WESTERNACHER WHITE PAPER

Sustainability Analytics: How to create your carbon footprint monitor.

In the [first part](#) of this 2022 white paper series, we focused on the motivation for companies to reduce their carbon footprint in order to gain a competitive advantage and the need for visibility of the different emission types. SAP S/4HANA and SAP Analytics Cloud (SAC) can provide the needed architecture to collect the required business data, host emission factors, calculate the footprint and visualize the emissions according to a well-accepted standard e.g., Greenhouse Gas Protocol.

However, it is not sufficient to look at the actual emissions in retrospect. Finance departments have known for a long time that the analytic outcome of actual data is only as good as the underlying plan.[1] Companies that strive to effectively reduce their carbon emissions and to be aware of the operational and financial implications of such, need to create strategic plans and look at different scenarios for success.

[1] Qualitätsmanagement im Reporting

Many of our customers have identified the need to create carbon analytics as legal frameworks are being established and because their customers as well as business partners are increasing their sustainability focus.[2] As we outlined in our first practical guide, Microsoft Excel can be a short-term enabler to create a carbon footprint monitor. However, on a continuous mid- to long-term base, it will definitely present many challenges and additional efforts compared to a dedicated reporting and planning solution such as SAP Analytics Cloud.

With this white paper, Westernacher Consulting will show how companies can set up a carbon footprint reporting in SAP Analytics Cloud and use it to create different scenarios. We will also set carbon emission planning in the context of financial planning and the implications of carbon pricing on business cases.

[2] EU Taxonomy – Wikipedia
Supply Chain Due Diligence Act – Deloitte
Purchase intention toward sustainable fashion brand

1. Build your CO$_2$ model in SAC

SAP Analytics Cloud works with data models from which stories i.e., reports or dashboards have their data fed. As with any regular Excel file, the starting point to create a data model in SAC are the different dimensions of the model which you would call columns and rows in Excel. What is important to consider when setting up your model: Make sure to create a planning model, not an analytical model, so that you can use the planning functionalities within SAC. Please note that for this approach, planning licenses are required.[3]

Some dimensions are mandatory but straightforward like the version or the date. For the date dimension, when setting up the model for the first time, you need to decide on which level of granularity your imported business data will be. Is

it hourly, daily, monthly? This may sound complicated but be assured the granularity selection in SAC is just a mouse-click away. What if you want to keep your granular daily data, but display them in a month-by-month or week-by-week report? You do not need to worry – SAC was designed to handle tasks such as aggregation and disaggregation with ease, so that the user can select which level of aggregation to display.

Depending on the data you want to bring to SAP Analytics Cloud, you can decide to either bind the different data sources to a single data model or to load the data into separate models, harmonize the data and then merge it. In our example, we decided to load all necessary data into a single model with 14 dimensions.

[3.] Data Modeling and Wrangling in SAC – SAP

DATA FOUNDATION

Measures 1
Calculations 0
Dimensions 14

Personnel_Numb...
Members	533
Properties	0
Hierarchies	0

Account (Account)
Formula Members	1
Non-Formula Members	4
Properties	0
Hierarchies	1

WBS_element (W...
Members	2547
Properties	0
Hierarchies	0

Unit_of_C (Unit o...
Members	9
Properties	0
Hierarchies	0

Year (Year)
Granularity	Year
Default Hierarchy	Y

Month (Month)
Members	13
Properties	0
Hierarchies	0

Source (Source)
Members	4
Properties	0
Hierarchies	0

Practice (Practice)
Members	21
Properties	0
Hierarchies	0

Compary_Code (...
Members	11
Properties	0
Hierarchies	0

Employee (Emplo...
Members	534
Properties	0
Hierarchies	0

Office (Office)
Members	8
Properties	0
Hierarchies	0

Unit_of_AEF (Unit...
Members	10
Properties	0
Hierarchies	0

Unit of GC (Unit ...
Members	6
Properties	0
Hierarchies	0

Detailed_Source (...
Members	15
Properties	0
Hierarchies	0

The fastest way to get your data model up and running is to use good old Excel files to upload transactional data. The setup of automatic interfaces usually comes second while the data model is still in the development phase and its final design is subject to change.

In some cases, it might turn out that you do not have all the relevant data available yet or if coming from different and not harmonized sources outside SAP S/4HANA, data amendment is needed, e.g., when master data is not identical. These inconsistencies in (master) data can be easily identified during Excel file upload as SAC will give the user a warning e.g. that not all dimensions are being represented in the used file.

The calculation of CO_2e is as simple as multiplication and division to receive CO_2e in kilograms or tons.

🔑 Member ID	Description	🗂 Hierarchy	Formula
2001	CO2e Car	22000	[1001]*[0003]/1000000

It is given that the calculation of CO_2e requires that the individual emission streams have been identified. Unless you can directly import the CO_2e, you need to set up an emission factor per CO_2 emission source.

🔑 Member ID	Description
0005	Avg Emission Public Transp
0006	Avg Emission Laptop
0007	Avg Emission Screen
0008	Avg Emission Phone
0009	Avg Emission Electricity
0010	Avg Emission Gas

Once your dimensions and data model are finalized, you can start setting up the automatic interfaces for loading of master data and transactional data via import connection. If you connect SAC to an on-premise SAP S/4HANA system for the first time, it will be necessary to set up SAP's cloud connector first. This is the gatekeeper that makes sure that there is no unauthorized access to your data. The cloud connector creates a tunnel between SAP S/4HANA and SAC to ensure that no data packages get lost or stolen. If your SAP S/4HANA system is in the cloud (be it private or public), both systems are cloud based and can work instantly together.

The fastest way to get your data model up and running is to use Excel files to upload transactional data.

2. Review your CO$_2$ emissions

With all the groundwork in creating your data model being done, you can move on and create your CO$_2$ monitor. Once again, you can decide which path to follow. Canvas pages inside your story provide maximum flexibility in visualizing and styling your reporting. The responsive pages open up the option for you to scale your report to any screen size which includes mobile devices such as tablets and smartphones.[4] In many cases, starting with a canvas page is recommended, as creating responsive pages comes with some implications that more advanced users have to deal with (e.g., not overlapping widgets which is usually required by the user to give the report the extra visual touch).

Before creating the individual sheets of your story, you should decide which way you would like to upload the data that is not coming from direct connection sources such as SAP S/4HANA to SAC. Typical cases are the emission factors that need to be updated regularly or the emissions from utilities that use gas and/or electricity. Data entries for this information can be done via direct file upload into the data model or via an input story that would need to be created. While you will probably have a long list of emission factors which should be uploaded via file, the upload of single values can be easily achieved via an input story. Input stories, basically include little tables with the period as headers, where the user can simply insert the value and publish it to the system.

In order to create a carbon footprint monitor inside SAC, you should focus on displaying the relevant data in an way that is easily consumed. A good mixture of

[4.] Canvas vs. responsive pages – SAP

tables, numeric points and graphs helps to consume all the information and produce the right conclusions from it. Create a story line with your data as you would when creating a PowerPoint presentation for the top management i.e., high-level, big picture to start with, with options for the user to dive deeply into information presented. This can take place by either utilizing built-in drill-down options in widgets or by offering additional sheets with more detailed information so that the user just needs to consume.
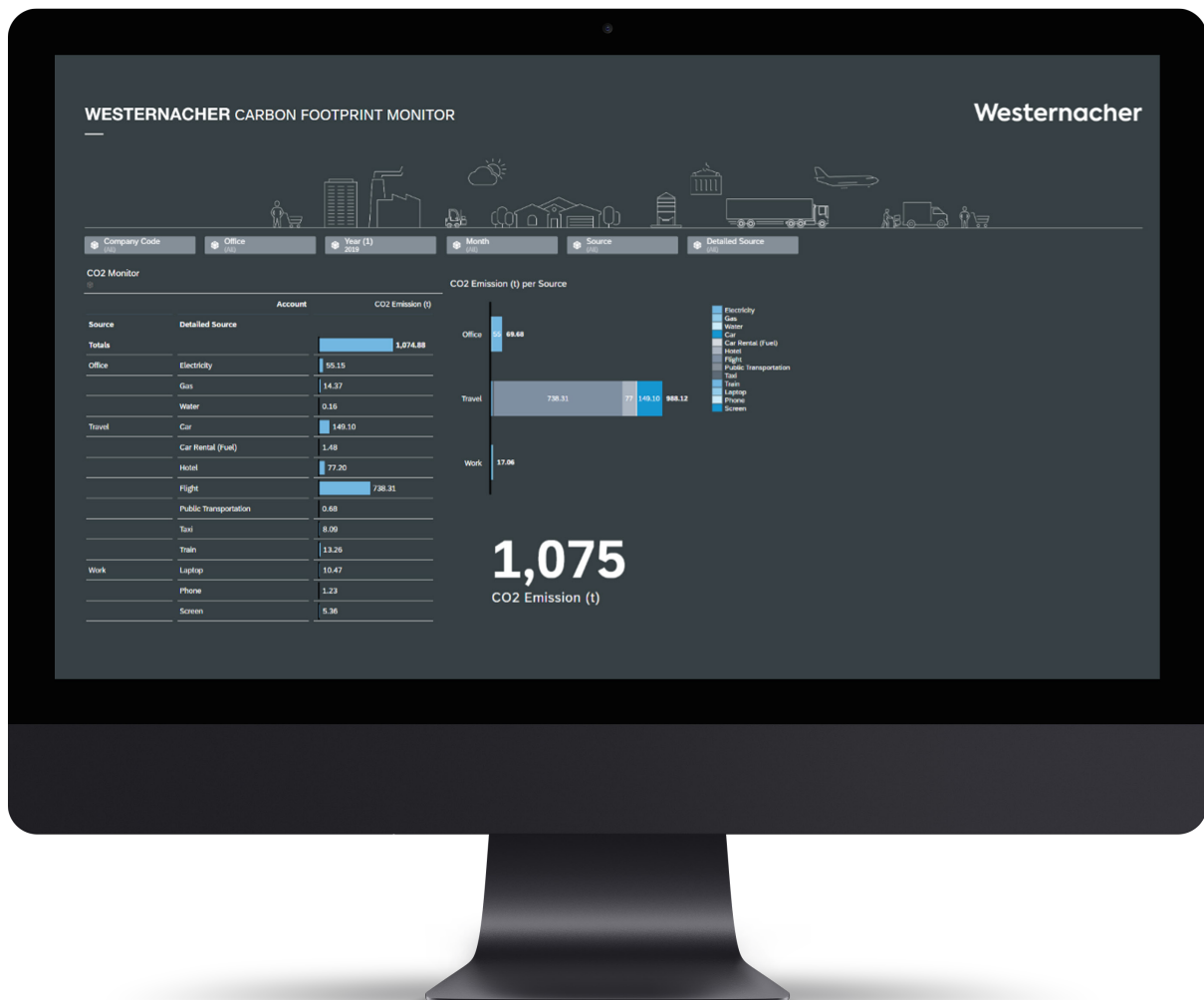
Data without comparison is hard to digest and it provides relatively little meaning. Therefore, you should look to provide such comparisons with tables or by using graphs that will visualize trends and enable the user to identify the critical path.
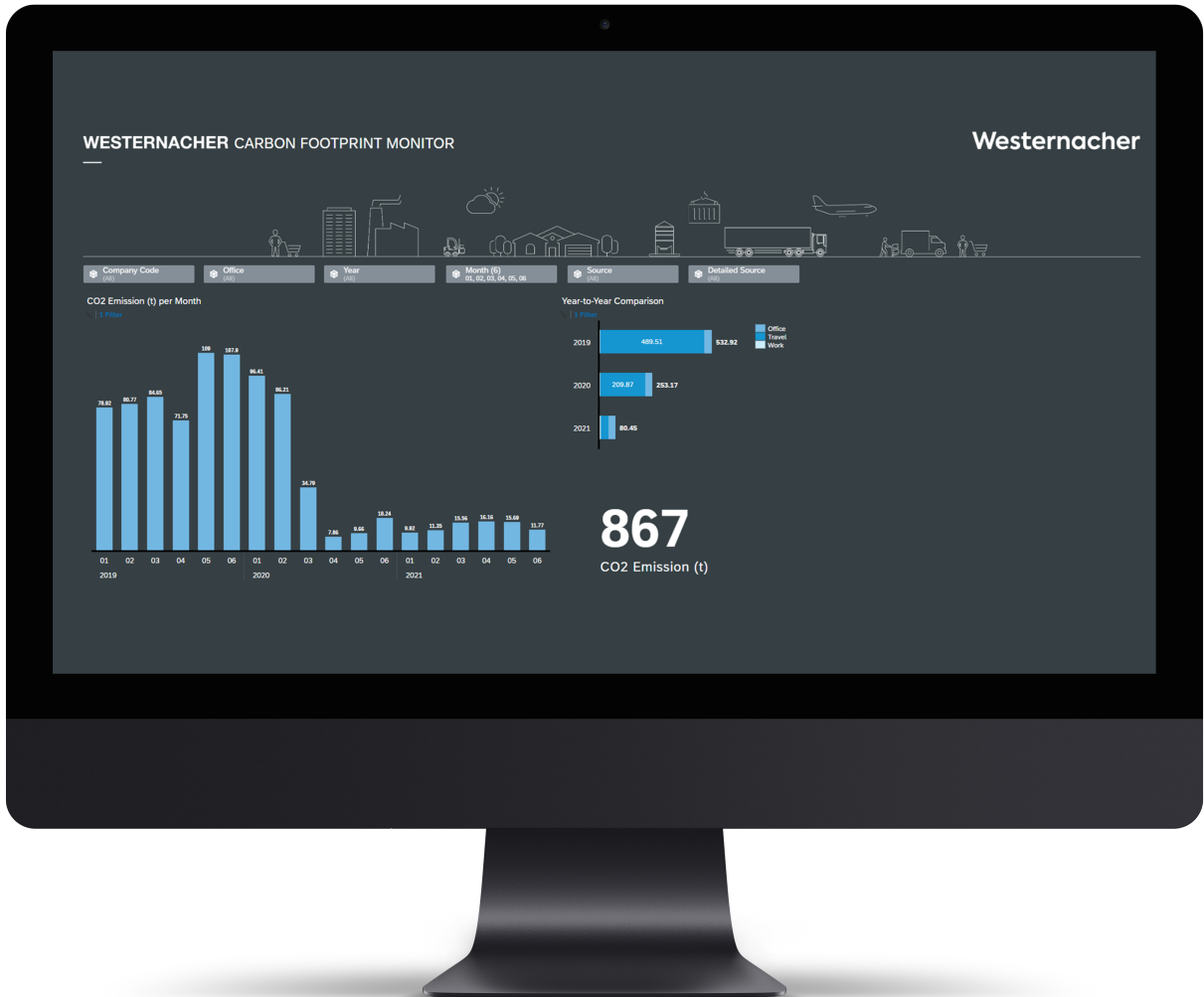
3. Plan your CO_2 emissions and reductions

Having a carbon footprint monitor in place is important to evaluate the current level of your CO_2 emissions. But to get a competitive advantage, companies need to create a roadmap and strategy on how to minimize their carbon emissions, reduce carbon cost and work out the real cost of offsetting carbon emissions.

At first, you should focus on "quick wins and low-hanging fruit". Easy-to-implement measures such as green energy contracts can have a big impact on your carbon footprint. The second area of focus should be the emission sources with highest level of emissions. For these sources, the measures to reduce your footprint will probably be not as simple to find. Furthermore, the impact of the planned actions may not be obvious. You need a simulation to evaluate which actions will have the highest impact and to verify your CO_2 reduction goals. Luckily, SAC has a built-in planning and simulation engine which is used to run simulations.

The easiest way to run what-if scenarios is to use a Value Driver Tree (VDT). "The value driver tree is a physical representation of interdependencies in measures that are used to generate a simulated effect of changing an underlying measure onto its parent."[5] The underlying measures in our context, are the input parameters e.g., gas consumption and the parent is the CO_2e.

In a nutshell, the value driver tree can answer questions like: What will be your CO_2e if you reduce the driven kilometers of your company car fleet by 10%.

[5] Value Driver Tree – SAP
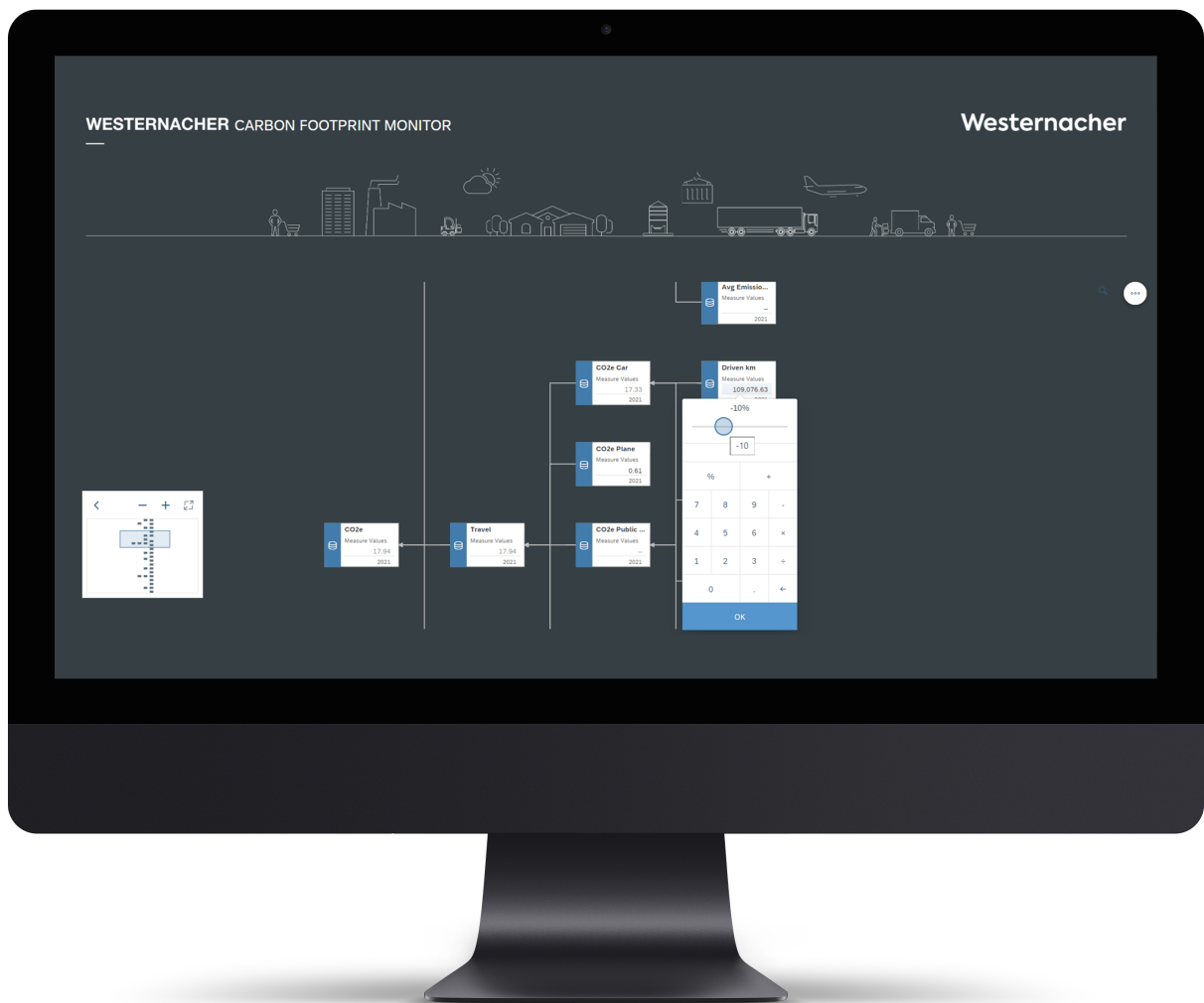
While answering this question, the VDT uses the existing data model with all the dependencies that you have created for your carbon footprint monitor. Of course, the simulation becomes more interesting when changing more parameters simultaneously e.g., what if I reduce my driven kilometers by 10% and switch from diesel cars to Plug-In Hybrid Electric Vehicles (PHEVs).

The best thing about the VDT, is that it will provide the answers to your questions instantly, with a clear marker of what has changed.

It almost goes without saying that you can adjust your simulation in real time, without the need for complicated manual adjustments in spreadsheets.
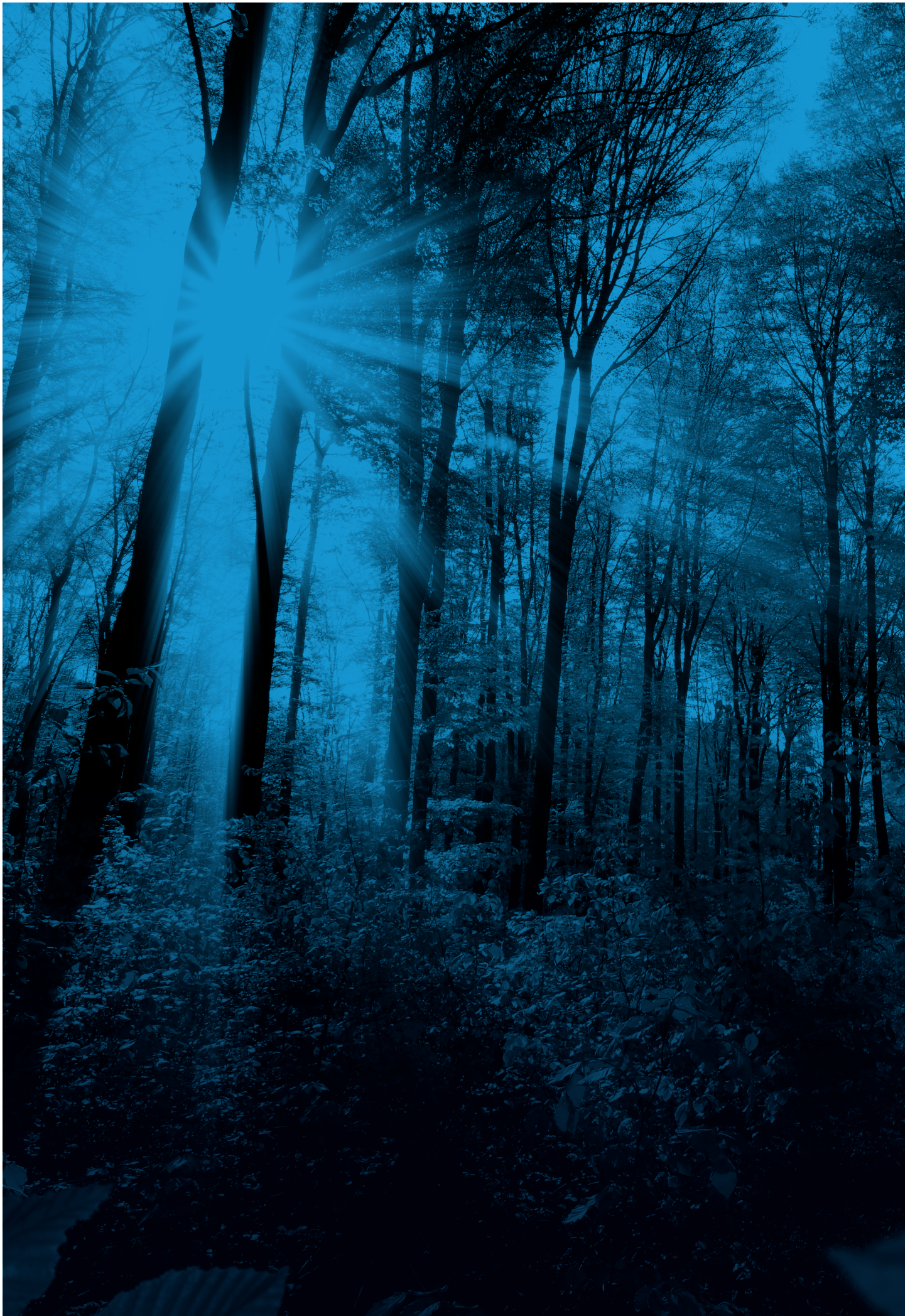
4. Interaction of CO_2 planning and financial planning

Up until recently, companies focused their companywide planning mainly on operations and finance. These were the main areas to decide on business cases and the strategy, in principle. But as carbon pricing is rapidly increasing, with a clear upward trend for the future (e.g., carbon taxation in Germany costs 30 €/ton in 2022 and will almost double up until 2025, to 55 €/ton). With legal requirements becoming stricter and customers asking for sustainable services, carbon emissions can no longer be ignored in companies` planning.[6]

Looking at different use cases, it is worthwhile for companies to connect their carbon planning with their general financial planning. Let us look at two examples:

- **Business case for a photovoltaic plant at a production company:** A production company needs to decide whether to build a photovoltaic plant on the roof of their factory or not. Of course, the cost for such an investment is very high and amortization will probably take quite long, given the energy savings. But what if you now consider that you can have carbon savings as the energy of your plant will be 100% renewable? This can be precisely the reduction in amortization time that is needed to make such an investment advisable and for sure viable.

- **Location of a new server farm for your IT department:** Again, this case is about the energy mix the new server farm consumes. The company might want to build a server farm e.g., in India and not in Europe as construction cost and personnel cost are much lower in India compared to in Europe. But

6. CO_2 Steuer in Deutschland – Handelsblatt

taking into consideration the different energy mix and that over 80% of the India's energy needs are covered by coal, oil and biomass, then the company might want to invest in Germany, where approx. 41% comes from renewable energy.[7] With such an energy intense server farm, the carbon emissions would be far lower in Germany than in India. This alone can outweigh the lower construction cost over a lifetime.

These examples show how a company's financial planning is impacted by carbon planning. Of course, this process also runs vice versa. Once you have decided to follow one direction or the other, your carbon planning is impacted and regulative actions need to be revisited to reach the carbon reduction goals. This is what makes SAC so attractive to deal with forthcoming and dynamic requirements.

[7.] Energy outlook India – IEA
Energy mix Germany – Statista

5. Scenario planning to optimize emissions and financial impact

Dealing with the implications of financial planning and carbon planning, companies need to look for the right tools to support such complex and interdependent planning steps. As a matter of course, this planning approach can also be done in MS Excel along with your financial planning. But as we already outlined earlier, this brings many disadvantages and inefficiencies and is unlikely to withstand a case where complex modeling is needed.[8]

With your carbon footprint monitor built in SAP Analytics Cloud, the next logical step is to also integrate the planning into it. SAP specifically designed SAC to work with complex financial planning models and replace SAP Business Planning and Consolidation BPC (besides the consolidation functionality which will be covered by Group Reporting in SAP S/4HANA).[9] Having set up

[8] Financial Planning with SAP Analytics Cloud – Westernacher
[9] Financial Planning: SAP Analytics Cloud to replace SAP BPC?

the different modules for your financial planning in SAC, e.g. cost center planning or P&L planning, it is not a major leap to create a planning application for carbon emissions with integration into your financial planning.

Like with the value driver tree, you will set all emission sources (amounts) and emission factors as planning parameters. In addition, you need to bring in the carbon cost per ton of CO_2e so that you can calculate the total carbon cost. You can integrate the results from your carbon cost calculation via data actions into your P&L or business case calculation.

Again, let us look how this approach would be modeled for the use case of a new photovoltaic system:

Obviously, the business case would need to show the general financial implications first. Balance sheet, the profit & loss statement (depreciation and reduction of energy cost) as well as cash-flow that would be impacted by the investment itself. Next, the carbon planning needs to be considered. The 100% renewable energy would not run into your planning model; thus, the emission level would be reduced, resulting in less carbon cost that would appear in the P&L. Only two little planning tables would be needed to run the planning and directly see the final result. Sharing the results of your simulation is then easily accomplished by using the collaboration functionalities of SAC e.g., broadcasting or comments.

6. Summary

Companies need to reduce their carbon footprint and energy cost to stay competitive and to be compliant with potential legal requirements in the future as well as partners/customers' expectations. Being able to take actions requires a carbon footprint monitor that can be easily set up and maintained by the business. SAP Analytics Cloud offers all needed functionalities to create meaningful dashboards for the tracking of your emissions.

But in finance, there is the saying that actuals are only as good as their comparison base. Companies that want to steer effectively and create real insights from their actual data need to create a carbon plan. Here is the real benefit. Value driver trees offer a simple way to simulate reduction measures. Using the core strengths of SAC, connecting the financial planning with the carbon planning for strategic planning and business case evaluation brings your company planning to the next level. Sophisticated companies aim to include the Scope 3 emissions from partners and suppliers in their carbon planning.

We will continue with the third part of this white paper series in 2022, focusing on the following aspect: How to handle carbon emissions in operational SAP systems and in reporting systems.

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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:

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

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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.

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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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