The EU Taxonomy for Sustainable Activities:

forward looking incentives for green disclosure

Andreas G. F. Hoepner

Notes: The underlying EU TEG work is based on the excellent and tireless efforts of the taxonomy subgroup of the EU Technical Expert Group (TEG) for Sustainable Finance lead by Nathan Fabian. Prof. Hoepner is merely providing a humble financial data science perspective on their world leading content.

EU Taxonomy for Sustainable Activities: the metrics matter

1. *Forward Looking: **CapEx is key**!*

&

2. *By Asset Class: **CapEx & OpEx** in Fixed Income, **Revenue & CapEx** in Equities*

&

3. *Incentivising bundles of economic activities (i.e. corporations) to **disclose CapEx and Revenue by activity***

&

4. *Corporations self-reporting taxonomy compliance: independent, unbiased **Verification** needed*

&

5. *Non-reported Taxonomy compliance needs **Precautionary Principle** based estimation*

References (1/2): The EU Green Taxonomy

Slevin, D.; Hoerter, S; Humphreys, N.; Viñes Fiestas, H.; Lovisolo, S.; Wilmotte, J.-Y.; Latini, P.; Fettes, N.; Kidney, S.; Dixson-Decleve, S.; Claquin, T.; Blasco, J. L.; Kusterer, T.; Martínez Pérez, J.; Philipponnat, T.; Löffler, K.; Vitorino, E.; Pfaff, N.; Brockmann, K. L.; Redondo Pereira, P.; Coeslier, M.; Menou, V.; Aho, A.; Fabian, N.; Hartenberger, U.; Lacroix, M.; Baumgarts, M.; Bolli, C.; Philipova, E.; Pinto, M.; Bukowski, M.; Krimphoff, J.; Hoepner, A. G. F.; Masoni, P. & Kramer, B. (2020) 'Taxonomy: Final report of the Technical Expert Group on Sustainable Finance'. Brussels: European Commission.

The Technical Annex:
https://ec.europa.eu/info/sites/info/files/business_economy_euro/banking_and_finance/documents/200309-sustainable-finance-teg-final-report-taxonomy-annexes_en.pdf

The Excel Tool:
https://ec.europa.eu/info/files/sustainable-finance-teg-taxonomy-tools_en

References (2/2): EU Climate Transition Investing

Hoepner, A. G. F.; Masoni, P.; Kramer, B.; Slevin, D.; Hoerter, S; Humphreys, N.; Viñes Fiestas, H.; Lovisolo, S.; Wilmotte, J.-Y.; Latini, P.; Fettes, N.; Kidney, S.; Claquin, T.; Blasco, J. L.; Dixson-Decleve, S.; Kusterer, T.; Martínez Pérez, J.; Suttor Sorel, L.; Löffler, K.; Vitorino, E.; Pfaff, N.; Brockmann, K. L.; Micilotta, F.; Coeslier, M.; Menou, V.; Aho, A.; Fabian, N.; Philipova, E.; Hartenberger, U.; Lacroix, M.; Baumgarts, M.; Bolli, C.; Pinto, M.; Bukowski, M. & Krimphoff, J. (2019b) 'Handbook of Climate Transition Benchmarks, Paris-Aligned Benchmark and Benchmarks' ESG Disclosure'. Brussels: European Commission.

Hoepner, A. G. F.; Masoni, P.; Kramer, B.; Slevin, D.; Hoerter, S; Ravanel, C.; Viñes Fiestas, H.; Lovisolo, S.; Wilmotte, J.-Y.; Latini, P.; Fettes, N.; Kidney, S.; Dixson-Decleve, S.; Claquin, T.; Blasco, J. L.; Kusterer, T.; Martínez Pérez, J.; Suttor Sorel, L.; Löffler, K.; Vitorino, E.; Pfaff, N.; Brockmann, K. L.; Micilotta, F.; Coeslier, M.; Menou, V.; Aho, A.; Fabian, N.; Philipova, E.; Hartenberger, U.; Lacroix, M.; Baumgarts, M.; Bolli, C.; Pinto, M.; Bukowski, M. & Krimphoff, J. (2019a) 'TEG Final Report on Climate Benchmarks and Benchmarks' ESG Disclosure'. Brussels: European Commission.

Both documents have appendices to look out for including

- guidance on climate tail risk measurement

- references to the underlying climate science

- Mappings of (i) NACE to (ii) BICS, GICS, ICB and TRBC

Final EU Regulation based on Hoepner et al. (2019a,b) available here: https://ec.europa.eu/finance/docs/level-2-measures/benchmarks-delegated-act-2020-4757_en.pdf

EU Taxonomy's incentive for Green CapEx (Slevin et al. 2020, p.29)

Figure 6: Example of company disclosures, from economic activity to company level

EU Taxonomy's incentive for Green CapEx (Slevin et al. 2020, p.29)

Figure 6: Example of company disclosures, from economic activity to company level

EU Taxonomy's incentive for Green CapEx (Slevin et al. 2020, p.30)

Table 4: Differences in calculation approaches for company climate change mitigation and adaptation

Financial metric	Climate change mitigation	Climate change adaptation
Turnover	Can be counted where economic activity meets Taxonomy technical screening criteria for substantial contribution to climate change mitigation and relevant DNSH criteria.	Turnover can be recognised only for activities enabling adaptation. Turnover cannot be recognised for adapted activities at this stage.
Capex & opex	Can be counted where costs incurred (capex and, if relevant, opex) are part of a plan to meet Taxonomy technical screening criteria for substantial contribution to climate change mitigation and relevant DNSH criteria.	Can be counted where costs incurred (capex and, if relevant, opex) are part of a plan to meet Taxonomy technical screening criteria for substantial contribution to climate change adaptation and relevant DNSH criteria.

EU Taxonomy's incentive for Green CapEx (Slevin et al. 2020, p.30)

Table 4: Differences in calculation approaches for company climate change mitigation and adaptation

Financial metric	Climate change mitigation	Climate change adaptation
Turnover	Can be counted where economic activity meets Taxonomy technical screening criteria for substantial contribution to climate change mitigation and relevant DNSH criteria.	Turnover can be recognised only for activities enabling adaptation. Turnover cannot be recognised for adapted activities at this stage.
Capex & opex	Can be counted where costs incurred (capex and, if relevant, opex) are part of a plan to meet Taxonomy technical screening criteria for substantial contribution to climate change mitigation and relevant DNSH criteria.	Can be counted where costs incurred (capex and, if relevant, opex) are part of a plan to meet Taxonomy technical screening criteria for substantial contribution to climate change adaptation and relevant DNSH criteria.

EU Taxonomy for Sustainable Activities: the metrics matter

1

2

3

4

5

Forward Looking: ***CapEx is key****!*

EU Taxonomy's incentive for Green CapEx (Slevin et al. 2020, p.41)

Table 8: Comparing disclosure methodologies for equities and fixed income

EQUITIES	FIXED INCOME (Corporate)[42]
1. % of the fund that complies with the Taxonomy; breakdown by environmental objectives; and breakdown by activities (all weighted). Investors are required to disclose the % of the fund invested in 'transition' and 'enabling' activities. 2. % of the fund that is potentially Taxonomy-align breakdown by environmental objectives and activities. Commentary following recommendations. 3. (Until the Taxonomy is finished) % of the fund that responds to environmental objectives 3–6, and a breakdown by objective, including an explanation on the methodology and criteria used following recommendations.	Same as equities. In addition, when appropriate, breakdown by: 1. % invested in bonds compliant with EU Green Bond Standard (100% Taxonomy-aligned); 2. % of the fund invested in green bonds partially aligned (and % that is Taxonomy-aligned); 3. % of the fund invested in corporate bonds (and the % that is Taxonomy-aligned).
What to disclose: Turnover.[43] Some investors, however, might decide to build a forward-looking portfolio and disclose the same information based on capex.	**What to disclose:** Capex, and opex if relevant. For corporate bonds, turnover could be used in selected cases, as appropriate, where capex does not properly represent the investments made by the issuer. If both metrics are used (e.g. one for green bonds, one for corporate bonds), it needs to be specified and reported separately.

EU Taxonomy's incentive for Green CapEx (Slevin et al. 2020, p.41)

Table 8: Comparing disclosure methodologies for equities and fixed income

EQUITIES	FIXED INCOME (Corporate)[42]
1. % of the fund that complies with the Taxonomy; breakdown by environmental objectives; and breakdown by activities (all weighted). Investors are required to disclose the % of the fund invested in 'transition' and 'enabling' activities. 2. % of the fund that is potentially Taxonomy-align breakdown by environmental objectives and activities. Commentary following recommendations. 3. (Until the Taxonomy is finished) % of the fund that responds to environmental objectives 3–6, and a breakdown by objective, including an explanation on the methodology and criteria used following recommendations.	Same as equities. In addition, when appropriate, breakdown by: 1. % invested in bonds compliant with EU Green Bond Standard (100% Taxonomy-aligned); 2. % of the fund invested in green bonds partially aligned (and % that is Taxonomy-aligned); 3. % of the fund invested in corporate bonds (and the % that is Taxonomy-aligned).
What to disclose: Turnover.[43] Some investors, however, might decide to build a forward-looking portfolio and disclose the same information based on capex.	**What to disclose:** Capex, and opex if relevant. For corporate bonds, turnover could be used in selected cases, as appropriate, where capex does not properly represent the investments made by the issuer. If both metrics are used (e.g. one for green bonds, one for corporate bonds), it needs to be specified and reported separately.

EU Taxonomy for Sustainable Activities: the metrics matter

1

2

3

4

5

Forward Looking: ***CapEx is key****!*

&

By Asset Class: ***CapEx & OpEx*** *in Fixed Income,* ***Revenue & CapEx*** *in Equities*

EU TECHNICAL EXPERT GROUP ON SUSTAINABLE FINANCE

EU Taxonomy's incentive for Green CapEx (Slevin et al. 2020, p.27)

3.2 COMPANY DISCLOSURE

3.2.1 Summary of requirements

The final Taxonomy Regulation introduces a new disclosure requirement for companies already required to provide a non-financial statement under the Non-Financial Reporting Directive.[29] National implementation varies, but NFRD covers, at a minimum, large public-interest companies with more than 500 employees, including listed companies, banks and insurance companies.

The requirements differ between financial and non-financial companies. Some financial companies will also be subject to the Financial Market Participant disclosure requirement (See: Financial market participants).

All companies subject to this requirement will include a description of how, and to what extent, their activities are associated with Taxonomy-aligned activities. For non-financial companies, the disclosure must include:

- the proportion of turnover aligned with the Taxonomy; and
- capex and, if relevant, opex aligned with the Taxonomy.

This disclosure should be made as part of the non-financial statement, which may be located in annual reporting or in a dedicated sustainability report.

The Commission developed new climate reporting guidelines for companies in 2019. A summary of the guidelines is also available. These guidelines already recommended that companies disclose their taxonomy-alignment.

By 1 June, 2021, the European Commission will adopt a delegated act specifying how these obligations should be applied in practice. The delegated act will consider the differences between non-financial and financial companies.

EU Taxonomy's incentive for Green CapEx (Slevin et al. 2020, p.27)

3.2 COMPANY DISCLOSURE

3.2.1 Summary of requirements

The final Taxonomy Regulation introduces a new disclosure requirement for companies already required to provide a non-financial statement under the Non-Financial Reporting Directive.[29] National implementation varies, but NFRD covers, at a minimum, large public-interest companies with more than 500 employees, including listed companies, banks and insurance companies.

The requirements differ between financial and non-financial companies. Some financial companies will also be subject to the Financial Market Participant disclosure requirement (See: Financial market participants).

All companies subject to this requirement will include a description of how, and to what extent, their activities are associated with Taxonomy-aligned activities. For non-financial companies, the disclosure must include:

- the proportion of turnover aligned with the Taxonomy; and
- capex and, if relevant, opex aligned with the Taxonomy.

This disclosure should be made as part of the non-financial statement, which may be located in annual reporting or in a dedicated sustainability report.

The Commission developed new climate reporting guidelines for companies in 2019. A summary of the guidelines is also available. These guidelines already recommended that companies disclose their taxonomy-alignment.

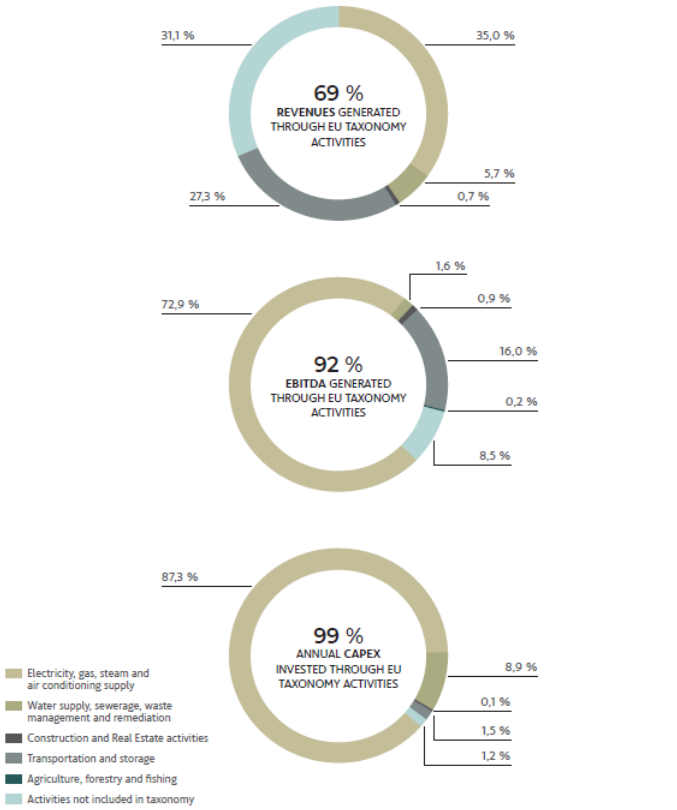
By 1 June, 2021, the European Commission will adopt a delegated act specifying how these obligations should be applied in practice. The delegated act will consider the differences between non-financial and financial companies.

EU Taxonomy for Sustainable Activities: the metrics matter

1. *Forward Looking:* ***CapEx is key****!*
2. *&*
3. *By Asset Class:* ***CapEx & OpEx*** *in Fixed Income,* ***Revenue & CapEx*** *in Equities*
4. *&*
5. *Incentivising bundles of economic activities (i.e. corporations) to* ***disclose CapEx and Revenue by activity***

ACCIONA's EU Green Taxonomy Report before (left) and after (right) independent, solicited verification

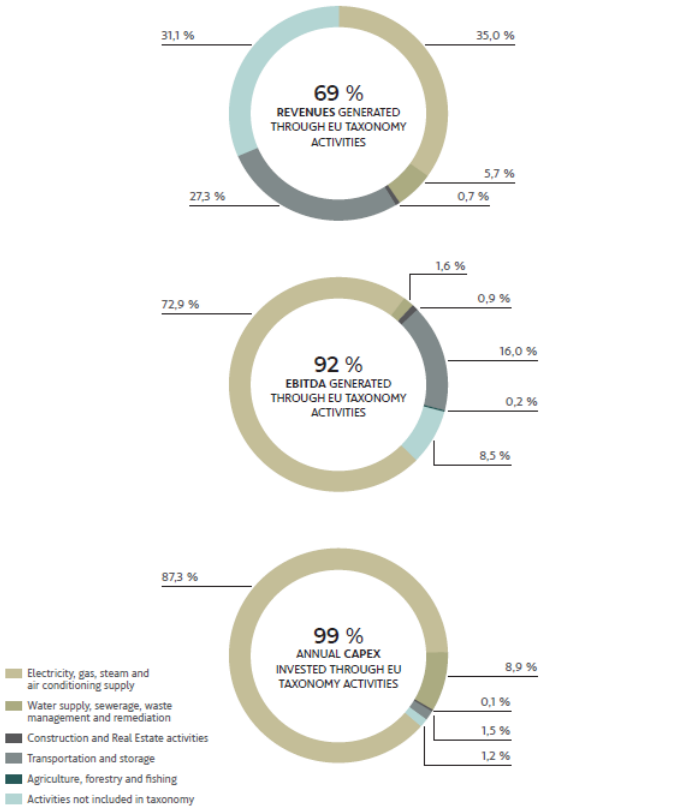
Once the criteria, metrics and thresholds of each subcategory were analyzed, ACCIONA's activities were aligned with the Taxonomy in terms of global revenue, EBITDA, and annual CAPEX using 2018 figures:



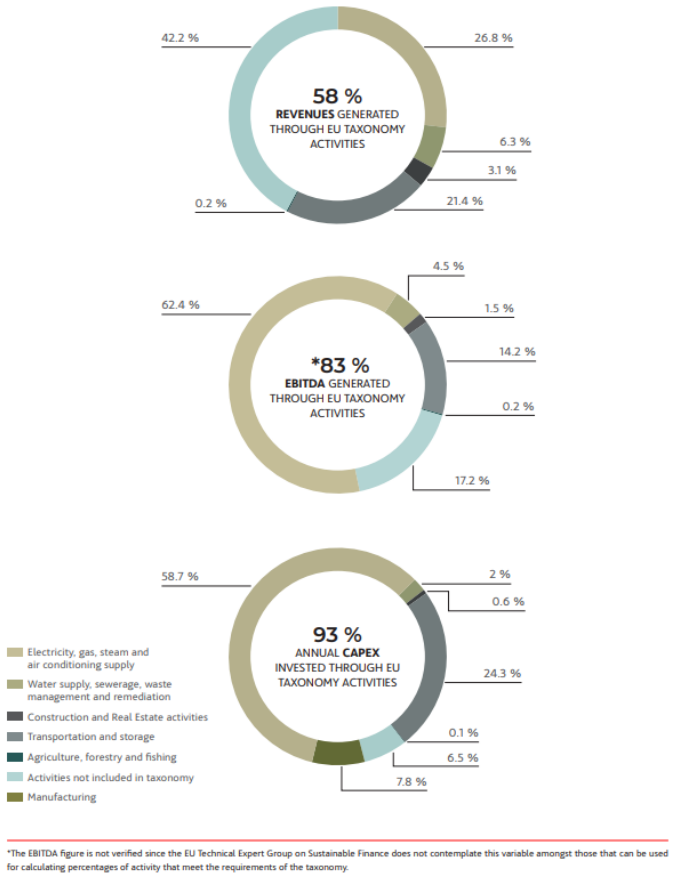
EU TECHNICAL EXPERT GROUP ON SUSTAINABLE FINANCE

ACCIONA's EU Green Taxonomy Report before (left) and after (right) independent, solicited verification

Once the criteria, metrics and thresholds of each subcategory were analyzed, ACCIONA's activities were aligned with the Taxonomy in terms of global revenue, EBITDA, and annual CAPEX using 2018 figures:



Once the criteria, metrics and thresholds of each subcategory were analyzed, ACCIONA's activities were aligned with the Taxonomy in terms of global revenue, EBITDA, and annual CAPEX using 2019 figures verified by independent auditors:



*The EBITDA figure is not verified since the EU Technical Expert Group on Sustainable Finance does not contemplate this variable amongst those that can be used for calculating percentages of activity that meet the requirements of the taxonomy.

EU TECHNICAL EXPERT GROUP ON SUSTAINABLE FINANCE

EU Taxonomy for Sustainable Activities: the metrics matter

1. *Forward Looking: **CapEx is key**!*

&

2. *By Asset Class: **CapEx & OpEx** in Fixed Income, **Revenue & CapEx** in Equities*

&

3. *Incentivising bundles of economic activities (i.e. corporations) to **disclose CapEx and Revenue by activity***

&

4. *Corporations self-reporting taxonomy compliance: independent, unbiased **Verification** needed*

5.

EU Climate Transition Benchmarks Law (2020/4757): Article 12.2

2. Administrators of EU Paris-aligned Benchmarks shall exclude from those benchmarks any companies that are found or estimated by them or by external data providers to significantly harm one or more of the environmental objectives referred to in Article 9 of Regulation (EU) 2020/852 of the European Parliament and of the Council[10], in accordance with the rules on estimations laid down in Article 13(2) of this Regulation.

3. Administrators of EU Paris-aligned Benchmarks shall disclose in their benchmark methodology any additional exclusion criteria they use and which are based on climate-related or other environmental, social and governance (ESG) factors.

CHAPTER III
TRANSPARENCY AND ACCURACY

Article 13

Source: European Commission 2020/4757 - 17/07/2020

EU Climate Transition Benchmarks Law (2020/4757): Article 12.2

2. Administrators of EU Paris-aligned Benchmarks shall exclude from those benchmarks any companies that are found or estimated by them or by external data providers to significantly harm one or more of the environmental objectives referred to in Article 9 of Regulation (EU) 2020/852 of the European Parliament and of the Council[10], in accordance with the rules on estimations laid down in Article 13(2) of this Regulation.

3. Administrators of EU Paris-aligned Benchmarks shall disclose in their benchmark methodology any additional exclusion criteria they use and which are based on climate-related or other environmental, social and governance (ESG) factors.

CHAPTER III
TRANSPARENCY AND ACCURACY

Article 13

Source: European Commission 2020/4757 - 17/07/2020

EU Climate Transition Benchmarks Law (2020/4757): Article 13.2

2. For the purposes of Article 12(2), administrators of EU Paris-aligned Benchmarks shall comply with the following requirements:

(a) administrators of EU Paris-aligned Benchmarks that use estimations that are not based on data provided by an external data provider shall formalise, document and make public the methodology upon which such estimations are based, including:

(i) the approach and research methodology that they have used, and the main assumptions and precautionary principles underlying those estimations;

(ii) the external data sets used in the estimation;

(b) administrators of EU Paris-aligned Benchmarks that use estimations that are based on data provided by an external data provider shall formalise, document and make public all of the following information:

(i) the name and contact details of the data provider;

(ii) the methodology used and the main assumptions and precautionary principles, where available;

(iii) a hyperlink to the website of the data provider, and to the relevant methodology used, where available.

EU Climate Transition Benchmarks Law (2020/4757): Article 13.2

2. For the purposes of Article 12(2), administrators of EU Paris-aligned Benchmarks shall comply with the following requirements:

(a) administrators of EU Paris-aligned Benchmarks that use estimations that are not based on data provided by an external data provider shall formalise, document and make public the methodology upon which such estimations are based, including:

(i) the approach and research methodology that they have used, and the main assumptions and precautionary principles underlying those estimations;

(ii) the external data sets used in the estimation;

(b) administrators of EU Paris-aligned Benchmarks that use estimations that are based on data provided by an external data provider shall formalise, document and make public all of the following information:

(i) the name and contact details of the data provider;

(ii) the methodology used and the main assumptions and precautionary principles, where available;

(iii) a hyperlink to the website of the data provider, and to the relevant methodology used, where available.

EU Climate Transition Benchmarks Law (2020/4757): Article 13.2

2. For the purposes of Article 12(2), administrators of EU Paris-aligned Benchmarks shall comply with the following requirements:

(a) administrators of EU Paris-aligned Benchmarks that use estimations that are not based on data provided by an external data provider shall formalise, document and make public the methodology upon which such estimations are based, including:

(i) the approach and research methodology that they have used, and the main assumptions and precautionary principles underlying those estimations;

(ii) the external data sets used in the estimation;

(b) administrators of EU Paris-aligned Benchmarks that use estimations that are based on data provided by an external data provider shall formalise, document and make public all of the following information:

(i) the name and contact details of the data provider;

(ii) the methodology used and the main assumptions and precautionary principles, where available;

(iii) a hyperlink to the website of the data provider, and to the relevant methodology used, where available.

EU Taxonomy for Sustainable Activities: the metrics matter

1. *Forward Looking: **CapEx is key**!*

&

2. *By Asset Class: **CapEx & OpEx** in Fixed Income, **Revenue & CapEx** in Equities*

&

3. *Incentivising bundles of economic activities (i.e. corporations) to **disclose CapEx and Revenue by activity***

&

4. *Corporations self-reporting taxonomy compliance: independent, unbiased **Verification** needed*

&

5. *Non-reported Taxonomy compliance needs **Precautionary Principle** based estimation*

The EU Taxonomy for Sustainable Activities:

forward looking incentives for green disclosure

"Thank you for your attention.
I would love to learn from your questions and comments."

Andreas G. F. Hoepner

Notes: The underlying EU TEG work is based on the excellent and tireless efforts of the taxonomy subgroup of the EU Technical Expert Group (TEG) for Sustainable Finance lead by Nathan Fabian. Prof. Hoepner is merely providing a humble financial data science perspective on the world leading content.

Appendix:
GHG data for
Climate Transition (i.e. Paris-Aligned) Investing

Andreas G. F. Hoepner

Notes: The underlying EU TEG work is based on the excellent and tireless efforts of Claudia Bolli, Manuel Coeslier, Delphine Dirat, Steffen Hoerter, Jean-Christophe Nicaise Chateau, Sebastien Lieblich, Sara Lovisolo, Veronique Menou, Cesare Posti, Chantal Sourlas and Jean-Yves Wilmotte. Andreas also gratefully acknowledges scientific support on the EU TEG work from Theodor Cojoianu, Saphira Rekker, Fabiola Schneider and Theresa Spandel.

Recommendations for climate benchmarks: Minimum Standards

*The TEG recommends minimum standards for the **EU Climate Transition Benchmark** and the **EU Paris-aligned Benchmark:***

2-factor Greenwashing Protection

	Climate Scenario	Relative decarbonization	Self decarbonization	Equity Allocation Constraint	Activity Exclusion
	IPCC 1.5°C **with no or limited overshoot**	**CTB: -30%** **PAB: -50%** **Minimum reduction in GHG emissions intensity (GHG/EVIC) compared to market index**	**-7%** **Minimum on average per annum reduction in GHG emissions intensity until 2050**	**= or >** **AH: Degree of Exposure to "asset heavy" sectors compared with investable universe [Equities Only]**	**1) Coal (1%+ rev.)** **2) Oil (10%+ rev.)** **3) Natural Gas** **4) Electricity producers with carbon intensity of lifecycle GHG emissions higher than 100gCO2e/kWh (both 50%+ rev)**
EU CTB	✓	✓	✓	✓	
EU PAB	✓	✓ ✓	✓	✓	✓

Key Objective of the Climate Benchmarks (2/3)

(8) A decarbonisation based only on Scope 1 and Scope 2 (GHG) emissions could lead to counterintuitive results. It should therefore be clarified that the minimum standards for EU Climate Transition Benchmarks and EU Paris-aligned Benchmarks should not only consider direct emissions from companies, but also emissions assessed on a life-cycle basis and thus including Scope 3 (GHG) emissions. However, due to the insufficient quality of the data currently available for Scope 3 GHG emissions, it is necessary to set out an appropriate phase-in timeline. That phase-in timeline should be based on the list of economic activities set out in Regulation (EC) No 1893/2006.

Source: European Commission Ref. Ares(2020)1993773 - 08/04/2020

Key Objective of the Climate Benchmarks (2/3)

(8) A decarbonisation based only on Scope 1 and Scope 2 (GHG) emissions could lead to counterintuitive results. It should therefore be clarified that the minimum standards for EU Climate Transition Benchmarks and EU Paris-aligned Benchmarks should not only consider direct emissions from companies, but also emissions assessed on a life-cycle basis and thus including Scope 3 (GHG) emissions. However, due to the insufficient quality of the data currently available for Scope 3 GHG emissions, it is necessary to set out an appropriate phase-in timeline. That phase-in timeline should be based on the list of economic activities set out in Regulation (EC) No 1893/2006.

Source: European Commission Ref. Ares(2020)1993773 - 08/04/2020

Absolutely Sustainable Investing =

1. ***Reduce GHG emissions vs. Market Benchmark*** *in a given year*
   (Relatively more sustainable investing as practiced in 2019)

+

2. ***Reduce GHG emissions year on year*** *by at least 7% p.a..*

+

3. *Reach* ***Net Zero GHG emissions by 2050****.*

+

4. *Integrate* ***Scope 3 GHG emissions.***

5.

GHG emissions: Scope 3 is Key!

GHG emissions should be considered using Life-Cycle Analysis with scope 3 being phased-in during a four year period

Period considered	NACE Level 2 (L2) Sectors considered	Suggested metric to be used by order of priority	Potential reduction target
At the date of implementation	At least energy (O&G), mining (i.e. NACE L2: 05, 06, 07, 08, 09, 19, 20)	Scope 3 emissions, Fossil fuel reserves (volume or revenue data)	30% for CTBs, 50% for PABs
Two years after implementation	At least transportation, construction, buildings, materials, industrial activities (i.e. NACE L2: 10-18, 21-33, 41-43, 49-53, 81)	Scope 3	30% for CTBs, 50% for PABs
Four years after implementation	Every sector	Scope 3	30% for CTBs, 50% for PABs

Double counting can be addressed by 'Footprinting Scope 1' and separately 'Benchmarking Scope 2 & 3', with at least 7% reductions on both

Key Objective of the Climate Benchmarks (3/3)

Article 12

Transparency requirements for estimations

In addition to the requirements laid down in Annex III to Regulation (EU) 2016/1011, administrators of EU Climate Transition Benchmarks or of EU Paris-aligned Benchmarks shall comply with the following requirements:

(a) administrators of EU Climate Transition Benchmarks or of EU Paris-aligned Benchmarks that use estimations that are not based on data provided by an external data provider, shall formalise, document and make public the methodology upon which such estimations are based, including:

(i) the approach that they have used to calculate GHG emissions, and the main assumptions and the precautionary principles underlying those estimations;

(ii) the research methodology to estimate missing, unreported, or underreported GHG emissions;

(iii) the external data sets used in the estimation of missing, unreported or underreported GHG emissions;

Source: European Commission Ref. Ares(2020)1993773 - 08/04/2020

Key Objective of the Climate Benchmarks (3/3)

Article 12

Transparency requirements for estimations

In addition to the requirements laid down in Annex III to Regulation (EU) 2016/1011, administrators of EU Climate Transition Benchmarks or of EU Paris-aligned Benchmarks shall comply with the following requirements:

(a) administrators of EU Climate Transition Benchmarks or of EU Paris-aligned Benchmarks that use estimations that are not based on data provided by an external data provider, shall formalise, document and make public the methodology upon which such estimations are based, including:

(i) the approach that they have used to calculate GHG emissions, and the main assumptions and the precautionary principles underlying those estimations;

(ii) the research methodology to estimate missing, unreported, or underreported GHG emissions;

(iii) the external data sets used in the estimation of missing, unreported or underreported GHG emissions;

Source: European Commission Ref. Ares(2020)1993773 - 08/04/2020

Key Objective of the Climate Benchmarks (3/3)

Article 12

Transparency requirements for estimations

In addition to the requirements laid down in Annex III to Regulation (EU) 2016/1011, administrators of EU Climate Transition Benchmarks or of EU Paris-aligned Benchmarks shall comply with the following requirements:

(a) administrators of EU Climate Transition Benchmarks or of EU Paris-aligned Benchmarks that use estimations that are not based on data provided by an external data provider, shall formalise, document and make public the methodology upon which such estimations are based, including:

(i) the approach that they have used to calculate GHG emissions, and the main assumptions and the precautionary principles underlying those estimations;

(ii) the research methodology to estimate missing, unreported, or underreported GHG emissions;

(iii) the external data sets used in the estimation of missing, unreported or underreported GHG emissions;

Source: European Commission Ref. Ares(2020)1993773 - 08/04/2020

Absolutely Sustainable Investing =

1. ***Reduce GHG emissions vs. Market Benchmark*** *in a given year*
   (Relatively more sustainable investing as practiced in 2019)

+

2. ***Reduce GHG emissions year on year*** *by at least 7% p.a..*

+

3. *Reach* ***Net Zero GHG emissions by 2050****.*

+

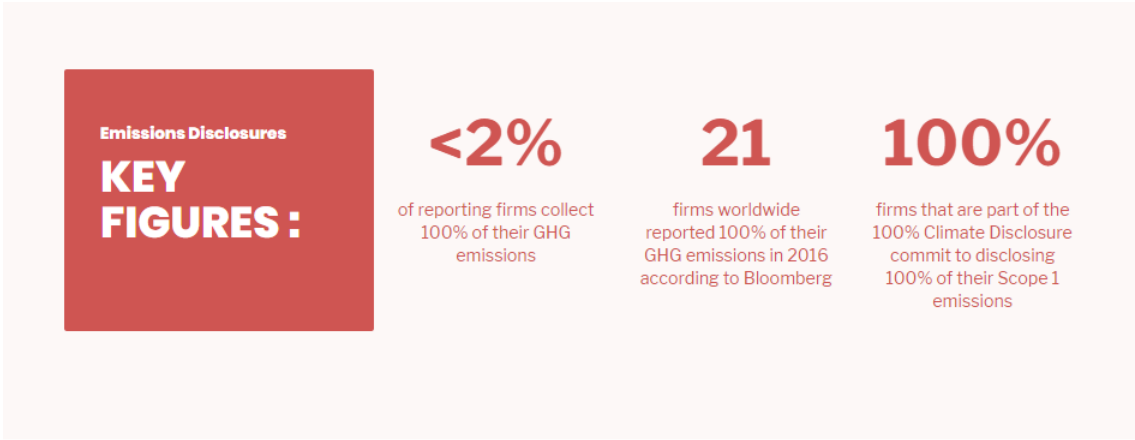
4. *Integrate* ***Scope 3 GHG emissions.***

+

5. *Use the* ***Precautionary Principle*** *in GHG data estimations****.***

The GHG Data Underreporting Challenge

Only 21 firms worldwide report 100.0% of their Scope 1 GHG emissions in the view of the Mistra funded academic intiative www.climatedisclosure100.info. Only Bloomberg is publicly known to have corrected for years for this underreporting (i.e. ES074)



Scope 1 GHG Reporting Challenge

Good news: *Thousands of firms report a number for their Scope 1 GHG emissions.*

Challenge: *Collecting 100.0% GHG emissions is technically and practically very challenging for most corporations (e.g. lack of communications with small offices abroad; small office in large office building with uninterested landlord).*

Consequence: *Most corporations claim to report the majority of Scope 1 GHG emissions but do not make a 'Quantitative Statement of Completeness' (such as 'We collected GHG emissions for 98.7% of our revenue lines')*

Bad News: *Only 43 firms worldwide disclosed 100.0% Scope 1 GHG emissions in 2016, over 30% of these are from the Financials Sector. Another 25 firms disclose at least 95% Scope 1 GHG emissions. (Bloomberg, ES074)*

Tragic Development: *The 100% and >95% Scope 1 GHG disclosing firms are not only less than 5% of all reporting firms; they also decreased since 2015, since firms currently have little economic incentive to invest resources in GHG data collection just to appear worse than a less diligent competitor.*

3 Examples of GHG Reporting

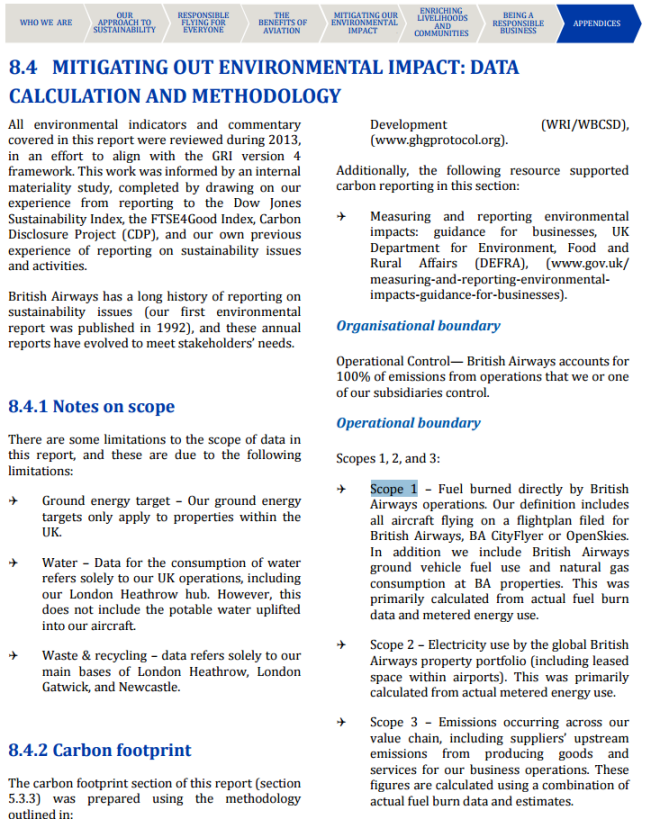
Best Case Example of 100.0% transparent GHG report

British Airways 2013: Appendix

Common Examples on 'intransparent' GHG reports

Volkswagen 2014: brief intransparent legend
General Electric 2015: long intransparent footnote

British Airways Sustainability Report 2013



8.4 MITIGATING OUT ENVIRONMENTAL IMPACT: DATA CALCULATION AND METHODOLOGY

All environmental indicators and commentary covered in this report were reviewed during 2013, in an effort to align with the GRI version 4 framework. This work was informed by an internal materiality study, completed by drawing on our experience from reporting to the Dow Jones Sustainability Index, the FTSE4Good Index, Carbon Disclosure Project (CDP), and our own previous experience of reporting on sustainability issues and activities.

British Airways has a long history of reporting on sustainability issues (our first environmental report was published in 1992), and these annual reports have evolved to meet stakeholders' needs.

8.4.1 Notes on scope

There are some limitations to the scope of data in this report, and these are due to the following limitations:

- Ground energy target – Our ground energy targets only apply to properties within the UK.
- Water – Data for the consumption of water refers solely to our UK operations, including our London Heathrow hub. However, this does not include the potable water uplifted into our aircraft.
- Waste & recycling – data refers solely to our main bases of London Heathrow, London Gatwick, and Newcastle.

8.4.2 Carbon footprint

The carbon footprint section of this report (section 5.3.3) was prepared using the methodology outlined in:

Development (WRI/WBCSD), (www.ghgprotocol.org).

Additionally, the following resource supported carbon reporting in this section:

- Measuring and reporting environmental impacts: guidance for businesses, UK Department for Environment, Food and Rural Affairs (DEFRA), (www.gov.uk/measuring-and-reporting-environmental-impacts-guidance-for-businesses).

Organisational boundary

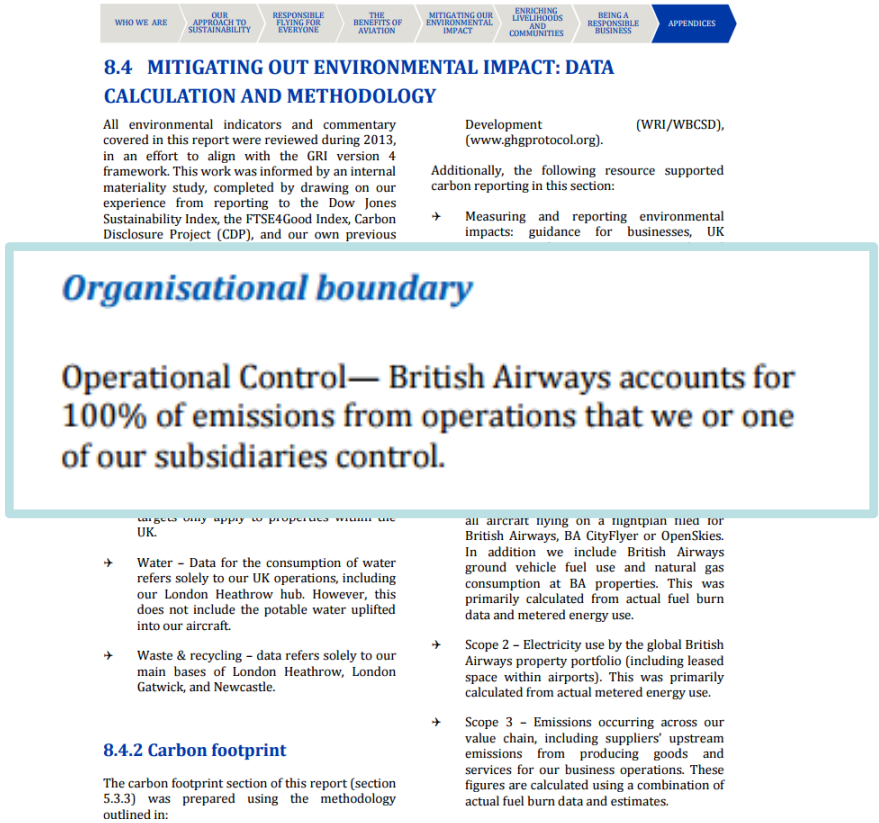
Operational Control— British Airways accounts for 100% of emissions from operations that we or one of our subsidiaries control.

Operational boundary

Scopes 1, 2, and 3:

- Scope 1 – Fuel burned directly by British Airways operations. Our definition includes all aircraft flying on a flightplan filed for British Airways, BA CityFlyer or OpenSkies. In addition we include British Airways ground vehicle fuel use and natural gas consumption at BA properties. This was primarily calculated from actual fuel burn data and metered energy use.
- Scope 2 – Electricity use by the global British Airways property portfolio (including leased space within airports). This was primarily calculated from actual metered energy use.
- Scope 3 – Emissions occurring across our value chain, including suppliers' upstream emissions from producing goods and services for our business operations. These figures are calculated using a combination of actual fuel burn data and estimates.

British Airways Sustainability Report 2013



WHO WE ARE | OUR APPROACH TO SUSTAINABILITY | RESPONSIBLE FLYING FOR EVERYONE | THE BENEFITS OF AVIATION | MITIGATING OUR ENVIRONMENTAL IMPACT | ENRICHING LIVELIHOODS AND COMMUNITIES | BEING A RESPONSIBLE BUSINESS | APPENDICES

8.4 MITIGATING OUT ENVIRONMENTAL IMPACT: DATA CALCULATION AND METHODOLOGY

All environmental indicators and commentary covered in this report were reviewed during 2013, in an effort to align with the GRI version 4 framework. This work was informed by an internal materiality study, completed by drawing on our experience from reporting to the Dow Jones Sustainability Index, the FTSE4Good Index, Carbon Disclosure Project (CDP), and our own previous

Development (WRI/WBCSD), (www.ghgprotocol.org).

Additionally, the following resource supported carbon reporting in this section:

- Measuring and reporting environmental impacts: guidance for businesses, UK

Organisational boundary

Operational Control— British Airways accounts for 100% of emissions from operations that we or one of our subsidiaries control.

UK.

- Water – Data for the consumption of water refers solely to our UK operations, including our London Heathrow hub. However, this does not include the potable water uplifted into our aircraft.
- Waste & recycling – data refers solely to our main bases of London Heathrow, London Gatwick, and Newcastle.

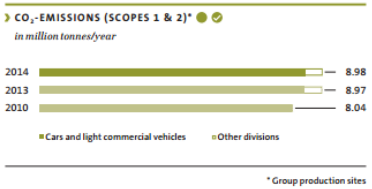
8.4.2 Carbon footprint

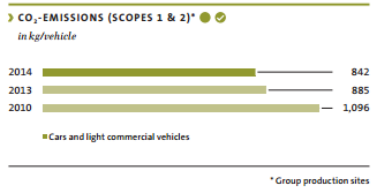
The carbon footprint section of this report (section 5.3.3) was prepared using the methodology outlined in:

all aircraft flying on a flightplan filed for British Airways, BA CityFlyer or OpenSkies. In addition we include British Airways ground vehicle fuel use and natural gas consumption at BA properties. This was primarily calculated from actual fuel burn data and metered energy use.

- Scope 2 – Electricity use by the global British Airways property portfolio (including leased space within airports). This was primarily calculated from actual metered energy use.
- Scope 3 – Emissions occurring across our value chain, including suppliers' upstream emissions from producing goods and services for our business operations. These figures are calculated using a combination of actual fuel burn data and estimates.

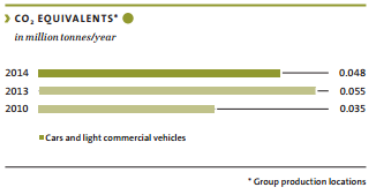
Volkswagen Sustainability Report 2014

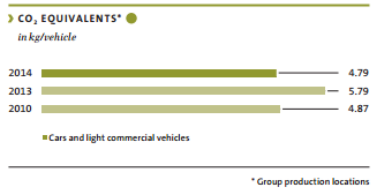




Total CO_2 emissions have risen due to increased consumption of electrical energy, heat and fuel gases for production. The rise in total CO_2 emissions is, however, limited due to increased use of renewably generated energy and the associated improvement in CO_2 emission factors.
By using suitable CO_2 emission factors to evaluate energy and heat consumption figures for production locations, the CO_2 emissions arising from power and heat generation for Volkswagen AG's production locations in power stations and boiler plants operated by Volkswagen AG are included in the total volume of CO_2 emissions.

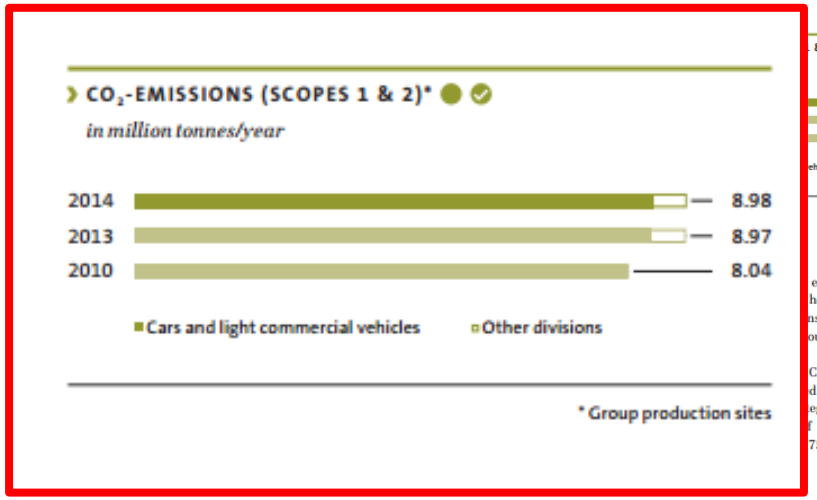
The stated carbon dioxide emissions do not include the emissions arising from district heating and power supplied to third parties from power stations operated by Volkswagen AG. For 2014, these emissions amounted to 297,371 tonnes of carbon dioxide.
A continuous reduction in CO_2 emissions per vehicle produced was achieved over the stated reporting period.
The "Other divisions" category also includes CO_2 emissions from the manufacture of heavy-duty commercial vehicles, which account for around 75 percent of total CO_2 emissions in this category.





CO_2 equivalents are calculated on the basis of the specific global warming potentials of individual, emitted refrigerants. Since such emissions do not occur continuously and are not dependent on a location's production volume, relatively large fluctuations may arise over a time series.

Volkswagen Sustainability Report 2014



"It is not practicing German accuracy, if 'Other divisions' are considered in some years but ignored in other years."

General Electric Online Sustainability Report 2015

Energy and Climate

Read more about our Sustainability strategy as it relates to Energy and Climate.

GE Greenhouse Gas Emissions and Energy (a)	Baseline (2004)	2012	2013	2014
GE Operational GHG Emissions (million metric tons of CO2 equivalent emissions) (b)	7.3	4.88	4.98	5.03
GE Operational GHG Intensity (metric tons per $ million revenue) (b)	59	33.1	34.1	33.7
GE Operational Energy Intensity (MMBtu per $ million revenue)	494	325	336	334
GE Operational Energy Use (million MMBtu)	61.1	48	49.1	49.4

Footnotes:
(a) For GHG and energy-related metrics, each year GE adjusts its 2004 baseline inventory to account for divestments and acquisitions. For water- and waste-related metrics, each year GE adjusts its 2006 baseline inventory to account for divestments and acquisitions.
(b) For GHG and energy-related metrics, each year GE adjusts its 2004 baseline inventory to account for divestments and acquisitions. For 2011, 2012 and 2013, GHG and energy-related data were not collected for new acquisitions. As a result, adjusted results for 2011, 2012 and 2013 are not available. For water and waste-related metrics, each year GE adjusts its 2006 baseline inventory to account for divestments and acquisitions. For 2011, 2012 and 2013, water and waste-related data were not adjusted for 2014 divestments and acquisitions. As a result, adjusted results for 2011, 2012 and 2013 are not available. Complete water and waste data were not collected before 2006. 2014 hazardous and non-hazardous wastes generated were higher than in 2006, largely due to non-routine events at a few large sites, for example, building demolition and construction.

General Electric Online Sustainability Report 2015

"If specific years are not adjusted for acquisitions, but the data is normally adjusted for "divestments and acquisitions", what does that *'mean'* for these years?"

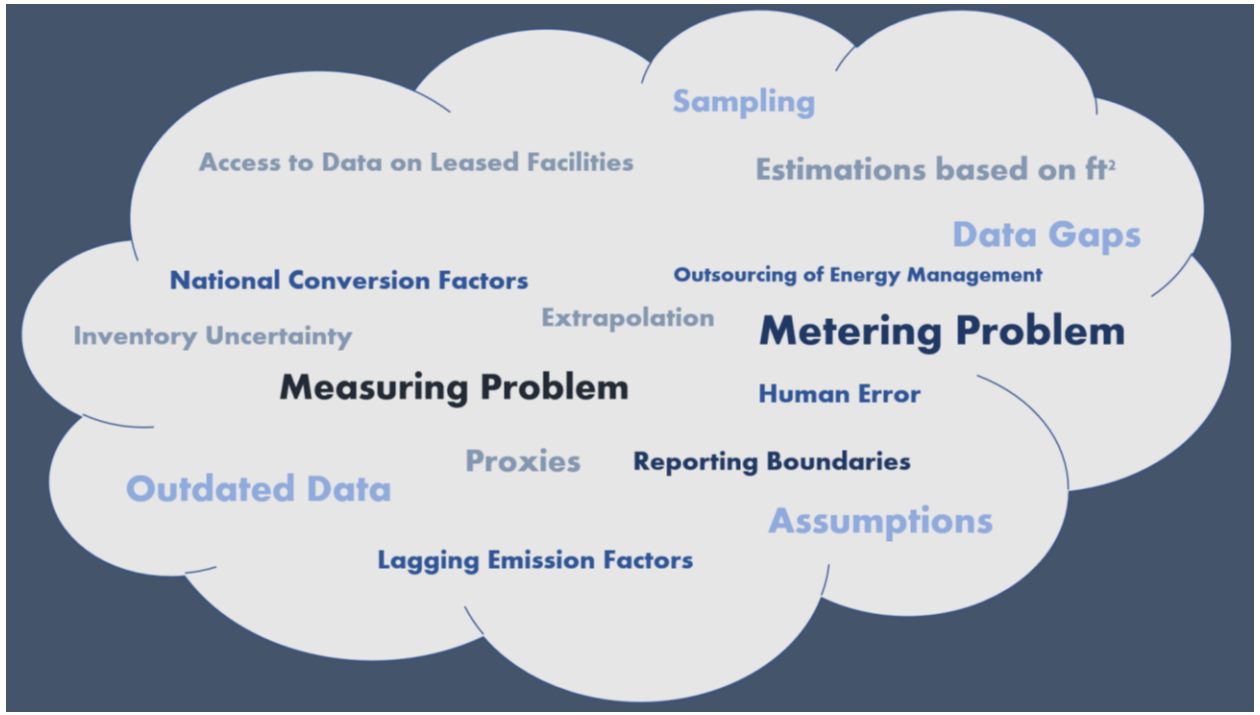
Energy and Climate

Read more about our sustainability strategy as it relates to Energy and Climate.

GE Greenhouse Gas Emissions and Energy (a)	Baseline (2004)	2012	2013	2014
GE Operational GHG Emissions (million metric tons of CO2 equivalent emissions) (b)	7.3	4.88	4.98	5.03
GE Operational GHG Intensity (metric tons per $ million revenue) (b)	59	33.1	34.1	33.7
GE Operational Energy Intensity (MMBtu per $ million revenue)	494	325	336	334
GE Operational Energy Use (million MMBtu)	61.1	48	49.1	49.4

Footnotes:
(a) For GHG and energy-related metrics, each year GE adjusts its 2004 baseline inventory to account for divestments and acquisitions. For water- and waste-related metrics, each year GE adjusts its 2006 baseline inventory to account for divestments and acquisitions.
(b) For GHG and energy-related metrics, each year GE adjusts its 2004 baseline inventory to account for divestments and acquisitions. For 2011, 2012 and 2013, GHG and energy-related data were not collected for new acquisitions. As a result, adjusted results for 2011, 2012 and 2013 are not available. For water and waste-related metrics, each year GE adjusts its 2006 baseline inventory to account for divestments and acquisitions. For 2011, 2012 and 2013, water and waste-related data were not adjusted for 2014 divestments and acquisitions. As a result, adjusted results for 2011, 2012 and 2013 are not available. Complete water and waste data were not collected before 2006. 2014 hazardous and non-hazardous wastes generated were higher than in 2006, largely due to non-routine events at a few large sites, for example, building demolition and construction.

Word Cloud of GHG data uncertainties as self-reported to CDP

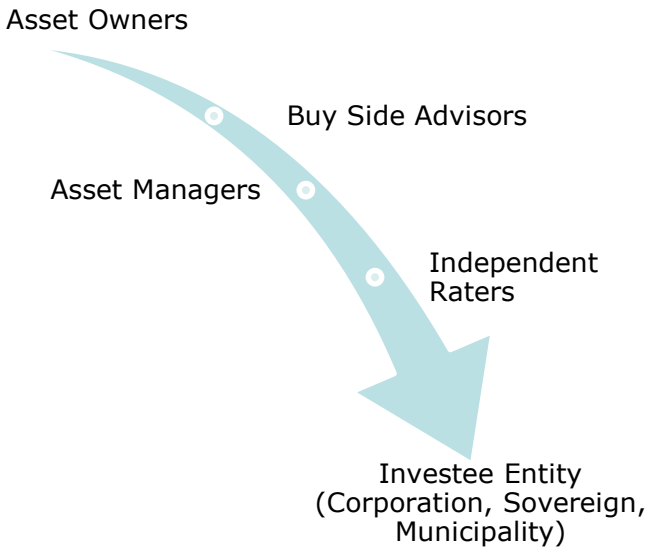


10 "perceived" Climate Leaders with approved Science-Based Targets and how they report Scope 1 GHG emissions in various breakdowns

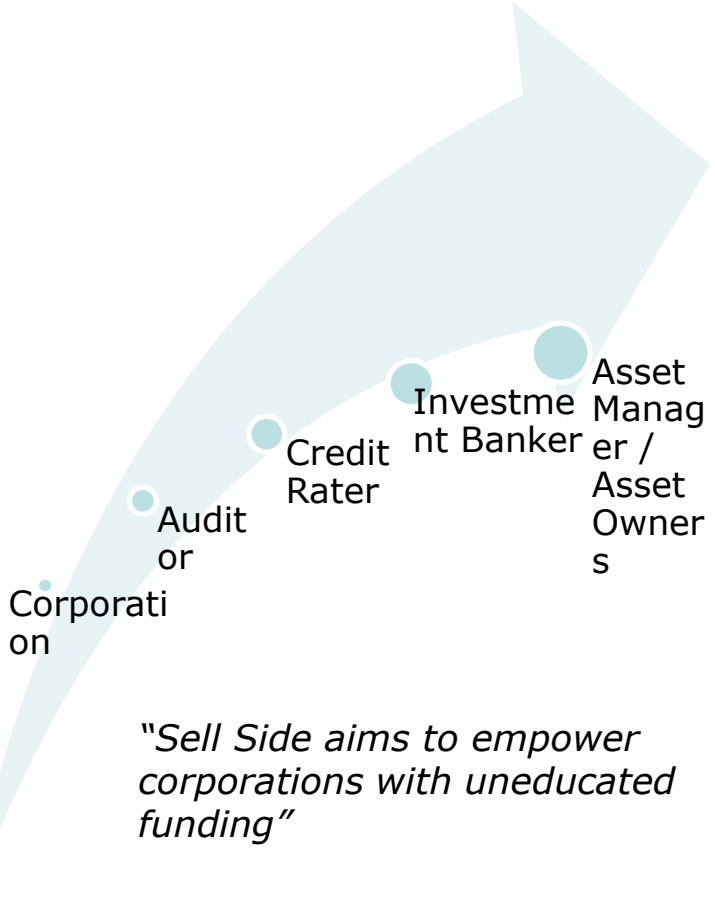
Name	Scope1	Sum of Breakdown by					(Max/Min-1)
		Region	Business Division	Facility	GHG types	Activity	
Sony Corporation	324,130	324,130	324,130		161,914		100.187%
Symrise AG	105,830	131,378					24.141%
General Mills Inc.	316,437	278,280	278,282			263,015	20.311%
SAP SE	160,674	160,672	135,570	160,674	160,674	160,674	18.517%
Wal-Mart Stores	6,107,244	6,107,244	6,107,245		5,369,779	5,929,283	13.734%
Biogen Inc.	57,574	57,574		60,574			5.211%
AstraZeneca	335,130	328,030	335,129		335,130	335,130	2.164%
Komatsu	90,248	90,248		91,377			1.251%
Carlsberg Group	644,076	641,077					0.468%
Autodesk	2,042	2,041				2,042	0.049%

AH: Is this GHG reporting challenge a classic a sell-side vs. buy-side issue?

"Buy Side aims to allocate capital in most effective and/or efficient manner"



Sufficient Requirement for Sustainable Finance: Conflict-free Capitalism = Capitalism – Financial Conflicts of Interest



"Sell Side aims to empower corporations with uneducated funding"

Climate Transition (i.e. Paris-Aligned) Investing: absolutely sustainable.

"Thank you for your attention.
I would love to learn from your questions and comments."

Andreas G. F. Hoepner

Notes: The underlying EU TEG work is based on the excellent and tireless efforts of Claudia Bolli, Manuel Coeslier, Delphine Dirat, Steffen Hoerter, Jean-Christophe Nicaise Chateau, Sebastien Lieblich, Sara Lovisolo, Veronique Menou, Cesare Posti, Chantal Sourlas and Jean-Yves Wilmotte. Andreas also gratefully acknowledges scientific support on the EU TEG work from Theodor Cojoianu, Saphira Rekker, Fabiola Schneider and Theresa Spandel.