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Developing Carbon Accounting

Between driving carbon reductions and complying with a carbon reporting standard

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Abstract

Carbon accounting is a relatively new research area. Whereas corporate carbon accounting is important for external stakeholders to receive a true and fair representation of an organization's carbon footprint and efforts in emissions reduction, organizational management issues of carbon accounting are highly relevant with regard to decision making, performance improvement and what is reported. In contrast to the reporting, stakeholder and regulatory focus, company-internal issues of carbon accounting have so far rarely been investigated in depth. By analysing an in depth case study of an organization's "convergence project" between two corporate accounting approaches, we raise questions about what should be considered an effective environmental accounting framework.

Keywords

Carbon accounting, convergence, GHG Protocol, PAS 2050, carbon management accounting

1. Introduction

Corporate carbon accounting is a relatively new research area and has received particular attention through the development of carbon emission trading markets with issues such as the recognition of carbon trading permits in the balance sheet (MacKenzie, 2009) or the establishment of carbon registers (Kolk et al., 2008). Corporate carbon accounting has also been studied for different regulatory, professional and societal conditions and applications (Ascui and Lovell, 2011; Bowen and Wittneben, 2011; Schaltegger and Csutora, 2012) by highlighting priorities of different stakeholders involved in carbon accounting and standardization processes.

Whereas corporate carbon accounting is important for external stakeholders to receivea true and fair representation of an organization's carbon footprint and efforts in emissions reduction, organizational management issues of carbon accounting are highly relevant with regard to decision making, performance management and what is reported. Typically, goals of internal management and performance measurement are in tension with externally requested carbon reporting information properties such as comparability and accuracy. In contrast to reporting (Mizuguchi, 2009; Andrew and Cortese, 2011; Haigh and Shapiro, 2012; Hrasky, 2012), company-internal issues of carbon accounting have so far rarely been empirically investigated in depth. An exception is the paper of Burritt et al. (2011) who examine internal carbon management accounting practices in German companies.

The design of the carbon management accounting approach can be of strategic importance for organizations trying to measure and manage their carbon performance (e.g. Hendrichs and Busch, 2012; Schaltegger and Csutora, 2012). Managers may expect that carbon accounting helps them identify and assess the potentials of different activities to reduce the company's emissions. The management of carbon performance

requires a sound management framework which links carbon management with the business, its competitive strategy and, that integrates carbon information with economic business information and carbon reporting (Schaltegger and Wagner, 2006). This is why this paper examines how different corporate carbon accounting approaches influence the measures of the total carbon footprint of a corporation and the carbon performance representation, and what consequences these approaches have on internally incentivizing carbon emission reduction actions.

This paper aims at contributing to the further development of corporate carbon accounting by examining the carbon management accounting approach of a multinational company (Danone) that attempts to improve both environmental and financial carbon performance and by comparing their approach with the approach of the Greenhouse Gas (GHG) Protocol. We are raising questions about what should be considered an effective corporate carbon accounting. Should it only consider criteria, which are lent from financial accounting such relevance, completeness, consistency, transparency, and accuracy, or are additional criteria needed? How can it best support effective and efficient action for reducing carbon impacts?

Whereas various standards have been developed to support the accounting of an organization's carbon footprint (EU, 2010) the GHG Protocol is currently dominant and most widely used (Ranganathan, 2011;Schaltegger and Csutora, 2012). We therefore discuss on the basis of a case study how the application of this carbon accounting standard can be complemented with additional carbon accounting measures to increase its effects in supporting internal management decisions for carbon emission reductions.

The paper firstly describes the research design of the case study. It then goes on to discuss criteria for an effective corporate carbon accounting, and reviews different current corporate carbon accounting standards. Thirdly, we describe Danone's carbon

accounting system, which was designed to drive organizational change and engage the organization in carbon emission reduction activities. With the example of one business unit (Stonyfield) of the company we discuss how this approach could be combined with the GHG Protocol corporate standard to deliver annual GHG emission figures. The process of convergence is analyzed, and possibilities to link the two accounting approaches are described. With this case study we aim at contributing to the further development of corporate carbon accounting to help organizations in achieving carbon reduction goals and in informing stakeholders with transparent and comparable carbon reports.

2. Research Design

The research investigates the design of company internal carbon management accounting, carbon reporting, and the link between the two. Therefore, the research has been conducted with an in-depth case study, using participant observation (Spradley, 1980). We follow the approach of Malmi and Granlund (2008) "to create theories useful for practice is to solve practical problems with practitioners and synthesize the novel solutions to a more general form". One of the authors was part of the Danone's Nature finance team for 12 months and therefore had full access to all data and information needed for this project.

The case study company, Danone, is a French multinational present in the fast consumer goods sector. Since 2007 the company has developed a unique carbon accounting system, based on PAS 2050, and a unique information systems to measure the footprints of each individual product. In November 2010, Danone decided to test the reconciliation of their accounting with the most commonly mentioned and used carbon accounting standard, the GHG Protocol Corporate Standard. The project was prolonged to 2012 to be able to get access to a full year data. In February 2012, data for 237 products over a

one-year period (2011) were collected for the business unit Stonyfield (US). In addition, carbon information confirming to the GHG Protocol Corporate Standard scopes 1, 2 and 3 were computed for 2011. Over a period of 5 months, data was analysed and broken down to match the exact footprint by both accounting approaches, the first covering the full product footprints and the second confirming with the GHG Protocol reporting standard. The project included workshops with the ERP partner of Danone, SAP, on the feasibility to converge a carbon reporting system complying with the GHG Protocol with the carbon ERP system used by Danone, and co-built by SAP in 2009 and 2010.

3. Carbon accountings and carbon performance

Although companies have already claimed to be green or environmentally successful for a long time, there is a still a lack of clear definition of what environmental performance is (e.g. Journeault and Henri, 2010), let alone what carbon performance encompasses.

Environmental performance has been described as both, reduction of the absolute amount of discharges into the environment (reduction of waste, absolute reduction of GHG emissions) as well as through intensity or efficiency targets, such as the reduction of emissions per kilogram of product or functional unit (e.g. Busch, 2010; Hoffmann and Busch, 2008; Schaltegger and Csutora, 2012). Environmental performance also has a stakeholder dimension depending on whether it is calculated for internal purposes and stakeholders (e.g. employees, different departments, managers) or for reporting purposes and external stakeholders. External stakeholders have different needs and expectations, whether they are investors, governmental bodies, NGOs, consumers, or the general public. Measures of environmental performance are furthermore influenced by the quality of the accounting method used, the quality of input data, and the standard

applied. Environmental performance is thus broadly defined by the organization that supports its calculation.

Journeault and Henri (2010) propose an environmental performance framework that allows analysing the different facets of this concept. They divide environmental performance into two dimensions: results versus processes, and internal versus external. Results relate to environmental outcomes and processes to the "means needed to achieve a specific end" (Journeault and Henri, 2010). The internal-external dimension refers to value systems that emphasize either the economic consequences of environmental performance (internal) or the sustainability oriented view of it (external) where "environmental protection is given a greater emphasis" (Journeault and Henri, 2010).

We build on this framework and extend it by allowing to also incorporate a more detailed account of internal stakeholder views of environmental performance.The measurement and management of physicalenvironmental and carbon performance requires and includes internal data exchange and calculation processesto determine performance figures and developments.These environmental and carbon accounting processes arecharacterized by typical management accounting issues such asstandards used, quality of data input, internal organization for accounting for environmental performance, existence of accounting tools and availability of external assurance.

Corporate carbon performance has been discussed since the beginning of the 2000s, and even more so since Al Gore's film "inconvenient truth". Corporations have started to tackle their carbon performance in the late 90s and developed accounting approaches to measure it. The first corporate carbon accounting standard was issued in 2001 by the GHG Protocol and revised in 2004 and in 2011 (GHG, 2011a, 2011b). In 2008, the British Standards Institution (BSI) issued the PAS 2050 that pertains to product carbon accounting. Corporations also use project accounting when targeting offsets of their

remaining emissions. In parallel to the dominant standards, various other corporate carbon accounting approaches have emerged: the European Union's 2010 report found a total of 30 "major" GHG reporting methods being in use globally (EU, 2010). This clearly shows that, although the GHG Protocol Corporate Standard is dominant as the corporate accounting standard for external carbon reporting (Ranganathan, 2011), there is still no common definition of carbon performance and no one way of coming to a comparable result (Even within the GHG Protocol Standard, different options in terms of organizational boundaries allow for major differences in performance results for example between equity share, financial or operational control).

To add to the confusion, many external ratings have developed for the last decade assessing carbon performance of corporations in different ways (Table 1). They assess the performance in terms of disclosure, compliance, or actions to reduce carbon emissions. Some also rate policy engagement and stakeholder engagement as part of carbon performance.

Table 1: External ratings

	What it rates	Accounting
Carbon Disclosure Project (CDP)	Rates disclosure	Advocates use of GHG Protocol accounting
Climate Counts	Reduction (56 points out of 100)	Advocates the use of an industry accepted accounting protocol
Global 800 Carbon Ranking (EIO)	Compliance to GHG protocol accounting	Advocates use of GHG Protocol accounting
New Economy Magazine	Disclosure, stakeholder engagement, reduction	none
Gigaton Awards	Reduction	none
Dow Jones Sustainability Index (DJSI) (generalist)	Reduction through targets (intensity), strategy	Advocates use of GHG Protocol accounting
Green Rankings (generalist)	Environmental impact, environmental management	none

However, the "Rate the Raters" study of Sustainability (2010), unveils very clearly that the Carbon Disclosure Project is the most influential advocating the use of the GHG Protocol Corporate Standard.

We analyse the development of Danone's convergence project by examining two aspects: the construction of the measurement of carbon performance and the different stakeholder views of carbon performance (the how and for whom; see Table 2).

Table 2: Stakeholder needs (examples)

	What accounting?	Characteristics	Auditable
Investors	GHGP Corporate Standard	Comparable	Yes
Rating agencies	GHGP Corporate Standard or equivalent	Comparable	Yes
Governmental labelling programs	LCA type (PAS 2050, BPX 30..)	Comparable	Yes
Distributors	LCA type, sometimes private scheme	Simple, understandable	
Consumers	Life cycle based	Simple, understandable	
NGOs	Life cycle based or GHGP corporate standard (disclosure)	Most show action (reduction)	
Managers	Based on their own work structure, and on known standard	Simple, understandable, manageable, most show reduction towards target. Must closely reflect their activity	Certifiable (based on standard)
Employees	Based on their own work structure	Simple, understandable, manageable, most show reduction towards target. Must closely reflect their activity	

Table 2 summarizes key expectations of some stakeholders and shows that they are sometimes contradictory. In particular, the requirements of comparability and that the information should be closely linked to the (reduction) activity can contradict. This includes the debate on the use of particular emission factors from an industry wide database, or allowing companies to use for example emission factors provided by suppliers if they are audited and certified. Making the accounting simple enough that it can be implemented successfully for an entire corporation can also contradict with the scientific complexity of the topic, and simplifications might not be well regarded by NGOs suspicious about potential green washing. As a conclusion, depending on the stakeholder the understanding of performance can vary substantially.

The 'how to measure carbon performance' is also challenging because of its novelty as a topic, its complexity and the link between climate change sciences and professional accounting practices.

Table 3 shows different aspects to consider when building a carbon performance measurement system.

Table 3: Performance measurement

Accounting standards: widely accepted, implementable, etc.
Accounting methods: physical carbon flow tracking, physical environmental budgeting, monetary environmental investment appraisal, material flow cost accounting, other tools
Software information management tools: ERP system, excel, other tools
Organization: carbon accountants, trainings, etc.
External assurance available
Data availability (emission factors but also activity data)

Several implementation issues can quickly develop as bottle necks, for example, when considering that very little training in carbon accounting has been conducted so far, and

that only few carbon accounting tools have been tested on a broad scale to manage scope 1, 2 and 3 for an entire corporation or which support efficient and reliable conducting of LCAs of all products of a large company (for a discussion of different carbon accounting scopes see Schaltegger and Csutora, 2012). Data availability is also an issue, for example in logistics when information on vehicles is required for management control. For supply chains the availability of carbon information, for example, at the origin of processed fruit or on the transformation process may cause further challenges.

4. Danone's carbon accounting system

Danone's carbon accounting methodology is primarily based on the LCA methodology (ISO 14044) and then on PAS 2050 (2008). The tool used since 2007 to collect data for individual product footprints is an excel tool called "danprint" which is used by "carbon masters" (the employees responsible for the data collection) in each country business unit to calculate carbon footprints once a year. The software tool provides tables with emission factors and calculation formulas so that the carbon masters only need to fill in activity data for the specific year (ingredients, kilometres, energy consumption, etc.). The carbon masters fill in data for at least ten product footprints, sometimes more depending on the representativeness of the products in terms of turnover in their country. Danone calculates the business footprint for each country but allocates the responsibility on a consumption basis and not on a production basis. For example, a product unit of Actimel made in Belgium and sold in France has a footprint partially calculated in Belgium, and the rest of the footprint is complemented with carbon accounting data by the French carbon master for logistics, consumption and end of life based on the French market. The total carbon product footprint is then allocated to the French business unit as it has ordered the manufactured product (in Belgium) and as the

product has been sold to the final customer in France. Since 2010 Danone has developed an ERP system that is gradually replacing the excel tool. This ERP system allows consolidating the data of all products of a country business unit (and not only a representation of it by a selection of 10 products). It also allows consolidating the data for the entire company Danone. Currently Danone's corporate footprint is calculated with the support of excel; but in the very near future the ERP system should allow to calculate the corporate footprint much faster and easier in a format comparable to the GHG Protocol corporate standard footprint. The boundary for Danone's accounting is the official turnover. This means that the company also includes "co-made" products produced by others but sold under the Danone brand.

The decision to construct their carbon accounting according to the LCA/PAS 2050 approach was based on several key criteria. Danone believes in the "extended responsibility" concept, meaning that their responsibility as a corporation does not end at the gates of their factories. This is why they designed their accounting to consider the life cycle of their products from cradle to grave. They also want to drive carbon emissions reductions and the accounting to be embedded in 'the Danone way of doing business'. As Danone has an internal responsibility structure based on brand and country business units, it made sense to develop a carbon accounting approach, which reflects product footprints and then country business unit footprints based on sales for each country. This allows the company to render each manager accountable for their product, brand and country's carbon footprint, and to make them responsible for the reduction of the emissions in their particular area of responsibility.

This way Danone's accounting tries to respond to calls for a more "engaged" approach (Trexler, 2011) that would translate into more emission reduction. Danone now places more emphasis on reducing carbon emissions than on disclosures of carbon footprints.

In spite of the focus on performance improvements, Danone also recognizes the need of stakeholders to base their analysis of corporate carbon performance on a common and widely recognized carbon accounting standard, i.e. the GHG Protocol Corporate Standard. This challenges the company to reconcile different accounting requirements and goals.

5. The convergence project

Based on the need to bring together different stakeholder views of carbon performance, Danone decided in 2010 to launch the "convergence" project. The project's aim was to examine whether different accounting approaches could be linked with each other in a way that the resulting information corresponds with each other. These accounting approaches are,on one hand,– Danone's internal accountingapproach addressing performance management issues for employees and managers,and on the other hand,the GHG Protocol Corporate Standard responding to investors' and external rating agencies' needs-. The goal of the convergence project is to develop a comprehensive corporate carbon accounting approach, which arrives at consistent figures, no matter whether the internal responsibility oriented performance accounting system or the externally driven accounting and reporting system complying with international standards is applied.

More precisely, standard setters say that reconciliation between the addition of product footprints of one corporation and the total footprint of this same corporation is possible. The GHG Protocol in its 2011 Product Standard (GHG, 2011b) shows a graphical representation of the link between the two accounting approaches. The European Union (2010) in its efforts to develop an "organisation environmental footprint guide" and a "product environmental footprint general guide" have always had the convergence of results in mind.

By analysing the case study we have identified several potential differences that could appear and that would need to be tackled in the reconciliation was to succeed.

Currently Danone's accounting approach does not take into account what is called "non-attributable processes" in the PAS 2050 standard or in the new GHG Protocol product life cycle accounting and reporting standard (p. 36 of the standard; Table 4). However, both standards say that they should be reported if calculated.

Table 4: Non-attributable processes

Administrative sites (Headquarters, sales offices)
Capital goods
Sales teams' fleet
Corporate activities and services: R&D, marketing, finance, etc. and operating expenses
Transport of consumer to the retail location
Employee travel

Other differences are related to the *specifics of Danone's accounting approach* (Table 5) such as the consumption-based perspective. This approach requires accounting for products at the place of sales to end consumers even if produced elsewhere. This causes time issues because the GHG Protocol corporate standard considers production based emissions at the time of production whereas Danone's consumption based approach considers emissions when the product is consumed.

Table 5: Differences linked to Danone's carbon accounting approach

Co maker products (products made by others on behalf of Danone)
Inter-company products
Inventory issues (stock)

Another difference is a *"boundary" issue.* Danone considers its responsibility beyond the factory gates, and this includes products that are "co-manufactured" by other companies but sold under the Danone label. These products do not enter any form of "control" in

the GHG Protocol Corporate Standard, and would only be considered as purchase of raw materials in scope 3.

A further identified difference is *standard based* (Table 6). The transport of employees, which is a non-attributable process for LCA standards, but is included in scope 3 of the corporate GHG Protocol standard, has to be included in the final convergence of accounting systems and information as a non-attributable process. Investments could also be seen as non-attributable but have not been calculated for the current case study because of a lack of data (the footprint of the companies where the investments were made would have to be collected).

Table 6: Differences linked to carbon reporting standards

Transport of employees to and from their normalplace of work is excluded in PAS 2050 but is included in Scope 3 (GHG Protocol Value Chain Standard)
Investments in other companies is considered in Scope 3 of the GHG Protocol Standard but not in LCA approaches (PAS 2050) and not in Danone's current accounting approach

Other differences have been noted and must be taken into consideration when considering convergence. Firstly, *emission factors* can be taken from different literature sources and can be based on full life cycles or only on scope 1 and 2. For this project, emission factors have been analysed systematically so that data sources are the same for both accounting approaches.Emission factors (especially for energy) have been broken down into scopes for the reconciliation purpose. Secondly, for the cases where Danone has *produced products for other companies* (B2B) the GHG Protocol Corporate Standard requires the accounting for energy consumption at the production site (activity based accounting) even though these products are not Danone products and thus not considered by Danone's current accounting. This is not discussed further in the current case study and remains an open topic for further research on B2B sales.

To our knowledge the convergence of different carbon accounting approaches has never been tested before. This is why we conducted the case study of the US business unit Stonyfield to examine the reconciliation issues of carbon accounting approaches and information.

6. Stonyfield case study

The following figures are not real but the order of magnitude is maintained to discuss the environmental and carbon management accounting topics. The case study illustrates that reconciliation is possible although this particular study does not resolve all issues that may arise on a wider scale and in other industries. With this study we would like to initiate the discussion for additional in depth analysis of the convergence process, and also call for further case studies to deepen our analysis of this process.

The case study was conducted with 2011 data (Tables 7, 8 and 9) and the GHG Protocol Corporate Standard 2004 was used to calculate the carbon emissions for scope 1, 2 and 3.

Table 7: GHG Protocol Corporate Standard Results Scope 1 and 2

Site	**Scope 1 & 2 (tons of CO_2)**
Plant 2 factory	2 620
Plant 2 warehouse	461
Plant 2 dry good warehouse	60
Plant 1 factory and warehouse	14342
Headquarters	1 326
Other site miscellaneous	443
Café 1	14
Café 2	227
Total	**19 493**

Table 8: GHG Protocol Corporate Standard results for Scope 3

Category	**Scope 3 (tons of CO_2)**
Purchased goods and services	113 709
Capital goods	5 052
Fuel and energy related activities (not in scope 1 and 2)	1 519
Upstream transportation and distribution	66 947
Waste generated in operations	4 848
Business travel	704
Employee commuting	1162
Upstream leased assets	n/a
Downstream transportation and distribution	18 477
Processing of sold products	n/a
Use of sold products	3458
End of life treatment of sold products	223
Downstream leased assets	n/a
Franchises	n/a
Investments	n/a
Total	**216101**

The corporate footprint of the business unit Stonyfield was calculated on the basis of the 237 different products creating the turnover of Stonyfield for 2011 (Table 9).

Table 9: Danone carbon accounting

Emission Process	**Tons of CO_2**
Raw & Pack Production	113 709
Upstream logistics	12 647
Manufacturing	20 178
Downstream logistics	59 071
Retail	18 477
Use phase	3 458
End of life	223
Non attributable processes	7 811
Total	**235 574**

Based on the two accounts shown inTables 8 and 9, it is hard to see whether matching is possible. It is necessary to break the items down to a lower level to enableinformation convergence. Table 10 in the appendix shows how the convergence was rendered

possible. It has to be noted that although this case study does not include inter-company products, inter-company products sold to another country business units would have been considered as sold to an end consumer. In Table 10, these figures are separated for reconciliation purposes, as Danone's accounting does not consider inter-company items sold outside of the country. Purchased inter-company products are considered like 'co-made' products and accounted for like a purchased good.

Table 10: Reconciliation table

Product life cycle phase	**Phase: detailed**	**Tons of CO_2**	**Scope**	**Scope 3 N°**	**Category**
Raw & Pack Production	Raw & Pack (without upstream transportation)	113 709	3	1	Purchased goods and services raw and packs (Danone products)
Upstream logistics	Upstream transportation (not under operational control)	12 647	3	4	Upstream transportation and distribution
Manufacturing	Manufacturing plants (under operational control)	6 698	1	--	Scope 1 energy related emissions
Manufacturing	Manufacturing plants (under operational control)	12 092	2	--	Scope 2 energy emissions
Manufacturing	Manufacturing plants (under operational control)	1 311	3	3	Scope 3 energy related emissions
Manufacturing	End of life site (packaging) Danone products	77	3	5	Waste generated in operations
Downstream logistics	Downstream transportation (not under operational control)	43 332	3	4	Upstream transportation and distribution
Downstream logistics	Energy and fugitive emissions of warehouses not under operational control	10 968	3	4	Upstream transportation and distribution

Downstream logistics	Transportation losses	4 770	3	5	Waste generated in operations (logistic)
Retail	Fugitive emissions from fridges at retail not under operational control	18 477	3	9	Downstream transportation and distribution (energy & fugitive emissions of retail not under operational control)
Use Phase	Emissions at home	3 458	3	11	Use of sold products
End of life	End of life at retail and at home	223	3	12	End of life treatment of sold products
Non attributable process	Headquarters and other sites	226	1	--	Scope 1 energy related emissions (Headquarters and other sites)
Non attributable process	Mobile combustions from sales cars and company cars	99	1	--	Scope 1 mobile combustions from sales cars and company cars
Non attributable process	Energy emissions from headquarters and other sites (electricity)	359	2	--	Scope 2 energy related emissions from headquarters and other sites
Non attributable process	Capital goods	5 052	3	2	Capital goods
Non attributable process	Energy related emissions from headquarters and other sites	208	3	3	Scope 3 energy related emissions (headquarters/others)
Non attributable process	Business travel	704	3	6	Business travel
Non attributable process	Employee commuting	1 162	3	7	Employee commuting
Total		**235572**			

Practical issues that arose from this case study include:

- that it is necessary to have a common definition of what a "site" is (especially when the warehouse is part of a factory building or when new sites are built or bought which have not been in the ERP system so far);
- that logistics data (which are often related to problems of availability of information) do not always allow distinguishing scope 1 from scope 3 information;
- that scope 3 data from operating expenses such as marketing or finance are mainly available in a format that requires an input-output type of LCA rather than the one currently used (PAS 2050).

Of course not all issues arising from such an investigation can be solved with the analysis of one case study. However, Table 10 allows mapping all processes by breaking them down to the lowest level of common denominator. This approach can potentially be repeated in further case studies of other business units.

7. Discussion and conclusion

The convergence project was only made possible thanks to the current organization and ERP system that Danone has in place to collect the carbon footprint information of all products. Although many indications exist that a convergence of the two types of carbon accounting is possible, further challenges remain such as to bridge corporate and product information measuring carbon performance on a larger scale and that further technical accounting issues may arise.

Currently the main difference that is left to handle is the consideration of inventories.For Danone, this is especially the case in the water or baby food businesses where products can be manufactured a long time in advance. Carbon is then "stocked" in warehouses

and, if applying the consumption-based accounting approach, only accounted for much later when consumed.

Further research is necessary to better understand the technical issues related to the convergence of the accounting approaches. More case studies in different industries could highlight further practical implementation difficulties and approaches to overcome. New corporate LCA accounting approach such as developed by Accor and Puma could also be considered and potentially help companies to bridge different accounting approaches. More than just a simple accounting exercise, this project highlights the carbon accounting organization and tools necessary to develop a carbon performance measurement approach that responds to various different stakeholder needs.

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Note

There is a slight differences in totals (20 tons) linked to rounding in energy consumptions used in different files.

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