Planet Tracker

EXPOSING PLASTIC RISK

What plastic companies really think of plastic-related risks

August 2023

CONTENTS

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Key takeaways

- The vast majority (83%) of the 8,245 documents, transcripts and filings analysed, do not mention plastic-related risks.
- However, executives of plastic value chain companies are increasing plastic risk disclosures, rising almost six-fold over the last five years.
- These risk disclosures are split fairly evenly over the three main segments of the plastic value chain: 35% for the upstream producers, 31% for the midstream plastic container converters and 34% for the downstream fast moving consumer goods (FMCG) companies.
- The companies that make the most plastic risk disclosures in each segment of the supply chain are Borealis [BRLS], 17% of all upstream disclosures, Berry Global [BERY] and Uflex [UFLX], 18% each of midstream disclosures, and Unilever [ULVR], is a stand-out with 24% of all downstream disclosures.
- Reports, rather than transcripts, are 5 times more likely to be used to convey risk information.
- The quality of plastic-related risk disclosures has increased over time; last year 30% were high quality although a similar percentage were also low quality.
- The majority of plastic risk disclosures focus on circularity, accounting for 73% of all risk disclosures. References to feedstock and pollution were the rarest.

Executive summary

Companies in the plastic industry should have one of the longest risk registers of any sector. These corporates, as well as their financiers, face physical, transitional, legal and reputational risks.[i]

Each plastic company's risk register should include exposure to CO_2 emissions, harmful toxic discharges, visible and invisible plastic pollution (for land, sea and air), chemical additives exposure and rising harm to people and nature. There is also mounting scientific evidence that chemical additives in plastics are linked to infertility, developmental issues such as ADHD and autism but also type 2 diabetes and obesity.[ii] Even some environmental 'positives' often associated with plastic, notably recycling, look questionable. It is worth recalling that 91% of total plastic waste is not currently recycled.[iii]

As these risks become more widely recognised, there has been an increase in new regulations focused on tackling various forms of plastic pollution. If the ongoing Global Plastic Pollution Treaty negotiations[iv] are successful in limiting plastic pollution, expect more regulation and controls.[v]

Investors and lenders in the plastic value chain are financially exposed to these plastic-related risks. Financial institutions should be contemplating the probability of substantial liabilities.

The Minderoo Foundation estimate that ***'the social costs arising from all from of plastic-related pollution – although dependent on imperfect assumptions – to be hundreds of billions of dollars each year, much of it driven by harms to human health.'*** [vi] For example, near-term exposures (2022–30) to corporate liabilities from plastic-related pollution are forecasted to exceed USD 20 billion in the US alone. Against this backdrop, Planet Tracker analysed a universe of 59 plastic-related companies across the value chain, from the upstream producers through to the downstream fast moving consumer goods companies. We examined how the management teams of these plastic-related companies perceive these risks by examining regulatory filings, investor meeting transcripts, annual reports and sustainability reports.

Do management teams and boards view the risks associated with the plastic industry as irrelevant or are there commonly identified risks? Do company executives from different segments of the supply chain take a different view of the risks? And are there some management teams which are highly cognisant of the risk profile while others do not see them? It is something that executives and board directors need to get right otherwise investors may claim they were misled. For lenders, especially, when investing in longer-term instruments, litigation liabilities and regulatory tightening, should be considered when calculating cash flow projections.

Investor, lender and insurer engagement

- We encourage investors, lenders and insurers to ensure the myriad of plastic-related risks are adequately priced into their investments, financial instruments and premia.
- Investors, in particular, need to fully understand these risks as they themselves could be litigation targets for failing to correctly assess these exposures.
- Ensure that plastic risk issues are frequently raised with management and challenge their assumptions.
- Investors should ask companies specifically how they are transitioning away from fossil fuel-based feedstocks and reducing their toxic footprint.

Introduction

In a recent paper, Plastic Risk, Planet Tracker calculated the implicit risk priced into 150 companies by investors in the plastic value chain, by analysing their equity risk premia[1], where possible.

The equity risk premium of the plastic supply chain remained stable for much of the last 11 years – i.e., investors are not forecasting a change in the industry's risk profile – but more recently there has been a perceptible decline in investors' risk perception for this value chain across the three main segments, declining to its lowest risk level last year.[vii] Planet Tracker finds this surprising especially against a backdrop of tightening regulation, rising litigation exposure and the possibility of a Global Plastic Pollution Treaty on the horizon.[viii]

In this analysis, Planet Tracker measured the risk as perceived by corporate management, rather than the investors' view, by scrutinising management filings and statements. We analysed over 8,200 reports and transcripts of 59 corporates across the plastic value chain by using a natural language processing (NLP)[2] algorithm. This has allowed us to assess plastic risk disclosure across the plastic value chain by segment and individual corporate.

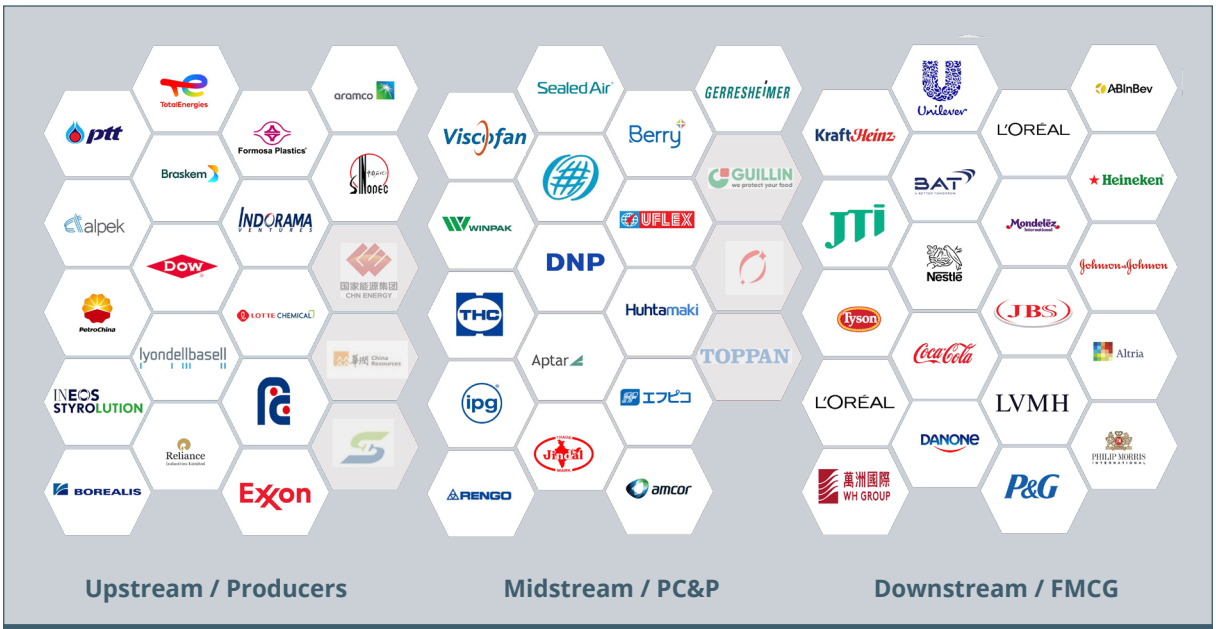

Figure 1: Plastic Universe – c.20 corporates in each segment of plastic value chain. Source: Planet Tracker.

[1] The equity risk premium is the difference between returns of individual stocks with that of the risk-free rate of return, which is normally a longer-term government bond, which assumes no default risk by the issuer. A higher risk premium signifies that the investor requires a greater level of compensation for taking the perceived risk.

[2] Natural language processing (NLP) is a branch of artificial intelligence (AI) which allows computers to understand text and spoken words in a similar way to human beings. NLP rule-based modelling of linguistics statistical, machine learning, and deep learning models. This enables computers to process human language, in text or voice, and to 'understand' its meaning, along with the writer's or speaker's sentiment.

Plastic universe

The universe of 59 companies[3] spans three main segments of the plastics value chain: the upstream resin producers (producers), the midstream containers and packaging converters (PC&P), and the downstream fast-moving consumer goods (FMCG) companies, which rely on plastic packaging to sell their goods – see Figure 1. For all companies we examined reports, filings and transcripts for the last five years.

Measuring Plastic Risk Disclosures (PRDs)

In order to determine how the executives of plastic companies perceive risk, Planet Tracker used a set of keywords related to plastic-related risks – e.g. toxins or recycling. These keywords relate to how companies communicate various aspects of plastic-related risks to investors and other stakeholders including:

1. Pollution impacts from plastic production and use.
2. How the company may transition to a circular economy.
3. The type and source of input materials.

Subsequently, the context words were categorized according to one of five themes – Circularity, Feedstock, General Risk, Product and Pollution – see Figure 2.

Figure 2: Plastic Risk Disclosure theme categorisation. Source: Planet Tracker.

Planet Tracker then categorised the PRDs into low, medium and high, reflecting the number of context words appearing in each text extract. This measures the density of context words in each extract, which acts as a proxy for disclosure quality – see **Appendix: Methodology**, for an example PRD for each category.

In total, only 17%[4] of the documents analysed contained PRDs. Documents analysed included reports such as annual reports, CSR and ESG reports and 8K (notifications of significant events), 10K (annual reports), 10Q (quarterly reports) and 20F filings (foreign private issuer reports) and transcripts such as company presentations, earnings calls and shareholder meetings.

[3] Six of the companies in the examined universe have been excluded either due to lack of English documentation or lack of plastic risk disclosure. The excluded companies are China Energy, China Resources, Groupe Guillin, Jiangsu Hailun, Jiangsu Shiangxing and Toppan.

[4] 5,496 reports and 2,749 transcripts were analysed; 1,376 documents found with plastic risk disclosures (PRDs). All documents that have been currently examined are in the English language.

Plastic risk disclosure in the plastic value chain

Key Points

1. PRDs are evenly dispersed among the plastic value chain segments (upstream, midstream and downstream).
2. Downstream companies reveal the most PRDs in reports, while midstream companies use them the least.
3. Midstream companies are the greatest users of transcripts for mentioning plastic risk comments.
4. PRDs are generally of medium quality across the value chain.
5. Unilever [ULVR] is a stand-out in discussing plastic-related risks.

When examining PRDs for the identified plastic companies, regardless of document type, we can observe that the split of disclosures is fairly equal between different supply chain segments; 35% for resin producers, 31% for PC&P converters and 34% for FMCG companies. Interestingly, when looking at the type of document, the segment with the highest number of PRDs in reports are FMCG companies, whilst the PC&P converters showed the lowest. When we examine the transcripts, we observe the reverse result, with PC&P converters with the highest and FMCG companies the lowest PRD levels – see Table 1.

Table 1: Plastic risk disclosure by value chain segment and report type. Metric: all context words in a text extract. Source: Planet Tracker.

Disclosure category	Report			Transcript		
	Producer	PC&P	FMCG	Producer	PC&P	FMCG
Low quality	7.7%	6.8%	8.5%	3.6%	4.5%	2.5%
Medium quality	10.3%	7.1%	12.6%	3.8%	4.9%	1.8%
High quality	8.0%	4.7%	8.2%	1.7%	2.6%	0.7%
Total	**25.9%**	**18.6%**	**29.4%**	**9.1%**	**12.0%**	**4.9%**

We also examine the 'quality' of the plastic risk disclosures. We do this by analysing the number of context words associated with each disclosure, determining that more words mean a better framing or context of the issue. We categorise this into three sets – low, medium and high. See **Appendix: Methodology** for further details.

When comparing across all three segments of the value chain, we note that:

- All three segments are generally showing the same trend in relation to the number of PRDs in a text extract - medium quality has the highest proportion of disclosures, followed by low and, finally, high quality.
- The individual companies that disclose the most PRDs are Unilever (8% of total PRDs), Borealis (6%), and Berry Global (6%).

One limitation to note is that a high number of PRDs does not necessarily guarantee that the company's disclosure of plastic-related risks is better than others. For instance, it could just have a division called plastics which gets picked up by our algorithm.

Upstream segment – resin producers

In the upstream segment of the supply chain, we found that Borealis [BRLS] (17%), followed by LyondellBasell [LYB] (16%), Dow [DOW] (14%), and Braskem [BRKM5] (12%), disclose the most plastic-related risks[5]. All three also have the highest percentages of high-quality disclosures. Overall, the majority of the upstream segment PRDs are classified as medium quality (40%), followed by low quality (32%), with high quality having the smallest percentage (28%) – see Table 2.

Table 2: Plastic risk disclosure by upstream resin producers. Source: Planet Tracker.

Upstream/Producers	Ticker	Low quality	Medium quality	High quality	Total
Borealis	BRLS	5.4%	7.0%	4.7%	17.0%
LyondellBasell	LYB	5.0%	5.8%	4.8%	15.6%
Dow	DOW	3.0%	5.3%	5.2%	13.6%
Braskem	BRKM5	4.5%	5.4%	2.3%	12.2%
Reliance Industries	RIL	2.6%	3.9%	2.5%	9.0%
Exxon	XOM	2.0%	3.5%	3.4%	8.9%
Indorama Ventures	IVL	2.1%	2.2%	1.0%	5.3%
Lotte Chemical	011170	1.0%	1.8%	2.2%	5.1%
Far Eastern New Century	1402	1.9%	0.7%	0.8%	3.4%
PTT	PTT	1.2%	1.4%	0.5%	3.0%
Alpek SAB	ALPEKA	0.7%	1.7%	0.1%	2.4%
TotalEnergies	TTE	1.0%	0.9%	0.1%	2.0%
Formosa Plastics	1301	1.0%	0.1%	-	1.0%
Saudi Armaco	ARAMCO	0.3%	0.3%	0.3%	0.9%
Sinopec	600028	0.3%	-	0.1%	0.4%
PetroChina	601857	0.1%	-	0.1%	0.2%
INEOS Styrolution	Private	0.2%	-	-	0.2%
Total		**32.0%**	**40.0%**	**27.9%**	**100%**

[5] Note that this does not necessarily mean these companies focus on these issues more than other producers as they could simply produce more reports than their peers.

Midstream segment – plastic containers and packaging converters (PC&P)

Following the same methodology for the PC&P companies, we conclude that Berry Global [BERY] and Uflex [UFLX] contribute the highest proportion of PRDs at 18%. Uflex [UFLX] has 10% of its PRD in the medium category, which is the highest ranking in this segment; however, they place behind a few other companies in relation to high quality disclosures including Berry Global [BERY], FP Corp [7947] and Dai Nippon [7912]. All three show more than 3% of high-quality disclosures. Overall, the majority of the midstream PRDs fall into the medium quality category (39%), followed by 37% of low quality and 24% high quality. It is worth mentioning that Dai Nippon [7912] has a large proportion of high-quality disclosures compared to its other disclosures – see Table 3.

Table 3: Plastic risk disclosure by midstream containers and packaging manufacturers. Source: Planet Tracker.

Midstream / PC&P	Ticker	Low quality	Medium quality	High quality	Total
Berry Global	BERY	6.8%	7.7%	3.9%	18.4%
Uflex	UFLX	5.7%	10.3%	2.3%	18.3%
Huhtamaki	HUH1V	4.9%	3.6%	2.0%	10.5%
FP Corp	7947	1.8%	4.1%	3.4%	9.3%
Guala Closures	1565860D	2.5%	4.4%	2.4%	9.3%
Sealed Air Corp	SEE	1.9%	2.3%	2.4%	6.6%
Dai Nippon Printing	7912	0.7%	1.0%	3.4%	5.2%
Gerresheimer	GXI	3.5%	0.8%	0.3%	4.7%
Aptar	ATR	2.2%	1.3%	1.0%	4.5%
Amcor	AMCR	2.3%	1.1%	0.4%	3.7%
Viscofan	VIS	1.4%	1.3%	0.9%	3.6%
Winpak	WPK	1.0%	0.8%	0.8%	2.6%
Taiwan Hon Chuan	9939	1.0%	-	0.6%	1.6%
Intertape Polymer Group	ITP	0.7%	0.4%	-	1.1%
Rengo	3941	0.2%	0.3%	0.1%	0.6%
Jindal Poly Films	JDPF	0.1%	-	0.2%	0.2%
Total		**36.6%**	**39.3%**	**24.2%**	**100%**

Downstream segment – fast moving consumer goods companies (FMCG)

Finally, in the downstream segment, the results are similar. As with the other segments of the value chain, the majority of PRDs are classified as medium quality (43%), followed by low quality (31%), and finally high quality (26%) – see Table 4.

Unilever [ULVR] heads the list with the highest percentage in all three categories, representing 24% of all PRDs in the segment, leaving a significant gap to the second placed British American Tobacco [BAT], representing 10% of total PRDs. This implies that Unilever [ULVR] is a leader in recognising plastic risks and communicates frequently on this issue with financial institutions or the public in their documentation, filings and transcripts.

Table 4: Plastic risk disclosure by downstream fast-moving consumer goods. Source: Planet Tracker.

Downstream / FMCG	Ticker	Low quality	Medium quality	High quality	Total
Unilever	ULVR	5.7%	10.6%	8.0%	24.3%
BAT	BATS	2.5%	3.5%	4.0%	10.0%
Nestle	NESN	3.5%	3.9%	1.7%	9.1%
Coca-Cola	KO	3.8%	3.6%	0.8%	8.2%
Danone	BN	2.8%	3.6%	1.5%	8.0%
L'Oreal	OR	2.4%	4.3%	1.2%	7.9%
PepsiCo	PEP	2.6%	2.5%	2.4%	7.4%
Mondelez	MDLZ	1.6%	2.5%	1.0%	5.1%
JBS	JBSS3	0.7%	1.4%	1.5%	3.6%
LVMH	MC	1.5%	1.5%	0.3%	3.3%
P&G	PG	0.8%	1.1%	1.0%	2.9%
AB InBev	ABI	1.3%	1.0%	0.3%	2.6%
Heineken	HEIA	0.5%	0.7%	0.5%	1.7%
Johnson&Johnson	JNJ	0.2%	0.6%	0.7%	1.4%
Altria Group	MO	0.1%	0.8%	0.4%	1.3%
Philip Morris International	PM	0.7%	0.3%	0.3%	1.3%
WH Group	288	0.1%	0.6%	0.4%	1.0%
Kraft Heinz	KHC	0.2%	0.1%	0.1%	0.4%
Japan Tobacco	2914	0.2%	0.1%	0.1%	0.4%
Tyson Foods	TSN	0.1%	0.1%	-	0.2%
Total		**31.1%**	**42.8%**	**26.1%**	**100%**

A positive trend over time

Key Points

1. PRDs in reports have increased almost 6 times, and in transcripts 2.4 times, over the last five years.
2. Sustainability reports are becoming more valuable as a source of risk disclosures, if the recent trend continues.
3. In transcripts, the PRDs in company presentations and earnings calls have increased almost 3 times over the last five years.
4. Quantity and quality of plastic risk disclosures have been improving over the last five-years.
5. Last year, 32% of PRDs were classified as high quality. A similar percentage were also classified as low quality.

Rising disclosure

When assessing the plastic risk disclosures over time for all reports and transcripts, it is noticeable that the number of plastic risk references has increased significantly since 2018. In 2022, the PRDs were almost five times higher than in 2018; rising from 2,600 in 2018 to almost 12,000 in 2022 – see Figure 3. This suggests that these corporates are discussing more plastic-related risks.

Total PRDs in reports only, increased from 1,725 disclosures in 2018, to 9,959 in 2022, an increase of 5.8x. In transcripts, the rate of increase was more modest, rising from 839 to 1,985, a 2.4x increase over the same period. However, for transcripts only, 2022 PRDs were lower than in both 2020 (peak PRDs), and 2021, suggesting that management rarely discussed plastic related risks, and/or participants expressed little interest in probing this line of questioning when given the opportunity.

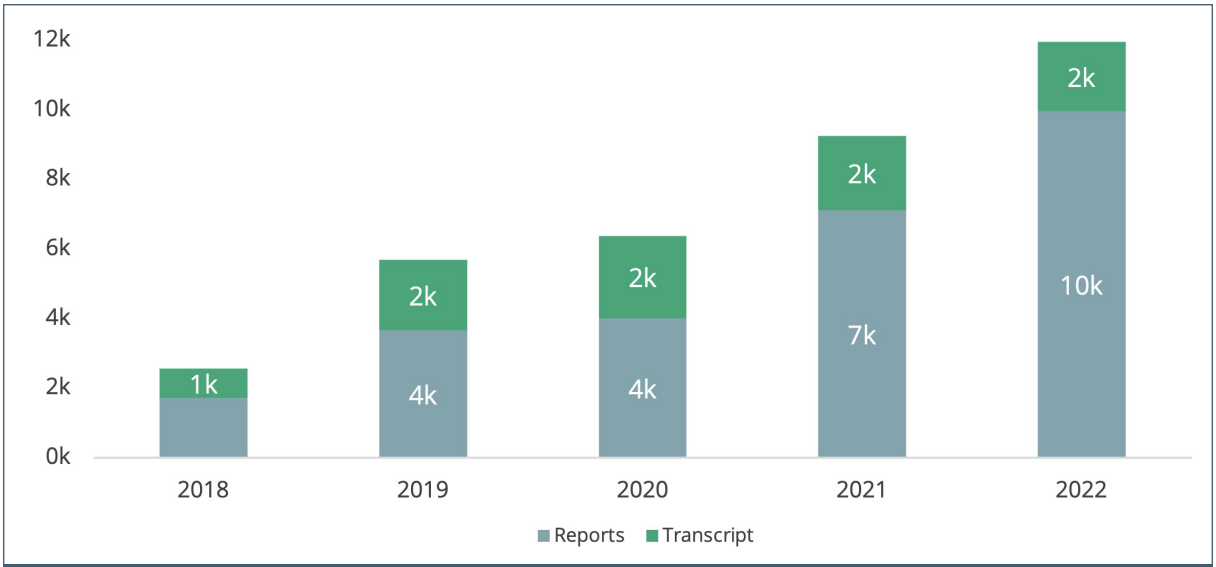

Figure 3: Total plastic risk disclosure in reports and transcripts over the last 5 years. Source: Planet Tracker.

Looking into the reports only, both annual reports (which also include 10K and 20F filings) and sustainability reports (which include ESG and CSR reports) contained similar PRDs in 2018 – 49% (853 PRDs) and 46% (785 PRDs) respectively of total report-based PRDs. In 2020, there was a significant increase of PRDs in annual reports – 71% of total report-based PRDs (2.8k PRDs) whilst PRDs in sustainability reports dropped to 23% of the total report-based PRDs (919 PRDs). In 2022, interestingly the PRDs in annual reports fell behind sustainability reports with 38% (3.8k PRDs) and 42% (4.2k PRDs) of total report-based PRDs respectively – see Figure 4. Does this imply that sustainability reports[6] are becoming more meaningful to the capital markets?

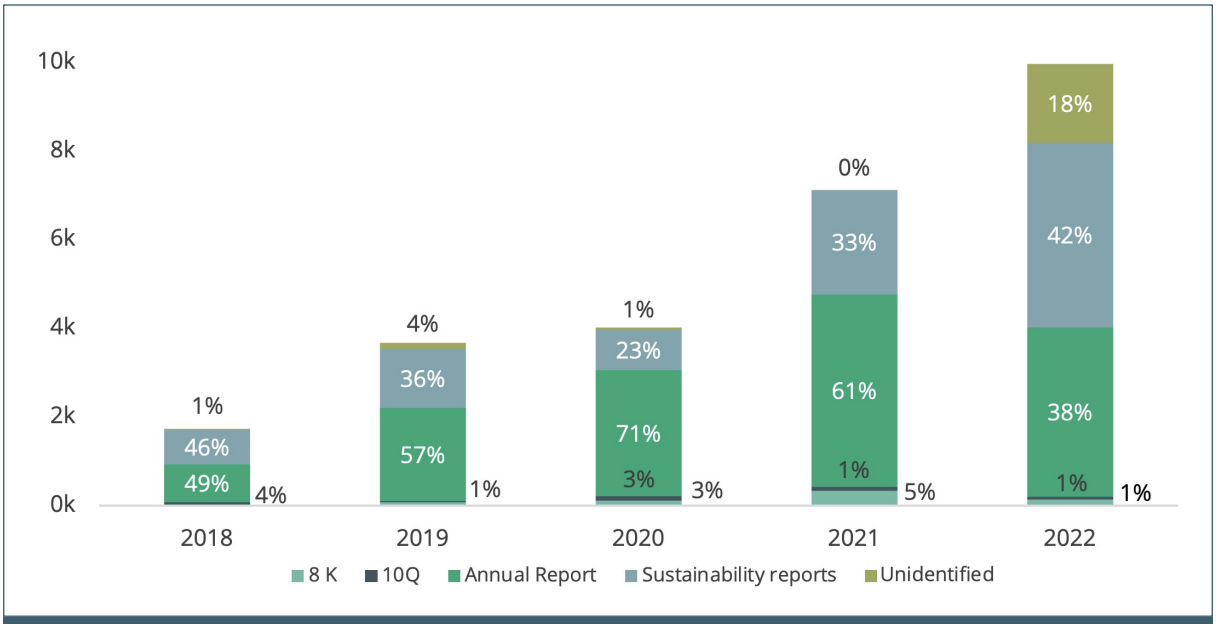

Figure 4: Total plastic risk disclosures by report type for the last 5 years. Please note that unidentified report types are those issued by an identifiable company but are not clearly categorised as one of the other document types. Source: Planet Tracker.

[6] Note that we use the terms ESG report and sustainability report interchangeably.

For transcripts, the majority of the PRDs have been found in company presentations which have increased almost 3 times from 2018 to 2022; 449 to 1.2k respectively. PRDs in earnings calls are following similar trend with PRDs increasing from 186 in 2018 to 467 in 2022 – see Figure 5.

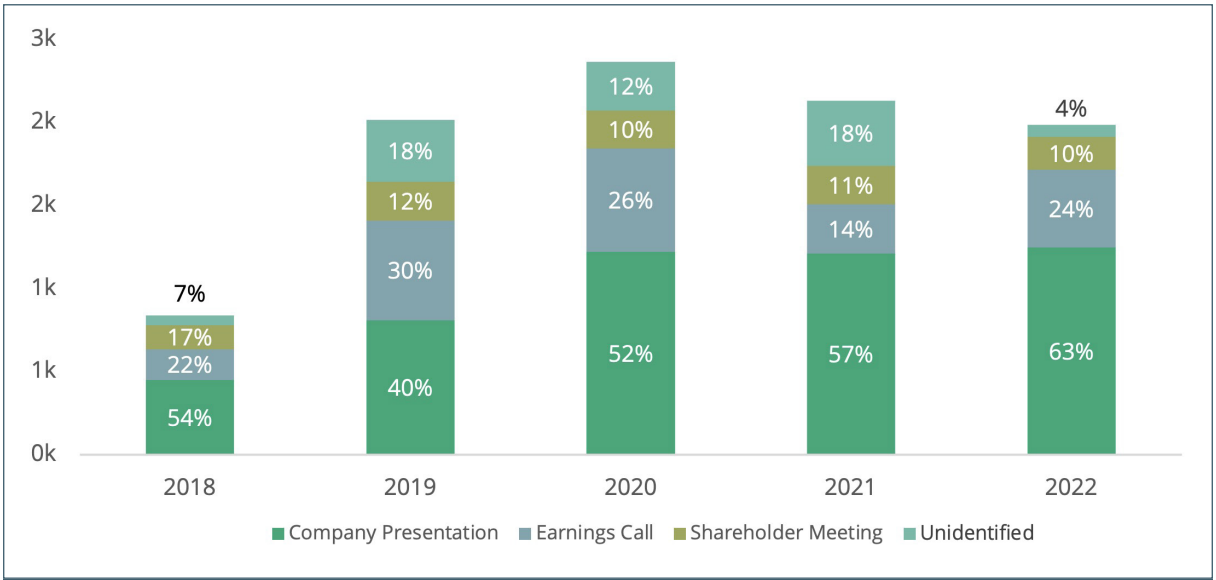

Figure 5: Total plastic risk disclosure for transcripts by document type for the last 5 years. Please note that unidentified report types are those issued by an identifiable company but are not clearly categorised as one of the other document types. Source: Planet Tracker.

Rising quality

The quality of PRDs has improved between 2018 to 2022. We can observe that the low-quality PRDs are decreasing as a proportion of all PRDs over time, whilst the high-quality ones are increasing over the same period. The high-quality PRDs have increased at the fastest rate per year (on average 1.7 times per year), followed by the medium-quality PRDs with annual average increase of 1.6 and lastly low-quality PRDs with 1.4 annual average increase – see Figure 6.

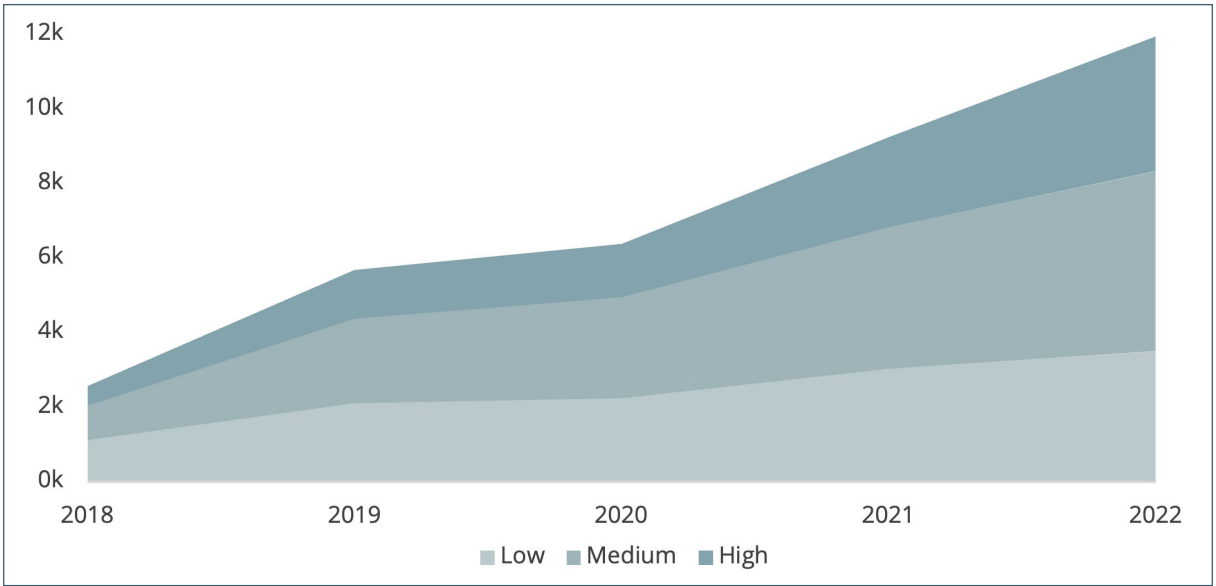

Figure 6: Increasing plastic risk disclosure for the last 5 years for reports and transcripts. Source: Planet Tracker.

Where to find the best risk disclosures

Key Points

1. PRDs are most likely to be found in annual reports (39% of all PRDs), 27% in sustainability reports and 14% in company presentations.
2. The highest quality source for PRDs were sustainability reports (36% of all such reports). The worst quality were 10Qs with 77% being of poor quality.
3. On average for those documents that contain PRDs, there are 40 PRDs per report, compared to 13 in transcripts.
4. The quality of all disclosures is increasing most rapidly in 8K reports (3.6 times average annual increase).

Overall, 39% of all disclosures are found in annual reports, followed by sustainability reports (27%), and then company presentations (14%).

When looking into the quality of the disclosures, it is disappointing to find that the majority of the reports are of low quality (44%), followed by medium quality 36% and lastly of high quality (18%). Sustainability reports are the only source that had both medium (39%) and high (36%) quality PRDs exceed the low-quality proportion. Annual reports and company presentations both had about one-quarter of all their reports being of high-quality reports (24% and 26% respectively) – see Table 5.

Table 5: Proportion of PRDs per quality and document type. Source: Planet Tracker.

Document	Low	Medium	High
8 K	47%	42%	11%
10 Q	77%	23%	0%
Annual Report	34%	42%	24%
Company Presentation	30%	44%	26%
Earnings Call	56%	36%	8%
Shareholder Meeting	51%	38%	11%
Sustainability Report	24%	39%	36%
Unidentified	35%	38%	26%
Average	**44%**	**36%**	**18%**

The quality of disclosures is increasing most rapidly for 8K filings, used to announce significant events for shareholders, increasing at an annual average of 3.6x. This was followed by sustainability reports (1.7x annual average increase) and annual reports and earnings calls at 1.6x annual average increase – see Figure 7.

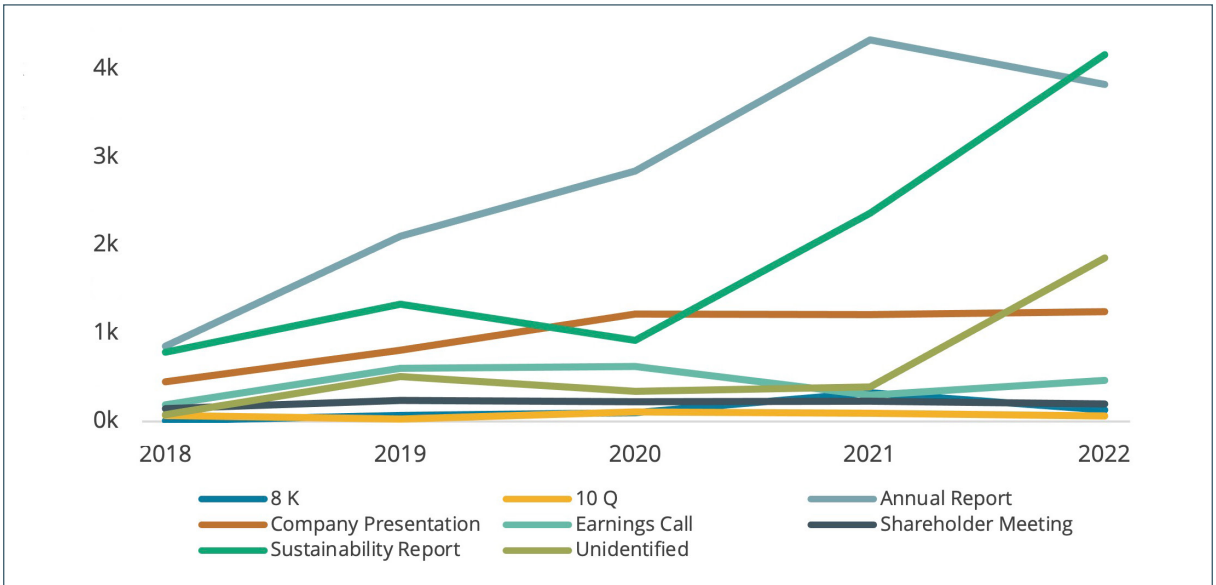

Figure 7: Total plastic risk disclosure for the last 5 years by type of document. Please note that unidentified report types are those issued by an identifiable company but are not clearly categorised as one of the other document types. Source: Planet Tracker.

Finally, when comparing PRDs based on the type of document in which PRDs are found – i.e. report or transcript – reports are significantly more valuable for analysing risk perception than conference call transcripts. 74% of the PRDs were found in reports, with an average of 40 PRDs per report, while just 26% of the PRDs were found in transcripts with an average of just 13 PRDs per transcript – see Table 6. Furthermore, the reports provide higher quality risk disclosures.

Table 6: Plastic risk disclosures for a typical report or transcript containing PRDs. Source: Planet Tracker.

	Report	Transcript	Average
Low	12	5	9
Medium	16	5	11
High	11	2	7
Total	**40**	**13**	**26**

Shareholder meetings, company presentations and conference calls are an opportunity for investors to question company management on specific topics, while the company reports are often the mouthpiece of management teams where public messaging can be more easily controlled. So what does the content of meeting transcripts say about current investor focus? If investors perceive plastic-related issues as a high risk to their investment, one could reasonably expect these topics to appear more frequently during investors' meetings. However, PRDs in transcripts have actually decreased slightly since their peak in 2020.

What plastic companies reveal about plastic risk

Key Points

1. 73% of PRDs focused on circularity - focusing on topics such as increasing recycling.
2. The PRDs of upstream resin producers were dominated by circularity (83% of producers' disclosures), compared to PC&P and FMCG companies with 69% and 64% respectively.
3. The least discussed issues were feedstocks and pollution, each representing 6% of total PRDs across all plastic value chain segments.
4. Most identified plastic-related risk words were 'liability', 'health', 'emissions', 'regulation', and 'waste'.
5. The most infrequent plastic-related risk words were 'micro/nano-plastics', 'toxins', 'bioplastic', 'refillable' and 'biodegradable'.

We have noted that there has been an increase in corporates' disclosures on plastic related issues. But what risk topics are they focused on?

We categorised plastic risk disclosures based on one of the following five themes: circularity, feedstock, pollution, product, and general risk. We observed the following:

- Overwhelmingly (73%) of PRDs centered on the circularity theme. This is followed by general risk statements (9%), and then statements about the products (7%). PRDs relating to feedstock and pollution were the least prevalent in the dataset. This trend is largely mirrored in each of the three value chain stages analysed here – see Figure 8.
- Producers are responsible for the most PRDs relating to circularity (41% of all circularity PRDs), followed by FMCG (30%), and then PC&P companies (29%).
- Producers' PRDs relating to feedstock and pollution are rarely mentioned categories, accounting for 1.4% and 1.7% of all PRDs, respectively.

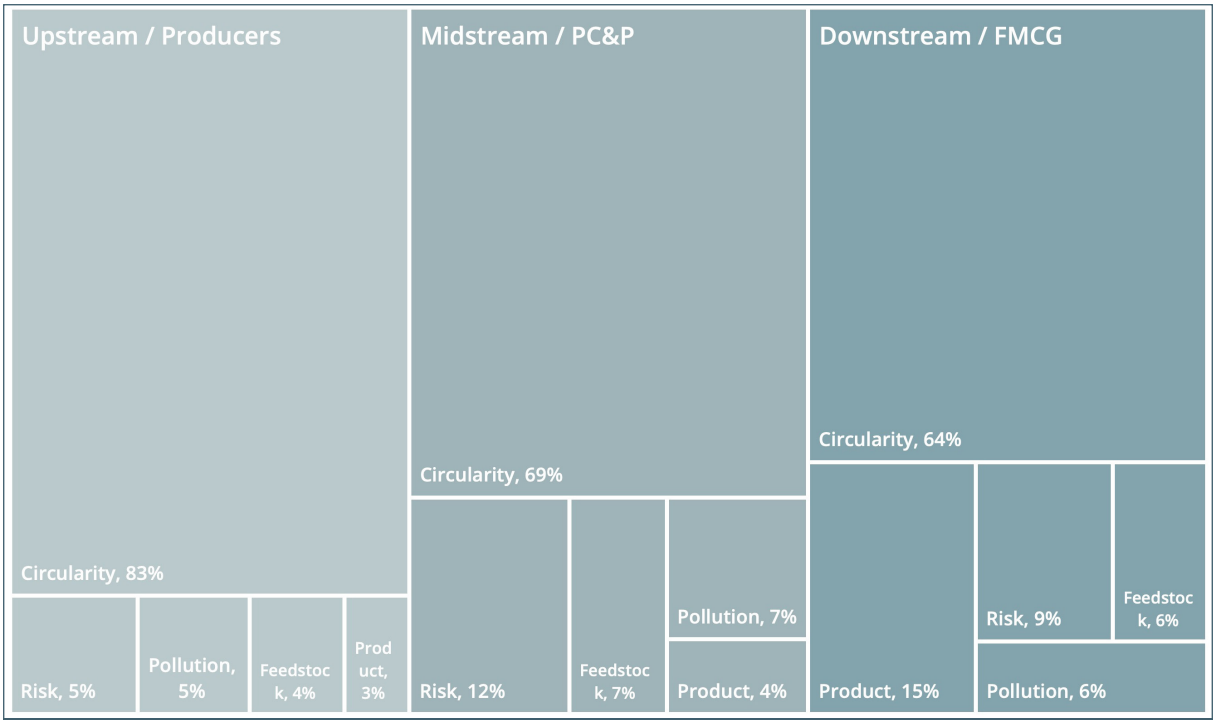

Figure 8: Plastic risk disclosure by general theme, by segment. Source: Planet Tracker.

Our analysis shows that throughout the plastic value chain the main focus of disclosures is on circularity; interestingly the more upstream the company, the keener it is to push the circularity messaging. Unfortunately, throughout the supply chain, little risk is attached to pollution, feedstock and product characteristics – perhaps of more immediate concern to investors.

Moving from assessing thematic-based plastic risks to looking at individual risks, we can identify the most and least common topics mentioned in these documents – see Table 7.

Table 7: Generic risk topics mentioned by plastic companies in all documents. Source: Planet Tracker.

Ranking	1	2	3	4	5
Most	Liability	Health	Emissions	Regulation	Waste
Least	Micro/Nano-plastics	Toxins	Bioplastic	Refillable	Biodegradable

We encourage readers to view this analysis alongside Planet Tracker's recent **Plastic Risk** report. In the Plastic Risk report, we found that the equity risk premium for the producers averaged 8.8%, over more than a decade, whereas for PC&P and FMCG companies it averaged 7.5% and 6.9% respectively.

Table 8 shows the range of the quarterly equity risk premium for companies. The range is greatest for upstream companies (7.5%), followed by midstream ones (4.8%), and then downstream companies (3.6%). Note that the minimum values achieved by midstream and downstream companies was in Q4 2022, and for upstream companies in Q4 2019.

Table 8: Range of equity risk premia for upstream, midstream and downstream companies from 2012–2022 . Source: Planet Tracker.

	Max	Min	Annual Average
Upstream / Producers	10.1%	2.6%	8.8%
Midstream / PC&P	9.0%	4.2%	7.5%
Downstream / FMCG	7.7%	4.1%	6.9%

By matching these equity risk premia against the risks identified by the management teams of these corporates, investors can determine whether their views align with executives. For example, for the upstream companies do investors agree that circularity is the biggest risk that these businesses face? - see Figure 8.

Do investors find it reasonable that plastic product characteristic is rarely mentioned as a risk by the midstream plastic container and packaging converters? And should the downstream FMCG companies view pollution as one of their lowest risks?

The geography of plastic risk disclosures

Key Points

1. The highest level of plastic-related disclosure by report was evident in South America, but this was likely impacted by the very small sample size.
2. North American headquartered companies provided the lowest number of plastic-related disclosures.
3. Those companies without English documentation were excluded from these results.
4. In Asia, annual reports are an important source of risk related information, followed by company presentations and sustainability reports.
5. In North America, do not ignore sustainability reports. They are an important source of information on risks.

Each company in the analysis was assigned to a country based on the location of their corporate headquarters. While this does not reflect their global footprint in terms of manufacturing and retail locations, it does provide an insight into how regional corporate cultures could contribute to the amount and quality of plastic risk disclosures.

Taking disclosures from an average company in each continent, we find that most disclosures per document come from South America, followed by Europe, Asia, and lastly North America - see Table 9. However, only two South American companies are included in this universe of plastic companies – and Braskem [BRKM5] and JBS [JBSS3].

Table 9: Average plastic risk disclosures per document, per company. Source: Planet Tracker.

Continent	Documents	Companies	PRDs	Average
Asia	245	18	7,727	1.8
Europe	432	14	13,849	2.3
North America	645	19	12,441	1.0
South America	54	2	1,962	18.2
Total	**1,376**	**53**	**35,979**	

We recognise that there is likely to be an inherent bias in these results as only documents published in English were analysed, which means, for instance, four Chinese companies are not included in these results.

Diving deeper into the PRDs from a geographical perspective, we notice the following key points – see Figure 9:

- Asian companies focus on annual reports and company presentations for risk disclosures.
- PRDs in annual reports of the European companies surpass any other type of documentation; they are more than 2x higher than in sustainability reports.
- PRDs in sustainability reports of the North American companies exceed all other documentations with 3.5k PRDs followed by annual reports, company presentations and earnings calls which all are in a similar range of 1.3k and 2k PRDs.
- PRDs in South America are concentrated in annual reports (1,101 PRDs) followed by sustainability reports (395 PRDs).

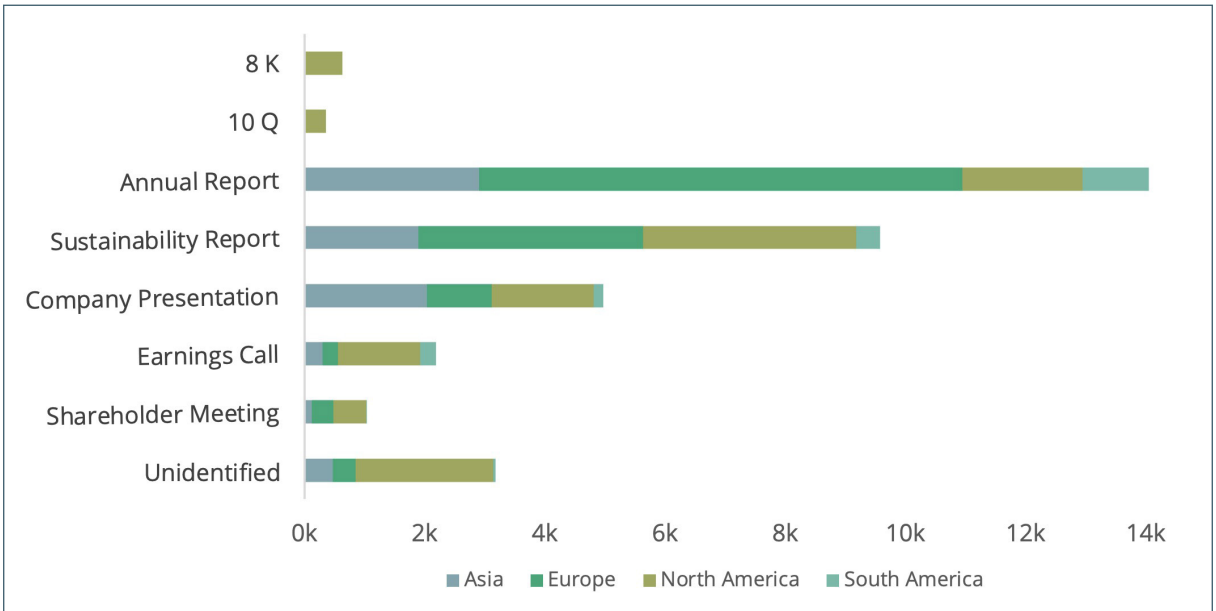

Figure 9: Plastic risk disclosure based on the location of the corporate. Source: Planet Tracker.

Conclusions

This analysis shows that over the last five years, plastic risk disclosures (PRDs) have increased suggesting that corporates have started to recognise the importance of plastic-related issues. However, the plastic industry, particularly the upstream segment, is very focused on circularity as the answer to plastic-related problems. Feedstock, plastic pollution and product characteristics barely feature. Depending on where corporates are in the plastic value chain, the perception of plastic-related risks varies. Notable is that the further upstream one goes, the greater the importance attached to circularity as the answer.

To gain an insight into perceived plastic risk, as viewed by executive teams, financiers should examine reports, particularly the sustainability ones followed by company presentations and annual reports, which are much more revealing than earnings calls and shareholder meeting transcripts.

There are some corporates leading the way in discussing plastic-related risks, notably Borealis and LyondellBasell among the upstream producers, Berry Global and Uflex for the midstream converters, and Unilever as the runaway leader among the downstream FMCG companies.

We encourage investors, lenders and insurers to remain mindful of the plastic sector's long ledger of risks and ensure this is adequately priced into their plastic related financial instruments.

BOREALIS

...In addition, Borealis monitors the revision and transposition of the new EU Waste Shipments Regulation in EU member states, to be prepared for opportunities and risks in regards to imports of plastics waste into Borealis' recycling plants.
The Ellen MacArthur Foundation's NPEC initiative continued to advocate for the development of a UN Treaty on Plastics Pollution and the use of EPR on a global scale. Borealis supported the Foundation in developing the related position papers...

2021 Annual Report

Braskem

...In the next slide, we will present an important partnership former this quarter. We signed an agreement with Tecipar to remove plastic waste from landfills. This agreement will prevent more than 2,000 tons of plastic waste from being disposed annually in the landfill of Santana do Parnaiba, Sao Paulo. The volume is equivalent to 36 million plastic packets made of polyethylene and polypropylene.

Earnings Call, 2020

Berry

Berry Global risk process is the change in consumer perception of plastics due to the negative perception of plastics impact on the environment which is driving a market shift towards non-plastic packaging. As Berry Global is one of the world's largest manufacturers of plastic packaging this risk could have significant strategic and financial impact. The top 5 risk themes are then extracted from the risk database, transcribed into a report that details the inherent risk and key mitigation activities....

ESG Report, 2022

Sealed Air

...~25% of shoppers seeking products utilizing minimal packaging, eliminating the box and all non-essential packaging. Consumers are seeking recycling education; manufacturers, retailers and brands are responding. Packaging protects up to 500x the resources it consumes.
Aggressive sustainability goals to facilitate plastics circularity. By 2025, pledge to advance & design solutions to be 100% recyclable or reusable & use 50% less virgin fossil-based materials. Leadership team and Board of Directors analyze sustainability risks and opportunities to guide our strategy...

Company presentation, 2021

Unilever

Strategy and risk management
Plastic has been identified as a principal risk for the company which has the potential to impact our business in the short, medium and long term. The process for assessing and identifying plastic packaging risk is the same for all principal risks and is described on page 44. For each of our principal risks we have a risk management framework detailing the controls we have in place and who is responsible for managing both the overall risk

20F, 2021

Mondelēz International

The Company is one of the largest plastic polluters in the world and has been sued for plastic pollution in California. The environmental consequences of plastic solutions are clear but climate injustice including plastic pollution, disproportionately burden Black, Indigenous and communities of color so there's an element of environmental racism that's necessary to address here. As shareholders we see a third-party racial equity audit as fundamentally about risk management...

Mentioned during Shareholder Meeting, 2022

Appendix: Methodology

Scope

Planet Tracker extracted text excerpts from company reports and transcripts of company meetings/conference calls to assess their disclosures on plastic-related risk. The analysis started with a group of 59 companies, split into one of three value chain stages – upstream resin producers, midstream plastic containers and packaging converters, and downstream fast-moving consumer goods companies. Over 8,245 documents were analysed, spanning from 1 January 2018 to 31 December 2022. The types of documents included in the analysis are[7]:

1 **Reports**

- 8-K, 10-K, 10-Q, 20-F
- Annual Reports
- Corporate Governance, Corporate Responsibility, and ESG Reports

2 **Transcripts**

- Company Presentations
- Earnings Calls
- Shareholder Meetings

NLP Model

Planet Tracker's NLP model searches for collections of target and context words. In this case, the target word is plastic, and the context words, such as litigation and regulation, are chosen by Planet Tracker to characterise various aspects of risk associated with the target word. Planet Tracker's model uses lemmatisation, which looks for different forms of a word so that occurrences of it can be analysed together. This means that searching for the word 'litigation' would also return findings of litigate, litigated, and litigating, for instance. Planet Tracker chose words that reflected risk in one of five areas:

1 **Circular Economy** – which can reflect the products' ability to be reused and recycled.

2 **Feedstock Used** – which accounts for the bio- and fossil-based inputs used to make the product.

3 **Pollution Impacts** – accounting for the location and type of impact.

4 **Product Characteristics** – which captures changes in the products' design, such as whether it is meant for a single-use or not.

5 **General Risk** – which captures generic risk terminology, such as litigation and regulation.

The model's algorithm then identified text extracts that span up to 100 words around the target word. Numerous versions of the model were run to find the optimal size of the span. It was found that extracts larger than 100 words tended to dilute its meaning, and shorter extracts tended to lack detail on the plastic risk being disclosed. In total the model found 36,000 extracts across all documents – see Figure 10.

[7] These are the categories of reports selected when downloading the documents from our data provider. Note that other report types may be included within each of these categories, such as responsible sourcing policies, and hence included in the analysis.

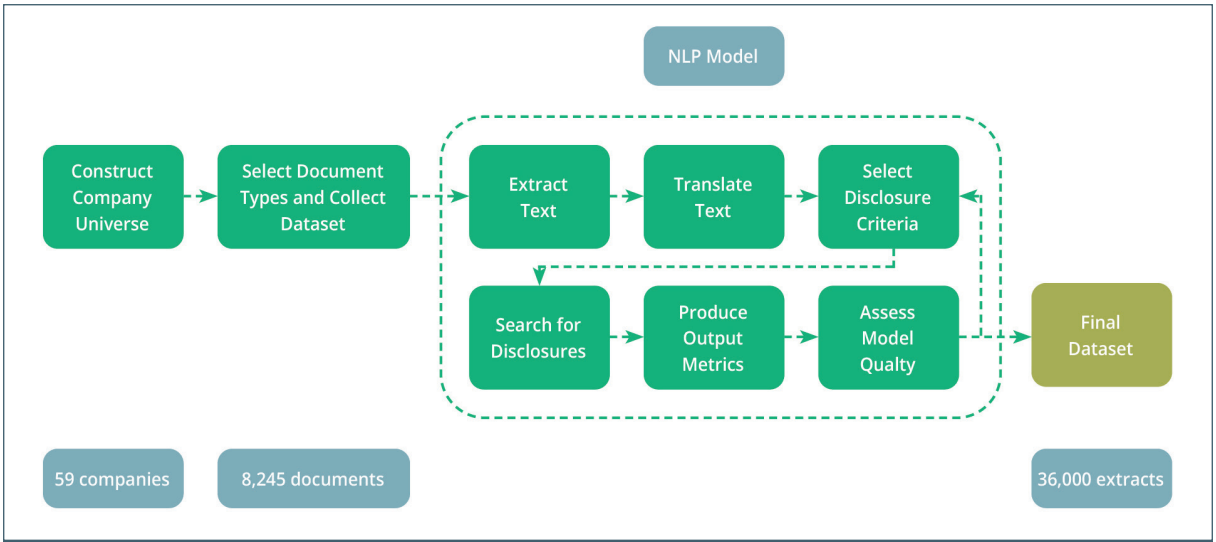

Figure 10: Planet Tracker analysis steps.

The Planet Tracker model was assessed for how well it identified plastic-related risk disclosures based on the context words provided to it. This was achieved through conducting multiple rounds of annotating up to 500 text extracts, which involved manually verifying each PRD returned by the model. Because of the approach taken, the model is extremely accurate in identifying all the extracts with the specified context words, but it will not pick up PRDs where they use words that were not specified by Planet Tracker.

Analysis

PRDs were classified into three categories which relate to the density of context words found within each extract. Low density PRDs were extracts which contained up to four context words, medium ones contained between five and eight, and high ones contained nine or more. These categories were assigned based on splitting the 36,000 text extracts into three approximately equal sized groups.

Examples of PRD in each of these categories are:

Low: Dow [DOW], 2022 CSR Report.

- "To ensure accountability and joint improvement toward a zero-pellet loss supply chain, standardised OCS contractual language was included in existing agreements. With support from the logistic service providers, we have completed a strategic risk review of the providers that handle packed plastic pellets. Together, we are identifying areas of risk and continuously developing a gap closure plan".

Medium: Phillip Morris International [PM], 2022 Integrated Report.

- "There is a pressing need to support ongoing efforts that holistically resolve the issue of plastic pollution, starting from its source. This means finding ways in which we can reduce the amount of plastic used across our devices, consumables, and packaging through better design and the use of more sustainable materials".

High: Uflex [UFLX], 2020 Annual Report,

- "Stringent environmental regulations related to plastic manufacturing and their use are hindering the market growth further. Strict legislation is designed to mitigate the adverse effect on the health and environment of consumers and workers. The indiscriminate disposal of plastic has become a major threat to the environment. The rising prevalence of stringent regulation has increased the demand for environment-friendly materials such as bioplastics".

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ABOUT PLANET TRACKER

Planet Tracker is a non-profit financial think tank producing analytics and reports to align capital markets with planetary boundaries. Our mission is to create significant and irreversible transformation of global financial activities by 2030. By informing, enabling and mobilising the transformative power of capital markets we aim to deliver a financial system that is fully aligned with a Net Zero, nature-positive economy. Planet Tracker proactively engages with financial institutions to drive change in their investment strategies. We ensure they know exactly what risk is built into their investments and identify opportunities from funding the systems transformations we advocate.

PLASTIC TRACKER

The goal of Plastics Tracker is to stem the flow of environmentally damaging plastics and related-products that are creating global waste and health issues by transparently mapping capital flows and influence in the sector starting from resins production through to product-use. By illuminating risks related to natural capital degradation and depletion, investors, lenders and corporate interests across the economy will be enabled to create more sustainable plastics products.

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