Trucost
ESG Analysis

S&P Global

Tennant Company Value Chain Footprint

Financial Year 2019

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Introduction

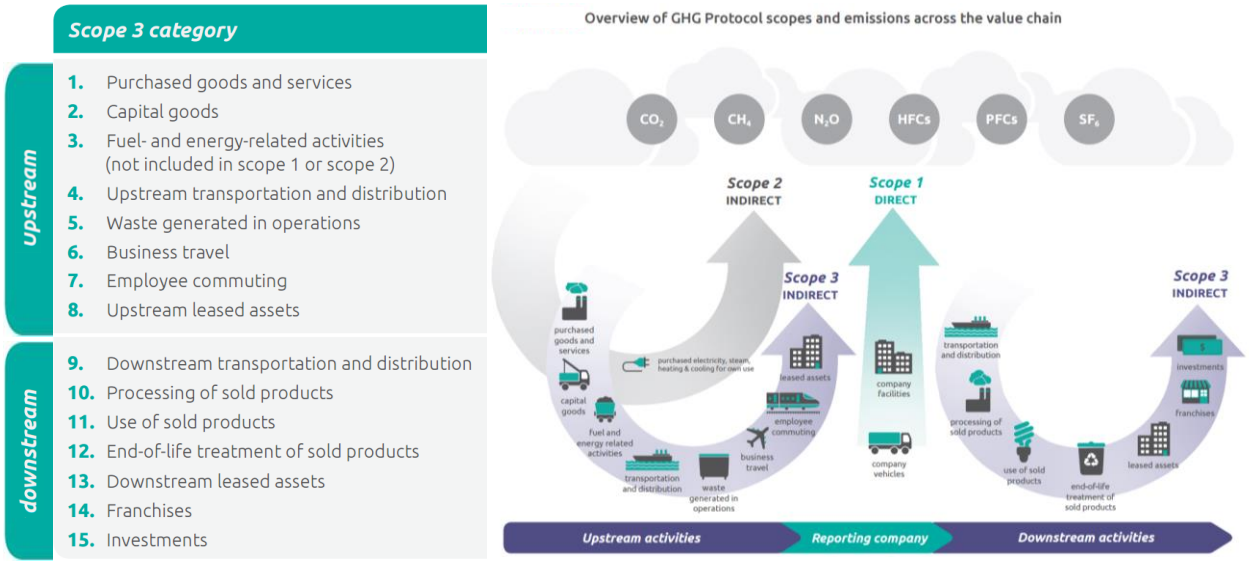
Tennant Company (henceforth Tennant) engaged Trucost to assess its value chain greenhouse gas (GHG) emissions in line with the WRI/WBCSD Corporate Value Chain (scope 3) Guidelines (GHG Protocol). The assessment allows Tennant to report its emissions according to the fifteen scope 3 categories outlined in the Guidelines.

Tennant has already been reporting its GHG emissions to CDP for multiple years. This project supports Tennant's ongoing efforts in GHG emissions disclosure by calculating and modeling its scope 3 emissions. Using data provided by Tennant and Trucost's database of GHG emissions by industry sector and business activity, Trucost calculated the GHG footprint for four Scope 3 GHG emission categories and combined this with other relevant Scope 3 categories calculated by Tennant independently, to create a value chain emissions profile including all relevant scope 3 categories. Finally, Trucost identified opportunities for potential emission reductions within Tennant's value chain.

Project Scope

Exhibit 1 below outlines the GHG Protocol's fifteen upstream and downstream scope 3 categories. Trucost estimated the GHG emissions of each category using the Trucost Environmentally Extended Input-Output (EEI-O) model along with primary data, where available, for all upstream and downstream categories. Primary data included Tennant's spend combined with the EEI-O model to estimate impacts, as well as existing research conducted by Tennant related to its GHG emissions.

Exhibit 1: Scope of value chain GHG emissions footprint[1]



[1] Figure from the GHG Protocol's *Corporate Value Chain (Scope 3) Accounting and Reporting Standard*

Trucost calculated the GHG footprint for five Scope 3 GHG emission categories, namely:

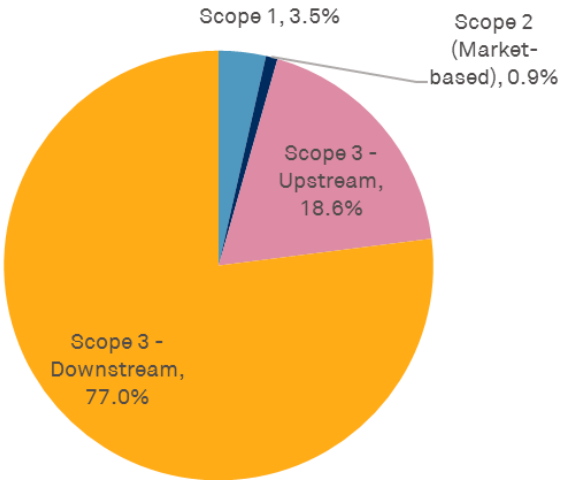
- 1: Purchased goods and services
- 2: Capital Goods
- 4: Upstream transportation and distribution
- 6: Business Travel
- 7: Employee commuting

Furthermore, scope 1 and 2, and scope 3, category 11 Use of sold products, were calculated by Tennant and incorporated into the total figures.

Key findings

In FY2019, Tennant's value chain (scope 3) was responsible for an estimated 719,878 metric tons of GHG emissions (tCO_2e), which is approximately 96% of its total estimated GHG inventory of 753,187 tCO_2e. Exhibit 2 below displays the emissions split among scopes 1, 2, 3-upstream and 3-downstream, calculated to be approximately 26,686 tCO_2e (calculated by Tennant), 6,623 tCO_2e (market-based emissions calculated by Tennant), 139,949 tCO_2e (estimated by Trucost) and 579,929 tCO_2 (calculated by Tennant), respectively. Tennant shared its scope 1 and scope 2 and scope 3, category 11 calculated emissions, for Trucost's assurance of those emissions. Detailed figures can be seen in Exhibit 3.

Exhibit 2: Tennant value chain emissions by scope



The GHG Protocol Corporate Standard classifies a company's GHG emissions into three 'scopes'.

- ***Scope 1*** emissions are direct emissions from owned or controlled sources
- ***Scope 2*** emissions are indirect emissions from the generation of purchased energy
- ***Scope 3*** emissions are all indirect (not included in scope 2) that occur in the value chain of the reporting company, including both upstream and downstream emissions

Exhibit 3: Tennant value chain emissions by scope - detail

Source of emission	2019 GHG emissions (tCO_2e)	Percentage contribution
Scope 1	26,686	3.5%
Scope 2 (market based)	6,623	0.9%
Scope 3- upstream	139,949	18.6%
Scope 3 – downstream*	579,929	77.0%
Total	753,187	100.0%

* Scope 3, category 11 units are tCO_2

Exhibit 4 presents a detailed breakdown of Tennant's GHG emissions per scope 3 category, highlighting the hotspots with the greatest emissions. Tennant and Trucost identified three of the fifteen scope 3 categories as relevant, based on business activities and related GHG emissions.

There is a number of changes in methodological approach adopted in this year GHG footprint accounting:

- Scope 3, category 1: The analysis in 2018 used aggregate expenditure to quantify emissions in category 1; in the 2019 analysis, emissions from purchased goods and services were quantified based on a detailed analysis of every spend item from legacy Tennant business units. The emissions results in 2019 is therefore considered more accurate as it is based on more granular data. The analysis does not include IPC and Gaomei.
- Scope 3, categories 2 and 6: Emissions quantified 2018 and 2017 included emissions from capital goods (category 2) and business travel (category 6) but were allocated to purchased goods and services as no disaggregation was done. In the 2019 analysis, the relevant emissions are allocated to categories 2 and 6. The analysis does not include IPC and Gaomei.
- Scope 3, category 4: The analysis does not include IPC and Gaomei.
- Scope 3, category 7: Emissions from employee commuting includes employees from IPC and Gaomei as well.
- Scope 3, category 11: In 2019, emissions include products from Tennant legacy, IPC, and Gaomei; IPC and Gaomei are not included in 2018 and 2017 analysis. Units for category 11 emissions are tCO_2.

Exhibit 4: Tennant value chain GHG emissions, FY2019

Value chain (Scope 3) category	2019 GHG emissions (tCO_2e)	Percentage contribution to scope 3%	Materiality[2]	GHG social cost ($million)[3]
1) Purchased goods and services	108,450.0	15.1%	Material	$13.18
2) Capital goods	2,464.2	0.3%	Not Material	$0.3
3) Fuel- and energy-related activities	*	*	*	*
4) Upstream transportation and distribution	20,494.3	2.8%	Material	$2.49
5) Waste generated in operations	*	*	*	*
6) Business travel	521.4	0.1%	Not Material	$0.06
7) Employee commuting	8,019.1	1.1%	Material	$0.97
8) Upstream leased assets	*	*	*	*
9) Downstream transportation and distribution	*	*	*	*
10) Processing of sold products	*	*	*	*
11) Use of sold products^	579,929.1	80.6%	Material	$70.46
12) End-of-life treatment of sold products	*	*	*	*
13) Downstream leased assets	*	*	*	*
14) Franchises	*	*	*	*
15) Investment	*	*	*	*
TOTAL	719,878.1	100%		**$87.47**

* Tennant and Trucost determined this category to be not relevant to Tennant's business activities and did not estimate the associated GHG emissions.

^ Scope 3, category 11 units are tCO_2

As has been apparent in previous years, the majority of GHG emissions from Tennant's value chain are associated with downstream sources, most significantly, use of sold products which accounts for 80.6%.

[2] Relevance based on 1% threshold relative to total scope 3 emissions inventory.

[3] GHG social costs account for the societal impacts of GHG emissions; priced at $122/$tCO_2e$ in 2019. Source: USEPA: https://19january2017snapshot.epa.gov/climatechange/social-cost-carbon_.html

Year-on-year comparison

Tennant strives to refine methodological approach and improve performance each year. There is a number of changes in methodological approach adopted in this year GHG footprint accounting:

- Scope 3, category 1: The analysis in 2018 used aggregate expenditure to quantify emissions in category 1; in the 2019 analysis, emissions from purchased goods and services were quantified based on a detailed analysis of every spend item from Tennant's various business units. The emissions results in 2019 is therefore considered more accurate as it is based on more granular data.
- Scope 3, categories 2 and 6: Emissions quantified 2018 and 2017 included emissions from capital goods (category 2) and business travel (category 6) but were allocated to purchased goods and services as no disaggregation was done. In the 2019 analysis, the relevant emissions are allocated to categories 2 and 6.
- Scope 3, category 11: In 2019, emissions include products from Tennant legacy, IPC, and Gaomei; IPC and Gaomei are not included in 2018 and 2017 analysis. Units for category 11 emissions are tCO_2.

These methodological changes should be taken into account in the comparisons of GHG emissions across reporting years.

Exhibit 5: Tennant value chain GHG emissions, year-on-year

Emission Scope	Emission Source	Scope	2019 GHG Emissions (tCO_2e)	2018 GHG Emissions (tCO_2e)	2017 GHG Emissions (tCO_2e)
Scope 3, Category 1	Purchased goods and services	Legacy Tennant only	108,450	121,897#	111,145#
Scope 3, Category 2	Capital Goods		2,464		
Scope 3, Category 4	Upstream transportation		20,494	25,904	20,365
Scope 3, Category 6	Business Travel		521	N/A#	N/A#
Scope 3, Category 7	Employee commuting	Tennant Company, IPC, Gaomei	8,019	4,585	6,972
Scope 3, Category 11	Use of sold products		579,929^	367,529^	369,060^
Total			719,878	519,915	507,542

Emissions quantified 2018 and 2017 included emissions from capital goods and business travel but were allocated to purchased goods and services as no disaggregation was done.

^ In 2019, emissions from category 11 include products from Tennant legacy, IPC, and Gaomei; IPC and Gaomei are not included in 2018 and 2017 analysis. Units for category 11 emissions are tCO_2.

Emissions from category 1,2, 4 and 6 does not include IPC or Gaomei.

GHG emissions associated with purchased goods and services (and capital goods) have decreased by 9% and a 4% decrease in spend compared to 2018. There is also a significant increase in headcount in 2019 compared to 2018 (35% increase) and have resulted in a rise in emissions associated with employee commuting.

CDP Reporting of Value Chain Emissions

Exhibit 6 outlines the process for evaluating each scope 3 category, along with the estimated emissions for each category. Tennant can use this information to complete its CDP questionnaire for scope 3 emissions and/or for other reporting purposes.

Exhibit 6: Tennant scope 3 methodologies and findings – suitable for external reporting

SOURCE OF SCOPE 3 EMISSIONS	EVALUATION STATUS[4]	GHG (tCO_2e)	EMISSIONS CALCULATION METHODOLOGY	% OF SCOPE 3 EMISSIONS
1) Purchased goods and services	Relevant, calculated	108,450.0	Trucost used its EEI-O model to calculate the supply chain GHG emissions through all tiers up to and including raw material extraction, based on Tennant's spend data for FY2019 and the previous analyses. Trucost scaled emissions from FY2017 to the 2019 spend amount, assuming the same proportional spend and exclusions.	15.1%
2) Capital goods	Not relevant, calculated	2,464.2	For the new data granularity for Brazil, Trucost mapped spend categories to sectors in its proprietary environmentally extended input-output (EEI-O) model.	0.3%
3) Fuel- and energy-related activities	Not relevant, not calculated	*	N/A	*
4) Upstream transportation and distribution	Relevant, calculated	20,494.3	Trucost used its EEI-O model to calculate GHG emissions for each component of transportation and distribution, based on Tennant's spend by transportation mode.	2.8%
5) Waste generated in operations	Not relevant, not calculated	*	N/A	*
6) Business travel	Not relevant, calculated	521.4	Trucost used its EEI-O model to calculate GHG emissions based on Tennant's spend data on transportation of employees for business related activities in vehicles owned or operated by third parties, such as aircraft, trains, buses, and passenger cars.	0.1%
7) Employee commuting	Relevant, calculated	8,019.1	Trucost estimated employee commuting emissions using Tennant's global employee head count and country averages for commuting time, transportation mode and distance	1.1%
8) Upstream leased assets	Not relevant, not calculated	*	N/A	*

* Tennant and Trucost determined this category to be not relevant to Tennant's business activities and did not estimate the associated GHG emissions.

[4] Relevance based on 1% threshold relative to total scope 3 emissions inventory.

SOURCE OF SCOPE 3 EMISSIONS	EVALUATION STATUS[5]	GHG (tCO_2e)	EMISSIONS CALCULATION METHODOLOGY	% OF SCOPE 3 EMISSIONS
9) Downstream transportation and distribution	Not relevant, calculated	*	N/A	*
10) Processing of sold products	Not relevant, not calculated	*	N/A	*
11) Use of sold products^	Relevant, calculated	579,929.1	Tennant calculated.	80.6%
12) End-of-life treatment of sold products	Not relevant, not calculated	*	N/A	*
13) Downstream leased assets	Not relevant, not calculated	*	N/A	*
14) Franchises	Not relevant, not calculated	*	N/A	*
15) Investment	Not relevant, not calculated	*	N/A	*

* Tennant and Trucost determined this category to be not relevant to Tennant's business activities and did not estimate the associated GHG emissions.

^ Scope 3, category 11 units are tCO_2

[5] Relevance based on 1% threshold relative to total scope 3 emissions inventory.

Appendix I: Methodology by scope 3 category

EMISSIONS SOURCE	METHODOLOGY	TRUCOST CALCULATION STEPS	REFERENCE	REMARKS
Scope 3, Category 1: Purchased goods and services	Calculated using Trucost EEI-O model	Trucost used its EEI-O model to calculate the supply chain GHG emissions through all tiers up to and including raw material extraction, based on Tennant's spend data for FY2019.	Tennant 2019 spend data	Results updated in 2019 with spend analysis (using Trucost EEIO)
Scope 3, Category 2: Capital goods				
Scope 3, Category 3: Fuel- & energy-related activities	Not calculated	Tennant and Trucost determined this category to be not relevant, based on the analysis of 2014 data		
Scope 3, Category 4: Upstream transportation and distribution	Calculated using Trucost EEI-O model	Applying Tennant's spend by transportation mode Trucost used the EEI-O model to calculate the GHG emissions for the different transportation modes associated with the spend amount	Tennant 2019 spend data	Tennant 2019 logistics spend split by transportation mode
Scope 3, Category 5: Waste generated in operations	Not calculated	Tennant and Trucost determined this category to be not relevant, based on the analysis of 2014 data		
Scope 3, Category 6: Business travel	Calculated using Trucost EEI-O model	Trucost used its EEI-O model to calculate the supply chain GHG emissions through all tiers up to and including raw material extraction, based on Tennant's spend data for FY2019.	Tennant 2019 spend data	Results updated in 2019 with spend analysis (using Trucost EEIO)
Scope 3, Category 7: Employee commuting	Estimated based on employee head count by country	1. Based on OECD data and number of working days in each country and Tennant's employee headcount, average commuting time spent in 2019 was calculated. 2. Applied country-specific modal split (if unavailable, applied average) to total commuting time of all employees in each country. 3. Using average time spent per transportation mode, total travel distance per transportation mode was calculated. 4. Applied Defra emissions factors per transportation mode.	Tennant employee headcounts and country averages for commuting time, transportation mode and distance	Tennant 2019 employee headcount by country OECD statistics on commuting time U.S. American Community Survey DEFRA

EMISSIONS SOURCE	METHODOLOGY	TRUCOST CALCULATION STEPS	REFERENCE	REMARKS
Scope 3, Category 8: Upstream leased assets	Not calculated	Tennant and Trucost determined this category to be not relevant, based on the analysis of 2014 data		
Scope 3, Category 9: Downstream transportation and distribution	Not calculated	Based on new analysis, this is determined to be 'not relevant'.		
Scope 3, Category 10: Processing of sold products	Not calculated	Tennant and Trucost determined this category to be not relevant, based on the analysis of 2014 data		
Scope 3, Category 11: Use of sold products	Calculated by Tennant			
Scope 3, Category 12: End-of-life treatment of sold products	Not calculated	Tennant and Trucost determined this category to be not relevant to Tennant's business activities, based on the analysis of 2014 data		
Scope 3, Category 13: Downstream leased assets	Not calculated	Tennant and Trucost determined this category to be not relevant, based on the analysis of 2014 data		
Scope 3, Category 14: Franchises	Not calculated	Tennant and Trucost determined this category to be not relevant, based on the analysis of 2014 data		
Scope 3, Category 15: Investment	Not calculated	Tennant and Trucost determined this category to be not relevant, based on the analysis of 2014 data		

Appendix II: The Trucost EEI-O Model

Since its founding in 2000, Trucost developed an environmental economic input output (EEI-O) life cycle based model for quantifying environmental impacts. The EEI-O model uses an economic modelling technique based on extensive government census data to analyze the products used and produced by over 464 business activities or sectors. The model also describes the economic interactions between each sector.
Trucost has improved upon standard EEI-O models in several ways, resulting in what we believe is a best in class model for analyzing environmental performance. These improvements include the following:

- Trucost has integrated the use and emissions of over 700 environmental resources. By applying a price to each environmental resource, based on the environmental impact of that resource, the model is able to analyze, in financial terms, the economic and environmental performance of each sector. This environmental performance measure incorporates the indirect, supply chain impacts by using the information on the interactions between sectors.
- Trucost maintains and updates its model annually to reflect market commodity flows. We annually update our sector revenue for all sectors, producer prices and annual production quantities for all primary sectors in our model.
- Environmental intensities for all sectors are also reviewed annually against companies' public disclosures from our annual engagement programs. Trucost engages with more than 6,000 companies directly to obtain environmental performance metrics, which are then considered against sector environmental intensity.

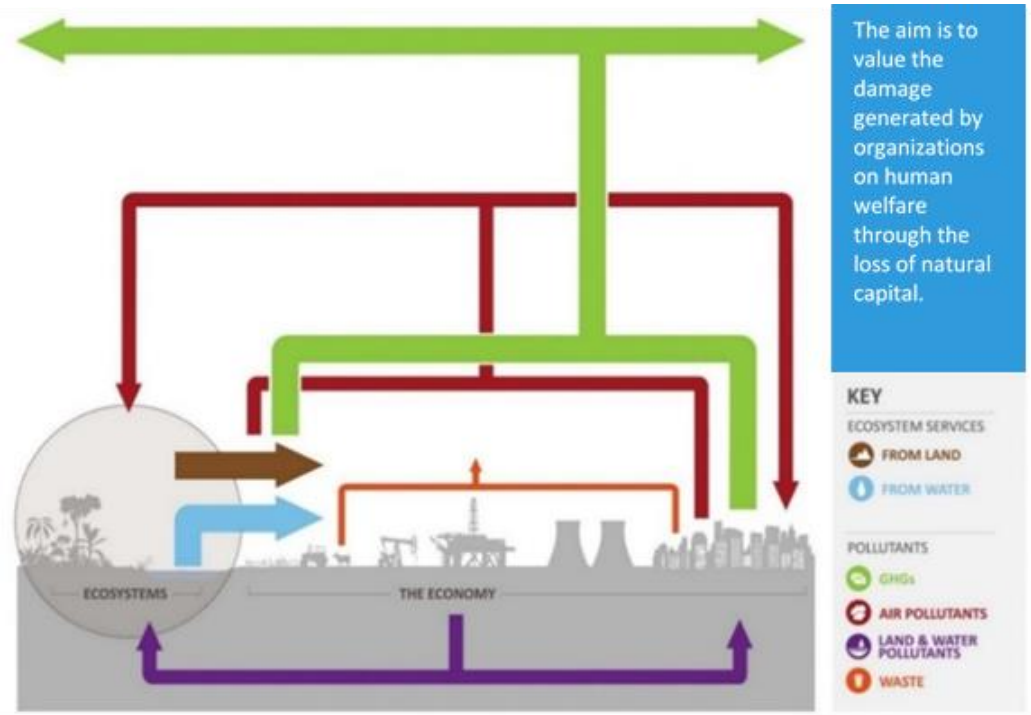
Appendix III: Natural capital valuation

Natural capital can be defined as the world's stocks of natural resources which make human life possible. Organizations rely on this natural capital to produce goods and deliver services. They depend on natural non-renewable resources (for example, fossil fuels and minerals) as well as natural renewable ecosystem goods and services (for example, freshwater and pollination). Organizations also rely on natural capital for its ability to absorb by-products of production, such as pollution and waste. This ability is finite and has already shown its limits, with climate change caused by GHG emissions. The interrelationship between impacts and dependencies is described in the figure below.

Business extraction and production activities can damage natural capital with long term economic and social consequences, which are more often paid by those affected rather than those responsible. The cost of natural capital is impacting organizations directly and through their supply chains. Organizations that fail to adapt in a world of increasingly scarce but historically free resources will lose competitiveness as their value is realized through tighter regulation.

Trucost relies on over 1,000 environmental valuations identified in peer-reviewed journals, as well as government studies to estimate the global average valuation of the six key performance indicator (KPIs) – GHG emissions, air pollution, water use, land and water pollution, and land use changes.

Exhibit 7: Natural capital infographic



Source: Trucost