

Supply chain carbon briefing

GHG Protocol Scope 3 Standard

Measuring indirect carbon emissions to build more sustainable business models and brands



TRUCOST PLC

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Introduction

Forward-thinking companies are assessing carbon emissions from supply chains to improve transparency and identify exposure to increasing carbon and energy costs.

For most companies, suppliers are responsible for the majority of their emissions, so managing carbon in supply chains is vital to develop more sustainable business models and brands. Furthermore, companies that measure and reduce supply chain emissions are using low-carbon credentials to attract customers and improve access to capital.

Business intelligence on energy use and emissions embedded in supply chains can be used to improve efficiency and risk management, revealing opportunities to gain competitive advantage. Companies are also starting to measure carbon in supply chains to strengthen sustainability, supply chain management and brand value. Emissions are largely measured in line with the Greenhouse Gas Protocol Corporate Accounting Standard, which breaks down emissions into Scope 1 for operations, Scope 2 for purchased electricity, and Scope 3 for activities such as the extraction and production of purchased materials.

Many organisations are grappling with the challenge of measuring supply chain carbon emissions due to their long and complex supply chains. To help organisations measure upstream and downstream supply chain emissions, the GHG Protocol Initiative launched a Scope 3 Standard in 2011. The guidance advises companies to use secondary data such as input-output (IO) modelling for a high-level overview of emissions, so that primary data collection can focus on high-impact suppliers.

As a member of a technical working group, Trucost advised on development of the standard.

Trucost has already engaged with many thousands of suppliers on behalf of clients and analysed billions of expenditure globally. Based on this experience, we have seen the following trends at companies measuring carbon in supply chains and using the intelligence gained to inform decision-making.

1 Information on carbon ‘hot spots’ is helping to make Scope 3 measurement more efficient

Secondary data such as input-output modelling are being used to identify the main sources of greenhouse gas (GHG) emissions from suppliers. Findings help prioritise suppliers for engagement up front, making data collection more time and cost effective.

2 Engagement programmes are becoming more supportive

Communication with suppliers is helping to develop their capacity to monitor, report and reduce emissions. This is increasing transparency, accountability and the ability of companies to manage emissions.

3 More granular data is enabling benchmarking of suppliers on carbon performance

Availability of more accurate and standardised data is making it easier to compare the carbon performance of suppliers and identify exposure to outliers.

4 Financial modelling is being used to assess the materiality of carbon

Carbon prices are being applied to suppliers’ emissions to understand exposure to future carbon costs that are likely to be passed through in higher input prices.

5 Primary and modelled data are being combined to make product life cycle analysis (LCA) more efficient

A hybrid input-output LCA approach is making in-depth product LCAs more focused and cost effective.

6 Baselines are being set for carbon management and reporting

Energy and carbon data are being used to set baselines and inform plans to cut supply chain emissions. Firms are starting to monitor emissions annually to track progress and report results publicly.

7 Measuring carbon can shed light on other environmental risks and opportunities in supply chains

An understanding of how suppliers’ use of resources contributes to carbon emissions can strengthen strategies to monitor and manage exposure to increasing energy, raw materials and pollution costs.

Durban Platform outcomes

Thirty-eight industrialised countries are among Governments that will have binding targets to cut GHG emissions from 1990 levels under a second commitment period of the UN Kyoto Protocol from 2013. Developed and developing countries agreed to adopt a universal legal agreement on climate change by 2015 at the latest. So far, governments have set voluntary targets to reduce emissions by 2020. Developed country targets range from 5% for Australia to 40% for Germany and Switzerland.¹ Countries including China, India, Brazil and South Africa have agreed “nationally appropriate mitigation actions” (NAMAs²) to cut emissions. Governments worldwide are using regulations and market-based policies to cut GHG emissions and build climate-resilient economies.

Why measure supply chain carbon?

“Trucost data shows that for 60% of companies in the MSCI World Index, at least 75% of emissions are from supply chains”

Why are companies measuring carbon in supply chains?

Emissions from international trade have increased by more than 80% since 1990.³ Outsourcing to companies in regions with more carbon-intensive power generation and manufacturing, combined with greater fuel use for transport, can increase exposure to carbon emissions. Emissions in supply chains typically make up the largest part of a corporate carbon footprint for most companies. For instance, Trucost data shows that for 60% companies in the MSCI World Index, at least 75% of emissions are from supply chains.

Improving efficiency

Measuring supply chain emissions can provide business intelligence on resource use, processes and products that can be used to improve efficiency and drive bottom up cost savings. For instance, **Wal-Mart Stores Inc.’s** initiative to reduce packaging in its supply chain by 5% by 2013 is expected to cut GHG emissions by more than 600,000 tonnes and deliver more than US\$3.4 bn in cost savings.⁴ The retailer is working with suppliers to cut GHG emissions from its supply chain by 20 million tonnes by the end of 2015. Carbon cutting measures are expected to reduce supplier costs and lower the costs of goods, helping Wal-Mart to retain market share.

Since the majority of GHG emissions are carbon dioxide (CO₂) from fossil fuel combustion, companies that cut carbon can benefit from lower energy costs. More than one-third of companies that responded to the 2011 Carbon Disclosure Project (CDP) supply chain information request have benefited from financial savings – or new revenue streams.⁵

“Companies will increasingly need to report and reduce emissions to compete for public and private sector business”

Creating business opportunities

Carbon data are being used to support client retention and develop low-carbon products and services. Brand-based carbon management can help raise awareness and strengthen customer loyalty. Moves by retailers such as **Wal-Mart**, **Tesco Plc** and **J Sainsbury Plc** to measure and reduce supply chain and product carbon footprints are spurring suppliers to strengthen carbon management. In turn, consumer goods companies such as **Unilever** and **Procter & Gamble** have begun to assess sustainability-related risks and opportunities through their own suppliers.

Carbon metrics will become part of brand value in markets including the UK, France, Japan and South Korea, where carbon and environmental labelling is being developed. France is currently trialling environmental labelling under its Grenelle 2 law on environmental protection, with more than 160 retailers and manufacturers displaying information on indicators including CO₂ on products. The European Commission is considering requiring products or services to have environmental labels, with criteria linked to production processes.

The Commission is also developing procurement policies on the environmental footprints of organisations and products.⁶ Legislation covering more than €420 billion (US\$546 bn⁷) in EU procurement supports the shift to a resource-efficient and low-carbon economy.⁸ And the U.S. is among countries that include carbon as a metric in public procurement standards. U.S. Federal agencies with procurement budgets of more than US\$500 bn must reduce the environmental impacts of expenditure, prioritising GHG emissions.⁹ Taxpayers are expected to benefit from energy and cost savings.

Companies will increasingly need to report and reduce emissions to compete for public and private sector business. Ratings such as the **Newsweek Green Rankings** assess corporate reporting on supply chain emissions. Brand management and sustainable supply chain management go hand in hand, and need robust data to support communications and strategies. Understanding which direct and indirect suppliers are responsible for the majority of emissions can strengthen business models, accountability, supply chain management and employee satisfaction.

Managing regulatory risk

Supplier carbon emissions will be increasingly covered by national climate change policies, after more than 190 countries agreed under the UN “Durban Platform” of December 2011 to back a legal agreement that will require them to limit GHGs (see page 5). Measures such as emissions trading, already in place in the EU and New Zealand, will soon cover industries in countries including China and Australia. Energy-intensive suppliers will try to pass on carbon costs.

With economy-wide cap-and-trade programmes limited to California in the United States, regulations such as carbon performance standards will be used to ensure industries

“We have been actively exploring ways to efficiently allocate capital to investments that could outperform in times of higher carbon prices”

Helen Winch, Head of Policy at BT Pension Scheme



help achieve a national target to cut emissions by 17% from 1990 levels by 2020. Transport and logistics costs will rise as suppliers, including airlines, pass on carbon costs in higher freight and business travel costs.¹⁰ The inclusion of international flights to and from Europe under the EU Emission Trading System (EU ETS) from January 2012 has already led to concerns about the competitiveness of exports from countries including China.

Furthermore, governments are under pressure to cut over US\$400 billion in fossil fuel subsidies, which would add to already high energy prices.¹¹ Cutting emissions can reduce exposure to higher fuel costs in the short-term, while managing medium- to long-term risks from emissions under climate change policy measures. Fragmented policies to cut carbon across countries and regions over the next eight years will make it more important for most companies to understand where GHGs are emitted across supply chains.

Improving access to capital

The **Carbon Disclosure Project** (CDP) asks companies for information on climate change on behalf of more than 530 investors globally. Trucost has assessed the emissions associated with funds worth US\$2.7 trillion on behalf of investors seeking to manage carbon risk. **British Telecom's Pension Scheme**, one of the UK's largest, recently invested £100 million in the **Legal and General Investment Management UK Equity Carbon Optimised Index Fund**, driven by Trucost data. Helene Winch, Head of Policy at BT Pension Scheme, said, “As part of our ongoing analysis of the potential impacts of climate risk on our portfolio of assets, we have been actively exploring ways to efficiently allocate capital to investments that could outperform in times of higher carbon prices, particularly as a result of policy moving towards a low-carbon economy.”

Measuring, reporting and reducing carbon emissions from operations and critical suppliers could help reduce the cost of capital.¹² Credit rating agency **Standard & Poor's** is developing an approach to analyse carbon risk by taking account of direct and supply chain emissions, including the embedded cost of carbon in raw materials, policymaking to set carbon prices, abatement opportunities and cost pass through. S&P plans to incorporate carbon risk into its rating methodology for all companies, focusing first on the most exposed industries including Oil & Gas, Transportation, Metals & Mining, Construction Materials and Chemicals.

Identifying sustainability issues

Processes used to measure energy and carbon in supply chains can extend to other sustainability issues such as water risks and exposure to rising resource and waste costs. An understanding of how suppliers' use of resources contributes to carbon emissions can strengthen strategies to monitor and manage exposure to energy, raw materials and pollution costs.

Forward-thinking companies are using information on supply chain emissions to identify



“The E P&L is an essential tool and a shift in how companies can and should account for the true costs of their reliance on ecosystem services”

Jochen Zeitz,
Chairman of PUMA and
Chief Sustainability
Officer PPR



suppliers that could achieve carbon and cost savings by improving material, energy and resource efficiency. **PepsiCo** began discussing emissions management with suppliers through the CDP supply chain programme, which encourages companies to measure and manage GHG emissions in supply chains. This led to PepsiCo helping strategic suppliers to identify opportunities to cut energy and water use, as well as waste. **Kraft Foods** measured its supply chain environmental impacts in 2011, and found that farm commodities account for 60% of its carbon footprint. The food producer has since set a target to increase sustainable sourcing of agricultural commodities by 25% from 2010 levels by 2015.¹³

PUMA asked Trucost and PriceWaterhouseCoopers to measure and value GHG emissions, water use, waste generation, air pollution and land use change across its operations and supply chain. Findings revealed that suppliers were responsible for 85% of PUMA's GHG emissions. PUMA has used the data to become the first company worldwide to publish an environmental profit and loss (E P&L) account. “The E P&L is an essential tool and a shift in how companies can and should account for the true costs of their reliance on ecosystem services,” said Jochen Zeitz, Chairman of PUMA and Chief Sustainability Officer at **PPR**. “Gaining a better understanding of the source of the natural goods and services PUMA relies on and the declining availability of the basic resources required for our business growth, will help PUMA build a more resilient and sustainable business model and ultimately better manage its impacts on the environment.”¹⁴ PPR now plans to implement an E P&L across all of its luxury and sport & lifestyle global brands, including **Gucci** and **Yves Saint Laurent**, by 2015.¹⁵

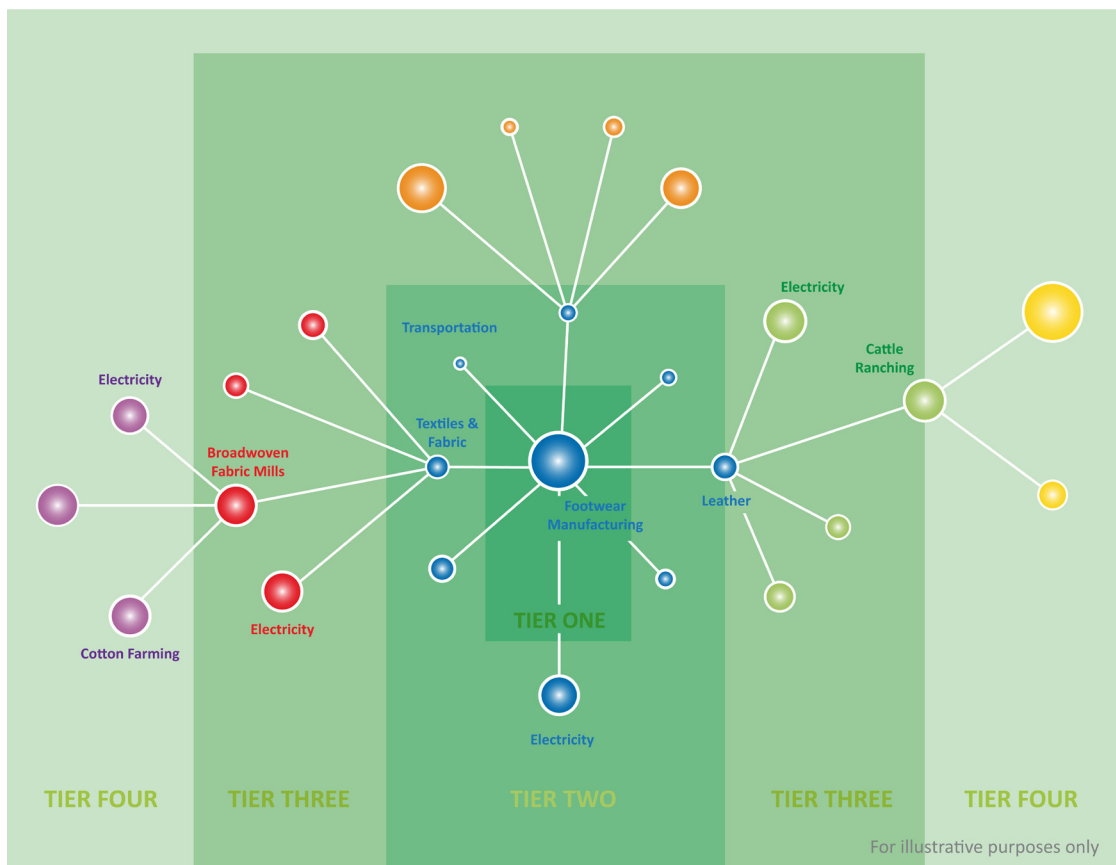
Increasing transparency and adhering to reporting guidance

Companies that measure carbon data in supply chains are better placed to communicate carbon audits to investors and customers through initiatives such as the CDP supply chain programme. Both the CDP and the Global Reporting Initiative G3 Guidelines encourage companies to collect information on GHG emissions from suppliers, in line with reporting standards developed by the Greenhouse Gas Protocol Initiative.¹⁶

The Initiative is behind the GHG Protocol Corporate Accounting and Reporting Standard (Corporate Standard), which underpins most carbon reporting guidance. The Corporate Standard breaks down emissions into three scopes to help identify sources and who is accountable for managing them. Direct emissions from operations that a company owns or controls are known as “Scope 1” and indirect emissions from purchased electricity are classified as “Scope 2”. An organisation’s indirect emissions from supply chains and products in use are known as “Scope 3”.

Growing demand for an internationally-accepted method to measure and report Scope 3 inventories has led to the development of a GHG Protocol Corporate Value Chain

Chart 1: Carbon intensity in PUMA's supply chain



(Scope 3) Accounting and Reporting Standard, also known as the Scope 3 Standard. A supplementary Product Life Cycle Accounting and Reporting Standard (Product Standard) was also launched in October 2011.

The voluntary Scope 3 Standard provides guidance for organisations to use a standardised approach to cost-effectively prepare and publicly report a GHG emissions inventory that includes indirect emissions from value chain activities. The main goal is to help organisations focus on the greatest GHG reduction opportunities.

Siemens, the **U.S. General Services Administration**, **Levi Strauss & Co**, **PepsiCo Inc**, **DuPont**, **Deutsche Telekom AG**, **Shell International Petroleum Company Ltd** and **Airbus** were among more than 60 companies that road tested the draft standards. They were developed over three years with the help of stakeholders including Trucost, which provided advice as a member of a technical working group. Trucost has analysed emissions from many thousands of companies in the supply chains of organisations including telecommunication firm **Sprint Nextel** (see page 11), and document technology company **Fuji Xerox Australia**. Cities, such as London, are also taking up the supply chain carbon challenge. Uptake of the standards will help improve accuracy and transparency on carbon disclosures across sectors.

Case study: Sprint gets the measure of carbon in its supply chain

“We believe Trucost’s approach is a breakthrough that finally facilitates a cost-effective, fast and timely assessment of a corporation’s supply chain carbon impact.”

Ralph Reid, Sprint Vice President, Corporate Social Responsibility



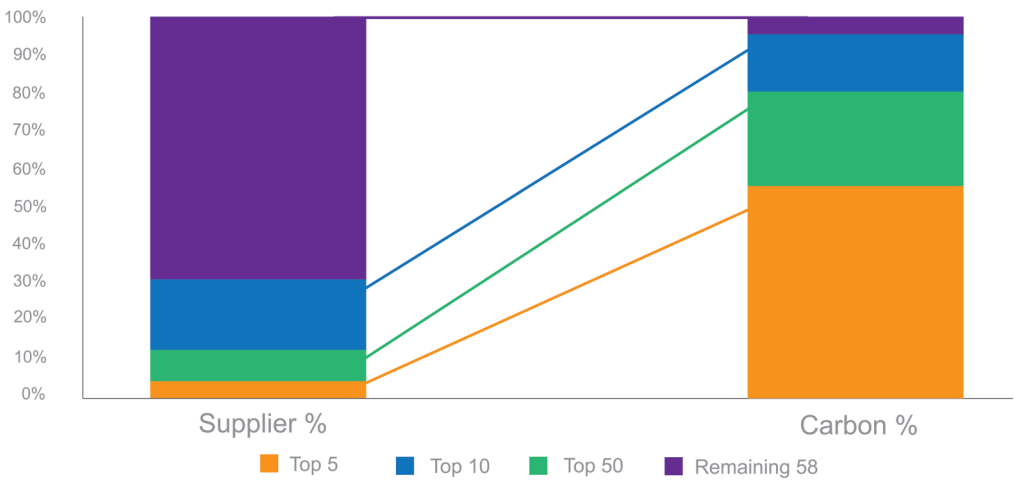
Sprint Nextel, ranked 3rd in **Newsweek’s Green Rankings** of the 500 largest companies in the U.S. in 2011, wanted to analyse the carbon footprint of its supply chain and identify high-impact suppliers and opportunities to cut emissions. Sprint commissioned Trucost to:

- Identify which companies contribute most to its supply chain emissions.
- Identify which sectors contribute most to its supply chain emissions.
- Assess how well suppliers disclose their environmental impacts.

A four-week initial assessment used verified and modelled carbon emissions data to calculate Sprint Nextel’s supply chain footprint. Verified carbon emission data on 34 of Sprint’s suppliers represented 81% of its supply chain carbon emissions and 70% of the expenditure analysed in its purchase ledger. Trucost used advanced IO modelling techniques to calculate likely carbon emissions data for the remaining suppliers.

Trucost broke down the supply chain carbon footprint by sector and identified carbon-intensive suppliers. Findings showed that three sectors with 121 of Nextel’s 162 suppliers contributed over 90% of the total carbon footprint and expenditure. The analysis revealed which 50 suppliers could be key to reducing Sprint’s carbon footprint (see Chart 2). Sprint can use this information to develop a low-carbon procurement strategy.

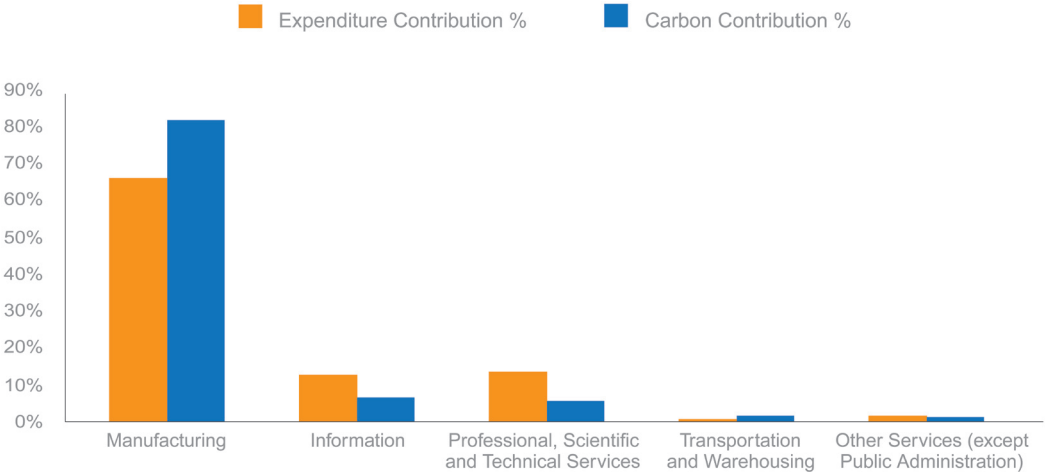
Chart 2: Distribution of carbon throughout Sprint’s supply chain



Ralph Reid, Sprint Vice President, Corporate Social Responsibility said, “We believe Trucost’s approach is a breakthrough that finally facilitates a cost-effective, fast and timely assessment of a corporation’s supply chain carbon impact. The barriers to completing a supply chain carbon assessment have been substantial, preventing most corporations from taking this important step in understanding their total carbon impact.”

Sprint has since joined the WWF Climate Savers partnership of 25 companies working to reduce carbon dioxide emissions. In October 2011, Sprint became the first U.S. company in the program to set a target to reduce GHG emissions from operations, suppliers and customers. The company aims to cut emissions by 20% from 2007 levels by 2017, with 95% of reductions expected to come from indirect emissions.

Chart 3: Top ICB sectors by contribution to the carbon footprint



How to capture and use carbon data?

“By addressing GHG emissions, companies can identify opportunities to bolster their bottom line, reduce risk, and discover competitive advantage.”

GHG Protocol Corporate Value Chain (Scope 3) Accounting and Reporting Standard

Measuring emissions in line with the Scope 3 standard

The Scope 3 Standard states that GHG accounting for Scope 1, 2 and 3 emissions should be based on the principles of relevance, completeness, consistency, transparency and accuracy. Björn Stigson, President of World Business Council for Sustainable Development said, “The new standards provide companies with a comprehensive view of the emissions produced when making a product and across the value chain. They will help companies make better business decisions and stimulate innovation of products and production methods.”

The standard outlines four steps to collect and evaluate data for Scope 3 emissions inventories:

- 1 Prioritise data collection efforts
- 2 Select data
- 3 Collect data and fill data gaps
- 4 Improve data quality over time

It outlines 15 categories to identify boundaries for Scope 3 emissions (see page 14). Organisations may want to differentiate more clearly between the carbon footprints of supply chains, products and investment portfolios, to reflect differences in methodologies to account for carbon from each business area.

Scope 3 Standard in a nutshell

What does it cover?

Indirect emissions, excluding those from purchased electricity (Scope 2). The indirect emissions covered result from activities of the company, but occur from sources that it does not own or control. E.g. The extraction and production of purchased materials; transportation of purchased fuels; and use of sold products and services. The standard divides Scope 3 emissions in value chains into 15 categories:

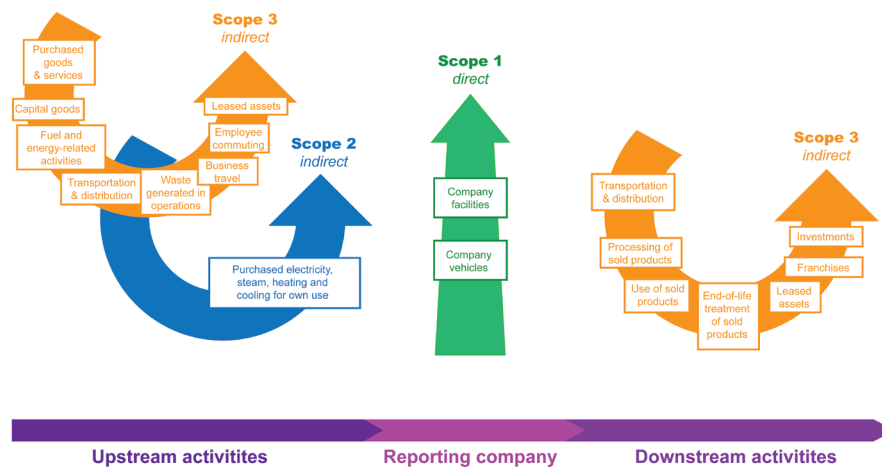
Upstream or downstream

- 1 Purchased goods and services
- 2 Capital goods
- 3 Fuel- and energy-related activities (not included in Scopes 1 and 2)
- 4 Upstream transportation and distribution
- 5 Waste generated in operations
- 6 Business travel
- 7 Employee commuting
- 8 Upstream leased assets

Downstream

- 9 Downstream transportation and distribution
- 10 Processing of sold products
- 11 Use of sold products
- 12 End-of-life treatment of sold products
- 13 Downstream leased assets
- 14 Franchises
- 15 Investments

Figure 1: Overview of GHG Protocol scopes and emissions across the value chain



**“Trucost’s
IO analysis
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chain GHG
emissions”**

Starting out

The most common question raised by those looking to report in line with the Scope 3 Standard is “where do we start?”. The standard’s 15 Scope 3 categories (see page 14) add a necessary level of complexity, but this can be quickly resolved with the help of tools that prioritise categories of emission that are most significant.

Trucost has worked with clients to identify high-impact Scope 3 categories using routinely collected expenditure, product, and/or investment information. Trucost provides a fast calculation of upstream emissions through a combination of its IO model and Environmental Register, Trucost’s database of environmental disclosures from many thousands of companies globally. Downstream emissions categories are assessed via readily available LCA analysis data. Combining these two research techniques provides the most efficient and complete approach to Scope 3 assessments for any organisation.

Collecting data

Under the Scope 3 Standard, organisations should collect high quality, primary data for identified high priority activities. To do this, companies are likely to be required to engage with suppliers, a critical part of their value chain but data collection can be challenging and time consuming. Response rates to requests for information in supplier engagement programmes are typically around 40%. The standard says that the most rigorous approach to prioritising data collection efforts is to estimate GHG emissions to determine which activities are expected to be most significant.

It highlights the advantages of using secondary data to prioritise primary data collection from suppliers and track emissions from minor sources. For instance, organisations can calculate Scope 3 inventories using industry-average data (e.g. from IO data, government statistics, literature studies, and industry associations) and financial data.¹⁷ Companies may use proxy data by using specific data from one activity in the value chain to estimate emissions for another activity (e.g. data on expenditure on construction can be used to estimate related emissions from aggregate mining).

Using secondary data

IO modelling is a well-established starting point to focus data collection on suppliers that are critical to an organisation’s Scope 3 carbon footprint. For instance, during the trial of the draft Scope 3 Standard, **Siemens** used an IO model to evaluate upstream carbon emissions, before taking a more detailed approach for specific suppliers.¹⁸ Trucost’s IO analysis typically finds that 20% of suppliers account for 80% of total supply chain GHG emissions. These suppliers are highlighted as a priority area for companies, ensuring that supplier engagement is optimised in terms of its focus and impact.

Companies can use IO analysis to create a snapshot of the carbon impacts of direct (tier 1) suppliers, as well as impacts further upstream, relatively quickly. Trucost’s advanced IO model, overseen by an academic advisory panel, combines financial data with sector-specific carbon data to identify which sectors generate the majority of

“Trucost’s IO model identifies hot spots in companies’ supply chains for CDP’s Supply Chain Programme”

emissions in a given supply chain. The model uses extensive government census and survey data and information on pollutant releases from national emissions registries to calculate a company’s supply chain carbon footprint.

Initial estimates based on spend with suppliers in different sectors can be used to identify GHG levels throughout supply chains. Suppliers can be prioritised based on the level of their direct emissions, as well as those further up the supply chain. Average carbon intensity, measured as emissions relative to expenditure, can be used to identify which industries to focus on. For example, a clothing manufacturer can compare the carbon impact of cotton farming and textile production, and may find dye houses are more of a “carbon hot spot” than stitching factories. Trucost’s model identifies carbon hot spots in supply chains, so that suppliers can be prioritised for engagement up front, making data collection and auditing more cost effective. As an example, Charts 3 and 4 show the average breakdown of sources of emissions in the General Merchandising sector. In this case, 57% of emissions were from suppliers, with manufacturing contributing almost one-third of these. Trucost also helps select companies for audits by assessing suppliers’ carbon reporting against the Greenhouse Gas Protocol Corporate Accounting Standard to identify gaps in carbon disclosure, based on verified data in Trucost’s Environmental Register of many thousands of companies. Companies are using readily-available data on carbon disclosures to focus efforts on the main sources of emissions that do not publicly disclose data.

Chart 3: Scope 3 GHGs in the General Merchandising sector

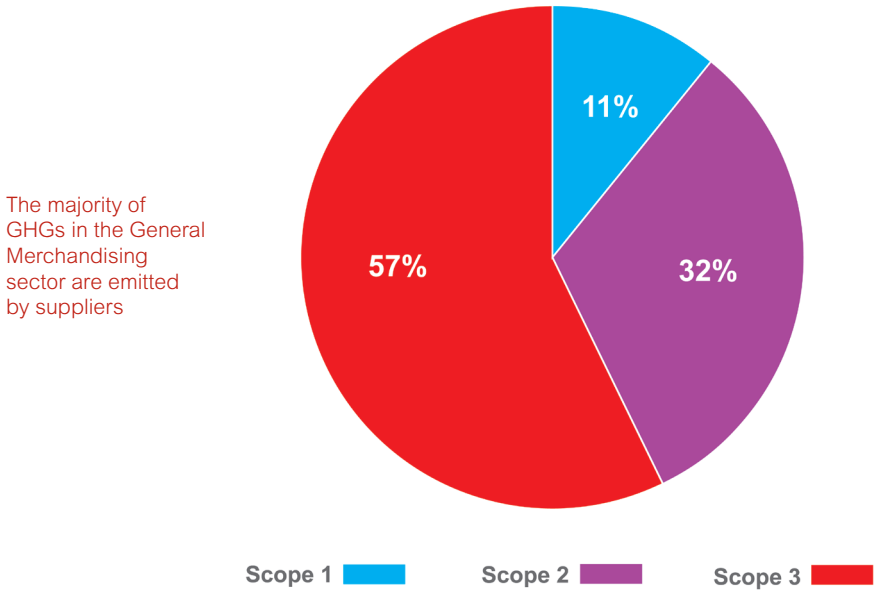
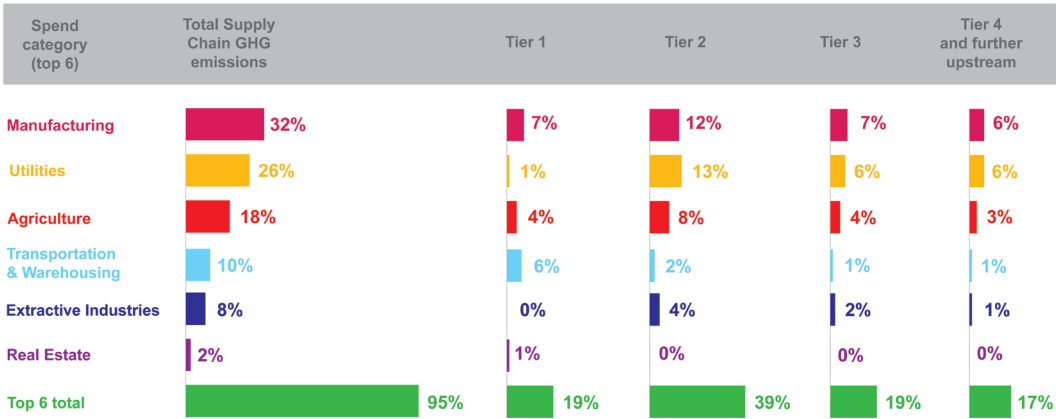


Chart 4: Percentage contribution of top 6 sectors to Scope 3 GHG emissions



Engaging with suppliers

Gathering accurate and comparable data can be challenging, given the often long and complex supply chains of large organisations. The Carbon Disclosure Project formed a partnership with Trucost to enable its clients to use IO modelling to identify high risk suppliers for the CDP supply chain programme. Frances Way, Head of CDP Supply Chain said, “Carbon management is a vital part of supplier engagement and for a number of years companies have been working with CDP to develop strategies that address carbon emissions in their supply chain. This offering enables companies to concentrate efforts where they can best minimise business risk and reduce environmental impact.” The partnership makes it easier for companies to measure, disclose and manage GHG emissions from suppliers. Trucost’s IO model identifies hot spots in companies’ supply chains for CDP’s Supply Chain Programme.

To calculate a carbon footprint, suppliers need data on energy use and refrigerant leakage. Providing guidance and advice on carbon reporting can enable suppliers to monitor and report emissions. Trucost uses an online portal to collect data on the six GHGs covered by the UN Kyoto Protocol. Suppliers can call a helpdesk for advice on carbon accounting to improve response rates. Communication can be co-ordinated with buyers to encourage suppliers to respond. Trucost also advises companies on how they can use internal systems and processes to capture relevant data.

Expectations are growing for companies to engage with suppliers and support them through capacity building. For instance, engaging upstream suppliers to collect data is a key requirement of members of the Sustainable Apparel Coalition, launched in March 2011. It aims to develop a common, industry-wide tool for measuring the environmental

“Carbon prices based on market prices, damage costs or abatement costs are being applied to understand exposure to rising carbon costs”

and social performance of apparel products and supply chains. Members include **Adidas, Levi Strauss & Co** and sportlifestyle company **PUMA**.

Filling data gaps

The Scope 3 standard says that companies should report separately on total supplier Scope 1 and 2 emissions data. It provides guidance on using secondary data to fill data gaps. Organisations can extrapolate proxy data, using IO models that estimate GHG emissions from the production and upstream supply chain activities of different sectors. Trucost's advanced IO model and Environmental Register provide standardised company data to fill in gaps.

Suppliers' emissions can be allocated to the reporting company using a consistent metric. For instance, where a company purchases components from a supplier that manufactures a variety of products for different customers, the supplier's emissions data can be allocated to the buyer based on its purchases as a share of total supplier production.

Making supply chain environmental accounting more credible

The Scope 3 Standard states that reporting companies should clarify the percentage of emissions calculated using primary data from suppliers or other value chain partners. Companies that are auditing data collected and strengthening processes to analyse information are making supply chain carbon measurement more robust. More rigorous research and data collection to assess emissions can provide evidence for carbon management and sustainable procurement strategies. Supply chain carbon accounting projects are increasing transparency, accountability and the ability of companies to monitor emissions in their value chains.

Understanding supplier performance

Our experience has shown that it is useful for buyers to focus carbon measurement and management on suppliers that could deliver the greatest energy and carbon savings cost-effectively. Collecting more accurate and standardised data is making it easier to compare the carbon performance of suppliers and to identify exposure to outliers. Data collected can be used to compare suppliers against their peers on their absolute emissions and carbon intensities – measured as emissions relative to revenue or expenditure. More precise GHG accounting is being used to benchmark suppliers' emissions profiles against sector averages.

Assessing the materiality of carbon

Carbon prices based on market prices, damage costs or abatement costs are being applied to understand exposure to rising carbon costs. The McKinsey abatement cost curve can be used to identify cost-effective emissions reductions across suppliers.¹⁹ It shows that more than one-third of abatement measures, including improving the efficiency of lighting, electronics and motor systems and switching to biofuels, can

deliver cost savings. Abatement costs can be adjusted to different sectors in the supply chain and applied to emissions data to develop an organisational or supply chain-specific marginal abatement cost curve. This can help ensure carbon efficiency is locked into procurement and capital expenditure plans and carbon liabilities or savings are accounted for.

Carbon costs can be measured relative to financial metrics such as revenue and earnings before interest, taxation, depreciation and amortisation (EBITDA), operating expenditure or capital expenditure. Suppliers that are more exposed to carbon costs than sector peers are likely to have greater upward pricing pressure (see Table 1, above). Suppliers that implement electricity savings and energy efficiency measures while shifting to low-carbon power supplies stand to gain competitive advantage as their energy- and carbon-intensive sector peers seek to pass on rising input costs in higher prices. Data on energy use can be used to model exposure to rising energy prices.

Table 1: GHG Protocol corporate standard scopes and potential exposure to carbon costs

Scope	Sources	Carbon risk quantified	Included in Trucost analysis
1	Direct emissions caused by a company's refrigerant use, fuel combustion and owned or controlled industrial processes.	Direct operational exposure to carbon costs.	Yes
2	Indirect emissions from purchased electricity	Exposure to carbon costs passed on by electricity suppliers in utility bills.	Yes
3	Indirect emissions from other sources not owned or controlled by the company, such as suppliers.	Exposure to carbon costs passed on by direct suppliers and through supply chains.	Yes
	Products in use	Potential downstream carbon costs that could affect competitiveness on pricing (e.g. vehicles use)	Optional as part of life cycle analysis.

Applying LCA data

The hot spots identified through Trucost's IO model can be used to identify areas for in-depth LCA of products. LCA takes a bottom-up approach to tracing all environmental impacts through the whole life cycle of a product from cradle-to-grave, including raw material extraction, processing/manufacturing, packaging and distribution, use and disposal. LCA investigates the inputs and outputs of a system, looking at impacts including GHG emissions.

“The hot spots identified through Trucost’s IO model can be used to identify areas for in-depth LCA”

Supply chain analysis can provide information on impacts from cradle-to-gate. IO modelling highlights high-impact areas in the supply of raw materials, production, packaging, transportation, storage, use and disposal to identify where investment in LCA could provide the greatest benefit. Trucost has begun to conduct “tiered” hybrid analysis, combining process LCA and IO modelling to quantify a company’s operational and supply chain GHG emissions. This approach can include granular data specific to a particular supply chain in emissions inventories, which can feed into carbon labelling of products and services. A hybrid approach that includes high-level supply chain data is making in-depth product LCAs more focused and cost effective.

Informing carbon management

Companies are building on initial engagement projects by actively working with suppliers to set baselines and develop carbon management. The 2011 OECD Guidelines for Multinational Enterprises state that businesses should continually seek to improve the corporate environmental performance of supply chains, where appropriate.²⁰ To fully benefit from analysing Scope 3 data, companies work with suppliers that contribute most to their supply chain carbon footprints to address carbon risk.

Carbon data can shed light on inefficiencies in fuel and electricity use, cooling systems, production and transportation to prioritise carbon reduction measures that can also cut costs.

Understanding where and why carbon is being emitted can lead to innovation and identify opportunities to use less carbon-intensive fuels and processes to produce goods and services. Carbon data can inform decision-making on raw materials and components during product design.

Firms are starting to monitor supply chain emissions annually to track progress against carbon reduction commitments. Some companies are using incentives to recognise and reward improvements. For instance, **Levi Strauss & Co.** educates companies on low-carbon manufacturing and accredits those that improve carbon efficiency with labels. The firm uses a scorecard to highlight annual energy cost savings, investments and payback periods.

Sourcing alternative materials or components or switching suppliers could be used as a last resort if carbon-intensive suppliers fail to improve carbon efficiency. Integrating carbon data into procurement decisions can help shift purchasing to low-carbon suppliers and products.

Conclusions

Organisations can use findings from measuring carbon in supply chains to manage risk from increasing carbon and energy costs and prepare for low-carbon opportunities. Extending carbon management to procurement can uncover resource and process efficiencies that deliver cost savings, or help protect cash flows from increasing input costs. Measuring, reporting and reducing carbon emissions from operations and critical suppliers can help reduce the cost of capital. Forward-thinking organisations are including measures to address supply chain carbon in climate change strategies. Working with critical suppliers to cut emissions can help strengthen supply chain management and brands. Organisations can take the following steps to measure their value chain GHG emissions and use carbon data to unlock competitive advantage:

Identify hot spots

- Use environmental input-output modelling to quantify your supply chain footprint efficiently and identify high impact suppliers for engagement programmes (in line with the GHG Protocol Scope 3 Standard).

Engage with suppliers

- Collect data/intelligence from high-impact suppliers.
- Share knowledge and build the capability of suppliers to monitor their carbon performance.
- Communicate climate change strategies to raise awareness and encourage suppliers to embed carbon management into operations and procurement.
- Support supplier implementation of best-in-class carbon-efficient technologies.

Benchmark suppliers

- Compare each supplier's carbon performance against sector benchmarks to identify outliers.
- Identify carbon-intensive suppliers to prioritise action to reduce supply chain emissions, and carbon-efficient suppliers to share good practice.
- Assess the financial materiality of carbon.
- Identify potential exposure to regional carbon costs passed on by suppliers through higher input prices.

Use financial modelling to assess the materiality of carbon

- Identify exposure to increasing carbon and energy costs likely to be passed through by suppliers in higher input prices.
- Understand opportunities to gain first mover advantage in reducing emissions in high impact areas

Use data collection to make product life cycle analyses (LCAs) more efficient

- Identify carbon performance within individual product lines and production cycles.
- Combine input-output modelling with LCA analysis in high-impact areas for more detailed assessments of products.

Use data to inform carbon management and reporting

- Use a carbon footprint baseline to set carbon reduction targets for procurement.
- Analyse data on the variations of supplier carbon performance to identify opportunities to reduce emissions by improving resource and process efficiency.
- Use emissions data in external reporting and communication, including reporting to the CDP, to improve access to capital and demonstrate robust environmental credentials to customers.

Expand carbon accounting to track resource and pollution risks

- Assess supply chain exposure to upward pricing pressures from rising raw materials, energy and pollution costs.
- Develop strategies to manage these risks and improve sustainability across different tiers of the supply chain.

Footnotes

- ¹ Developed country targets for 2020 http://unfccc.int/resource/docs/2011/sb_eng/inf01r01.pdf
- ² Developing country nationally appropriate mitigation actions and targets for 2020 <http://unfccc.int/resource/docs/2011/awglca14/eng/inf01.pdf>
- ³ Peters, G.P. et al (May 2012) Growth in emission transfers via international trade from 1990 to 2008, <http://www.pnas.org/content/early/2011/04/19/1006388108#cited-by>, accessed 2 February 2012
- ⁴ <http://www.awarenessintoaction.com/whitepapers/Wal-Mart-Supply-Chain-Packaging-Scorecard-sustainability.html>
- ⁵ CDP Supply Chain Report 2012
- ⁶ Exchange rate 1.30031 as of 3 January 2012, Oanda.com
- ⁷ <http://europa.eu/rapid/pressReleasesAction.do?reference=MEMO/11/931&format=HTML>, accessed 4 January 2012
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- ⁹ <http://www.epa.gov/greeningepa/documents/sspp2011.pdf>
- ¹⁰ EU wins ETS court case against US airlines, ENDS Europe, 21 December 2011
- ¹¹ http://www.worldenergyoutlook.org/docs/weo2011/executive_summary.pdf, accessed 4 January 2012
- ¹² <http://www.trucost.com/article/35/environmental-outperformance-attracts-capital>, accessed 4 January 2012
- ¹³ <http://www.kraftfoodscompany.com/SiteCollectionDocuments/pdf/PR-KFTLandAirWaterFootprinting.pdf>
- ¹⁴ http://vision.puma.com/us/en/?source=marketing_pumacom_en_pumavision_navbar, accessed 6 June 2011
- ¹⁵ <http://www.ppr.com/en/press/press-releases/ppr-commits-group-environmental-profit-loss-account-2015>
- ¹⁶ Led by the World Resources Institute and World Business Council for Sustainable Development
- ¹⁷ Corporate Value Chain (Scope 3) Accounting and Reporting Standard, Greenhouse Gas Protocol, WRI and WBCSD, September 2011
- ¹⁸ Setting a supply chain standard, Environmental Finance, 4 March 2011
- ¹⁹ McKinsey & Company, Impact of the financial crisis on carbon economics, Version 2.1 of the Global Greenhouse Gas Abatement Cost Curve, 2010
- ²⁰ OECD (2011) OECD Guidelines for Multinational Enterprises, OECD Publishing

Websites last accessed 14th February 2012

About Trucost

Over the past 10 years, Trucost has researched, standardised and validated the world's most comprehensive data on corporate environmental impacts, including carbon emissions, water usage, waste disposal, pollutants and natural resource use. This provides Trucost's clients with:

- The most efficient approach to measuring carbon and wider environmental impacts across operations and supply chain tiers;
- Clear identification of focus areas for reducing material environmental risks;
- Validation of source data, including completion of gaps in data which are currently not being tracked or reported;
- Comparison of environmental performance against peers, suppliers and sector benchmarks

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