



Measuring and Managing Scope 3 Emissions

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Why do we care about Scope 3 emissions?

Given that climate change is one of the biggest risks facing the real economy as well as the financial industry, there is an urgent need to measure and manage this risk.¹ For example, this risk may come from new regulation of a company's high emission products and shifts in end-product market demand driven by climate concerns. One way to measure this risk is the carbon (or carbon dioxide/CO₂) exposure of products and their corresponding supply chains.²

This risk can be internalized by these supply chains in presence of a universal carbon tax.³ However, such a universal tax, or even an equivalent cap-and-trade program, appears unlikely due to political economy related barriers.⁴ Nevertheless, even in the absence of such a tax, it is of tremendous value to measure and manage this carbon exposure, given that it provides a measure of the transition risk facing companies in these supply chains.⁵

Furthermore, many companies are under increasing pressure from their shareholders and stakeholders to commit to reducing their carbon footprints in a significant manner over time. Failing to do so may raise reputational concerns, with adverse implications for financial performance.⁶ Recognizing these drivers, since the Paris agreement, more than 1200 companies have committed to climate action through the We Mean Business

1 TCFD, 2017. Recommendations of the Task Force on Climate-related Financial Disclosures. Available at [FINAL-2017-TCFD-Report-11052018.pdf](https://www.tcf.org/~/media/TCFD/2017/07/FINAL-2017-TCFD-Report-11052018.pdf) ([bbhub.io](https://www.bbhuh.io))

2 Economist, 2020. Making Sense of Banks' Climate Targets. December 10.

3 Metcalf G E, Weisbach D, 2009. The Design of a Carbon Tax. Harvard Environmental Letters Review.

4 Cullenward D, Victor D G, 2020. Making Climate Policy Work. Polity.

5 Baker B, 2020. Scope 3 Carbon Emissions: Seeing the Full Picture. Available at <https://www.msci.com/www/blog-posts/scope-3-carbon-emissions-seeing/02092372761>

6 GS, 2019. Climate Related Risks and Opportunities. Goldman Sachs 2019 TCFD Report. Available at [tcfid.pdf](https://www.goldmansachs.com/~/media/2019/04/Climate-Related-Risks-and-Opportunities.pdf) ([goldmansachs.com](https://www.goldmansachs.com))

Platform and over 800 companies have committed to setting science-based targets.⁷ Recent examples of financial institutions setting net-zero target are Barclays, HSBC, and J P Morgan Chase.

The carbon exposure of a business entity – e.g., a corporate or a financial institution – is typically measured in three different ways.⁸ Scope 1 emissions are the entity’s emissions due to its own activities, e.g., coal power plant emissions for the corresponding power producer. Scope 2 emissions are the emissions from the electricity procured by the business entity, e.g., the coal power plant emissions for the corresponding buyer of electricity. Scope 3 emissions are the emissions of the remainder of the supply chain (minus electricity, i.e., Scope 2), of both upstream and downstream activities.

To get an accurate sense of a business entity’s carbon risk, it is then pertinent that all three emissions are accurately calculated. Accurate measurement of these emissions would allow business entities to track progress towards their stated climate targets and transition pathways.⁹ Companies have so far focused on measuring and reducing their Scope 1 and Scope 2 emissions, and they have been quite successful in doing so.¹⁰

However, the greatest emission reduction opportunities lie in the Scope 3 emissions going forward, given that on average the Scope 3 emissions are 5.5 times the amount of combined Scope 1 and Scope 2 emissions.¹¹ For example, for Lego and Walmart, Scope 3 emissions constitute 75% and 90%, respectively, of total emissions.¹² In fact, it has now been established that more than 50% of the world’s carbon emissions are in eight supply chains.¹³

Therefore, while the historical focus has been on Scope 1 and Scope 2 emissions, now the focus is starting to shift to Scope 3 emissions, not only for assessing the carbon risk of the supply chain but also to hold business entities responsible for the whole supply chain. This also ensures that the carbon emissions of a business entity are not simply pushed to other parts of the supply chain.¹⁴

Measuring Scope 3 emissions is not easy

While the process of calculating Scope 1 and Scope 2 emissions is well established; the same cannot be said of Scope 3 emissions, despite multiple ongoing efforts by coalitions and industry actors, as well as commercial data providers.¹⁵ Among these, ones from the Greenhouse Gas Protocol¹⁶ and Partnership for Climate Aligned Finance¹⁷

7 BSR, 2020. Climate Action in the Value Chain: Reducing Scope 3 Emissions and Achieving Science-Based Targets. Available at <https://www.bsr.org/en/our-insights/report-view/scope-3-emissions-science-based-targets-climate-action-value-chain>

8 WRI, 2017. Methodology. Available at [Methodology | World Resources Institute \(wri.org\)](https://www.wri.org/methodology)

9 SBTi, 2020. Financial Sector Science Based Target Guidance. Available at <https://sciencebasedtargets.org/wp-content/uploads/2020/10/Financial-Sector-Science-Based-Targets-Guidance-Pilot-Version.pdf>

10 BSR, 2020. Ibid.

11 BSR, 2020. Ibid.

12 Huang Y A, Weber C, Mathews H S, 2009. Categorization of Scope 3 Emissions for Streamlined Enterprise Carbon Footprinting. Environ Sci Tech, 43 (22): 8509-8515.

13 WEF, 2021. Net-zero Challenge: The Supply Chain Opportunity. Available at [Net-Zero Challenge: The supply chain opportunity | World Economic Forum \(weforum.org\)](https://www.weforum.org/publications/net-zero-challenge-the-supply-chain-opportunity)

14 Granot D, Granot F, Sosis G, 2014. Allocation of Greenhouse Gas Emissions in Supply Chains. Working paper. Available at <https://pdfs.semanticscholar.org/2c1c/90268ae4288f3b7cdf1d614c16744a1da1d6.pdf>

15 Busch T, Johnson M, Pioch T, Kopp M, 2018. Consistency of Corporate Carbon Emissions Data. University of Hamburg Working Paper.

16 GHP, 2020. Corporate Value Chain (Scope 3) Standard and Technical Guidance. Available at <https://ghgprotocol.org/standards/scope-3-standard> as well as <https://ghgprotocol.org/scope-3-technical-calculation-guidance>

17 PCAF, 2020. Public Consultation of the draft Global Carbon Accounting Standard for the Financial Industry. Available at <https://carbonaccountingfinancials.com/consultation-signup>

are particularly instructive, given that the former is the overall industry standard, and the latter is the frontrunner standard for financial institutions.

For example, as of March 2020, only 18% of the constituents of MSCI ACWI IMI reported Scope 3 emissions,¹⁸ with considerable variability across sectors. As another example, there is increasing evidence that many of the worst polluters – both private (e.g., Exxon) and public (e.g., NIOC/Iran) – either under-report or do not report at all.¹⁹ Furthermore, the Scope 3 emissions data from commercial data providers tends to be high inconsistent, with correlations as low as 1%, which calls for not only increased transparency but also standardization.²⁰

This may be due to various barriers, such as lack of transparency of supply chain, lack of direct connections with various tiers of suppliers, reduced leverage to influence action, and complex accounting principles.²¹ Furthermore, the industry standard (i.e., the Greenhouse Gas Protocol) provides so much scope for discretion and ambiguity that the ultimate reporting, if it is there at all, can be inconsistent and misleading.²²

How to measure uncertain Scope 3 emissions data?

Uncertainty in Scope 3 emissions data may arise from multiple avenues, including parameters (e.g., from data on direct emissions, activities, emission factors, and global warming potentials), scenarios (e.g., from methodological choices on allocation methods, product use assumptions, and end-of-life assumptions), and models themselves.²³ All this results in the eventual data being unreliable.

The main issue with unreliable data is that it can change over time, making it difficult to track actual progress towards stated climate targets and pathways. For example, as data quality improves over time, even though the actual emissions are going up, it is possible that the reported emissions go down, or vice-versa; which may even result in perverse incentives for keeping uncertainty high.²⁴ This may also result in the need for recalculating the base year emissions.²⁵

Obviously, one approach to address the issue of unreliable data is to mandate provision of more accurate data over time, both upstream and downstream, with clear timelines. This would send clear signals to the market that appropriate resources need to be engaged. In the context, the Partnership for Climate Aligned Finance takes a welcome first step in that it requires different sectors to at least start providing Scope 3 emissions data, based on the following deadlines: from 2020, at least energy (oil & gas), mining; from 2023, at least transportation, constructions, buildings, materials, and industrial activities; from 2025, every sector. Furthermore, another welcome effort is by the Bank of America, which set emission reduction targets for 70% of its vendors.²⁶

18 Baker B, 2020. Scope 3 Carbon Emissions: Seeing the Full Picture. Available at <https://www.msci.com/www/blog-posts/scope-3-carbon-emissions-seeing/02092372761>

19 Fickling D, He E, 2020. The Biggest Polluters Are Hiding in Plain Sight. Available at <https://www.bloomberg.com/graphics/2020-opinion-climate-global-biggest-polluters-scope-3-emissions-disclosures/>

20 Busch et al, 2018. Ibid.

21 BSR, 2020. Ibid.

22 Fickling and He, 2020. Ibid.

23 GHP, 2020. Ibid.

24 Marland E, Cantrell J, Kiser K, Marland G, Shirley K, 2014. Valuing Uncertainty Part I: The Impact of Uncertainty in GHG Accounting. Carbon Management, 5 (1): 35-42

25 GHP, 2020. Ibid.

26 BOA, 2021. Bank of America Announces Actions to Achieve Net Zero Greenhouse Gas Emissions before 2050. Available at [Bank of America Announces Actions to Achieve Net Zero Greenhouse Gas Emissions before 2050](#)

However, despite this first step of simply reporting Scope 3 emissions data, the next key step would be in requiring these sectors to improve reliability of their reported Scope 3 emissions data over time. In this context, there needs to be recognition that estimated (i.e., lower quality) data is much less effective than reported (i.e., higher quality) data in identifying the worst emitters,²⁷ and that estimated data has no predictive power in estimating future emissions, further strengthening the case for mandatory and audited carbon emissions disclosure, potentially using regulation.²⁸

Nevertheless, in the interim, we need to figure out a couple of things: first, how to combine data of different reliability; and second, how to improve data reliability using advances in information technology and computer science. The latter would ideally use the artificial intelligence and machine learning techniques²⁹; such as ones used by GHGSAT, Climate TRACE and CarbonChain; to improve the accuracy and precision of Scope 3 estimates.

How to manage Scope 3 emissions reductions?

While accurate measurement of Scope 3 emissions remains an important problem and should remain a key area of focus, given the goal of getting to our ambitious climate targets and the urgency surrounding it, there is an increasing recognition that we need to develop practical methods that allow real reductions of economy wide emissions in the interim, in presence of uncertain (i.e., unreliable) emissions data?

This is not to say this has not been examined at all. In fact, companies and coalitions have been using various qualitative and quantitative approaches, including hybrid approaches,³⁰ where the top-down EEIO-based approach first is used to quickly identify so-called hotspots in the supply chain³¹, allowing for deeper dives within the hotspots using the bottom-up process-based approach.

BSR has taken an important first step in this direction, by identifying a three-step process for the so-called carbon leaders, to be implemented in collaboration with supply chain (and other) partners, as follows: one, map the value chain and develop a reverse sourcing approach; two, demonstrate emissions reductions through pilot projects; and three, scale up through engaging value chain partners and peers. Step one goes beyond supply chain mapping to identifying emission hotspots as well as emission reduction opportunities, and then steps two and three involve recursively assigning and managing the emission reduction responsibilities with suppliers that are increasingly upstream in the value chain.

There can be many ways to engage partners, including monitoring, information sharing, rewarding, and penalizing partners;³² as well as risk sharing via co-investing, offtake agreements, etc..³³ Here, game theoretic approaches,

27 Kalesnik V, Wilkens M, Zink J, 2020. Green Data or Greenwashing? Do Corporate Carbon Emissions Data Enable Investors to Mitigate Climate Change? Working paper. Available at <https://ioandc.com/wp-content/uploads/2020/11/3-Research-Affiliates-carbon-paper.pdf>

28 IOSCO, 2021. Need for Sustainability Disclosure Standards. Available at [IOSCO sees an urgent need for globally consistent, comparable, and reliable sustainability disclosure standards and announces its priorities and vision for a Sustainability Standards Board under the IFRS Foundation](https://www.iosco.org/secretariat/publications/Pages/IOSCO-sees-an-urgent-need-for-globally-consistent-comparable-and-reliable-sustainability-disclosure-standards-and-announces-its-priorities-and-vision-for-a-Sustainability-Standards-Board-under-the-IFRS-Foundation.aspx)

29 SBTi, 2018. Best Practices in Scope 3 Greenhouse Gas Management. Available at <https://sciencebasedtargets.org/wp-content/uploads/2018/12/SBT-Value-Chain-Report-1.pdf>

30 Agez M, Bettez G M, Margni M, Stromann A, Samson R, 2019. Lifting the Veil on the Correction of Double Counting Incident in Hybrid Lifecycle Assessments. *Journal of Industrial Ecology*, 24 (6): 517-533.

31 Huang Y A, Weber C, Mathews H S, 2009. Categorization of Scope 3 Emissions for Streamlined Enterprise Carbon Footprinting. *Environ Sci Tech*, 43 (22): 8509-8515.

32 Huang et al, 2020. *Ibid.*

33 WEF, 2021. *Ibid.*

in presence of a carbon leader, using an internal carbon tax for rewarding (and penalizing) partners should be explored in more detail in practice.³⁴

However, these steps leave some of the previously identified questions unanswered. For example, Step one leaves an open question around the possibility of focusing on non-hotspots in the interim due to the uncertain information. Similarly, steps two and three leave an open question around how well these schemes would work in presence of uncertain information. These open questions would require this process to be closely monitored and managed.

³⁴ Gopalakrishnan S, Granot D, Granot F, Susic G, Cui H, 2020. Incentives and Emission Responsibility Allocation in Supply Chains. Management Science.