



# Deep Dive: From Carbon Counting to Carbon Accounting with SAP

Larissa Limarova, Dominik Schwarz, SAP  
January 28<sup>th</sup> 2025

Public



# Disclaimer

The information in this presentation is confidential and proprietary to SAP and may not be disclosed without the permission of SAP. Except for your obligation to protect confidential information, this presentation is not subject to your license agreement or any other service or subscription agreement with SAP. SAP has no obligation to pursue any course of business outlined in this presentation or any related document, or to develop or release any functionality mentioned therein.

This presentation, or any related document and SAP's strategy and possible future developments, products and or platforms directions and functionality are all subject to change and may be changed by SAP at any time for any reason without notice. The information in this presentation is not a commitment, promise or legal obligation to deliver any material, code or functionality. This presentation is provided without a warranty of any kind, either express or implied, including but not limited to, the implied warranties of merchantability, fitness for a particular purpose, or non-infringement. This presentation is for informational purposes and may not be incorporated into a contract. SAP assumes no responsibility for errors or omissions in this presentation, except if such damages were caused by SAP's intentional or gross negligence.

All forward-looking statements are subject to various risks and uncertainties that could cause actual results to differ materially from expectations. Readers are cautioned not to place undue reliance on these forward-looking statements, which speak only as of their dates, and they should not be relied upon in making purchasing decisions.

# Agenda

- **Introduction & Overview**

What is Green Ledger and how it fits into the SAP Sustainability Portfolio

- **System Demo Green Ledger**

From Carbon Collection to Analysis/Reporting

- **Green Ledger Architecture**

Green Ledger architecture, BTP application, integration & synchronization of master data and FI transaction

- **Integration Guide**

How to connect SFM, DSP and S/4HANA

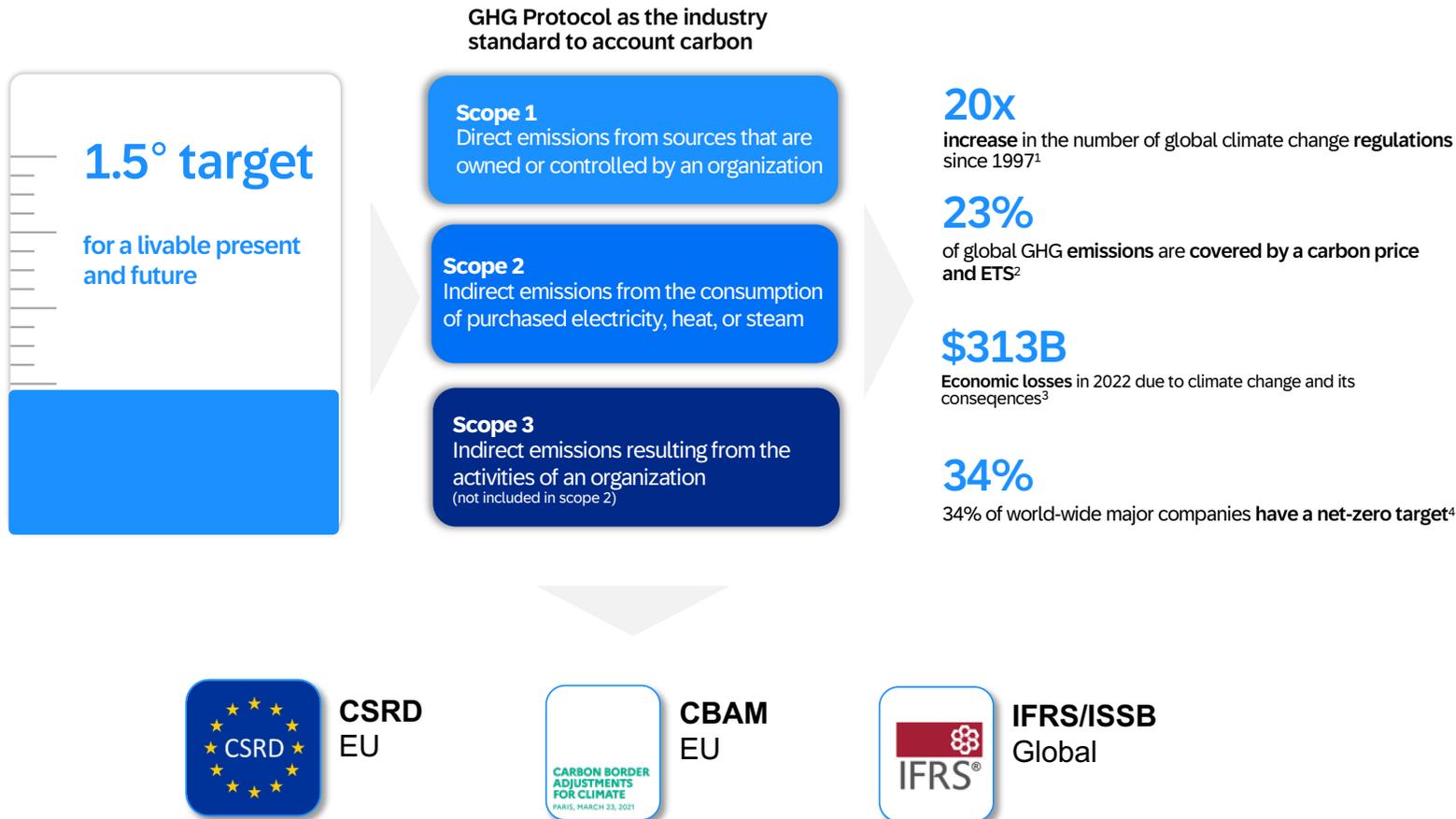
- **Implementation Guide**

What needs to be considered, done and configured during implementation

# Introduction & Overview



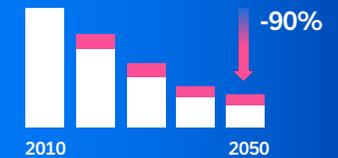
# A clear mandate on businesses to drive climate action



Climate action is progressing too slow

**93%**

Of companies will fail to reach net zero if they do not increase their effort significantly<sup>5</sup>



To reach net zero companies must cut around 90% of their emissions.

<sup>1</sup>Source: Grantham research institute on climate change, McKinsey

<sup>2</sup>Source: State and Trends of Carbon Pricing 2023, World Bank Group

<sup>3</sup>Source: From Risk to Reward, BCG.

<sup>4</sup>Source: Accenture Report Finds, Accenture.

<sup>5</sup>Source: Accenture Report Finds, Accenture.

# Treat carbon like money

➤➤➤ Foundation for carbon accounting based on **existing and trusted financial processes** and structures.

↻↻↻ Financial quantification of carbon impact and the integration into **decision-making processes**,

🛡️ Leverage **rigor and trust** associated with financial reporting making carbon accounting **traceable, accountable, and auditable**.

🏠💰 Make **strategic decisions** by aligning carbon and financial plan and actual data.

Finance → Sustainability

**Ledger View**

Line Items (2) | Standard ▾

Journal Entry	G./L Account
000001	893010 (COGS)
000002	792000 (Finished goods)
<b>Total Debit</b>	<b>Total Credit</b>
12.35 USD	12.35 USD

Total CO2e amount  
**29.97 tons**

**General Information**

Line Items (6) | Variants ▾

Account	GHG Emission Scope
893010 (COGS)	1 (Scope 1 Direct Emissions)
893010 (COGS)	2.1 (Scope 2 Energy – Location Based)
893010 (COGS)	3.1 (Scope 3.1 Purchased Goods and Services)
792000 (Finished goods)	1 (Scope 1 Direct Emissions)
792000 (Finished goods)	2.1 (Scope 2 Energy – Location Based)
792000 (Finished goods)	3.1 (Scope 3.1 Purchased Goods and Services)

Debit	Credit	Emission Total Unit	Quality Grade
2,000,000	0	TNE CO2e	1.5
23,599,999	0	TNE CO2e	1.5
45,802,401	0	TNE CO2e	1.5
0	2,000,000	TNE CO2e	1.5
0	23,599,999	TNE CO2e	1.5
0	45,802,401	TNE CO2e	1.5

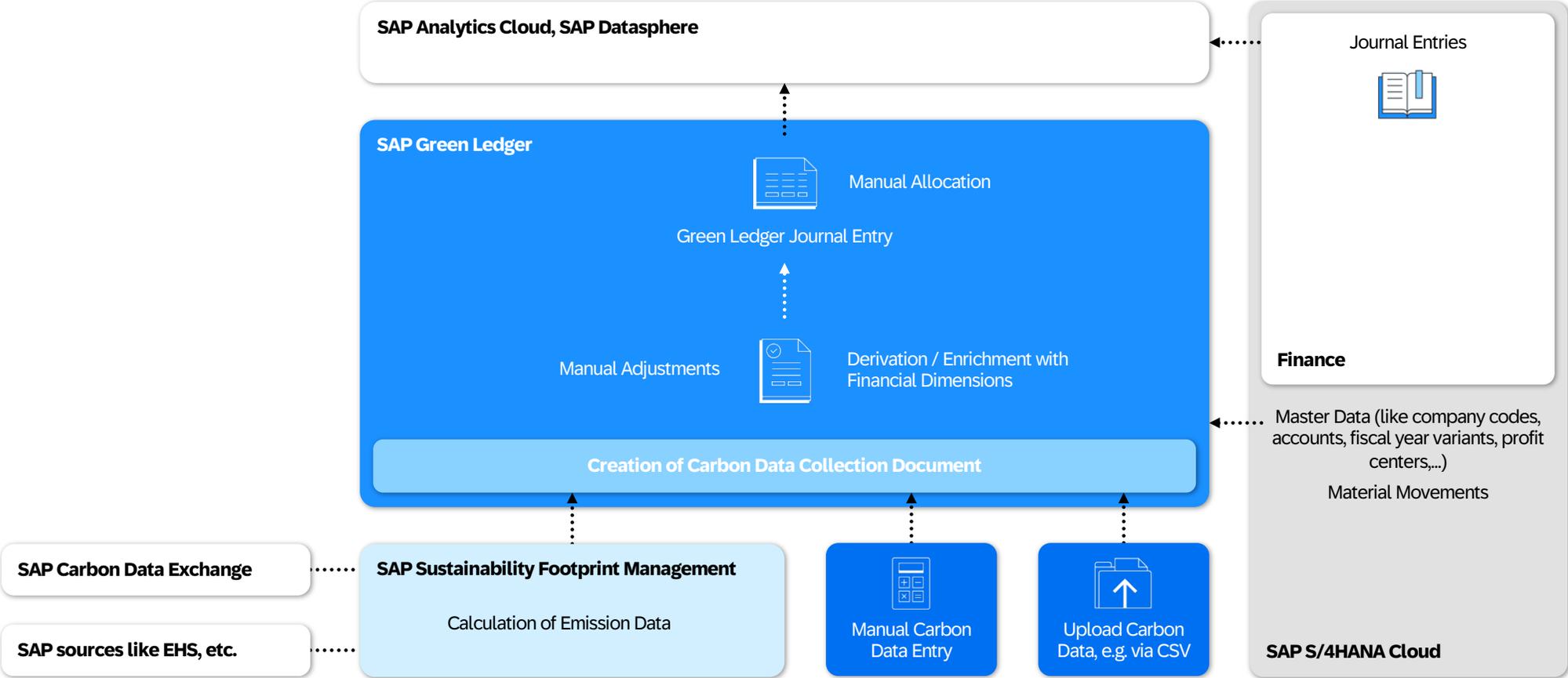
**For more in depth overview please check  
our first session from December 2024**

**[Revolutionizing Sustainability with SAP Green Ledger](#)**

# System Demo Green Ledger



# SAP Green Ledger demo flow: From carbon collection to reporting

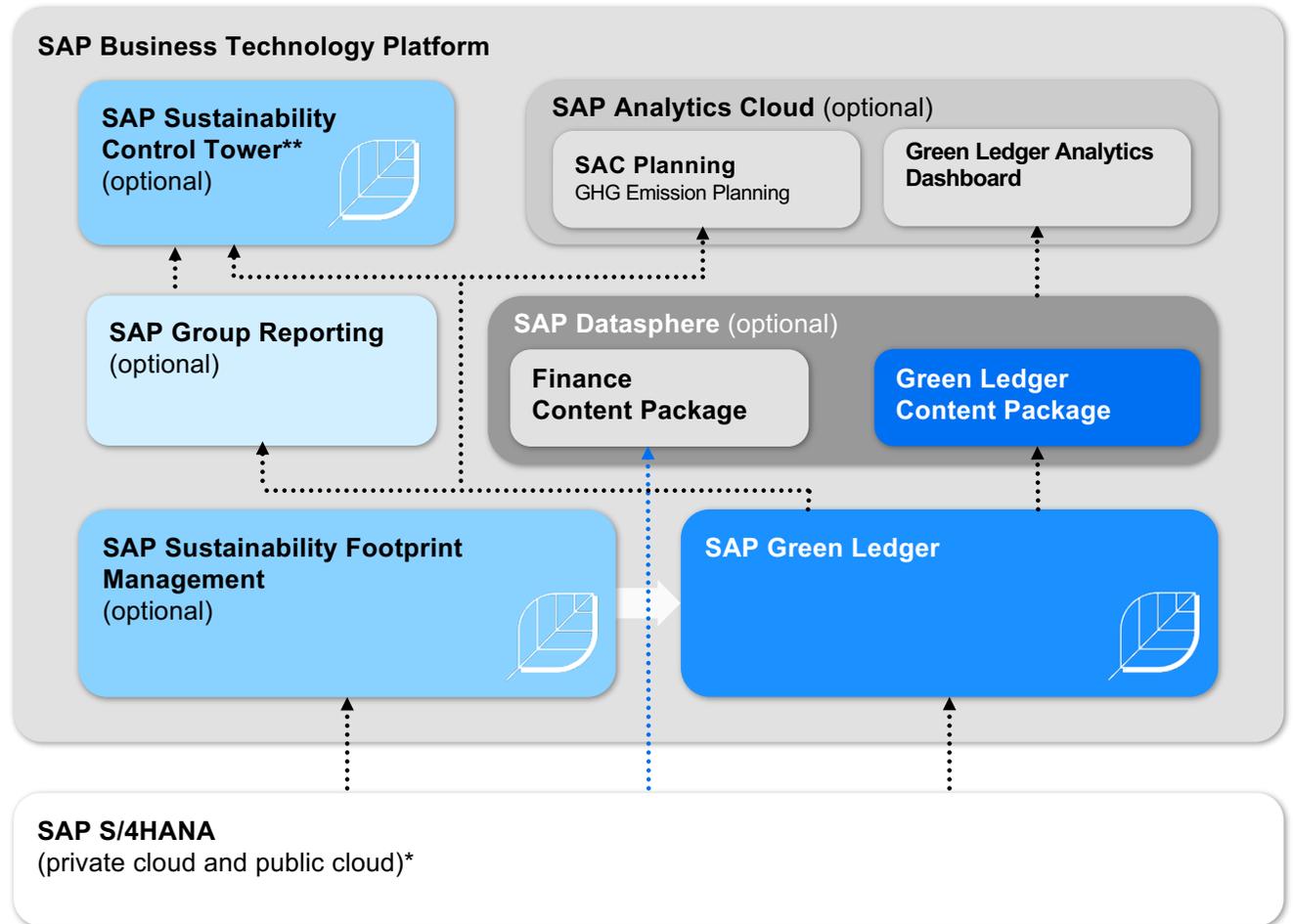


# Green Ledger Architecture





## Building blocks

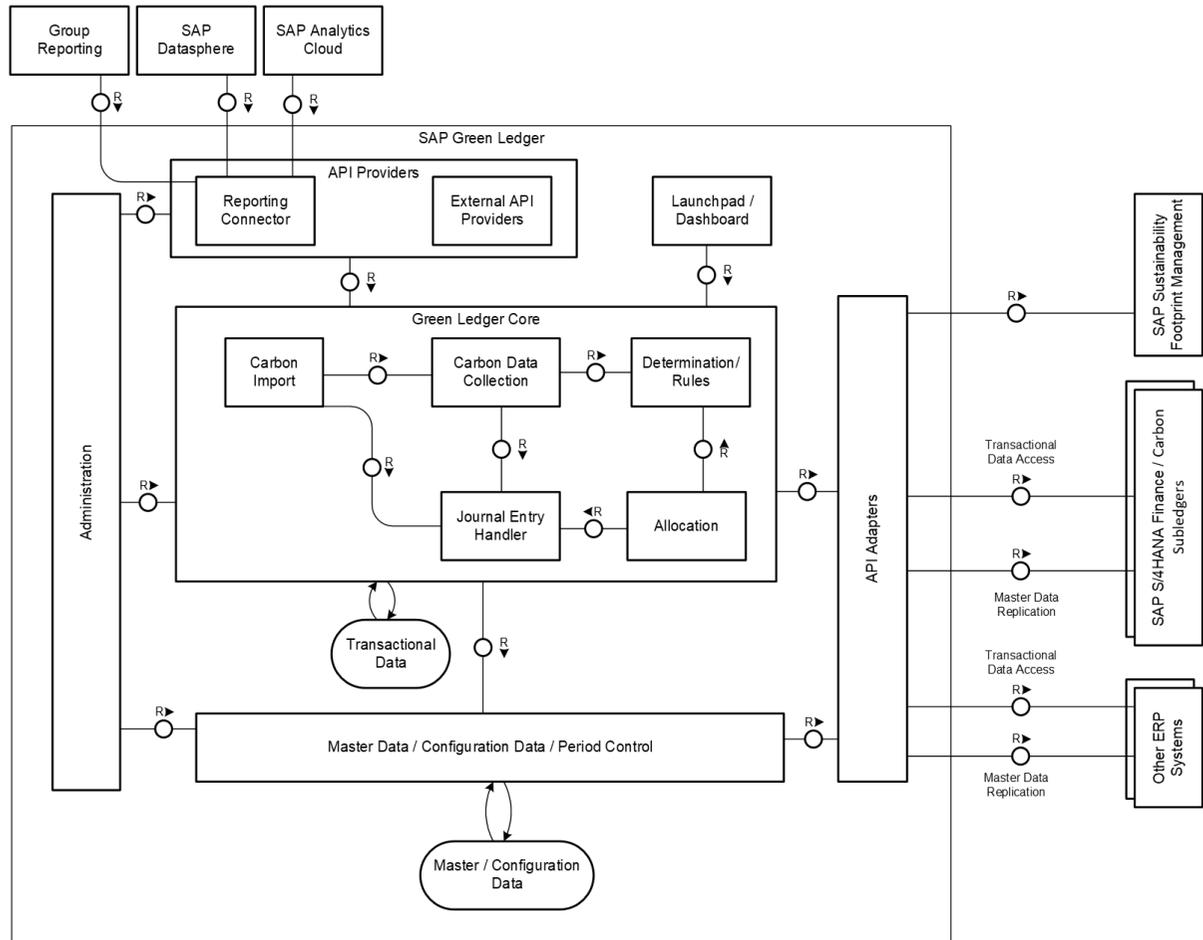


\* Only offered to customers with a GROW or RISE contract  
 \*\* integration with SCT planned, not part of GA version

# Micro service architecture

Internal architecture of microservice communication of the respective modules of SAP Green Ledger.

Message-based communication is facilitated by Kafka.



# Integration Guide



## Documentation and user help

All supporting materials, guides, help and general documentation will be available after release at

<https://help.sap.com/gl>

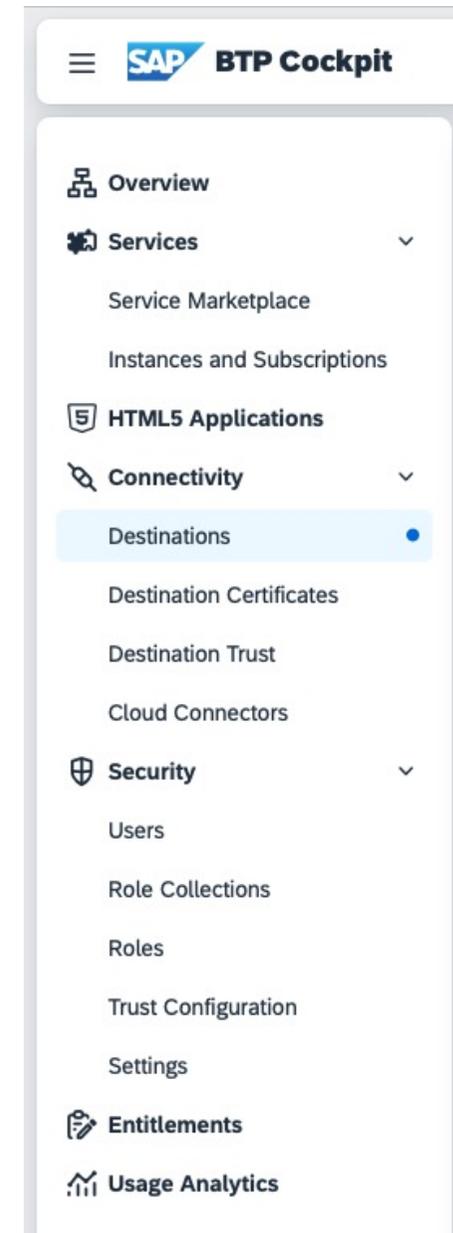
at the time of the official release in December.



## Integration with SAP S/4HANA Cloud

To set up the technical integration with [SAP S/4HANA Cloud](#), follow these steps:

1. Create a technical communication user, assigned the business catalog *SAP\_CORE\_BC\_COM* in the SAP S/4HANA Cloud system.
2. Create a communication system in the SAP S/4HANA Cloud system.
3. Create a communication arrangement (*SAP\_COM\_0531*) in the SAP S/4HANA Cloud system.
4. Set up a destination in the BTP cockpit of your SAP Green Ledger subaccount.



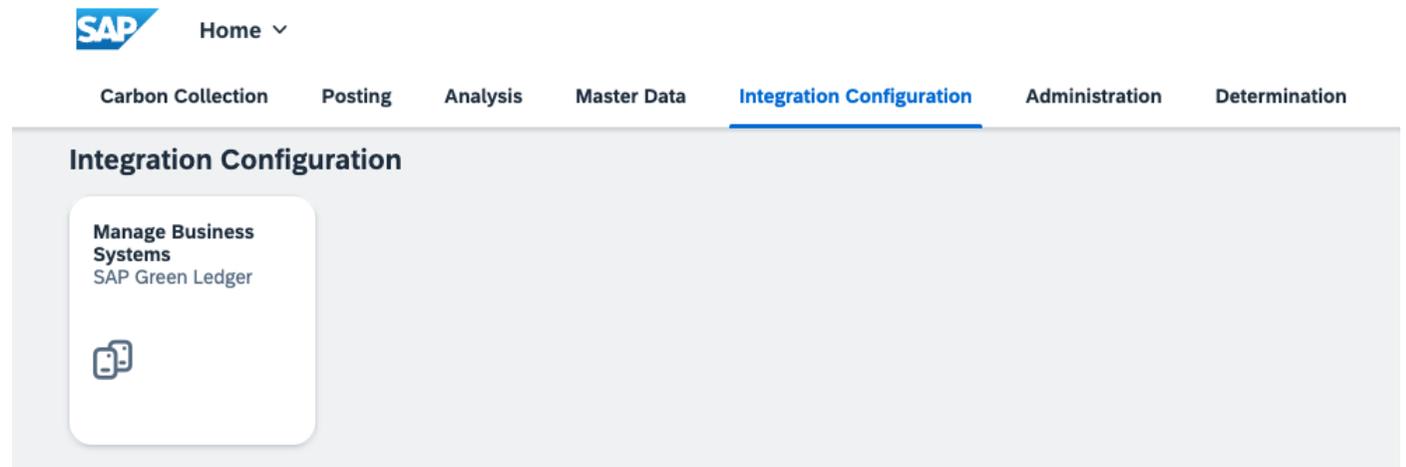
# Integration with SAP S/4HANA Cloud

To set up a business system from [SAP S/4HANA Cloud](#) as the **LEADING SYSTEM** where master data is defined, follow these steps:

1. Go to **Manage Business Systems** and choose **Create**.
2. Add the relevant data and assign the business system role **SAP Green Ledger**.
3. Choose **Create**.

This step is mandatory for each deployment of SAP Green Ledger.

It is only done **once** and the system defined thus cannot be removed anymore!



# Integration with SAP S/4HANA Cloud

To set up origin business systems and scope for each system that you use to maintain your financial data from [SAP S/4HANA Cloud](#), follow these steps:

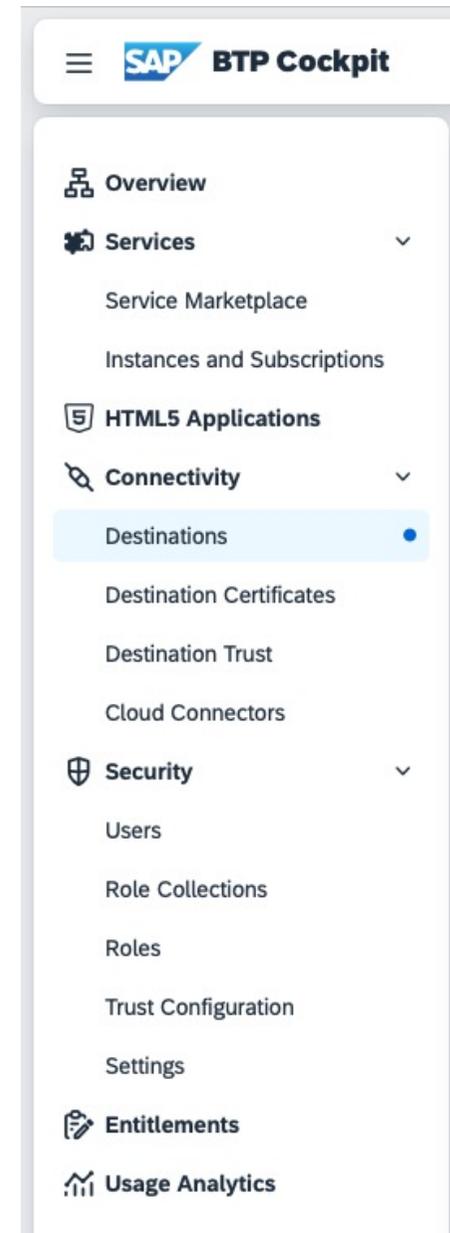
1. Go to **Manage Business Systems** and choose **Create**.
2. Add the relevant data and assign the business system role **SAP S/4HANA Finance**.
3. Add the relevant information in the **Finance Integration Configuration** section.
4. Add the relevant company codes and select whether master data should be imported for the company codes by selecting **Yes** or **No**.
5. Choose **Create**.

The screenshot displays the SAP S/4HANA Cloud interface. At the top, the SAP logo and 'Home' dropdown are visible. The navigation bar includes 'Carbon Collection', 'Posting', 'Analysis', 'Master Data', 'Integration Configuration' (highlighted), 'Administration', and 'Determination'. Below the navigation bar, the 'Integration Configuration' section is shown, featuring a card for 'Manage Business Systems' with 'SAP Green Ledger' and a lightbulb icon. A callout box on the right states: 'This step is optional and can be repeated for multiple systems.'

## Integration with SAP S/4HANA

To set up the technical integration with [SAP S/4HANA](#) (minimum version S/4HANA 2021 OP), follow these steps:

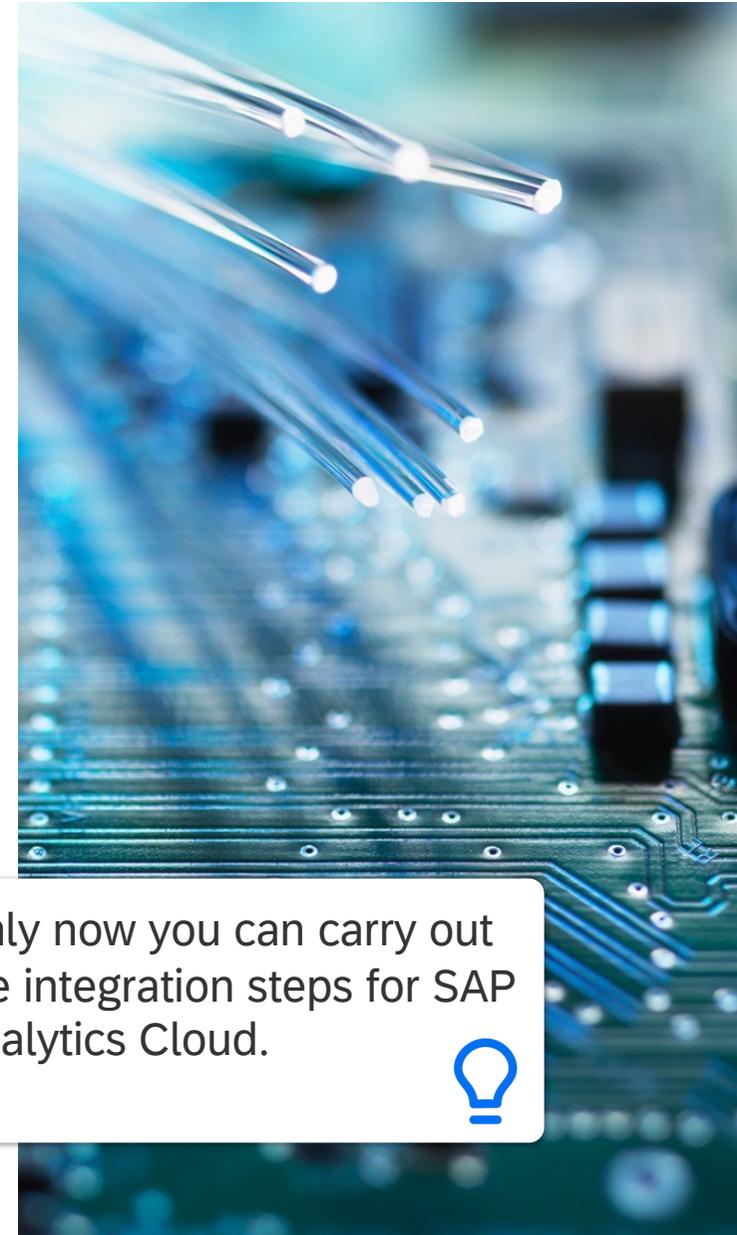
1. Activate OData services (*CDI\_CDS and CDI*) in the SAP S/4HANA system.
2. Define authorizations for data replication with CDI in the SAP S/4HANA system. A technical user must be (already) created and assigned these authorizations, as later used in the destination.
3. Enable the Cloud Connector for this system to facilitate integration to BTP.
4. Set up a destination in the BTP cockpit of your SAP Green Ledger subaccount.



## Integration with SAP Datasphere

To integrate with [SAP Datasphere](#), follow these steps:

1. Create a connection from Datasphere to BTP. Dedicated [credentials](#) must be created in the IDP.
2. Install and setup business content. (Only required if Datasphere is **not** provisioned by SAP)
3. Create replication flows for the replicating SAP S/4HANA system for master and financial data.
4. Create [data flows](#).
5. Create data flow for *I\_SemtagGLAccount* to maintain time/date specific data.
6. Replace Semantic Tag *OTHINCEXP* (Other Income and Expense) with a custom semantic tag to maintain re-usability.



Only now you can carry out the integration steps for SAP Analytics Cloud.



# Business content for reporting

[Green Ledger Reporting](#) for SAP S/4HANA and SAP S/4HANA Cloud

Scope:

- **GHG Emissions Overview – GHG Emissions and Finance KPIs:** Visualizes GHG emissions and financial KPIs using charts for various scopes and categories.
- **GHG Emissions Overview – Trend Analysis:** Shows trends in carbon emissions over time, linked with financial metrics like income, margin, and revenue.
- **CO2e Flow Statement:** Presents a CO2e flow statement similar to a cash flow, detailing opening, closing, and changes in CO2e by scope and category over time.
- **Financial Statement with CO2e Quantities:** Combines financial data with CO2e Quantities, allowing comparison of financial performance and carbon emissions across two periods.



## Integration with SAP Analytics Cloud

To integrate with [SAP Analytics Cloud](#), follow these steps:

1. Establish a connection between SAP Analytics Cloud and SAP Datasphere as a [live data connection](#).
2. Copy *SAP\_CONTENT* to your workspace and replace the analytic models in the SAP Analytics Cloud story, e.g. *SAP\_GRL\_DSP\_GreenHouseGasEmissions*, and ensure that *SAP\_GRL\_RL\_GLAccountSemTagKPI* has been set as default.



# Integration with SAP Sustainability Footprint Management

To integrate with [SAP Sustainability Footprint Management](#), you need to create and configure a new HTTP destination in SAP BTP subaccount named *SFM\_API*.

You need to add an additional property to the destination and maintain the name of the SAP S/4HANA business system that was set up for SAP Green Ledger in SFM.

## Prerequisite:

You have carried out the initial setup and subscribed to SAP Sustainability Footprint Management. For more information, see [Initial Setup for SAP Sustainability Footprint Management](#)



The screenshot displays the SAP BTP Cockpit interface. The left sidebar shows the navigation menu with 'Destinations' selected under 'Connectivity'. The main area shows a table of destinations and a configuration panel for the selected 'SFM\_API' destination.

Type	Name	Basic Properties	Actions
HTTP	CCB_100	Authentication: BasicAuthentication ProxyType: Internet URL: [redacted]	[edit] [copy] [download] [share] [delete]
HTTP	SCIUserGroup	Authentication: BasicAuthentication ProxyType: Internet URL: [redacted]	[edit] [copy] [download] [share] [delete]
HTTP	SFM_API	Authentication: OAuth2ClientCredentials ProxyType: Internet URL: [redacted]	[edit] [copy] [download] [share] [delete]

**Destination Configuration**

Name: SFM\_API  
Type: HTTP  
Description: SAP Sustainability Footprint Management  
URL: [redacted]  
Proxy Type: Internet

**Additional Properties**

S4System: CCB\_100  
Use default JDK truststore:

# Integration with SAP Sustainability Footprint Management

To set up a business system [SAP Sustainability Footprint Management](#), follow these steps:

1. Go to **Manage Business Systems** and choose **Create**.
2. Add the relevant data as entered in the *Destination* in the BTP cockpit and assign the business system role **SAP Sustainability Footprint Management**.
3. Choose **Create**.

The screenshot displays the SAP BTP cockpit interface. On the left, the 'Integration Configuration' section is visible, featuring a 'Manage Business Systems' card for 'SAP Green Ledger'. A blue arrow points from this card to the right-hand panel, which shows the configuration details for the 'SFM' business system.

**SFM**

General Information | SAP Sustainability Footprint Management Integration Configuration | Administrative Data

Business System Role: SAP Sustainability Footprint Ma...	Version: 2	Latest Version: Yes
---	---------------	------------------------

**SAP Sustainability Footprint Management Integration Configuration**

Assigned Finance Business System: <a href="#">CC8_100</a>	Destination: SFM_API	Destination Type: HTTP
--	-------------------------	---------------------------

Administrative Data

# Implementation Guide



## Administration Guide

The [Administration Guide](#) of SAP Green Ledger outlines all important steps to set up the solution for business use, including:

- configuration of master data
- user management
- security and data protection settings
- monitoring and troubleshooting

We will highlight here only the most important aspects.



# Master data import

Master data is imported from the connected business system or systems, such as SAP S/4HANA Cloud, into the SAP Green Ledger. You can import, monitor, and review master data in the **Manage Master Data Imports** app.

1. To start the import, go to **Manage Master Data Imports** and choose **Import**.
2. Select the relevant business system.
3. Choose **Start**.
4. To review the master data related to this master data import, select the line. In the object page you can monitor the data, such as object type, status, and number of records. The list also displays how many records of the master data objects are new, changed or deleted.
5. To display a detailed list of the imported master data object, select the relevant line.
6. To release a master data import, select the relevant line. Select **Release** in the details screen after reviewing the imported master data objects.

The screenshot shows the SAP Green Ledger user interface. At the top, there is a navigation bar with the SAP logo and a 'Home' dropdown menu. Below this, a horizontal menu contains several tabs: Carbon Collection, Posting, Analysis, Master Data (which is currently selected and highlighted in blue), Integration Configuration, Administration, and Determination. The main content area is divided into two sections. The first section, titled 'Master Data', contains a grid of 14 tiles. Each tile represents a different master data object, such as 'Display Company Codes', 'Manage Accounts', 'Display Cost Centers', 'Display Plants', 'Display Products', 'Display Product Types', 'Display Profit Centers', 'Display Segments', 'Display Ledgers', 'Display Fiscal Year Variants', 'Display Units of Measure', 'Display Unit of Measure Dimensions', 'Manage Master Data Imports', and 'Manage Fiscal Periods'. The 'Manage Master Data Imports' tile is highlighted with a large blue arrow pointing upwards. The second section, titled 'Integration Configuration', contains a single tile labeled 'Manage Business Systems'.

# Master data configuration

The following master data can be imported in the SAP Green Ledger and reviewed on the SAP Fiori launchpad:

- **Account:** Accounts related to the company codes and charts of accounts in scope are imported if they have one of the following account types:
  - Balance Sheet Account
  - Cash Account
  - Non-Operating Expense or Income
  - Primary Costs or Revenue
  - Secondary Costs
- **Chart of Accounts:** All charts of accounts related to the company codes in scope are imported.
- **Company Code:** Company codes are imported according to your company code assignments for your connected business system with business system role *SAP S/4HANA Finance* in the *Manage Business Systems* app.
- **Cost Center:** All cost centers related to the company codes in scope are imported.
- **Fiscal Period:** All fiscal periods from the connected business systems are imported.
- **Fiscal Year Variant:** All fiscal year variants related to the company codes in scope are imported.
- **Ledger:** All leading ledgers from the connected business systems are imported.
- **Profit Center:** All profit centers related to the company codes in scope are imported.
- **Segment:** All segments from the connected business systems are imported.
- **Unit of Measure:** All units of measure from the connected business systems are imported.
- **Unit of Measure Dimension:** All unit of measure dimensions from the connected business systems are imported.

# User management

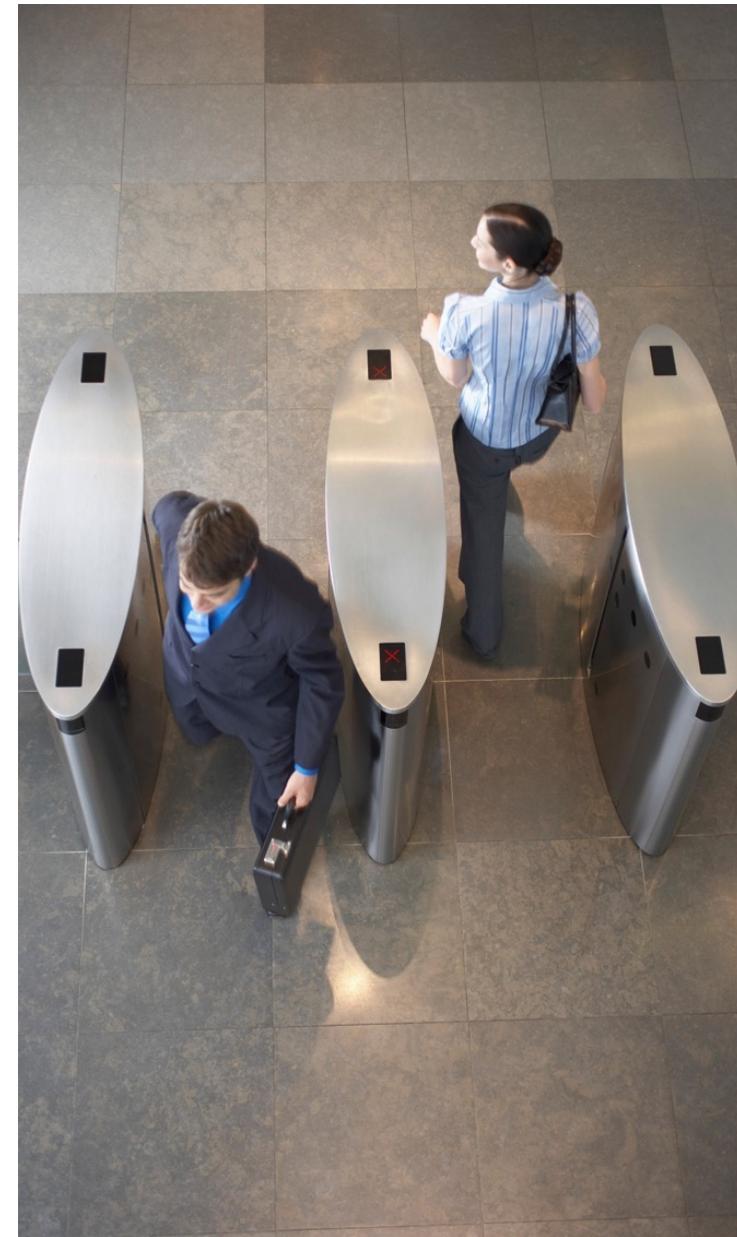
**Prerequisite:** Business users and user groups are created in the identity provider (IdP). **SAP ID service** is configured as the default IdP, but to use the solution you must add your instance of SAP Cloud Identity Services - Identity Authentication.

## Process for provisioning user data:

1. Access your Identity Provisioning service tenant.
2. Add your user store or identity provider as a source system.
3. Add your Identity Authentication tenant as a target system.
4. Run read or resync jobs.

## User roles:

SAP Green Ledger uses BTP authorizations that combine **Authorizations Policies** (“what can I do?”) with **Master Data** (“where can I do it?”).



# User management

Default authorization policies, pre-configured by SAP:

BusinessConfigurationExpert	<ul style="list-style-type: none"><li>▪ Display master data</li><li>▪ Display accounts</li><li>▪ Create, update and delete SAP Green Ledger-specific accounts</li><li>▪ Update fiscal periods</li><li>▪ Display and update business systems</li><li>▪ Display, create, update and delete the import scope from your integrated finance system</li><li>▪ Display and execute the master data imports from business system</li></ul>
TechnicalConfigurationExpert	<ul style="list-style-type: none"><li>▪ Set up and maintain business systems</li><li>▪ Display the import scope from your integrated finance system</li><li>▪ Display and execute the master data imports from business system</li></ul>
CarbonAccountant	<ul style="list-style-type: none"><li>▪ Display master data</li><li>▪ Display and update fiscal periods</li><li>▪ Display, create, import, update and delete carbon collections</li><li>▪ Display, create, update, post and reverse journal entries</li><li>▪ Display and export account balances</li><li>▪ Display allocations</li><li>▪ Display and export account balances</li></ul>
CarbonAnalyst	<ul style="list-style-type: none"><li>▪ Display master data, carbon collections and journal entries</li><li>▪ Display and export account balances</li><li>▪ Display, create, update and allocate allocations</li></ul>
Auditor	<ul style="list-style-type: none"><li>▪ Display all available objects</li><li>▪ Export account balances</li></ul>
SupportExpert	<ul style="list-style-type: none"><li>▪ Provides access to support-specific APIs for all objects.</li><li>▪ Assign this role when SAP needs to take over the support of the solution. It grants access to APIs</li></ul>

# User management

The **master data** entries in the authorization policies can be defined with these object types:

- Charts of Accounts
- Company Codes
- Cost Centers
- Fiscal Year Variants
- Fiscal Year Variant Periods
- Ledger
- Profit Centers
- Segments
- Units of Measure
- Unit of Measure Dime



You can also restrict authorization policies by company code and/or business system. To do this, go to **SAP Cloud Identity Services > Applications & Resources** and select your application. Go to the **Authorization Policies** tab and choose **Create > Create Restriction**. Enter a name and select a **Base Policy** you want to restrict. On the object page of the authorization policy, go to the **Rules** tab. Here, you can make the relevant changes, such as setting up rules for company codes and/or business systems.

Let's assume you want to set up your authorization policies for your carbon accountants. You want to create a policy which is restricted to the policy to **company code 1234** and **business system ABC**. Your configuration looks something like this in the **Rules** tab:

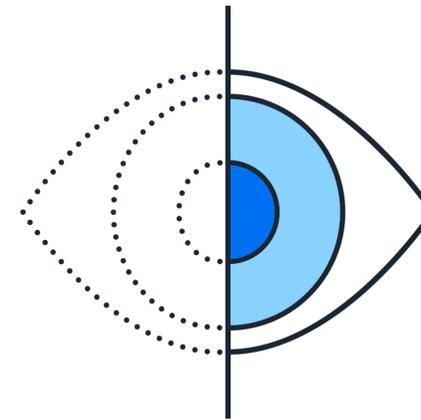
- **Use:** CarbonAccountant
- **Restrict:**
  - CompanyId = 1234
  - BusinessSystemId = ABC



## Security and data protection



SAP Green Ledger is delivered with secure [default configurations](#) wherever this is possible. However, you might want to review some settings and adjust them to your particular use case and corporate policies.



Currently, SAP Green Ledger doesn't provide any capabilities to [manage personal data](#). The solution doesn't store any personal data aside from the information provided in the **Created By** and **Changed By** fields. This information is required to ensure the traceability and thereby the integrity of the data.

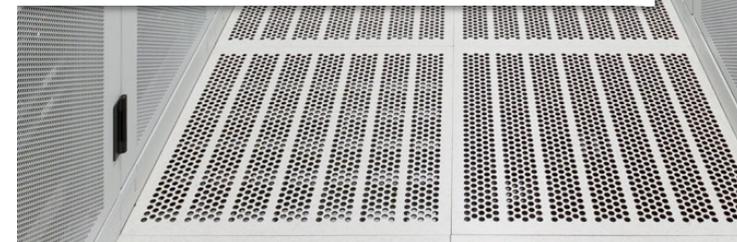
# Monitoring and troubleshooting

SAP Green Ledger uses the [Audit Log service](#) of Cloud Foundry. Security events by SAP BTP are logged and can be retrieved with the **Audit Log Viewer**.

If an entry is available in the Provider Tenant, it is not visible in your audit log. Only the provider of the app - SAP - is able to view those entries.

Event Grouping	What events are logged	How to identify related log events	Availability	Additional Information
Security Event	Logon to the solution: Logs that a user logged on to the app.	[...] "message": "TokenIssuedEvent[...]	Consumer Tenant	Logged by SAP BTP
Security Event	Authentication checks: Logs whether a user was successfully authenticated or could not be authenticated	[...] "message": "UserAuthenticationSuccess[...]	Provider Tenant	Logged by SAP BTP
Security Event	Permission checks: Logs that a user received the relevant permission.	[...] "type": "xs_rolecollection2user"[...]	Consumer Tenant	Logged by SAP BTP

**Troubleshooting:** If you need support with the SAP Green Ledger, please create a customer incident using the following component: **FIN-GRL**.



# Outlook



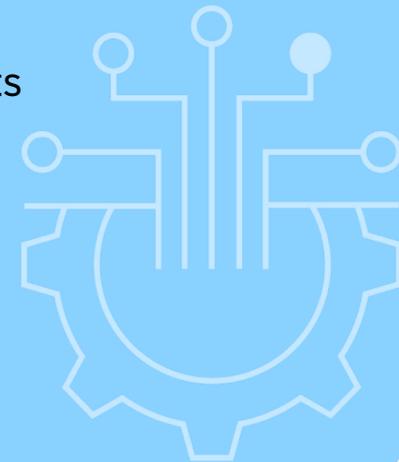
## Future shift of focus of SAP Green Ledger

With a **central carbon ledger** in place, that is highly **integrated** and **automated** into financial processes, carbon accounting becomes **less effort** intensive and only adjustments, corrections and reviews will be necessary.

The carbon ledger serves a **central source** for optimization, simulation and **strategy** development.



SAP Green Ledger will **transition** from an accounting solution to an **operational tool** for **decision** makers and key operatives with its sophisticated **simulation** and **reporting** capabilities.



# Future focus of SAP Green Ledger

- Automated integration with financial flows
  - automation of carbon accounting
  - creating a central carbon ledger as basis

- Create baseline value with reliable carbon accounting and fulfilling **legal requirements** like carbon reporting and carbon certificate management (CBAM).
- Enabling accountants and controllers to **understand**, book and **review** carbon values.
- Invest in **automation** and **integration**, as well as the **completion** of feature scope.

## Focus at release and short-term (2025/2026)

- Simplification** of UIs and further improvement of **user experience** to make necessary **manual** carbon accounting tasks as easy and quick as possible.

- Utilize more **AI** and integrate it deep into SAP S/4HANA processes to continuously automatically **identify** and **account** for carbon quantities.

- Provide **operational** capabilities like carbon cost **simulation** and carbon cost **optimization**, together with smart dashboards.

- Cover further **legal** and **mandatory** requirements that arise over time and provide and adjust **best practice** approaches to carbon accounting.

## Focus at long-term (2026+)

# Answers to your Questions



## Further information

Roadmap Green Ledger: [SAP Road Map Explorer](#)

Blog on GHG Planning: <https://community.sap.com/t5/enterprise-resource-planning-blogs-by-sap/driving-corporate-sustainability-greenhouse-gas-emission-planning-along/ba-p/13602334>

Collaboration with academia and partners:

- E-liability Institute: Kaplan/Ramanna at Harvard Business Review: [Accounting for Climate Change](#)
- Collaboration on E-liability Proto-Standard: [A Proto-Standard for Carbon Accounting and Auditing using the E-Liability Method by Karthik Ramanna, Lauren Holloway, Max Israelit, Chloe Wenye Zhang, Robert S. Kaplan :: SSRN](#)
- Paper with TUM Technical University Munich: [Incorporating Carbon Emissions into Decision-Making - The Case of Transactional Connectivity](#)
- Paper with Deloitte: <https://www.deloitte.com/global/en/alliances/sap/perspectives/sap-green-ledger.html>
- Stanford and University Mannheim (Prof. Reichelstein): [Corporate carbon accounting: balance sheets and flow statements | Review of Accounting Studies](#)
- McKinsey: <https://www.mckinsey.com/capabilities/strategy-and-corporate-finance/our-insights/managing-carbon-a-new-role-for-the-cfo>



# Thank you.

Contact information:

## **Product Management**

Dominik Schwarz  
[dominik.schwarz@sap.com](mailto:dominik.schwarz@sap.com)

## **Product Marketing**

Larissa Limarova  
[larissa.limarova@sap.com](mailto:larissa.limarova@sap.com)  
  
Silja Huebner  
[silja.huebner@sap.com](mailto:silja.huebner@sap.com)

 **Bring out your best.**