

WESTERNACHER WHITE PAPER

Sustainability Analytics: How to set up a Corporate Carbon Footprint with SAP S/4 and SAC.

Practical Guide – Part 1

Global crises, like the COVID-19 pandemic and the Russian war against Ukraine, are temporarily masking the possibility that mankind may not be able to limit global warming to 1.5 °C or even to 2 °C.¹ What seems to be a concern at first sight could actually be a starting point for more action initiated by companies as opposed to it being enforced by country legislations. Companies in competition with each other cannot just increase prices – they need to significantly improve productivity in order to balance out the negative effects of broken supply chains, inflation and high energy costs that result from these crises.² Energy saving measures and decarbonization can therefore become one of the main drivers for improved productivity, while indirectly fighting global warming. Seeing the crisis as a challenge and an opportunity to outperform competition, companies can start

their decarbonization journey with the clear target to be in a better overall position after decarbonization. This approach requires information about energy consumption and carbon emissions in order to determine the powerful and verifiable countermeasures. A corporate carbon footprint needs to be developed, a strategy run and reported on. With a clever approach, these efforts can be kept affordable. Decarbonization measures will pay off – to the benefit of the company and society.

There are plenty of statistics about CO2 emissions globally e.g., country emissions and regional distribution, timelines with yearly amounts or accumulated views.³

When it comes to statistics about companies, you might find high-polluting industries or values for certain companies only⁴ but not a holistic view on companies and their carbon emissions.

¹ [Climate change - Wikipedia](#)

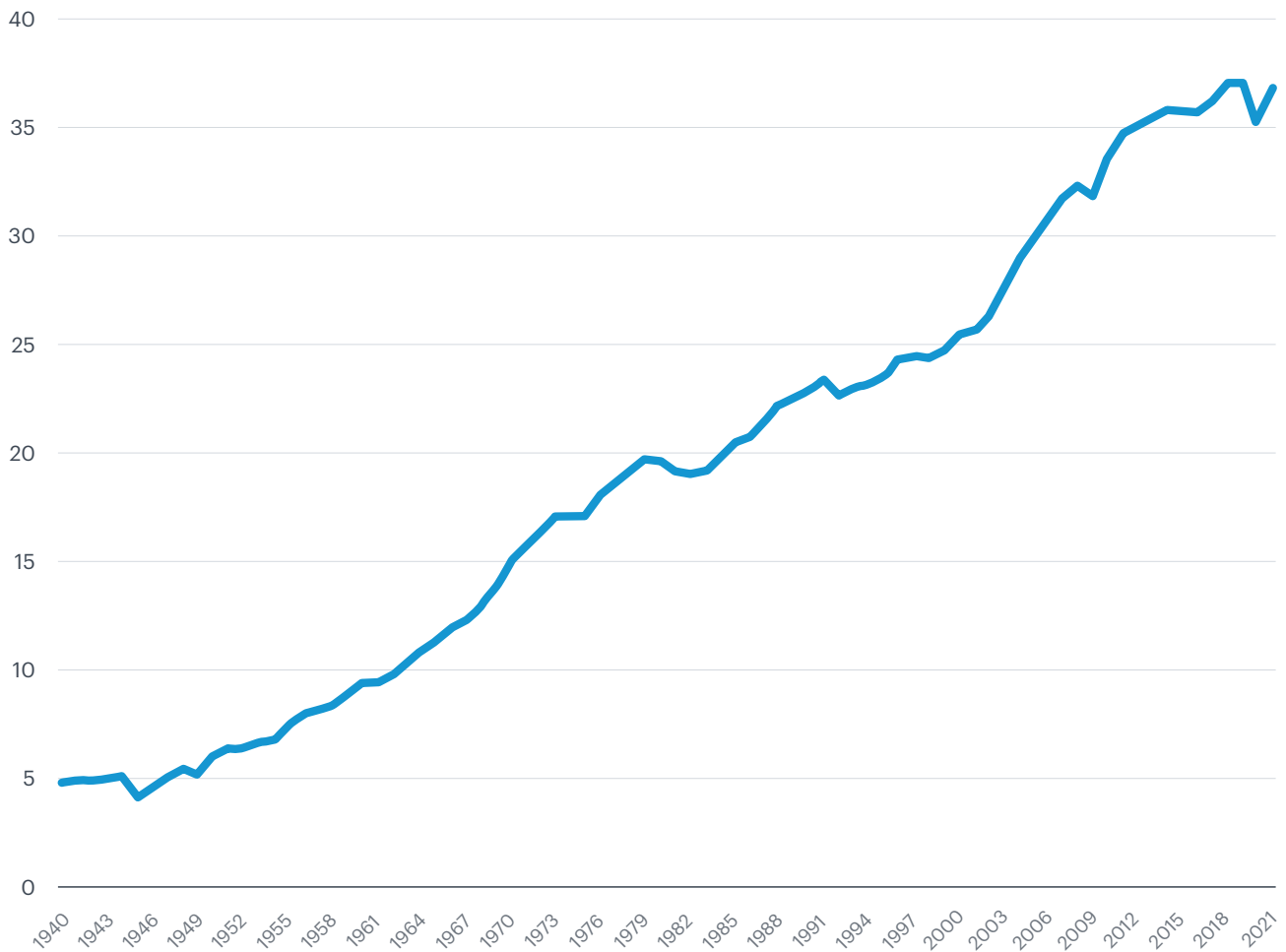
² [Productivity - Wikipedia](#)

[Der Zusammenhang zwischen Profitabilität und Nachhaltigkeit | SAP News](#)

³ [Annual CO2 emissions worldwide 1940-2020 | Statista](#)

⁴ [100 companies are responsible for 71% of GHG emissions \(activesustainability.com\)](#)

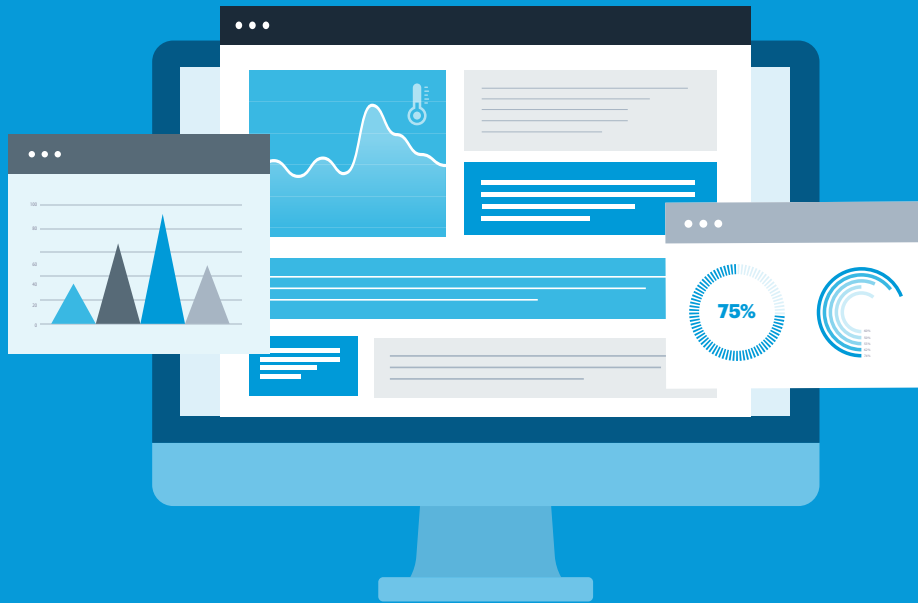
ANNUAL CO2 EMISSIONS WORLDWIDE FROM 1940 TO 2020



(in billion metric ton)

The lack of publicly accessible documentation and statistics is not only restricted to companies' carbon emissions, but means we also miss structured information about the corporate carbon footprint (CCF) or a system-based yearly corporate carbon reporting of companies' carbon emissions. This, however, is the foundation for the various IT strategies needed to fulfill the following requirements:

- Automate the yearly corporate carbon footprint reporting,
- Derive adequate carbon reduction measures and control their efficiency,
- Forecast and simulate scenarios based on central parameters,
- Give insights about the impact of future carbon emissions on the financial plan.



With this white paper, Westernacher Consulting will show what companies need to consider when setting up their corporate carbon footprint, with a special focus on SAP systems to monitor, forecast and simulate emissions. We will also give an overview on main tasks and related efforts to create a CCF.

- 1.** Strategy to set up the Corporate Carbon Footprint (CCF).
- 2.** System landscape considerations.
- 3.** Availability of emission factors.
- 4.** Yearly calculation of the Corporate Carbon Footprint (CCF).
- 5.** Yearly CCF report with reduction measures and verification of reduction targets.
- 6.** Efforts to set up a CCF.
- 7.** Summary and outlook.

1. Strategy to set up the Corporate Carbon Footprint (CCF).

The good news is that there is a lot of freely available information about the necessary steps to set up a corporate carbon footprint model and calculation. The literature shows which calculation methods and standards exist for carbon accounting, such as Greenhouse Gas Protocol or ISO 14064. The standards are fully or partially available for free or can be downloaded.⁵

These documents can be used directly as a guide. There are also many commercial offers on the market that give an overview of the major points to be considered and to give companies a quick start on this topic.⁶

Setting up the strategy and the CCF is not rocket science and plays a small part in the overall effort. It requires insights into the main

systems and processes as well as the organizational structure of the company. The mathematical approach behind the calculation is simple, it basically requires multiplying a quantity with the equivalent factor of carbon that was emitted when this quantity was consumed/produced, e.g.:

100 kWh of electricity (quantity)
x 0.5 kg CO₂e/kWh (emission
factor of electricity) = 500 kg CO₂e
(emission)

Of course, the devil is in the detail, which you will see when checking what source data you currently have in your systems versus what data you need to calculate reliable emissions (e.g., flight costs vs flight distances). Nevertheless, the effort of setting up the CCF strategy should not be more than 10% of the overall effort of creating an

⁵ [Greenhouse Gas Protocol | \(ghgprotocol.org\)](https://ghgprotocol.org/)
[ISO 14064 - Wikipedia](https://en.wikipedia.org/wiki/ISO_14064)

⁶ [SGS INSTITUT FRESENIUS - Corporate Carbon Footprints \(institut-fresenius.de\)](https://institut-fresenius.de)
[Sustainability Analytics with Westernacher Consulting](#)

initial CCF. With this information, you should be able to answer the following five questions:

1. What is the motivation to set up the Corporate Carbon Footprint?
2. What is the definition of the general target and the organization in scope?
3. Which accounting standard will you use?
4. What is the relevant scope,

emission sources, emission factors and base year of calculation?

5. What is the emission reduction target and how will compensation work?

As soon as these questions are answered and the concept for a CCF is designed, the source data can be collected according to the chosen carbon accounting standard.



2. System landscape considerations.

There are many options to technically support the calculation of the corporate carbon footprint. We will outline some considerations in this chapter. There is, of course, a unique situation when the footprint is calculated for the first time: Available data is reviewed for the first time, gaps in data may be seen, there may be inconsistencies and missing data points, different rollout stages of tools in different units, etc.

We hear from our customers that they initially collected all data in MS Excel, which seems the easiest way by which functional departments can calculate the CCF without much expert IT knowledge. This happens because they prefer to focus on creating a clear picture by cleaning up the gaps for the future but do not focus on its effectivity.

As good as this method may be to come to an initial result, it has some serious disadvantages:

- The initial high manual effort

might be acceptable, it is less acceptable in the years to come when year after year the manual calculation needs to be repeated.

- Manual work is error-prone and hence not recommended as a permanent solution.
- This approach also does not allow for the use of built-in features of modern IT systems like forecasting, versioning, or use of scenarios.
- You have to find and manage all relevant emission factors required for your calculations and find the source for all emission factors needed.

The latter point is probably one of the biggest advantages in taking another approach. This approach is using carbon calculation software packages that can bring emission factors as part of the software: Life Cycle Assessment Software and Carbon Footprint Tools.⁷

⁷ PRé | Fact-based sustainability (pre-sustainability.com)

[Home - IINAS](#)

[Home | ClimatePartner](#)

[ecocockpit – CO2-Bilanzierung für Unternehmen](#)

Carbon Footprint Tools are usually cheap and easy to use – however, they do not offer flexible or individual options to be customized. Professional modeling is possible in life cycle assessment software packages, but that functionality usually comes with higher prices and more complexity. The good thing is that there are free-of-charge versions on the market that at least allow to check and test the general functionalities.

Still, those systems are stand-alone packages, and the main data needs to be either uploaded or manually entered in the worst case. Alternatively, interfacing to a source system like SAP S/4HANA, where most of the relevant source

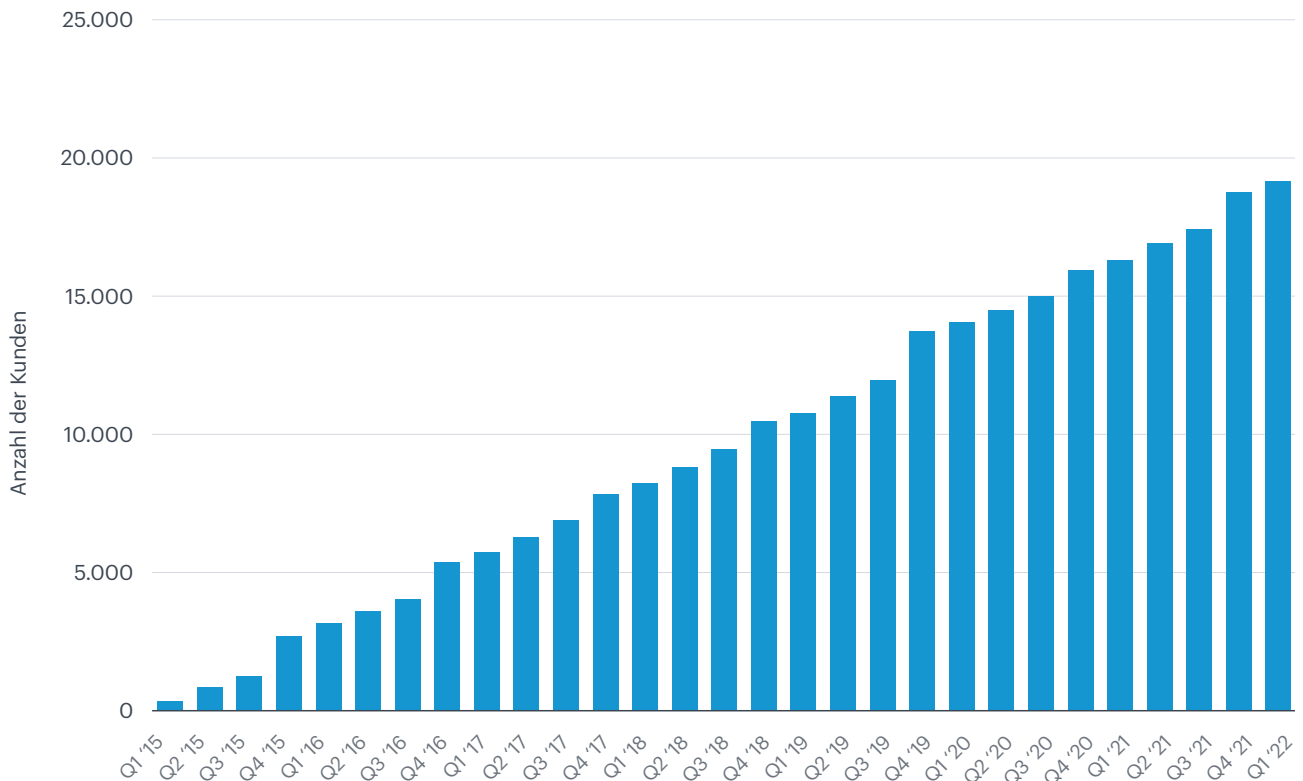
data should come from, might also be possible. But that needs to be separately checked for each system and requires niche expertise. If possible and successfully implemented, the systems do not stand alone anymore, and the calculation is completely automated.

Many companies are using SAP S/4HANA systems and additional systems from SAP's ecosystem e.g., to manage transportation or warehouses, or to plan their supply chain or their financial situation. Those companies might want to stay integrated in SAP's ecosystem and not add a third-party tool to calculate their CO2 emissions.⁸



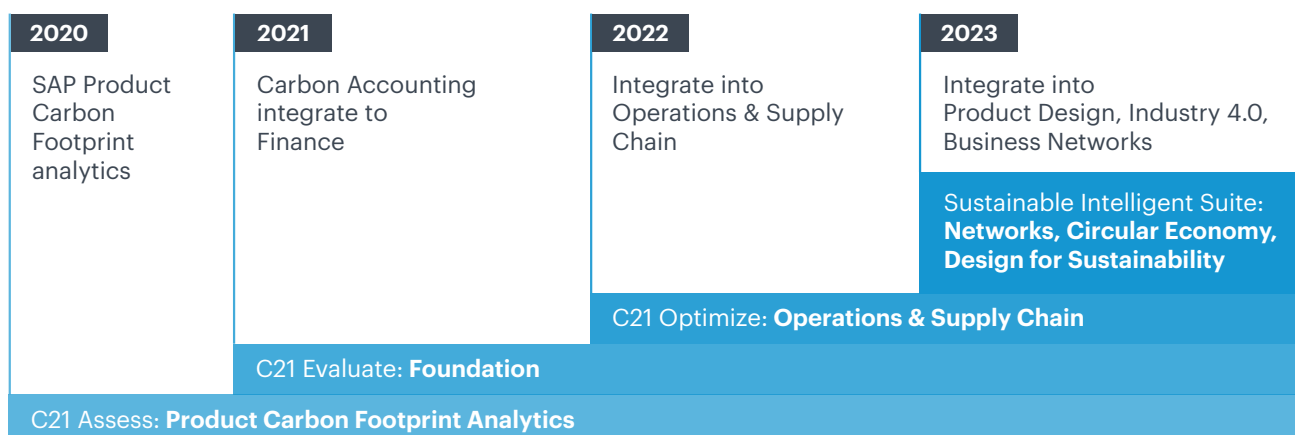
⁸ SAP - Anzahl der S/4HANA-Kunden Q1 2022 | Statista

NUMBER OF SAP S/4HANA CUSTOMERS WORLDWIDE



In 2020, SAP published their Climate 21 initiative with announcements for mainly product carbon footprint integration in both new and existing tools.⁹

CLIMATE 21 PRODUCT ROADMAP - KEY USE CASES



⁹ Climate 21 Solution Overview (sap.com)

We expect that SAP will add tools and technologies in future to further integrate carbon accounting and reporting e.g., the Sustainability Control Tower published in 2021.¹⁰ You can stay up to date with SAP’s Road Map Explorer and find respective updates in carbon roadmaps there.¹¹

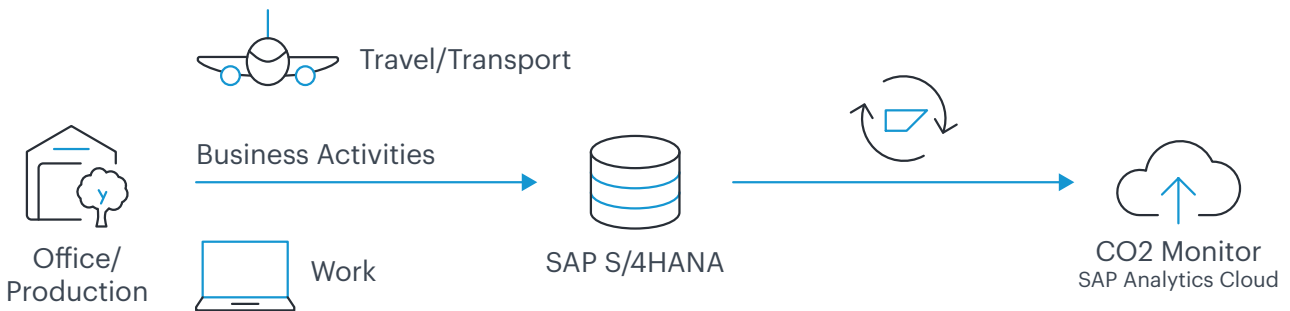
Reviewing current tools, roadmaps, and announcements from SAP, we think that for companies that want to stay in the SAP ecosystem, there are mainly two options:

You can either build the carbon measurements and rules to generate and populate the measure in your SAP S/4 HANA ecosystem, where it is not yet done by SAP. Or, you can wait until SAP does so in the next few years. The Climate 21 roadmap is published by SAP. Due to recent crises resulting in the overall lower priority of carbon emissions, many companies may still have time to act before legally binding steps need to be taken.

Cost-wise the situation is different. Companies that feel the high pressure on the cost side might not be willing to wait for fully integrated carbon measures into the SAP S/4HANA ecosystem.

The simple alternative that allows a quick start into CCF reporting, forecasting and scenario-based planning within the SAP ecosystem is to build your tailored CCF in SAP Analytics Cloud using the interfaces to SAP S/4HANA, where at least the financial view of the company should be present as a minimum.

In this scenario, the SAP S/4HANA system reflects all relevant business activities, at least in a financial sense, but partially also with relevant units that can be used to calculate the CCF. This information will be fed via interfaces into SAC, where the emission factors that are used to calculate carbon emissions out of the business activity data from the SAP S/4HANA system have been maintained.



¹⁰. [SAP Sustainability Control Tower: Neue Nachhaltigkeitslösung | SAP News](#)

¹¹. [SAP Road Map Explorer](#)

There are many good reasons to choose this approach:

- SAC is the strategic SAP product for reporting and business planning but even if not in use yet, as a cloud product, subscriptions for SAC can be provided within a few days and no major system setup is needed.
- Business teams can start right away in SAC without using interfaces as SAC is meant to be used and set up by business.
- The ecosystem is well-known, and experts are available.
- Interfacing between SAP S/4HANA and SAC was designed by SAP to be simple.
- SAC is flexible and allows you to model what is needed for

carbon footprint visibility, no matter which carbon accounting standard is used.

- The solution is future-proof in a sense that even when SAP has fully integrated the carbon measure in all systems in future, the general setup will still work.
- The system can work automatically, and you can immediately start reaping the benefits for your organization and for the world.

The only real disadvantage of this integrated SAP solution is the need to find appropriate emission factors on your own. But with a closer look at emission factors in general, you will see that this exercise is something you partially need to do anyway, irrespective of the system landscape you select.

An integrated system using SAP S/4HANA and SAC can be used to design Corporate Carbon Footprint monitoring, forecasting and simulating CO₂ emissions and related costs.

3. Availability of emission factors.

There are several sources for emission factors. Depending on your business and the nature of your available data, you will need to work with different sources as one source will not provide all the necessary information.

The UK Department for Environment, Food and Rural Affairs (DEFRA) publishes a list with emission factors that can be downloaded free of charge from their web page.¹² It lists widely accepted emission factors in many categories not only for the UK but also for other countries (e.g., for hotel stays in many countries). Depending on your industry, you can make use of these general emission factors in e.g., transportation, travel or energy use for your CCF.

In addition, there are commercial offerings, “Ecoinvent” for example provides emission factors that might fill some gaps. You can also

look into Life Cycle Assessment software or Carbon Footprint Tools and make use of the emission factors that are built in there.

One aspect that will be missing from all of the above is when you need to calculate the part of the CCF that refers to carbon emissions of purchased goods like e.g., mobile phones that your company is using. DEFRA does not have emission factors at hand, and you need to search if the manufacturer of these phones already calculated the product carbon footprint so that you can use it in your calculations.¹³

Another example of when you may need to search emission factors is your carbon emissions in purchased services e.g., cloud computing services.

While more and more companies are using cloud systems to run and support their businesses¹⁴, it is still

¹² [Department for Environment, Food & Rural Affairs - GOV.UK \(www.gov.uk\)](http://www.gov.uk)

¹³ [iPhone 12 Product Environmental Report \(apple.com\)](http://apple.com)

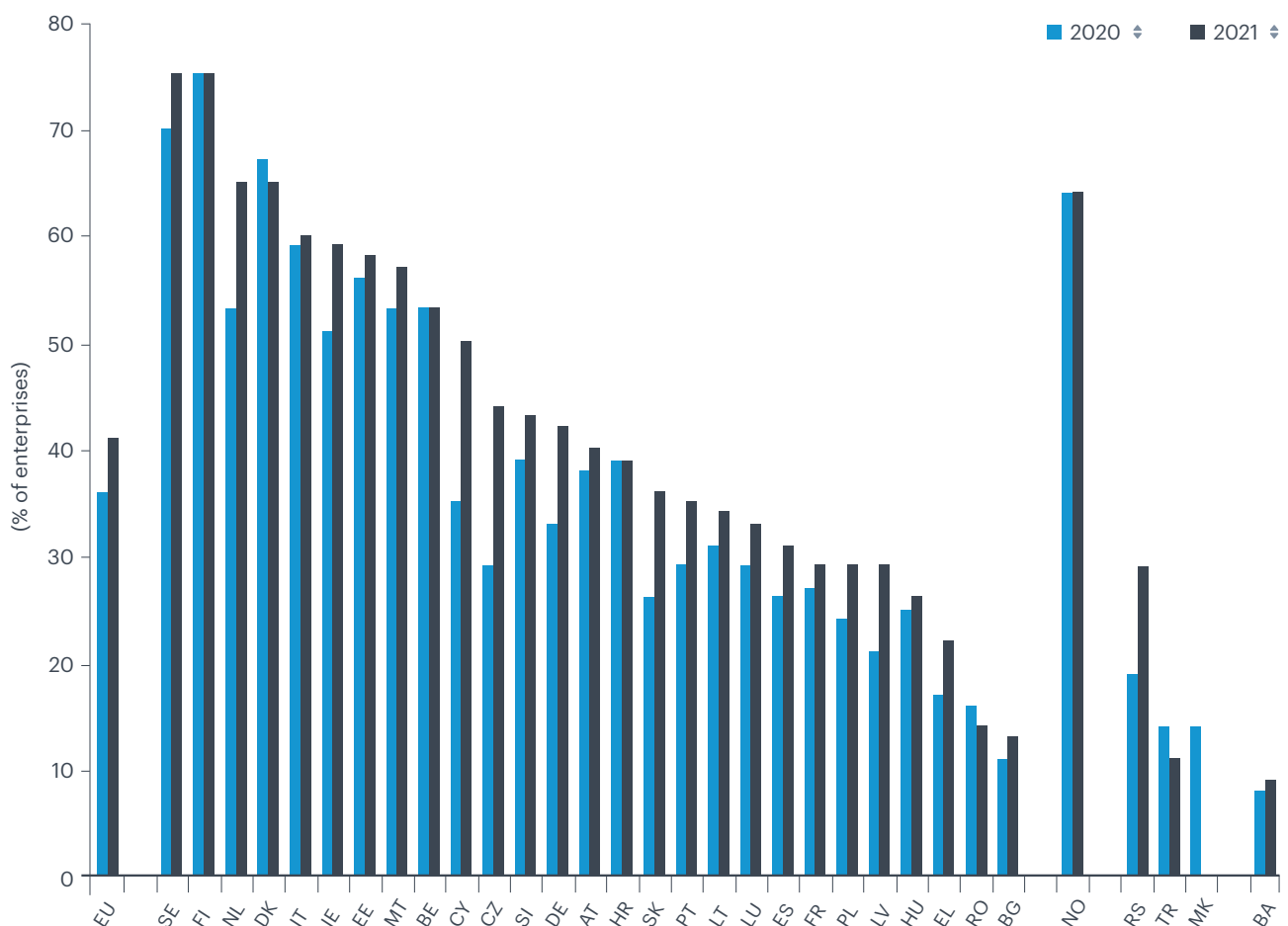
¹⁴ [Cloud computing - statistics on the use by enterprises - Statistics Explained \(europa.eu\)](http://europa.eu)

difficult to find relevant numbers of carbon emissions that are caused by server farms. In these cases, you can search for more general scientific articles about carbon footprint of e.g., cloud servers and build a model based on these assumptions.¹⁵

With these examples, it becomes

clear that once companies calculate their CCF, they need to research emission factors on their own for purchased products and services. With this insight, the integrated SAP solution for CCF calculation, which is based on SAP S/4HANA and SAC, becomes the most favorable solution.

USE OF CLOUD COMPUTING SERVICES, 2020 AND 2021



15. [WD-8-070-21-pdf-data.pdf \(bundestag.de\)](https://www.bundestag.de/SharedDocs/DE/08-070-21-pdf-data.pdf)

4. Yearly calculation of the Corporate Carbon Footprint (CCF).

Depending on the system that you have set up for your carbon monitoring, the yearly calculation of the CCF numbers can result in a lot of effort and can make up to 90% of the yearly effort for carbon reporting. Manual generation may make sense during the initial calculation, as the method shows quick results without the need for interface building. In the long term however, the integrated systems outperform the manual systems, not only regarding effort but they also have a higher accuracy rate and have more diverse functionalities.

The most time-consuming tasks in the yearly review is the updating of the emission factors to be used each year, as well as the adaption of the carbon model in case of changes e.g., new businesses

are integrated, or new products are launched, etc. With a fully automatic system, our experience shows that a drop from 90% to 10% in maintenance effort can be expected.

In addition, the use of modern front-end tools in integrated systems like SAP S/4HANA and SAC allows for more than just reporting of numbers. It supports the insights needed to create the yearly CCF report that a company needs to publish when adhering to a standard like Greenhouse Gas Protocol.¹⁶ Modern systems also allow real-time integration, so you move from a yearly calculation to a system that allows you to see immediately what effects your carbon reduction measures have had.

¹⁶ [Greenhouse Gas Protocol | \(ghgprotocol.org\)](https://ghgprotocol.org)

5. Yearly CCF report with reduction measures and verification of reduction targets.

Having your CCF numbers available in a fully integrated real-time system, allows you to focus on carbon reduction measures and their impact on cost and carbon levels. With this information, you have everything at hand to write the yearly CCF report for your company. This is probably the most time-consuming task in regular yearly CCF work.

Effort can then be focused on

where it generates most value, which is cost and carbon reduction measures. You need to find the adequate measures, calculate, simulate, plan the financial, operational and carbon impact. In parallel talk to stakeholders in the company and make sure the aligned measures are implemented and contribute to your carbon reduction target as expected. This should then be the baseline for your next CCF reports.

6. Efforts to set up a CCF.

The efforts spent on a CCF calculation depends on many factors like:

- Size of the company or group in scope
- System andscape
- Industry
- CO2 scopes
- Maturity of the business model

A small owner-managed service business with 10 people in one country can potentially calculate a CCF in weeks while a multi-national, multi-billion public corporation might need years and therefore, efforts will differ accordingly. Relative efforts per activity typically look like this:

Initial relative effort for first time CCF creation:

- 10%: Initial idea and stakeholder discussions
- 10%: CCF strategy
- 60%: First calculation of CCF
- 10%: Carbon reduction measures

- 10%: Documentation and publication

Initial findings should be directly converted to carbon reductions, making use of the “low hanging fruit”. Switching to green energy contracts for example or comparable and easy-to-achieve measures should be implemented right away.

In the coming years, we see the efforts for regular tasks as follows:

- 10%: Adapt and improve the carbon model for CCF
- 80%: Define, plan and run carbon reduction measures
- 10%: Documentation and publication

This scenario is only valid when at least after the first calculation of the CCF, a fully integrated system for CCF calculations has been built e.g., based on SAP S/4HANA and SAC. The main one-time effort lies in the definition and implementation of the interface between the two systems.

7. Summary and outlook.

Although the climate crisis is not always main headline in the news, for companies there is still a big incentive to reduce their carbon footprint and reduce related energy costs. Companies can gain a competitive advantage in doing so but need visibility about their carbon emissions. A good approach is to set up a Corporate Carbon Footprint according to a well-accepted standard like Greenhouse Gas Protocol. A solid system architecture could make use of an SAP S/4HANA and SAC system – the latter to collect the business activity data out of the source system SAP S/4HANA, hosting the carbon model and calculating the carbon emissions with the help of emission factors. Reporting, planning with different scenarios, and forecasting of carbon emissions is built-in

functionality of SAC and can be used to predict the financial impact of the CO2 reduction measures taken. Related efforts are needed but can be kept at an acceptable level when following this approach, making sure the one-time setup cost can easily be outperformed by the savings.

We will continue with the second and third part of this white paper series in 2022, focusing more on the following aspects:

- How carbon emissions will impact the financial situation of a company and how you can simulate results for different scenarios.
- How to handle carbon emissions in operational SAP systems and in reporting systems.

Start your digital transformation with Westernacher.

Westernacher has been innovating business and IT for more than 50 years. We are successful in helping our customers with many different transformation initiatives by providing solutions for operational, organizational and technical issues:

Technical:

From implementing EWM, S/4HANA, SCE and other SAP solutions to developing custom ABAP and Fiori solutions.

Organizational:

Supporting businesses in the transformation to becoming a merchandise- focused retail organization. Providing an engaging vision and training to

realize quick wins and removing (cultural) barriers.

Operational:

Developing innovative business processes to make the most of the new technology and information. Improving KPIs and creating KPPs to move the company from a reactive stage to an orchestrating stage.

To provide you with a better understanding, we offer an Inspiration Day, where we show you what sustainability analytics looks like and how it might impact your company. This is achieved through demonstrations and discussions with our Analytics experts.



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