts', 'Michigan', 'Minnesota', 'Mississippi', 'Missouri', 'Montana', 'Nebraska', 'Nevada', 'New Hampshire', 'New Jersey', 'New Mexico', 'New York', 'North Carolina', 'North Dakota', 'Northern Mariana Islands', 'Ohio', 'Oklahoma', 'Oregon', 'Palau', 'Pennsylvania', 'Puerto Rico', 'Rhode Island', 'South Carolina', 'South Dakota', 'Tennessee', 'Texas', 'Utah', 'Vermont', 'Virgin Islands', 'Virginia', 'Washington', 'West Virginia', 'Wisconsin', 'Wyoming' <u>For Australia:</u>

Valid values

'Australian Capital territory', 'New South Wales', 'Northern Territory', 'Queensland', 'South Australia', 'Tasmania', 'Victoria', 'Western Australia'

3. API endpoints

You can use the JSON body examples and the attribute definitions to guide you when you are making your API calls.

Stationary endpoint

Use the Stationary API to calculate emissions from comfort heating or combustion of fuels in stationary combustion sources.

An example of the JSON body for the call is presented in Table 6 and the activity data attributes are defined in Table 7 and in Table 8Table 8Table 7.

Table 6 - Stationary JSON body example

```
{
  "customID": {
    "id": "Retailer_A_stationary_31234"
  },
  "onBehalfOfClient": {
    "companyId": "877889877",
    "companyName": "Retailer_A"
  },
  "organisation": {
    "departmentId": "384834",
    "departmentName": "Acme_retail"
  },
  "requestType": "ACTUAL",
  "location": {
    "country": "England",
    "stateProvince": "",
    "zipPostCode": "",
    "city": "London"
  },
  "site": {
    "siteId": "T2383823",
    "siteName": "Retailer_A_South_Bank",
    "buildingId": "B38383",
    "buildingName": "Building_6"
  },
  "timePeriod": {
    "year": 2021,
    "month": 1
  },
  "activityData": {
    "sector": "Energy",
    "fuelName": "Coal tar",
  }
}
```

```

    "fuelAmount": "1",
    "fuelUnit": "metric ton",
    "hvBasis": "Not applicable"
  }
}

```

Table 7 - Stationary activity data

Parameters	Data type	Required	Valid values
sector	String	Optional	"Energy", "Manufacturing", "Construction", "Commercial", "Institutional", "Residential", "Agriculture", "Forestry", "Fisheries"
fuelName	String	Required	Fuels can be solid fossil fuels, liquid fossil fuels, gaseous fossil fuels, biomass, or biogas. See Table 8 for valid values.
fuelAmount	String	Required	The amount of fuel consumed.
fuelUnit	String	Required	Fuel units are based on the fuel type. <u>Energy-based fuel:</u> 'TJ', 'GJ', 'MJ', 'KWh', 'MWh', 'mmBtu', 'Therm' <u>Solid state fuel:</u> 'metric ton', 'pound', 'kilogram' <u>Liquid state fuel:</u> 'barrel', 'gallon ', 'litres' <u>Gaseous state fuel:</u> 'foot3', 'metre3'
hvBasis	String	Optional	For energy-based units: 'Lower', 'Higher' For all other units: 'Not applicable'

Table 8 - Required Parameter - fuelName

Valid values
<u>Solid Fossils:</u> 'Anthracite', 'Bitumen', 'Brown coal briquettes', 'Coal tar', 'Coke oven coke', 'Coking coal', 'Gas coke', 'Lignite', 'Lignite coke', 'Municipal waste (Non biomass fraction)', 'Other bituminous coal', 'Paraffin waxes', 'Patent fuel', 'Petroleum coke', 'Sub bituminous coal'
<u>Liquid Fossil:</u> 'Aviation gasoline', 'Crude oil', 'Gas/Diesel oil', 'Diesel', 'Jet gasoline', 'Jet kerosene', 'Lubricants', 'Motor gasoline', 'Naphtha', 'Natural Gas Liquids', 'Oil shale and tar sands', 'Orimulsion', 'Other kerosene', 'Refinery feedstocks', 'Residual fuel oil', 'Shale oil', 'Waste oils', 'White Spirit/SBP', 'Fuel Oil 1', 'Fuel Oil 2', 'Fuel Oil 4', 'Fuel Oil 5', 'Fuel Oil 6'
<u>Gaseous Fossil:</u> 'Blast furnace gas', 'Coke oven gas', 'Ethane', 'Gas works gas', 'Liquified Petroleum Gases/LPG', 'Natural gas', 'Oxygen steel furnace gas', 'Refinery gas'
<u>Biomass:</u> 'Biodiesels', 'Biogasoline', 'Charcoal', 'Landfill gas', 'Municipal wastes (Biomass fraction)', 'Other biogas', 'Other liquid biofuels', 'Other primary solid biomass fuels', 'Peat', 'Sludge gas', 'Sulphite lyes (Black liquor)', 'Wood or Wood waste'
<u>Biomass:</u> 'Biodiesels', 'Biogasoline', 'Charcoal', 'Landfill gas', 'Municipal wastes (Biomass fraction)', 'Other biogas', 'Other liquid biofuels', 'Other primary solid biomass fuels', 'Peat', 'Sludge gas', 'Sulphite lyes (Black liquor)', 'Wood or Wood waste'

Fugitive endpoint

Use the Fugitive API to calculate emissions leaks of GHG from refrigeration or air conditioning units.

An example of the JSON body for the call is presented in Table 9 and the activity data attributes are defined in Table 10 and in Table 11.

Table 9 - Fugitive JSON body example

```
{
  "customID": {
    "id": "Retailer_A_fugitive_31234"
  },
  "onBehalfOfClient": {
    "companyId": "877889877",
    "companyName": "Retailer_A"
  },
  "organisation": {
    "departmentId": "384834",
    "departmentName": "Acme_retail"
  },
  "requestType": "ACTUAL",
  "location": {
    "country": "England",
    "stateProvince": "",
    "zipPostCode": "",
    "city": "London"
  },
  "site": {
    "siteId": "T2383823",
    "siteName": "Retailed_A_South_Bank",
    "buildingId": "B38383",
    "buildingName": "Building_6"
  },
  "timePeriod": {
    "year": 2021,
    "month": 1
  },
  "activityData": {
    "refrigerantName": "R-404A",
    "refrigerantInventoryBeginning": "10",
    "refrigerantInventoryEnd": "2",
    "refrigerantsPurchasedFromProducers": "6",
    "refrigerantsProvidedByManufacturers": "2",
    "refrigerantsAddedToEquipment": "3",
    "refrigerantReturnedAfterRecycling": "0",
    "refrigerantSales": "3",
    "refrigerantLeftInEquipment": "4",
  }
}
```

```

    "refrigerantReturnedToSuppliers": "1",
    "refrigerantForRecycling": "0",
    "refrigerantForDestruction": "0",
    "totalChargeNewEquipment": "0",
    "totalChargeRetrofitted": "0",
    "originalChargeEquipment": "0",
    "totalChargeEquipmentRetroAway": "0",
    "unitOfMeasurement": "kilogram"
  }
}

```

Table 10- Fugitive activity data

Note: The data type for all parameters is string.

Parameters	Required	Valid values or description
refrigerantName	Required	Refrigerant name. See Table 11 for valid values
refrigerantInventoryBeginning	Required	Refrigerant inventory at the beginning of the period. Refers to inventory in storage and not to equipment.
refrigerantInventoryEnd	Required	Refrigerant inventory at the end of the period. Refers to inventory in storage and not to equipment.
refrigerantsPurchasedFromProducers	Required	Refrigerant purchased in bulk from producers or distributors.
refrigerantsProvidedByManufacturers	Required	Refrigerant provided by manufacturers with equipment or inside equipment.
refrigerantsAddedToEquipment	Required	Refrigerant added to equipment by contractors.
refrigerantReturnedAfterRecycling	Required	Refrigerant returned after off-site recycling or reclamation.
refrigerantSales	Required	Sales of refrigerant to other entities. Refers to sales in bulk and not in equipment.
refrigerantLeftInEquipment	Required	Refrigerant that remained in equipment that is sold to other entities.
refrigerantReturnedToSuppliers	Required	Refrigerant returned to suppliers.
refrigerantForRecycling	Required	Refrigerant sent off-site for recycling or reclamation.
refrigerantForDestruction	Required	Refrigerant sent off-site for destruction.

totalChargeNewEquipment	Required	Total full charge of new equipment.
totalChargeRetrofitted	Required	Total full charge of equipment that was retrofitted to use this refrigerant.
originalChargeEquipment	Required	Original total full charge of equipment that is retired or sold to other entities.
totalChargeEquipmentRetroAway	Required	Total full charge of equipment retrofitted away from this refrigerant to a different refrigerant.
unitOfMeasurement	Required	Units: 'metric ton', 'kilogram', 'pound', 'short ton', 'long ton', 'gram'

Table 11- Required Parameter - refrigerantName

Valid values
'CO2', 'CH4', 'N2O', 'Carbon dioxide', 'Methane', 'Fossil methane', 'Nitrous Oxide', 'CFC-11', 'CFC-12', 'CFC-13', 'CFC-113', 'CFC-114', 'CFC-115', 'HCFC-21', 'HCFC-22', 'HCFC-122', 'HCFC-122a', 'HCFC-123', 'HCFC-123a', 'HCFC-124', 'HCFC-132c', 'HCFC-141b', 'HCFC-142b', 'HCFC-225ca', 'HCFC-225cb', '(E)-1-Chloro-3,3,3-trifluoroprop-1-ene', 'HFC-23', 'HFC-32', 'HFC-41', 'HFC-125', 'HFC-134', 'HFC-134a', 'HFC-143', 'HFC-143a', 'HFC-152', 'HFC-152a', 'HFC-161', 'HFC-227ca', 'HFC-227ea', 'HFC-236cb', 'HFC-236ea', 'HFC-236fa', 'HFC-245ca', 'HFC-245cb', 'HFC-245ea', 'HFC-245eb', 'HFC-245fa', 'HFC-263fb', 'HFC-272ca', 'HFC-329p', 'HFC-365mfc', 'HFC-43-10mee', '(Z)-HFC-1336', 'Methyl chloroform', 'Carbon tetrachloride', 'Methyl chloride', 'Methylene chloride', 'Chloroform', 'Methyl bromide', 'Methylene bromide', 'Halon-1201', 'Halon-1202', 'Halon-1211', 'Halon-1301', 'Halon-2301', 'Halon-2311', 'Halon-2401', 'Halon-2402', 'Nitrogen trifluoride', 'Sulphur hexafluoride', '(Trifluoromethyl) sulphur pentafluoride', 'Sulphuryl fluoride', 'PFC-14', 'PFC-116', 'PFC-c216', 'PFC-218', 'PFC-318', 'PFC-31-10', 'Perfluorocyclopentene', 'PFC-41-12', 'PFC-51-14', 'PFC-61-16', 'PFC-71-18', 'PFC-91-18', 'Perfluorodecalin (cis)', 'Perfluorodecalin (trans)', 'Perfluorobut-2-ene', 'HFE-125', 'HFE-134 (HG-00)', 'HFE-143a', 'HFE-227ea', 'HCFE-235ca2 (enflurane)', 'HCFE-235da2 (isoflurane)', 'HFE-236ca', 'HFE-236ea2 (desflurane)', 'HFE-236fa', 'HFE-245cb2', 'HFE-245fa1', 'HFE-245fa2', '2,2,3,3,3-Pentafluoropropan-1-ol', 'HFE-254cb1', 'HFE-263fb2', 'HFE-263m1', 'HFE-329mcc2', 'HFE-338mmz1', 'HFE-338mcf2', 'HFE-347mmz1', 'Sevoflurane', 'HFE-7000', 'HFE-347mcc3', 'HFE-347mcf2', 'HFE-347pcf2', 'HFE-347mmy1', 'HFE-356mec3', 'HFE-356mff2', 'HFE-356pcf2', 'HFE-356pcf3', 'HFE-356pcc3', 'HFE-356mmz1', 'HFE-365mcf2', 'HFE-

374pc2', '2,2,3,3,4,4,5,5-Octafluorocyclopentanol', 'HFE-43-10pccc124 (H-Galden 1040x, HG-11)', 'HFE-449s1', 'HFE-7100', 'n-HFE-7100', 'i-HFE-7100', 'HFE-569sf2', 'HFE-7200', 'n-HFE-7200', 'i-HFE-7200', 'HFE-236ca12 (HG-10)', 'HFE-338pcc13 (HG-01)', '1,1,1,3,3,3-Hexafluoropropan-2-ol', 'HG-02', 'HG-03', 'HG-20', 'HG-21', 'HG-30', '1-Ethoxy-1,1,2,2,3,3,3-heptafluoropropane', '1,1,2,2-Tetrafluoro-1-(fluoromethoxy)ethane', '2-Ethoxy-3,3,4,4,5-pentafluorotetrahydro-2,5-bis[1,2,2,2-tetrafluoro-1-(trifluoromethyl)ethyl]-furan', 'Fluoro(methoxy)methane', 'Difluoro(methoxy)methane', 'Fluoro(fluoromethoxy)methane', 'Difluoro(fluoromethoxy)methane', 'Trifluoro(fluoromethoxy)methane', 'HG'-01', 'HG'-02', 'HG'-03', 'HFE-329me3', '2-Chloro-1,1,2-trifluoro-1-methoxyethane', 'PFPMIE (perfluoropolymethylisopropyl ether)', 'Trifluoromethyl formate', 'Perfluoroethyl formate', 'Perfluoropropyl formate', 'Perfluorobutyl formate', '2,2,2-Trifluoroethyl formate', '3,3,3-Trifluoropropyl formate', '1,2,2,2-Tetrafluoroethyl formate', '1,1,1,3,3,3-Hexafluoropropan-2-yl formate', 'Perfluorobutyl acetate', 'Perfluoropropyl acetate', 'Perfluoroethyl acetate', 'Trifluoromethyl acetate', 'Methyl carbonofluoride', '1,1-Difluoroethyl carbonofluoride', '1,1-Difluoroethyl 2,2,2-trifluoroacetate', 'Ethyl 2,2,2-trifluoroacetate', '2,2,2-Trifluoroethyl 2,2,2-trifluoroacetate', 'Methyl 2,2,2-trifluoroacetate', 'Methyl 2,2-difluoroacetate', 'Difluoromethyl 2,2,2-trifluoroacetate', '2,2,3,3,4,4,4-Heptafluorobutan-1-ol', '1,1,2-Trifluoro-2-(trifluoromethoxy)-ethane', '1-Ethoxy-1,1,2,3,3,3-hexafluoropropane', '1,1,1,2,2,3,3-Heptafluoro-3-(1,2,2,2-tetrafluoroethoxy)-propane', '2,2,3,3-Tetrafluoro-1-propanol', '2,2,3,4,4,4-Hexafluoro-1-butanol', '2,2,3,3,4,4,4-Heptafluoro-1-butanol', '2,2-Difluoroethanol', '2,2,2-Trifluoroethanol', '1,1'-Oxybis[2-(difluoromethoxy)-1,1,2,2-tetrafluoroethane', '1,1,3,3,4,4,6,6,7,7,9,9,10,10,12,12-hexa-decafluoro-2,5,8,11-Tetraoxadodecane', '1,1,3,3,4,4,6,6,7,7,9,9,10,10,12,12,13,13,15,15-eicosafluoro-2,5,8,11,14-Pentaoxapentadecane', 'R-404A', 'R-407A', 'R-407B', 'R-407C', 'R-407D', 'R-407F', 'R-410A', 'R-410B', 'R-417A', 'R-421A', 'R-421B', 'R-422A', 'R-422B', 'R-422C', 'R-422D', 'R-424A', 'R-426A', 'R-427A', 'R-428A', 'R-434A', 'R-438A', 'R-442A', 'R-448A', 'R-449A', 'R-450A', 'R-507A', 'R-508A', 'R-508B', 'R-513A'

Mobile endpoint

Use the Mobile API to calculate emissions from fleet fuel consumption.

An example of the JSON body for the call is presented in Table 12 and the activity data attributes are defined in Table 13.

Table 12 – Mobile JSON body example

```
{
  "customID": {
    "id": "Retailer_A_mobile_31234"
  },
  "onBehalfOfClient": {
    "companyId": "877889877",
    "companyName": "Retailer_A"
  },
  "organisation": {
    "departmentId": "384834",
    "departmentName": "Acme_retail"
  },
  "requestType": "ACTUAL",
  "location": {
    "country": "England",
    "stateProvince": "",
    "zipPostCode": "",
    "city": "London"
  },
  "site": {
    "siteId": "T2383823",
    "siteName": "Retailed_A_South_Bank",
    "buildingId": "B38383",
    "buildingName": "Building_6"
  },
  "timePeriod": {
    "year": 2021,
    "month": 1
  },
  "activityData": {
    "vehicleType": "Heavy Duty Vehicle - Rigid - Gasoline - Year 2005-present",
    "fuelUsed": "Gasoline",
    "fuelAmount": "20",
    "unitOfFuelAmount": "US Gallon"
  }
}
```

Table 13 - Mobile activity data

Note: The data type for all parameters is string.

Parameters	Required	Description
vehicleType	Required	Vehicle type. See Table 14 for valid values.
fuelUsed	Required	'Jet Fuel', 'Aviation Gasoline', 'Gasoline/Petrol', 'On-Road Diesel Fuel', 'Residual Fuel Oil (3s 5 and 6)', 'LPG', 'CNG', 'LNG', 'Ethanol', '100% Biodiesel', 'E85 Ethanol/Gasoline', 'B20 Biodiesel/Diesel'
fuelAmount	Required	The amount of fuel.
unitOfFuelAmount	Required	<u>Units:</u> 'US Gallon', 'UK Gallon', 'Litre', 'Barrel', 'Standard Cubic Foot', 'Cubic Foot', 'Cubic Meter'

Table 14 – Required parameter – vehicleType

Valid values
<u>For US:</u> 'train - diesel fuel', 'agricultural equipment - gasoline', 'agricultural equipment - diesel fuel', 'construction equipment - gasoline', 'construction equipment - diesel fuel', 'bus - cng', 'bus - ethanol', 'bus - diesel', 'bus - gasoline', 'passenger car - gasoline - year 1984-1993', 'passenger car - gasoline - year 1994', 'passenger car - gasoline - year 1995', 'passenger car - gasoline - year 1996', 'passenger car - gasoline - year 1997', 'passenger car - gasoline - year 1998', 'passenger car - gasoline - year 1999', 'passenger car - gasoline - year 2000', 'passenger car - gasoline - year 2001', 'passenger car - gasoline - year 2002', 'passenger car - gasoline - year 2003', 'passenger car - gasoline - year 2004', 'passenger car - gasoline - year 2005-present', 'passenger car - diesel - year 1960-1982', 'passenger car - diesel - year 1983-present', 'passenger car - fuel unknown', 'light goods vehicle - cng', 'light goods vehicle - lpg', 'light goods vehicle - ethanol', 'light goods vehicle - gasoline - year 1987-1993', 'light goods vehicle - gasoline - year 1994', 'light goods vehicle - gasoline - year 1995', 'light goods vehicle - gasoline - year 1996', 'light goods vehicle - gasoline - year 1997', 'light goods vehicle - gasoline - year 1998', 'light goods vehicle - gasoline - year 1999', 'light goods vehicle - gasoline - year 2000', 'light goods vehicle - gasoline - year 2001', 'light goods vehicle - gasoline - year 2002', 'light goods vehicle - gasoline - year 2003', 'light goods vehicle - gasoline - year 2004', 'light goods vehicle - gasoline - year 2005-present', 'light goods vehicle - diesel - year 1960-1982', 'light goods vehicle - diesel - year 1983-1995', 'light goods vehicle - diesel - year 1996-present', 'light goods vehicle - fuel unknown', 'heavy duty vehicle - rigid - gasoline - year 1985-1986', 'heavy duty vehicle - rigid - gasoline - year 1987', 'heavy duty vehicle - rigid - gasoline - year 1988-1989', 'heavy duty vehicle - rigid - gasoline - year 1990-1995', 'heavy duty vehicle - rigid - gasoline - year 1996', 'heavy duty vehicle - rigid - gasoline - year 1997', 'heavy duty vehicle - rigid - gasoline - year 1998', 'heavy duty vehicle - rigid - gasoline - year 1999', 'heavy duty vehicle - rigid - gasoline - year 2000', 'heavy duty vehicle - rigid - gasoline - year 2001', 'heavy duty vehicle - rigid - gasoline - year 2002', 'heavy duty vehicle - rigid - gasoline - year 2003', 'heavy duty vehicle - rigid - gasoline - year 2004', 'heavy duty vehicle - rigid - gasoline - year 2005-present', 'heavy duty vehicle - rigid - diesel - year 1960-present', 'heavy duty vehicle - rigid - cng', 'heavy duty vehicle - rigid - lng', 'heavy duty vehicle

- rigid - lpg', 'heavy duty vehicle - rigid - ethanol', 'heavy duty vehicle - rigid - fuel unknown', 'heavy duty vehicle - articulated - gasoline - year 1985-1986', 'heavy duty vehicle - articulated - gasoline - year 1987', 'heavy duty vehicle - articulated - gasoline - year 1988-1989', 'heavy duty vehicle - articulated - gasoline - year 1990-1995', 'heavy duty vehicle - articulated - gasoline - year 1996', 'heavy duty vehicle - articulated - gasoline - year 1997', 'heavy duty vehicle - articulated - gasoline - year 1998', 'heavy duty vehicle - articulated - gasoline - year 1999', 'heavy duty vehicle - articulated - gasoline - year 2000', 'heavy duty vehicle - articulated - gasoline - year 2001', 'heavy duty vehicle - articulated - gasoline - year 2002', 'heavy duty vehicle - articulated - gasoline - year 2003', 'heavy duty vehicle - articulated - gasoline - year 2004', 'heavy duty vehicle - articulated - gasoline - year 2005-present', 'heavy duty vehicle - articulated - diesel - year 1960-present', 'heavy duty vehicle - articulated - cng', 'heavy duty vehicle - articulated - lng', 'heavy duty vehicle - articulated - lpg', 'heavy duty vehicle - articulated - ethanol', 'heavy duty vehicle - articulated - fuel unknown', 'motorbike - non-catalyst control', 'motorbike - uncontrolled', 'motorbike - control unknown', 'ship and boat - residual fuel oil', 'ship and boat - diesel fuel', 'ship and boat - gasoline'

For UK:

'train - diesel fuel', 'other', 'agricultural equipment - gasoline', 'agricultural equipment - diesel fuel', 'construction equipment - gasoline', 'construction equipment - diesel fuel', 'ship and boat - residual fuel oil', 'ship and boat - diesel fuel', 'ship and boat - gasoline'

Location endpoint

Use the Location API to calculate emission from electricity grids that are providing an organization with energy.

An example of the JSON body for the call is presented in Table 15 and the activity data attributes are defined in Table 16.

Table 15 – Location JSON body example

```
{
  "customID": {
    "id": "Retailer_A_mobile_31234"
  },
  "onBehalfOfClient": {
    "companyId": "877889877",
    "companyName": "Retailer_A"
  },
  "organisation": {
    "departmentId": "384834",
    "departmentName": "Acme_retail"
  },
  "requestType": "ACTUAL",
  "location": {
    "country": "England",
    "stateProvince": "",
    "zipPostCode": "",
    "city": "London"
  },
  "site": {
    "siteId": "T2383823",
    "siteName": "Retailed_A_South_Bank",
    "buildingId": "B38383",
    "buildingName": "Building_6"
  },
  "timePeriod": {
    "year": 2021,
    "month": 1
  },
  "activityData": {
    "commodity": "Electricity",
    "energyConsumedMWh": "100"
  }
}
```

Table 16- Location activity data

Parameters	Required	Valid values or description
commodity	Required	Electricity, Heating, Cooling
energyConsumedMWh	Required	Energy consumption in MWh.

Market endpoint

Use the Market endpoint to calculate emission hotspots in the supply chain from resource and entry risks in the chain.

An example of the JSON body for the call is presented in Table 17 and the activity data attributes are defined in Table 18.

Table 17 – Market JSON body example

```
{
  "customID": {
    "id": "tesco_stationary_3838"
  },
  "onBehalfOfClient": {
    "companyId": "877889877",
    "companyName": "Tesco"
  },
  "organisation": {
    "departmentId": "384834",
    "departmentName": "lloyds_retail"
  },
  "requestType": "ACTUAL",
  "location": {
    "country": "USA",
    "stateProvince": "Alabama",
    "zipPostCode": "",
    "city": ""
  },
  "site": {
    "siteId": "T2383823",
    "siteName": "TescoCanaryWharf",
    "buildingId": "B38434",
    "buildingName": "Building6"
  },
  "timePeriod": {
    "year": 2021,
    "month": 1
  },
  "activityData": {
    "commodity": "electricity",
    "energyConsumedMWh": "1000",
    "energySupplierResidualEF": "na",
    "supplierNameREC": "XXX",
    "energyPurchasedMWhREC": "20",
    "emissionFactorREC": "0.03",
    "sourceREC": "solar",
    "expiryDateREC": "12-31-2020",
    "instrumentTypeREC": "bundled",
  }
}
```

```

    "trackingSystemREC": "ERCOT",
    "certificateNumberREC": "1168",
    "supplierNameREDI": "Apex Clean Energy",
    "energyPurchasedMWhREDI": "10",
    "emissionFactorREDI": "na",
    "sourceREDI": "wind",
    "expiryDateREDI": "12-31-2020",
    "certificateNumberREDI": "1078",
    "supplierNameDEPC": "Invenergy",
    "energyPurchasedMWhDEPC": "10",
    "suppliedEmissionFactorDEPC": "0.25",
    "expiryDateDEPC": "12-31-2020",
    "certificateNumberDEPC": "2089"
  }
}

```

Table 18 – Market activity data

Note: If not value is applicable, enter

Parameters	Required	Valid values or description
commodity	Required	Commodity types: 'Electricity', 'Heating', 'Cooling'
energyConsumedMWh	Required	Energy consumption in MWh.
energySupplierResidualEF	Required	Supplier- specific residual emission factor.
supplierNameREC	Required	Supplier name of the Renewable Energy Certificates (REC).
energyPurchasedMWhREC	Required	Energy credits in MWh purchased via REC.
emissionFactorREC	Required	Emission factor of energy purchased via REC.
sourceREC	Required	Source of energy purchased via REC.
expiryDateREC	Required	Expiry date of REC .
instrumentTypeREC	Required	Instruments types: 'Bundled', 'unbundled'
trackingSystemREC	Required	Name of the REC tracking system.
certificateNumberREC	Required	REC certificate number.
supplierNameREDI	Required	Supplier name of the Renewable Energy Direct Instruments (REDI).
energyPurchasedMWhREDI	Required	Energy purchased in MWh via REDI.

emissionFactorREDI	Required	Emission factor of energy purchased via REDI.
sourceREDI	Required	Source of Energy purchased via REDI.
expiryDateREDI	Required	Expiry date of REDI.
certificateNumberREDI	Required	REDI certificate number.
supplierNameDEPC	Required	Name of the Direct Energy Purchase Contract (DEPC) supplier.
energyPurchasedMWhDEPC	Required	Energy purchased in MWh via DEPC.
suppliedEmissionFactorDEPC	Required	Emission factor of energy purchased via DEPC.
expiryDateDEPC	Required	Expiry date of DEPC.
certificateNumberDEPC	Required	DEPC certificate number.

Transport endpoint

Use the Transport API to calculate emissions from business-related employee travel, employee commuting, and freight transport.

An example of the JSON body for the call is presented in Table 19Table 6 and the activity data attributes are defined in Table 20 and in Table 21 .

Table 19 - Transport JSON body example

```
{
  "customID": {
    "id": "Retailer_A_fugitive_31234"
  },
  "onBehalfOfClient": {
    "companyId": "877889877",
    "companyName": "Retailer_A"
  },
  "organisation": {
    "departmentId": "384834",
    "departmentName": "Acme_retail"
  },
  "requestType": "ACTUAL",
  "location": {
    "country": "England",
    "stateProvince": "",
    "zipPostCode": "",
    "city": "London"
  },
  "site": {
    "siteId": "T2383823",
    "siteName": "Retailed_A_South_Bank",
    "buildingId": "B38383",
    "buildingName": "Building_6"
  },
  "timePeriod": {
    "year": 2021,
    "month": 1
  },
  "activityData": {
    "typeOfActivityData": "Weight Distance",
    "vehicleType": "Road Vehicle - HGV - Articulated - Engine Size 3.5 - 33 tonnes",
    "distanceTravelled": "2000",
    "totalWeightOfFreight": "100",
    "numberOfPassengers": 15,
    "unitOfMeasurement": "Tonne Mile",
    "fuelUsed": "",
    "fuelAmount": ""
  }
}
```

```

    "unitOfFuelAmount": ""
  }
}

```

Table 20 -Transport activity data

Fields	Required	Valid values or description
typeOfActivityData	Required	The type of activity: 'Fuel use and vehicle distance', 'Vehicle distance', 'Passenger distance', 'Weight distance'
vehicleType	Required	Type of vehicle. See Table 14 for valid values.
distanceTravelled	Required	Total distance travelled.
totalWeightOfFreight	Required for a 'weight distance' activity.	Total weight of the freight.
numberOfPassengers	Required for 'passenger distance' activity.	Total number of passengers.
unitOfMeasurement	Required	For fuel use and vehicle distance: 'kilometer', 'mile' For vehicle distance: 'kilometer', 'mile' For weight distance: 'tonne kilometer', 'tonne mile', 'short ton kilometer', 'short ton mile' For Passenger distance: 'passenger kilometer', 'passenger mile'
fuelUsed	Required for fuel use and vehicle distance' activity.	'Jet Fuel', 'Aviation Gasoline', 'Gasoline/Petrol', 'On-Road Diesel Fuel', 'Residual Fuel Oil (3s 5 and 6)', 'LPG', 'CNG', 'LNG', 'Ethanol', '100% Biodiesel', 'E85 Ethanol/Gasoline', 'B20 Biodiesel/Diesel'

fuelAmount	Required for fuel use and vehicle distance' activity.	Fuel consumption amount.
unitOfFuelAmount	Required for fuel use and vehicle distance' activity.	For US: gallon For UK: 'gallon', 'litre', 'barrel', 'standard cubic foot', 'cubic foot', 'cubic meter'

Table 21 - Required parameter - vehicleType

Valid values
<u>For fuel use and vehicle distance option – US:</u> 'bus - cng', 'bus - ethanol', 'bus - diesel', 'bus - gasoline', 'passenger car - gasoline - year 1984-1993', 'passenger car - gasoline - year 1994', 'passenger car - gasoline - year 1995', 'passenger car - gasoline - year 1996', 'passenger car - gasoline - year 1997', 'passenger car - gasoline - year 1998', 'passenger car - gasoline - year 1999', 'passenger car - gasoline - year 2000', 'passenger car - gasoline - year 2001', 'passenger car - gasoline - year 2002', 'passenger car - gasoline - year 2003', 'passenger car - gasoline - year 2004', 'passenger car - gasoline - year 2005-present', 'passenger car - diesel - year 1960-1982', 'passenger car - diesel - year 1983-present', 'passenger car - fuel unknown', 'light goods vehicle - cng', 'light goods vehicle - lpg', 'light goods vehicle - ethanol', 'light goods vehicle - gasoline - year 1987-1993', 'light goods vehicle - gasoline - year 1994', 'light goods vehicle - gasoline - year 1995', 'light goods vehicle - gasoline - year 1996', 'light goods vehicle - gasoline - year 1997', 'light goods vehicle - gasoline - year 1998', 'light goods vehicle - gasoline - year 1999', 'light goods vehicle - gasoline - year 2000', 'light goods vehicle - gasoline - year 2001', 'light goods vehicle - gasoline - year 2002', 'light goods vehicle - gasoline - year 2003', 'light goods vehicle - gasoline - year 2004', 'light goods vehicle - gasoline - year 2005-present', 'light goods vehicle - diesel - year 1960-1982', 'light goods vehicle - diesel - year 1983-1995', 'light goods vehicle - diesel - year 1996-present', 'light goods vehicle - fuel unknown', 'heavy duty vehicle - rigid - gasoline - year 1985-1986', 'heavy duty vehicle - rigid - gasoline - year 1987', 'heavy duty vehicle - rigid - gasoline - year 1988-1989', 'heavy duty vehicle - rigid - gasoline - year 1990-1995', 'heavy duty vehicle - rigid - gasoline - year 1996', 'heavy duty vehicle - rigid -

gasoline - year 1997', 'heavy duty vehicle - rigid - gasoline - year 1998', 'heavy duty vehicle - rigid - gasoline - year 1999', 'heavy duty vehicle - rigid - gasoline - year 2000', 'heavy duty vehicle - rigid - gasoline - year 2001', 'heavy duty vehicle - rigid - gasoline - year 2002', 'heavy duty vehicle - rigid - gasoline - year 2003', 'heavy duty vehicle - rigid - gasoline - year 2004', 'heavy duty vehicle - rigid - gasoline - year 2005-present', 'heavy duty vehicle - rigid - diesel - year 1960-present', 'heavy duty vehicle - rigid - cng', 'heavy duty vehicle - rigid - lng', 'heavy duty vehicle - rigid - lpg', 'heavy duty vehicle - rigid - ethanol', 'heavy duty vehicle - rigid - fuel unknown', 'heavy duty vehicle - articulated - gasoline - year 1985-1986', 'heavy duty vehicle - articulated - gasoline - year 1987', 'heavy duty vehicle - articulated - gasoline - year 1988-1989', 'heavy duty vehicle - articulated - gasoline - year 1990-1995', 'heavy duty vehicle - articulated - gasoline - year 1996', 'heavy duty vehicle - articulated - gasoline - year 1997', 'heavy duty vehicle - articulated - gasoline - year 1998', 'heavy duty vehicle - articulated - gasoline - year 1999', 'heavy duty vehicle - articulated - gasoline - year 2000', 'heavy duty vehicle - articulated - gasoline - year 2001', 'heavy duty vehicle - articulated - gasoline - year 2002', 'heavy duty vehicle - articulated - gasoline - year 2003', 'heavy duty vehicle - articulated - gasoline - year 2004', 'heavy duty vehicle - articulated - gasoline - year 2005-present', 'heavy duty vehicle - articulated - diesel - year 1960-present', 'heavy duty vehicle - articulated - cng', 'heavy duty vehicle - articulated - lng', 'heavy duty vehicle - articulated - lpg', 'heavy duty vehicle - articulated - ethanol', 'heavy duty vehicle - articulated - fuel unknown', 'motorbike - non-catalyst control', 'motorbike - uncontrolled', 'motorbike - control unknown'

For fuel use and vehicle distance option – UK:

'passenger car - petrol - engine size <1.4 liter', 'passenger car - petrol - engine size 1.4 - 2.0 liters', 'passenger car - petrol - engine size >2.0 liters', 'passenger car - petrol - engine size unknown', 'passenger car - diesel - engine size <1.7 liter', 'passenger car - diesel - engine size 1.7 - 2.0 liters', 'passenger car - diesel - engine size >2.0 liters', 'passenger car - diesel - engine size unknown', 'passenger car - hybrid - engine size 1.4 - 2.0 liters', 'passenger car - hybrid - engine size >2.0 liters', 'passenger car - hybrid - engine size unknown', 'passenger car - lpg - engine size average', 'passenger car - lpg - engine size medium', 'passenger car - lpg - engine size large', 'passenger car - cng - engine size 1.4 - 2.0 liters', 'passenger car - cng -

engine size >2.0 liters', 'passenger car - cng - engine size unknown', 'light goods vehicle (e.g. van) - petrol - engine size ≤1.25 tonnes', 'light goods vehicle (e.g. van) - diesel - engine size ≤3.5 tonnes', 'light goods vehicle (e.g. van) - lpg - engine size ≤3.5 tonnes', 'light goods vehicle (e.g. van) - cng - engine size ≤3.5 tonnes', 'light goods vehicle (e.g. van) - fuel unknown', 'motorbike - engine size ≤125 cc', 'motorbike - engine size >125 and ≤500 cc', 'motorbike - engine size >500 cc', 'motorbike - engine size unknown', 'hgv - rigid - engine size 3.5 - 7.5 tonnes - 0% weight laden', 'hgv - rigid - engine size 3.5 - 7.5 tonnes - 50% weight laden', 'hgv - rigid - engine size 3.5 - 7.5 tonnes - 100% weight laden', 'hgv - rigid - engine size 3.5 - 7.5 tonnes - default 41% weight laden', 'hgv - rigid - engine size 7.5 - 17 tonnes - 0% weight laden', 'hgv - rigid - engine size 7.5 - 17 tonnes - 50% weight laden', 'hgv - rigid - engine size 7.5 - 17 tonnes - 100% weight laden', 'hgv - rigid - engine size 7.5 - 17 tonnes - default 41% weight laden', 'hgv - rigid - engine size >17 tonnes - 0% weight laden', 'hgv - rigid - engine size >17 tonnes - 50% weight laden', 'hgv - rigid - engine size >17 tonnes - 100% weight laden', 'hgv - rigid - engine size >17 tonnes - default 53% weight laden', 'hgv - rigid - engine size unknown - % weight laden', 'hgv - articulated - engine size 3.5 - 33 tonnes - 0% weight laden', 'hgv - articulated - engine size 3.5 - 33 tonnes - 50% weight laden', 'hgv - articulated - engine size 3.5 - 33 tonnes - 100% weight laden', 'hgv - articulated - engine size 3.5 - 33 tonnes - default 45% weight laden', 'hgv - articulated - engine size >33 tonnes - 0% weight laden', 'hgv - articulated - engine size >33 tonnes - 50% weight laden', 'hgv - articulated - engine size >33 tonnes - 100% weight laden', 'hgv - articulated - engine size >33 tonnes - default 61% weight laden', 'hgv - articulated - engine size unknown', 'hgv - type unknown'

For vehicle distance option:

Same as for the 'Fuel use and vehicle distance' activity option.

For passenger distance option:

'air - domestic', 'air - short haul - seating unknown', 'air - short haul - economy class', 'air - short haul - first/business class', 'air - long haul - seating unknown', 'air - long haul - economy class', 'air - long haul - economy+ class', 'air - long haul - business class', 'air - long haul - first class', 'train - light rail', 'train - tram', 'train - average (light rail and tram)', 'train - national rail',

```
'train - subway', 'taxi', 'bus - local bus', 'bus - coach',
'bus - type unknown', 'large ropax ferry'
```

For weight distance option – US and others:

```
'air - domestic', 'air - short haul', 'air - long haul',
'rail', 'road vehicle - hgv - rigid - engine size 3.5 - 7.5
tonnes', 'road vehicle - hgv - rigid - engine size 7.5 - 17
tonnes', 'road vehicle - hgv - rigid - engine size >17
tonnes', 'road vehicle - hgv - rigid - engine size unknown',
'road vehicle - hgv - articulated - engine size 3.5 - 33
tonnes', 'road vehicle - hgv - articulated - engine size >33
tonnes', 'road vehicle - hgv - articulated - engine size
unknown', 'road vehicle - hgv - type unknown', 'road vehicle -
light goods vehicle - petrol - engine size <=1.25 tonnes',
'road vehicle - light goods vehicle - diesel - engine size
<=3.5 tonnes', 'road vehicle - light goods vehicle - lpg or
cng - engine size <=3.5 tonnes', 'road vehicle - light goods
vehicle - fuel unknown', 'watercraft - large ropax ferry',
'watercraft - shipping - small tanker (844 tonnes
deadweight)', 'watercraft - shipping - large tanker (18371
tonnes deadweight)', 'watercraft - shipping - very large
tanker (100000 tonnes deadweight)', 'watercraft - shipping -
small bulk carrier (1720 tonnes deadweight)', 'watercraft -
shipping - large bulk carrier (14201 tonnes deadweight)',
'watercraft - shipping - very large bulk carrier (70000 tonnes
deadweight)', 'watercraft - shipping - small container vessel
(2500 tonnes deadweight)', 'watercraft - shipping - large
container vessel (20000 tonnes deadweight)'
```

For weight distance option – UK:

```
'air - domestic', 'air - short haul', 'air - long haul',
'rail', 'road vehicle - hgv - rigid - engine size 3.5 - 7.5
tonnes', 'road vehicle - hgv - rigid - engine size 7.5 - 17
tonnes', 'road vehicle - hgv - rigid - engine size >17
tonnes', 'road vehicle - hgv - rigid - engine size unknown',
'road vehicle - hgv - articulated - engine size 3.5 - 33
tonnes', 'road vehicle - hgv - articulated - engine size >33
tonnes', 'road vehicle - hgv - articulated - engine size
unknown', 'road vehicle - hgv - type unknown', 'road vehicle -
light goods vehicle - petrol - engine size <=1.25 tonnes',
'road vehicle - light goods vehicle - diesel - engine size
<=3.5 tonnes', 'road vehicle - light goods vehicle - lpg or
cng - engine size <=3.5 tonnes', 'road vehicle - light goods
vehicle - fuel and engine size unknown', 'watercraft - large
ropax ferry', 'watercraft - shipping - small tanker (844
tonnes deadweight)', 'watercraft - shipping - large tanker
(18371
```

```
tonnes deadweight)', 'watercraft - shipping - very large  
tanker (100000 tonnes deadweight)', 'watercraft - shipping -  
small bulk carrier (1720 tonnes deadweight)', 'watercraft -  
shipping - large bulk carrier (14201 tonnes deadweight)',  
'watercraft - shipping - very large bulk carrier (70000 tonnes  
deadweight)', 'watercraft - shipping - small container vessel  
(2500 tonnes deadweight)', 'watercraft - shipping - large  
container vessel (20000 tonnes deadweight)'
```