Use the API to export Carbon optimization in Azure emissions data

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This article helps you understand and use the latest Carbon Service REST API to export Carbon optimization in Azure emissions data. Emissions data is available for the previous month by day 19 of the current month.

To export emissions data using the REST API, you must create and authorize a service principal to access your emissions data. You can then use the service principal to get an authorization token and then export emissions data using the REST API.

Create and authorize a service principal

A service principal is an application whose tokens can be used to authenticate and grant access to specific Azure resources by using Microsoft Entra ID. Resources include user apps, services, or automation tools.

1. Create a Microsoft Entra application and service principal that can access resources.
2. Save the tenant ID, new client ID, and client secret value for your app for use in token requests.
3. The app must be assigned the `Carbon Optimization Reader` role for the resources that you want to export emissions data for. If you want to use the app to export emissions data for many resources, you can assign the role at the subscription level. For more information, see Assign Azure roles by using the Azure portal and Assign access to Carbon optimization in Azure.

Get an authorization token

Send the following `POST` request in the command prompt or by using a client. Use the resource URL `https://management.azure.com` to get an access token for the resource management API.

Console

```
curl -X POST 'https://login.microsoftonline.com/<tennant ID>/oauth2/token' \
-H 'Content-Type: application/x-www-form-urlencoded' \
--data-urlencode 'grant_type=client_credentials' \
--data-urlencode 'client_id=<your apps client ID>' \
--data-urlencode 'client_secret=<your apps client secret' \
--data-urlencode 'resource=https://management.azure.com'
```

The response body appears as follows:

JSON

```
{
    "token_type": "Bearer",
    "expires_in": "86399",
    "ext_expires_in": "86399",
    "expires_on": "1672826207",
    "not_before": "1672739507",
    "resource": "https://management.azure.com",
    "access_token": "eyJ0eXAiOiJKV1Qi....gpHWoRzeDdVQd2OE3dNsLIvUIxQ"
}
```

Use the access token from the response for use in the following HTTP requests.

Export emissions data using the REST API

Use the following `POST` request to export emissions data.

```http
HTTP
```

```http
POST /providers/Microsoft.Carbon/carbonEmissionReports?api-version=2025-04-01
Host: management.azure.com
Content-Type: application/json
Authorization: Bearer \<token value\>
```

Example request and response

```http
HTTP
```

```http
POST https://management.azure.com/providers/Microsoft.Carbon/carbonEmissionReports?api-version=2025-04-01

{
  "reportType": "MonthlySummaryReport",
  "subscriptionList": [
    "00000000-0000-0000-0000-000000000000"
  ],
  "carbonScopeList": [
    "Scope1",
    "Scope3"
  ],
  "dateRange": {
    "start": "2024-03-01",
    "end": "2024-05-01"
  }
}
```

Sample output

```json
JSON
```

```json
{
  "subscriptionAccessDecisionList": [
    {
      "subscriptionId": "00000000-0000-0000-0000-000000000000",
      "decision": "Allowed"
    }
  ],
  "value": [
    {
      "dataType": "OverallSummaryData",
      "latestMonthEmissions": 0.1,
      "previousMonthEmissions": 0.05,
      "monthOverMonthEmissionsChangeRatio": 1,
      "monthlyEmissionsChangeValue": 0.05
    }
  ]
}
```

Here's a curl example:

```console
Console
```

```console
curl --location 'https://management.azure.com/providers/Microsoft.Carbon/carbonEmissionReports?api-version=2025-04-01' \
--header 'Content-Type: application/json' \
```

```
--header 'Authorization: Bearer eyJ0eXA...2-KgVBNrsvg' \
--data '{
  "reportType": "ItemDetailsReport",
  "subscriptionList": [
    "00000000-0000-0000-0000-000000000000",
    "00000000-0000-0000-0000-000000000001,",
    "00000000-0000-0000-0000-000000000002",
    "00000000-0000-0000-0000-000000000003",
    "00000000-0000-0000-0000-000000000004",
    "00000000-0000-0000-0000-000000000005",
    "00000000-0000-0000-0000-000000000006",
    "00000000-0000-0000-0000-000000000007",
    "00000000-0000-0000-0000-000000000008"
  ],
  "carbonScopeList": [
    "Scope1",
    "Scope3"
  ],
  "dateRange": {
    "start": "2024-05-01",
    "end": "2024-05-01"
  },
  "categoryType": "Resource",
  "orderBy": "LatestMonthEmissions",
  "sortDirection": "Desc",
  "pageSize": 100
}
'
```

Sample curl output:

Console

```
{
  "subscriptionAccessDecisionList": [
    {
      "subscriptionId": "00000000-0000-0000-0000-000000000000",
      "decision": "Allowed"
    },
    {
      "subscriptionId": "00000000-0000-0000-0000-000000000001",
      "decision": "Allowed"
    },
    {
      "subscriptionId": "00000000-0000-0000-0000-000000000002",
      "decision": "Allowed"
    },
    {
      "subscriptionId": "00000000-0000-0000-0000-000000000003",
      "decision": "Allowed"
    },
    {
      "subscriptionId": "00000000-0000-0000-0000-000000000004",
      "decision": "Allowed"
    },
    {
      "subscriptionId": "00000000-0000-0000-0000-000000000005",
      "decision": "Allowed"
    },
    {
      "subscriptionId": "00000000-0000-0000-0000-000000000006",
      "decision": "Denied"
    },
    {
      "subscriptionId": "00000000-0000-0000-0000-000000000007",
      "decision": "Denied"
    },
```

```json
      {
        "subscriptionId": "00000000-0000-0000-0000-000000000008",
        "decision": "Denied",
        "denialReason": "Carbon Optimization Reader permisison required"
      }
  ],
  "value": [
      {
        "dataType": "ResourceItemDetailsData",
        "latestMonthEmissions": 0.1,
        "previousMonthEmissions": 0.05,
        "monthOverMonthEmissionsChangeRatio": 1,
        "monthlyEmissionsChangeValue": 0.05,
        "itemName": "rgName1",
        "resourceGroup": "rgGroup",
        "resourceId": "/subscriptions/00000000-0000-0000-0000-
000000000000/resourceGroups/rgGroup/providers/microsoft.storage/storageaccounts/rgName1",
        "subscriptionId": "00000000-0000-0000-0000-000000000000",
        "categoryType": "Resource",
        "resourceType": "microsoft.storage/storageaccounts",
        "location": "east us"
      },
      {
        "dataType": "ResourceItemDetailsData",
        "latestMonthEmissions": 0.1,
        "previousMonthEmissions": 0.05,
        "monthOverMonthEmissionsChangeRatio": 1,
        "monthlyEmissionsChangeValue": 0.05,
        "itemName": "rgName2",
        "resourceGroup": "rgGroup",
        "resourceId": "/subscriptions/00000000-0000-0000-0000-
000000000000/resourceGroups/rgGroup/providers/microsoft.storage/storageaccounts/rgName2",
        "subscriptionId": "00000000-0000-0000-0000-000000000000",
        "categoryType": "Resource",
        "resourceType": "microsoft.storage/storageaccounts",
        "location": "east us"
      },
      {
        "dataType": "ResourceItemDetailsData",
        "latestMonthEmissions": 0.1,
        "previousMonthEmissions": 0.05,
        "monthOverMonthEmissionsChangeRatio": 1,
        "monthlyEmissionsChangeValue": 0.05,
        "itemName": "rgName3",
        "resourceGroup": "rgGroup",
        "resourceId": "/subscriptions/00000000-0000-0000-0000-
000000000000/resourceGroups/rgGroup/providers/microsoft.storage/storageaccounts/rgName3",
        "subscriptionId": "00000000-0000-0000-0000-000000000000",
        "categoryType": "Resource",
        "resourceType": "microsoft.storage/storageaccounts",
        "location": "east us"
      },
      {
        "dataType": "ResourceItemDetailsData",
        "latestMonthEmissions": 0.1,
        "previousMonthEmissions": 0.05,
        "monthOverMonthEmissionsChangeRatio": 1,
        "monthlyEmissionsChangeValue": 0.05,
        "itemName": "rgName4",
        "resourceGroup": "rgGroup",
        "resourceId": "/subscriptions/00000000-0000-0000-0000-
000000000002/resourceGroups/rgGroup/providers/microsoft.storage/storageaccounts/rgName4",
        "subscriptionId": "00000000-0000-0000-0000-000000000002",
        "categoryType": "Resource",
        "resourceType": "microsoft.storage/storageaccounts",
        "location": "east us"
      },
      {
```

```
        "dataType": "ResourceItemDetailsData",
        "latestMonthEmissions": 0.1,
        "previousMonthEmissions": 0.05,
        "monthOverMonthEmissionsChangeRatio": 1,
        "monthlyEmissionsChangeValue": 0.05,
        "itemName": "rgName5",
        "resourceGroup": "rgGroup",
        "resourceId": "/subscriptions/00000000-0000-0000-0000-
000000000002/resourceGroups/rgGroup/providers/microsoft.storage/storageaccounts/rgName5",
        "subscriptionId": "00000000-0000-0000-0000-000000000002",
        "categoryType": "Resource",
        "resourceType": "microsoft.storage/storageaccounts",
        "location": "east us"
    }
  ],
  "skipToken": "dGVzZGZhZGZzZnNkZg=="
}
```

Report types

Carbon optimization provides various report types to help you analyze your emissions data. Each report type serves a different purpose and is used for your specific needs:

⊡ **Expand table**

Report type	Description	When to use
OverallSummaryReport	Provides total carbon emissions for the specified date range and query parameters, and comparative values for a high-level overview. This report type accepts different values in the start and end fields within DateRange. For example, start: 2024-03-01 and end: 2024-06-01.	High level report data required
MonthlySummaryReport	Provides carbon emissions data by month for the specified query parameters. This report type accepts different values in the start and end fields within DateRange. For example, start: 2024-03-01 and end: 2024-06-01.	Details for a specified month
TopItemsSummaryReport	Provides the N highest-emitting items for the specified query filters. This report returns data for a single month at a time, so it requires the same values for the start and end fields within DateRange. A maximum of N=10 items are returned at a time.	Data for the top items by category
TopItemsMonthlySummaryReport	Provides the N highest-emitting items by month for the specified query filter. Returns emissions data for the top N items by month within the given date range. A maximum of N=10 items are returned at a time.	Data for top items by category and month
ItemDetailsReport	A granular list of items based on the specified CategoryType (including: Resource, ResourceGroup, ResourceType, Location, or Subscription) for the query filter. You can query for only one month at a time. The DateRange requires the same values for the start and end fields.	Emissions data by category

Export emissions API parameters

For each `reportType`, different query parameters are defined. The following sections provide detailed information about the query parameters for each `reportType`.

⊡ **Expand table**

Name	Description
ItemDetailsQueryFilter	Query parameters for `ItemDetailsReport`
MonthlySummaryReportQueryFilter	Query filter parameters to configure `MonthlySummaryReport` queries.
OverallSummaryReportQueryFilter	Query filter parameters to configure `OverallSummaryReport` queries.
TopItemsMonthlySummaryReportQueryFilter	Query filter parameters to configure `TopItemsMonthlySummaryReport` queries.
TopItemsSummaryReportQueryFilter	Query filter parameters to configure `TopItemsSummaryReport` queries.

For more information on the REST API reports, see Carbon Service - List Carbon Emission Reports.

ItemDetailsQueryFilter

Here are the query parameters for `ItemDetailsReport`.

⌞⌝ Expand table

Name	Required	Type	Description
carbonScopeList	True	EmissionScopeEnum[]	List of carbon emission scopes. Required. Accepts one or more values from `EmissionScopeEnum`. For example, Scope1, Scope2, Scope3 in list form. The output includes the total emissions for the specified scopes.
categoryType	True	CategoryTypeEnum	Specifies the category type for detailed emissions data, such as Resource, ResourceGroup, ResourceType, Location, or Subscription. See supported types in `CategoryTypeEnum`.
dateRange	True	DateRange	The start and end dates for carbon emissions data. Required. For `ItemDetailsReport` and `TopItemsSummaryReport`, only one month of data is supported at a time, so start and end dates should be equal within `DateRange`. For example, start: 2024-06-01 and end: 2024-06-01.
orderBy	True	OrderByColumnEnum	The column name to order the results by. See supported values in `OrderByColumnEnum`.
pageSize	True	integer (int32) minimum: 1 maximum: 5000	Number of items to return in one request, maximum value is 5000.
reportType	True	string: ItemDetailsReport	The ReportType requested for carbon emissions data. Required. Specifies how data is aggregated and displayed in the output, as explained in the `ReportTypeEnum`.
sortDirection	True	SortDirectionEnum	Direction for sorting results. See supported values in `SortDirectionEnum`.
subscriptionList	True	string[]	List of subscription IDs for which carbon emissions data is requested. Required. Each subscription ID should be in lowercase format. The maximum length of the list is 100.
locationList		string[]	List of locations (Azure Region display name) for carbon emissions data, with each location specified in lowercase. For example, `east us`. Optional. You can use the command `az account list-locations -o table` to find Azure Region display names.

Name	Required	Type	Description
resourceGroupUrlList		string[]	List of resource group URLs for carbon emissions data. Optional. Each URL must follow the format `/subscriptions/{subscriptionId}/resourcegroups/{resourceGroup}`, and should be in all lowercase.
resourceTypeList		string[]	List of resource types for carbon emissions data. Optional. Each resource type should be specified in lowercase, following the format `microsoft.{service}/{resourceType}`. For example, `microsoft.storage/storageaccounts`.
skipToken		string	Pagination token for fetching the next page of data. This token is nullable and is returned in the previous response if other data pages are available.

MonthlySummaryReportQueryFilter

Here are the query filter parameters to configure `MonthlySummaryReport` queries.

⬚ **Expand table**

Name	Required	Type	Description
carbonScopeList	True	[EmissionScopeEnum](#)[]	List of carbon emission scopes. Required. Accepts one or more values from `EmissionScopeEnum`. For example, Scope1, Scope2, Scope3 in list form. The output includes the total emissions for the specified scopes.
dateRange	True	[DateRange](#)	The start and end dates for carbon emissions data. Required. For `ItemDetailsReport` and `TopItemsSummaryReport`, only one month of data is supported at a time, so start and end dates should be equal within `DateRange`. For example, start: 2024-06-01 and end: 2024-06-01.
reportType	True	string: MonthlySummaryReport	The ReportType requested for carbon emissions data. Required. Specifies how data is aggregated and displayed in the output, as explained in the `ReportTypeEnum`.
subscriptionList	True	string[]	List of subscription IDs for which carbon emissions data is requested. Required. Each subscription ID should be in lowercase format. The maximum length of the list is 100.
locationList		string[]	List of locations (Azure Region display name) for carbon emissions data, with each location specified in lowercase. For example, `east us`. Optional. You can use the command `az account list-locations -o table` to find Azure Region display names.
resourceGroupUrlList		string[]	List of resource group URLs for carbon emissions data. Optional. Each URL must follow the format `/subscriptions/{subscriptionId}/resourcegroups/{resourceGroup}`, and should be in all lowercase.
resourceTypeList		string[]	List of resource types for carbon emissions data. Optional. Each resource type should be specified in lowercase, following the format `microsoft.{service}/{resourceType}`. For example, `microsoft.storage/storageaccounts`.

OverallSummaryReportQueryFilter

Here are the query filter parameters to configure OverallSummaryReport queries.

Name	Required	Type	Description
carbonScopeList	True	EmissionScopeEnum[]	List of carbon emission scopes. Required. Accepts one or more values from `EmissionScopeEnum`. For example, Scope1, Scope2, Scope3 in list form. The output includes the total emissions for the specified scopes.
dateRange	True	DateRange	The start and end dates for carbon emissions data. Required. For `ItemDetailsReport` and `TopItemsSummaryReport`, only one month of data is supported at a time, so start and end dates should be equal within `DateRange`. For example, start: 2024-06-01 and end: 2024-06-01.
reportType	True	string: OverallSummaryReport	The ReportType requested for carbon emissions data. Required. Specifies how data is aggregated and displayed in the output, as explained in the `ReportTypeEnum`.
subscriptionList	True	string[]	List of subscription IDs for which carbon emissions data is requested. Required. Each subscription ID should be in lowercase format. The maximum length of the list is 100.
locationList		string[]	List of locations (Azure Region display name) for carbon emissions data, with each location specified in lowercase. For example, `east us`. Optional. You can use the command `az account list-locations -o table` to find Azure Region display names.
resourceGroupUrlList		string[]	List of resource group URLs for carbon emissions data. Optional. Each URL must follow the format `/subscriptions/{subscriptionId}/resourcegroups/{resourceGroup}`, and should be in all lowercase.
resourceTypeList		string[]	List of resource types for carbon emissions data. Optional. Each resource type should be specified in lowercase, following the format `microsoft.{service}/{resourceType}`. For example, `microsoft.storage/storageaccounts`.

TopItemsMonthlySummaryReportQueryFilter

Here are the query filter parameters to configure `TopItemsMonthlySummaryReport` queries.

Name	Required	Type	Description
carbonScopeList	True	EmissionScopeEnum[]	List of carbon emission scopes. Required. Accepts one or more values from `EmissionScopeEnum`. For example, Scope1, Scope2, Scope3 in list form. The output includes the total emissions for the specified scopes.
categoryType	True	CategoryTypeEnum	Specifies the category type to retrieve top-emitting items, aggregated by month. See supported types in `CategoryTypeEnum`.
dateRange	True	DateRange	The start and end dates for carbon emissions data. Required. For `ItemDetailsReport` and `TopItemsSummaryReport`, only one month of data is supported at a time, so start and end dates should be equal within `DateRange`. For example, start: 2024-06-01 and end: 2024-06-01.

Name	Required	Type	Description
reportType	True	string: TopItemsMonthlySummaryReport	The ReportType requested for carbon emissions data. Required. Specifies how data is aggregated and displayed in the output, as explained in the `ReportTypeEnum`.
subscriptionList	True	string[]	List of subscription IDs for which carbon emissions data is requested. Required. Each subscription ID should be in lowercase format. The maximum length of the list is 100.
topItems	True	integer (int32) minimum: 1 maximum: 10	The number of top items to return, based on emissions. Must be between 1 and 10.
locationList		string[]	List of locations (Azure Region display name) for carbon emissions data, with each location specified in lowercase. For example, `east us`. Optional. You can use the command `az account list-locations -o table` to find Azure Region display names.
resourceGroupUrlList		string[]	List of resource group URLs for carbon emissions data. Optional. Each URL must follow the format `/subscriptions/{subscriptionId}/resourcegroups/{resourceGroup}`, and should be in all lowercase.
resourceTypeList		string[]	List of resource types for carbon emissions data. Optional. Each resource type should be specified in lowercase, following the format `microsoft.{service}/{resourceType}`. For example, `microsoft.storage/storageaccounts`.

TopItemsSummaryReportQueryFilter

Here are the query filter parameters to configure `TopItemsSummaryReport` queries.

⌖ **Expand table**

Name	Required	Type	Description
carbonScopeList	True	EmissionScopeEnum[]	List of carbon emission scopes. Required. Accepts one or more values from `EmissionScopeEnum`. For example, Scope1, Scope2, Scope3 in list form. The output includes the total emissions for the specified scopes.
categoryType	True	CategoryTypeEnum	Specifies the category type for which to retrieve top-emitting items. See supported values defined in `CategoryTypeEnum`.
dateRange	True	DateRange	The start and end dates for carbon emissions data. Required. For `ItemDetailsReport` and `TopItemsSummaryReport`, only one month of data is supported at a time, so start and end dates should be equal within `DateRange`. For example, start: 2024-06-01 and end: 2024-06-01.
reportType	True	string: TopItemsSummaryReport	The ReportType requested for carbon emissions data. Required. Specifies how data is aggregated and displayed in the output, as explained in the `ReportTypeEnum`.
subscriptionList	True	string[]	List of subscription IDs for which carbon emissions data is requested. Required. Each subscription ID should be in lowercase format. The maximum length of the list is 100.
topItems	True	integer (int32)	The number of top items to return, based on emissions. This value must be between 1 and 10.

Name	Required	Type	Description
		minimum: 1 maximum: 10	
locationList		string[]	List of locations (Azure Region display name) for carbon emissions data, with each location specified in lowercase. For example, `east us`. Optional. You can use the command `az account list-locations -o table` to find Azure Region display names.
resourceGroupUrlList		string[]	List of resource group URLs for carbon emissions data. Optional. Each URL must follow the format `/subscriptions/{subscriptionId}/resourcegroups/{resourceGroup}`, and should be in all lowercase.
resourceTypeList		string[]	List of resource types for carbon emissions data. Optional. Each resource type should be specified in lowercase, following the format `microsoft.{service}/{resourceType}`. For example, `microsoft.storage/storageaccounts`.

Sample reports

The following sections show sample requests and responses for each report type.

All reports include the `subscriptionAccessDecisionList` response. The field shows the access decision for each input subscription.

OverallSummaryReport

The report shows total emissions for all subscriptions scopes and date range specified in the input. Use the report when you need high-level report data.

Sample request

HTTP

```
POST https://management.azure.com/providers/Microsoft.Carbon/carbonEmissionReports?api-version=2025-04-01

{
    "reportType": "MonthlySummaryReport",
    "subscriptionList": [
        "00000000-0000-0000-0000-000000000000"
    ],
    "carbonScopeList": [
        "Scope1",
        "Scope3"
    ],
    "dateRange": {
        "start": "2024-03-01",
        "end": "2024-05-01"
    }
}
```

Sample response

JSON

```json
{
  "subscriptionAccessDecisionList": [
    {
      "subscriptionId": "00000000-0000-0000-0000-000000000000",
      "decision": "Allowed"
    }
  ],
  "value": [
    {
      "dataType": "OverallSummaryData",
      "latestMonthEmissions": 0.1,
      "previousMonthEmissions": 0.05,
      "monthOverMonthEmissionsChangeRatio": 1,
      "monthlyEmissionsChangeValue": 0.05
    }
  ]
}
```

Related content

- Export emissions data to a CSV file
- Manage permissions for Carbon optimization in Azure
- View and analyze your carbon emission data and insights
- Reduce your carbon emissions