KDD065 - Carbon Accounting

Status	Approved
Owner	Stefanie Schwartz, Alex Bechter
Stakeholders	Marie Flourie, Gilles Madjarian

Issue

The current carbon accounting and reporting solution Syensqo is using is a heavily customized solution in the existing BW system. It only covers scope 1 and scope 2 of the carbon emission protocols and another solution for capturing additional categories of scope 3 emissions is currently being deployed (Novecare is fully live whilst Speciality Polymers is under way).

With the current BW system being phased-out by SAP and replaced in the ERP Rebuild with a state-of-the-art data warehousing solution and the concurrent push from SAP for fully-integrated sustainability solutions to measure carbon emissions effectively at the individual process and transaction level in the underlying ERP systems, an opportunity arises to re-design, simplify and standardize the carbon emission accounting solution used at Syensqo.

Recommendation

Based on the analysis performed, the project team recommends to pursue option A 'Deploy 'Green Ledger' for carbon emission accounting in S/4 HANA'. With this option the carbon emission impact across all sustainability scope items can be accurately captured, tracked and monitored at various levels of the organization and correlations between financial and carbon emission performance can be identified and measured against. It is the state-of-the art product from SAP for carbon emission accounting with a heavily loaded roadmap of additional features and functionalities to be added in the near future to the current scope of capabilities which makes it a future-proof and scalable solution. It comes with its own set of analytics and reporting applications that allow for insightful and comparative reporting on the performance of the organization both in terms of financial as well as carbon emission results.

SAP Green Ledger will only be available from SAP in December 2024. It needs to be considered how the recommended solution could be de-risked as part of the implementation approach. Hence the recommendation is to implement SAP Green Ledger with a phased implementation to allow for the stabilisation of SAP SFM to support Green Ledger functionalities. Phase implementation meaning the use of SAP Datasphere to de-risk the stabilisation phase between SAP SFM and SAP Green Ledger.

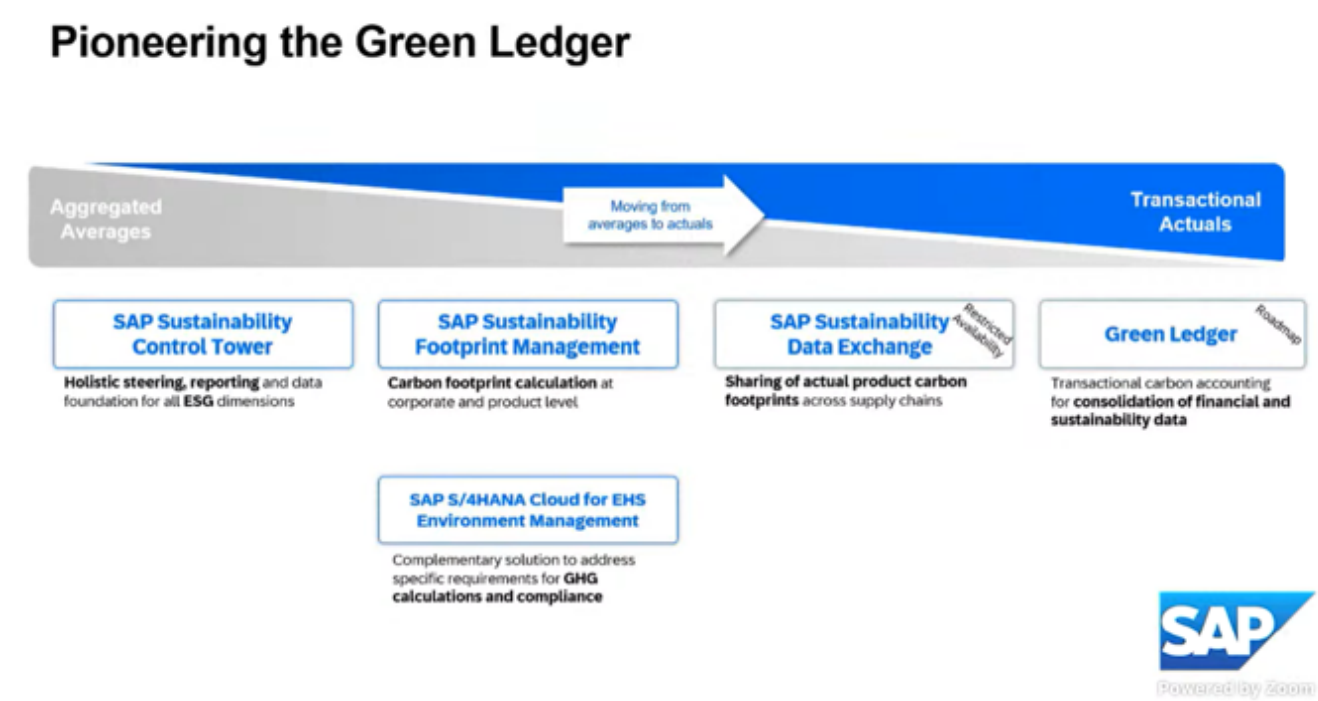
Background & Context

Financial decision-making may be influenced by carbon emission considerations as regulations become stricter globally, financial incentive systems are put in place for companies to accelerate their carbon emission curbing and consumer as well as investor decisions are becoming increasingly driven and influenced by a company's public perception of its environmental impacts and sustainability efforts. Publicly listed companies such as Syensqo are also obliged to disclose sustainability outlooks and carbon emission performance details in the annual reports published by the company. All these factors call for a growing need of companies for a reliable, robust and auditable system with transparent and governed mechanisms to digitally track its carbon emission footprints end-to-end from cradle-to-grave.

SAP recognised the need and potential benefits for companies to operate with a more accurate, integrated and automated carbon accounting solution and has recently launched a new product, under its comprehensive product suite of sustainability-focused solutions, called the 'Green Ledger' to facilitate this process. The SAP roadmap and development pipeline for new product features and planned capabilities to be added to the Green ledger functionalities over the next two years is remarkably packed with over 35 items available in the list at the time of writing (refer to section 'See Also' for a complete list of SAP roadmap items). This is another indicator which evidently shows that SAP is serious and committed in its efforts to provide companies with a capable and comprehensive carbon accounting solution embedded in the core ERP system going forward.

The green ledger allows for transaction-oriented accounting of carbon emissions thereby applying the same rigorous rules that are required for accounting data to comply with Financial Accounting standards. This guarantees accuracy, full traceability, clear accountability and reportability of carbon emissions throughout the organization. It gives the Finance departments and other interested stakeholders also the ability to track any direct or indirect correlations between Financial results and carbon emission impacts at the various levels of the reporting hierarchies defined as part of the ERP Rebuild Program (e.g by market, GBU, entity, region, group). The green ledger will also provide useful insights to the involved teams to further facilitate emission trading as it allows for accurate reporting of actual CO2e consumptions as well as simulation and forecast capabilities based on planned financial or operational data. Needs to replenish or sell CO2 certificates can therefore be identified early on in the process. During detailed design it will be further explored if Procurement and Sales activities for emission trading can be further automated based on information available in the green ledger and/or SAP Sustainability Footprint Management (SFM).

Technically, the green ledger relies on underlying data captured by the Sustainability Footprint Management (SFM) solution. Once implemented, SFM tracks the carbon emission footprint of all transactions relevant to scope 1, 2 and 3 as defined by the GHG protocols. For further details on the capabilities of SAP SFM, please refer to the KDD on ' EHS - Sustainability Footprint Management '. The multiple layers involved in the transition from aggregated data down to the transactional data available in the green ledger can be viewed in the below chart:

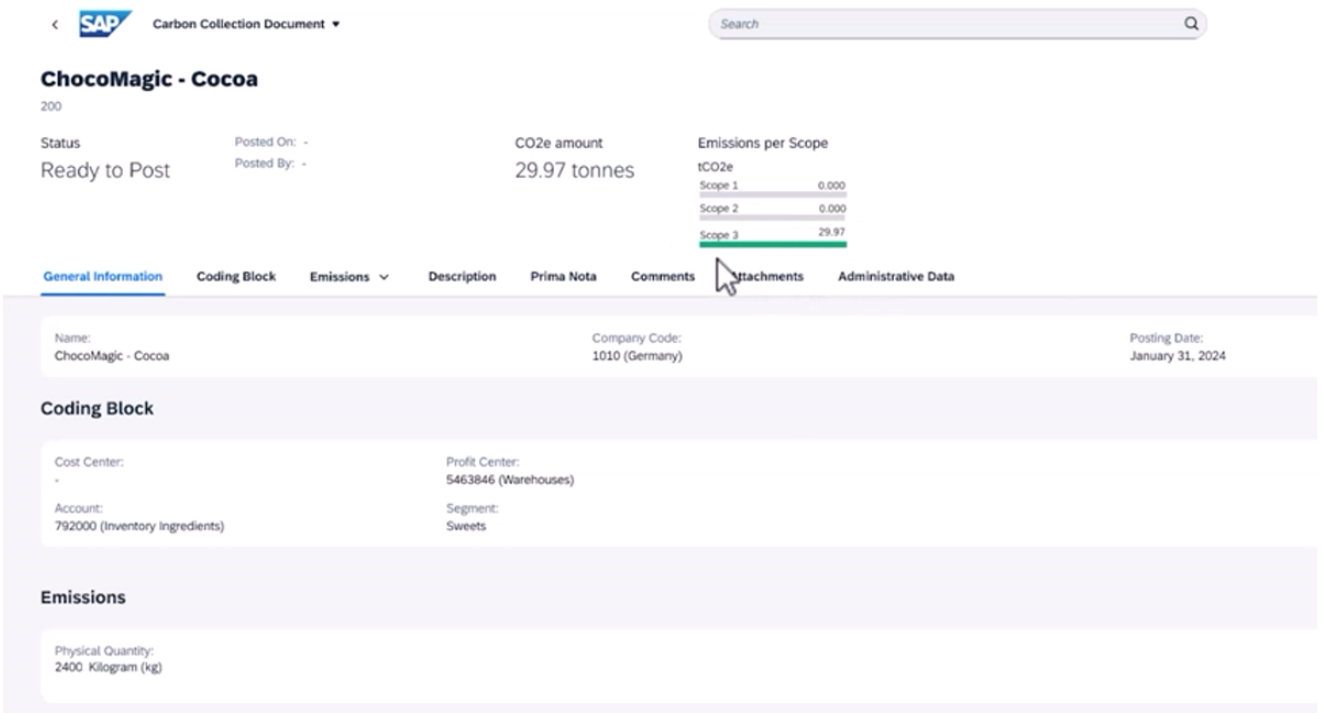


The below screenshots offer a look-and-feel for analytics and reporting features available out of the green ledger in S/4 HANA:

1. Carbon emission totals for each section of the P&L and Balance Sheet (e.g. at carbon totals at contribution margin level).

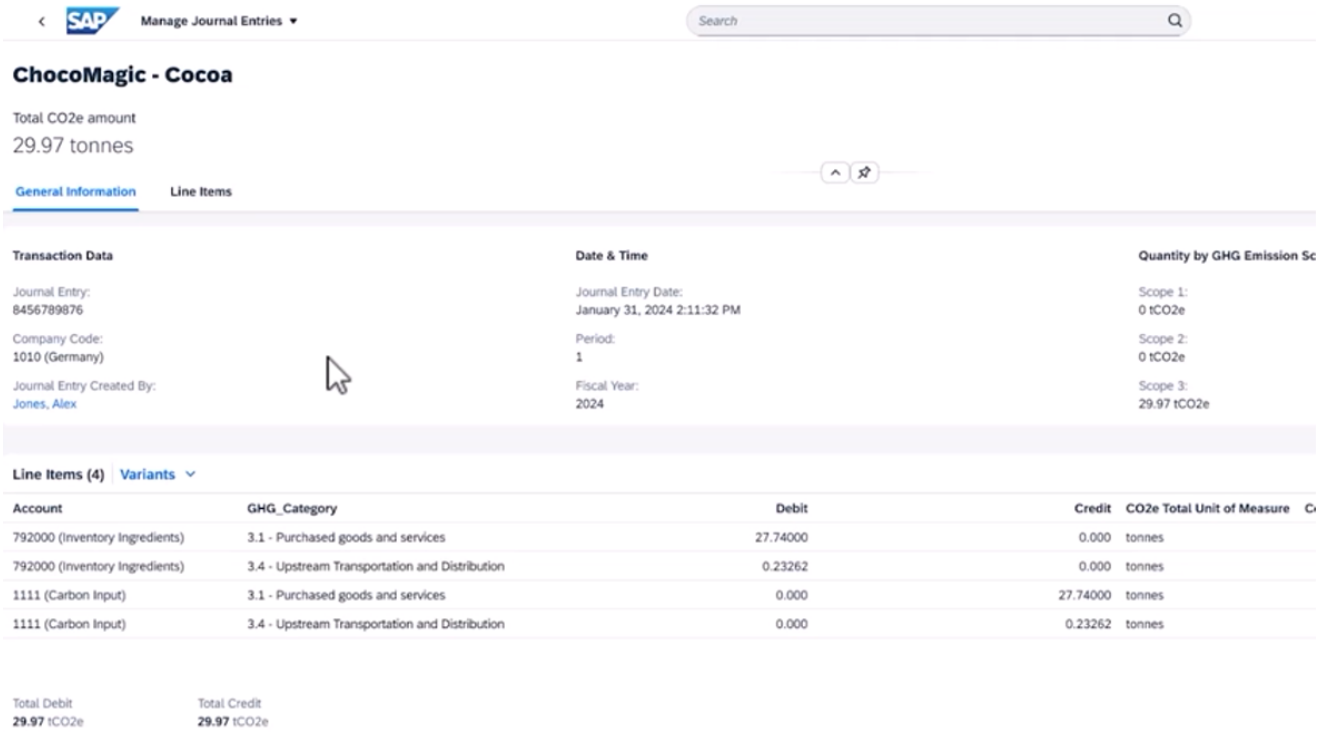
	Amount (m EUR)	Emissions Total (tCO2e)
Net Income	-4,493	926,396
Operating Income	-4,493	926,396
Gross Margin	-6,745	741,117
Net Revenue	-49,918	
Cost of Services	43,173	741,117
Operating Expense	2,252	185,279

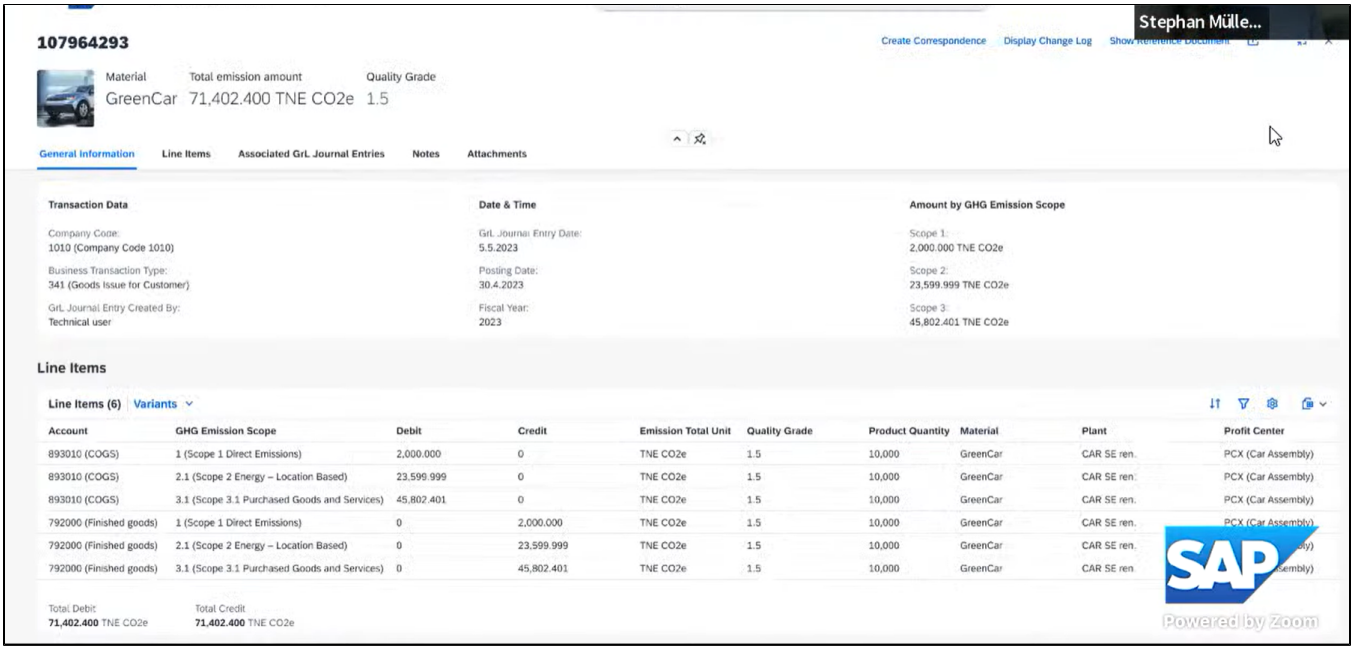
2. Drill-down abilities from top-level Financial Statement position to individual carbon collection documents causing carbon emission total for reporting period (e.g. drill-down from inventory account balance to goods receipt/goods issues impacting carbon emission total for inventory holdings):



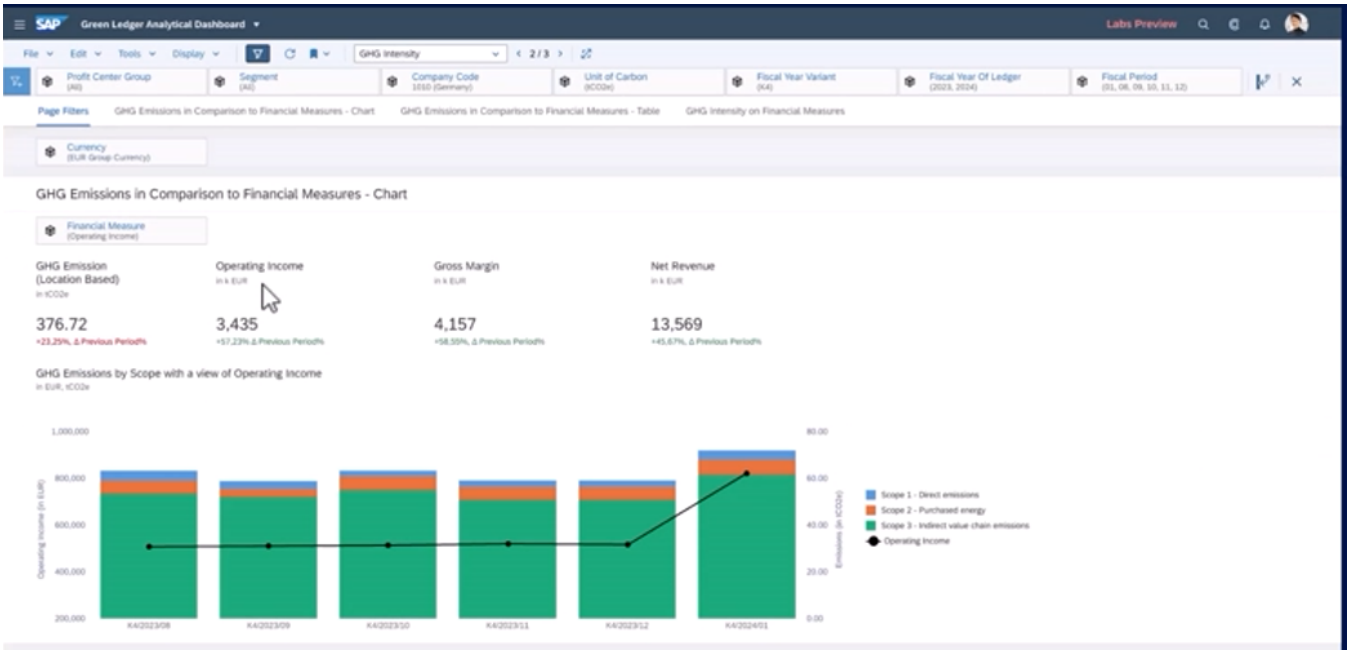
3. Break-down of each carbon collection document by scope and GHG category:

4. Translation of carbon collection document into Financial Accounting document inside the 'Green Ledger' (e.g. carbon emission impact from goods receipt/goods issue posting assigned to same G/L account and profit centre/cost centre as source posting in Financial Accounting):





5.) Dashboard Reporting of GHG emissions based on Financial Accounting dimensions and reporting hierarchies (e.g. visibility of scope 1 to scope 3 footprint in operating income of company by financial period and company code/segment/profit centre):



GHG Emissions in Comparison to Financial Measures - Table

	Amount (k EUR)	Emissions Total (tCO2e)	Scope 1 - Direct emissions (tCO2e)	Scope 2 - Purchased en
Net Income	1,058	146.92	6.93	
Operating Income	1,512	146.92	6.93	
Gross Margin	1,829	126.35	5.96	
Net Revenue	5,970			
Cost of goods sold	-4,141	126.35	5.96	
Operating Expense	-317	20.57	0.97	

The SAP Green Ledger is, however, still an unreleased product from SAP at the time of writing (official release expected by end of 2024). There are also some uncertainties associated with its licensing and availability in private cloud environments. It is therefore important to also consider other options for carbon emission accounting should there be any delays in the SAP roadmap for the planned product release or other licensing constraints imposed by SAP in recent months. A reliable system for carbon emission accounting and reporting has become a key strategic pillar for Syensqo's sustainability efforts in recent years that must not be compromised in the ERP Rebuild solution.

Against this background, the following options are considered in this KDD:

1. Deploy 'Green Ledger' for Carbon Accounting and Reporting in S/4 HANA.
2. Re-build current solution for carbon emission accounting and reporting in SAP Datasphere.

Assumptions

- SAP Green Ledger will be released as per current release schedule in Q4 2024.
- SAP Sustainability Footprint Management will be implemented in the ERP Rebuild Program.
- Automatic event-based triggers of Procurement activities with regards to external emission trading due to carbon footprint requirements (e.g. additional need for CO2 certificates due to increased production levels) will be explored in detailed design under the umbrella of SAP Sustainability Footprint Management functionalities.
- SAP Green Ledger is available as part of the licensing package acquired by Syensqo for S/4 HANA, private cloud edition.
- SAP Green Ledger is currently only available in SAP RISE. To be confirmed in December 2024 if SAP RISE part of ERP Rebuild scope.

Constraints

- Should SAP Sustainability Footprint Management not be implemented in the to-be solution or should there be any delays in the planned product release for the 'Green Ledger' by SAP, the recommendation shifts from 'Option A' to 'Option B'.

Impacts

- Reporting: Native SAP Fiori apps are available to support reporting out of the green ledger. These reports may require some form of customization to fulfill current reporting requirements with regards to carbon emission accounting for Syensqo.
- Change Management: Intensified user training and awareness campaigns needed to ensure seamless transition from legacy to new green ledger solution.
- Data: Historical data needs to be migrated and potentially converted for year-on-year reporting out of S/4 HANA.

Business Rules

- None identified at the time of writing. This section may be revisited and updated during detailed design.

Options considered

Option A: 'SAP Green Ledger'

In this option, it is assumed that the 'SAP Green Ledger' will be released by SAP according to its currently laid out roadmap.

The SAP Green Ledger allows for holistic management and accounting of carbon emissions across all 3 tiers of scope. It is closely linked to the Financial Accounting data captured in the S/4 HANA system following typical rules for capturing accounting data in an audited ERP system (e.g. zero-balance between debits and credits per ledger entry) to allow for comparative reporting of financial results and the environmental impact the financial performance of the organization brings about.

The SAP Green Ledger requires data feeds from Sustainability Footprint Management to be able to use it efficiently. It is assumed in this option that Sustainability Footprint Management will be introduced as part of the ERP Rebuild Program. SFM is capable of capturing carbon footprints of all business and supply chain activities at the various scope levels. Carbon emission accounting in the SAP Green Ledger will subsequently be performed based on data captured in the SAP SFM module. It can be posted at various levels of granularity using objects from the SAP enterprise structure and organizational units depending on the reporting needs for the respective activities (e.g. company code, cost centre, plant, sales area, profit centre, etc.).

Option B: SAP Datasphere

The current As-is solution for Carbon Emission Accounting and Reporting named 'Cerise' is a heavily customized solution built in the existing BW system with data extracted from various modules in WP1 and PF1 as the main source of information for its calculations and computations of the actual carbon emission footprint of Syensqo's scope 1 and scope 2 operations.

In this option, the intention would be to re-build the core parts of the existing solution in a similar fashion based on new S/4 HANA master and transactional data designs. Efforts would be made to extend its current coverage beyond scope 2 to also include scope 3 categories, which are becoming increasingly important to the company. With the deployment of SAP Sustainability Footprint Management in the to-be solution and its comprehensive coverage of data capture across all 3 scope categories this should become a realisable improvement opportunity.

The classic BW system will be replaced with the succeeding and roadmap-aligned data warehousing software from SAP called ‘Datasphere’ as part of the ERP Rebuild program. It is expected that similar and potentially more advanced data extractors and calculations models as currently used in the BW system can be replicated in Datasphere allowing for at least like-for-like reporting to what's available at the moment in the legacy BW system.

Evaluation

The below table provides an overview of each option's pros and cons against selected key pillars of the project charter and other important evaluation criteria in the context of the solution that need to be considered in the selection process:

		Qualitative Evaluation		Score	
	Weighting (H/M/L)	**Option A: SAP Green Ledger**	**Option B: SAP Datasphere**	**Option A**	**Option B**
Compliance	H	Pros: • Once integrated with SAP SFM, the SAP Green Ledger is able to account for carbon emissions from scope 1 all the way through to scope 3 categories using SAP standard integration capabilities. • Data entered into the green ledger follow strict data entry requirements and principles of Financial Accounting documents (e.g. zero-balanced journals, assignment to profit centres, etc.) thereby ensuring accuracy, compliance and reportability of the data. • Meet ESG expectations from various stakeholders (e.g. regulators, investors). Cons: • Limited support for capital expenditure-related carbon emission reporting but included in roadmap for 2025 (planned release date: Q3/2025).	Pros: • Complies with current disclosure requirements for scope 1 and scope 2. Cons: • Current solution 'Cerise' only supports coverage of carbon emissions incurred at scope 1 and scope 2 of the sustainability scope scheme. Additional customization would be required to include scope 3 emissions. • Traceability of the source data may be a challenge during audits as data is only available in an aggregated manner.	High	Medium
Standardization and Simplification	M	Pros: • SAP standard solution and target design from SAP for Sustainability Accounting. • Unified solution and process designs for carbon accounting across the organization. • Intuitive user-interfaces for efficient handling of transactional data and reporting. Cons: • Training and Change Management required for Carbon Accounting teams as it is a new application with new look-and-feel.	Pros: • Lower change management and training efforts expected due to similarities and overlaps with current solution. Cons: • Heavily customized solution with no support from SAP. • Complex calculation models and data conversions that require ongoing maintenance and special expertise. • Solution not directly related to Financial Accounting data hence it doesn't allow for direct comparative reporting of carbon emission impacts based on financial performance of the company,	High	Low

Integration	M	Pros: • Seamless integration with SAP SFM to capture emission footprints at transactional data level. • Native SAP reporting tools allowing for usage of standard SAP organisational units and master data for reporting at the required levels of granularity (e.g. company code, G/L account, G/L Account hierarchies, cost centre, plant, profit centre, etc.). • Allows for planning of financial data in accordance with carbon emission goals set out for the company. • Simulation and forecasting of carbon emission impacts to steer operational and financial decision-making (or vice versa) e.g. make or buy decisions based on carbon footprint impact, expected carbon footprint development based on S&OP planning data. • Allows for upload of external data via file interfaces. Cons: • Integration to other applications than SAP SFM may require customization.	Pros: • Allows for automatic data extractions and conversions from multiple systems. Cons: • Data can only be reported on in an aggregated manner, drill-down to individual transaction detail not feasible. • Data cubes and calculation models need to be retrofitted to S/4 HANA architecture and object usage requirements in the to-be solution (e.g. cost object no longer used in S/4 HANA).	High	Low
Future-Proof /Scalability	L	Pros: • The SAP Green Ledger is an integral part of SAP's roadmap design for Sustainability Accounting with several product innovations in the pipeline for the near future. By adopting the solution, Syensqo can benefit from latest product innovations which makes the solution future-proof. • SAP adheres to standards and protocols published by major governing bodies of the Sustainability industry in the solution design of the SAP Green Ledger. Changes in regulations are likely to be adopted in the SAP standard solution scope. • The solution is based on Finance master data and organisational units which makes it easily scalable as the company grows or divestments occur. Cons: • N/A.	Pros: • N/A. Cons: • Changes to processes or master data used in S/4 HANA may require updates to data extractors or calculation models.	High	Low
Costs	H	Pros: • SAP standard solution with many out-of-the box functionalities that reduce the needs for customization. Cons: • Additional license costs may apply. • New product which may increase testing and maintenance costs in the early phases of product deployment.	Pros: • No separate licensing costs for carbon emission accounting and reporting system. Datasphere is also required for other purposes in the to-be solution. Cons: • Additional implementation and customization efforts expected to increase coverage of current solution to scope 3 items.	Medium	Medium
Deployment Risk (Score)	H	Pros: • SAP support is assured as it's a SAP standard product offering. Cons: • New product from SAP which will likely require time to reach full maturity. Higher chance for product bugs that require SAP's attention.	Pros: • Less risk as some parts of the current (tested) solution can be retrofitted to the S/4 HANA designs and only require regression testing. Cons: • This option still requires fundamental changes to the underlying calculation models as many input factors change in the S/4 designs (e.g. use of cost objects and materials, changes to CoA, etc.).	Low	Medium
Overall Score **(High: 3 Points, Medium: 2 Points, Low: 1 Point)**	-	-	-	**33**	**23**

See also

SAP Roadmap for 'Green Ledger' as of September 2024 - click 'expand' below:

Business Capability	Road Map Item	Product	Status	Planned for
Sustainability Accounting	Importing emission quantities through file upload	SAP Green Ledger	PLANNED	Q4 2024
Sustainability Accounting	Determining accounts and account assignments by analyzing corresponding financial postings	SAP Green Ledger	PLANNED	Q1 2025
Sustainability Accounting	Enabling parallel accounting of location-based and market-based scope 2 emissions	SAP Green Ledger	PLANNED	Q1 2025
Sustainability Accounting	Generating carbon collection documents by analyzing supplier invoices	SAP Green Ledger	PLANNED	Q2 2025
Sustainability Accounting	Importing journal entries containing carbon quantities from financial accounting in SAP S/4HANA	SAP Green Ledger	PLANNED	Q2 2025
Sustainability Accounting	Posting and analyzing carbon quantities on maintenance orders	SAP Green Ledger	PLANNED	Q1 2025
Sustainability Accounting	Depreciating carbon quantities for a fixed asset over its useful time	SAP Green Ledger	PLANNED	Product Vision
Sustainability Accounting	Analyzing the carbon reduction effect of an investment	SAP Green Ledger	PLANNED	Product Vision
Sustainability Accounting	Posting carbon quantities on statistical cost objects	SAP Green Ledger	PLANNED	Product Vision
Sustainability Accounting	Collection and allocation of greenhouse gas emissions in a carbon journal	SAP Green Ledger	PLANNED	Q4 2024
Sustainability Accounting	Retrieving greenhouse gas emission quantities from SAP Sustainability Footprint Management	SAP Green Ledger	PLANNED	Q4 2024
Sustainability Accounting	Enabling automatic allocations of carbon quantities by reflecting allocations in financial accounting	SAP Green Ledger	PLANNED	Q1 2025
Sustainability Accounting	Enabling manual postings of green ledger journal entries	SAP Green Ledger	PLANNED	Q2 2025
Sustainability Accounting	Enabling cross-company allocations	SAP Green Ledger	PLANNED	Product Vision
Sustainability Accounting	Enabling year-end closing activities	SAP Green Ledger	PLANNED	Q1 2025
Sustainability Accounting	Enriching material movements from SAP S/4HANA with imported emission quantities	SAP Green Ledger	PLANNED	Q1 2025
Sustainability Accounting	Posting and analysis of carbon quantities on projects and WBS elements	SAP Green Ledger	PLANNED	Q2 2025
Sustainability Accounting	Enabling Joule for use in reporting queries	SAP Green Ledger	PLANNED	Q2 2025
Sustainability Accounting	Enabling automatic allocation of carbon quantities based on rules	SAP Green Ledger	PLANNED	Q4 2024
Sustainability Accounting	Combining data from several SAP S/4HANA systems in reporting	SAP Green Ledger	PLANNED	Q2 2025
Sustainability Accounting	Importing emission quantities using external APIs	SAP Green Ledger	PLANNED	Q2 2025
Sustainability Accounting	Enabling the just ask feature in carbon reporting	SAP Green Ledger	PLANNED	Q1 2025
Sustainability Accounting	Determining accounts and account assignments based on predefined rules	SAP Green Ledger	PLANNED	Q4 2024
Sustainability Accounting	Importing master data from external APIs	SAP Green Ledger	PLANNED	Q1 2025
Sustainability Accounting	Posting and analysis of carbon quantities by functional areas	SAP Green Ledger	PLANNED	Q1 2025
Sustainability Accounting	Enabling management reporting, planning, and analysis of greenhouse emissions related to financial performance and impac	SAP Green Ledger	PLANNED	Q4 2024
Sustainability Accounting	Enabling automatic carbon collections and automated allocations by analyzing material movements in SAP S/4HANA Finance	SAP Green Ledger	PLANNED	Q4 2024
Sustainability Accounting	Enabling automatic carbon collections and automated allocations by analyzing postings in fixed asset accounting	SAP Green Ledger	PLANNED	Q3 2025
Sustainability Accounting	Posting and analysis of carbon quantities on internal orders	SAP Green Ledger	PLANNED	Q1 2025

Sustainability Accounting	Posting and analyzing carbon quantities on fixed assets	SAP Green Ledger	PLANNED	Q3 2025
Sustainability Accounting	Posting and analysis of carbon quantities on market segment characteristics	SAP Green Ledger	PLANNED	Q3 2025
Sustainability Accounting	Posting and analysis of carbon quantities on sales order items	SAP Green Ledger	PLANNED	Product Vision
Sustainability Accounting	Connecting to several tenants of SAP Sustainability Footprint Management	SAP Green Ledger	PLANNED	Q2 2025
Sustainability Accounting	Enabling double-entry bookkeeping of greenhouse gas emission quantities	SAP Green Ledger	PLANNED	Q4 2024
Sustainability Accounting	Complying with mandatory external reporting on greenhouse gas emissions based on IFRS-S1, IFRS-S2, and ESRS-E1	SAP Green Ledger	PLANNED	Q4 2024
Sustainability Accounting	Import master data from SAP S/4HANA for carbon accounting	SAP Green Ledger	PLANNED	Q4 2024
Sustainability Accounting	Accounting for carbon allowances in a carbon journal	SAP Green Ledger	PLANNED	Product Vision

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Change log

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Oct 21, 2024	Actor	Type	Activity	Version
Approved	FALL-ext, Cheikh	State	changed state to Approved at 7:36 am	v87
Pending SteerCo Review	FALL-ext, Cheikh	State	gave *Final Approval* approval at 7:36 am	
		State	changed expiry date to '04 Nov, 2024 08:36 am' at 7:36 am	
		State	changed state to Pending SteerCo Review at 7:36 am	v87
Pending Stakeholder Review	FALL-ext, Cheikh	State	gave *Stakeholder Review* approval at 7:36 am	
Oct 08, 2024				
	FALL-ext, Cheikh	State	changed expiry date to '15 Oct, 2024 09:13 am' at 9:13 am	
		State	changed state to Pending Stakeholder Review at 9:13 am	v87
Edited following DA Endorsement	FALL-ext, Cheikh	State	gave *Minor change* approval at 9:13 am	