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CLIMATE CHANGE RISK-RELATED DISCLOSURES IN EXTRACTIVE INDUSTRIES

ACCA AND ADAM SMITH BUSINESS SCHOOL RESEARCH REPORT

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1. Introduction

1.1 Background and objectives

Climate change has been increasingly (and more urgently) recognised by governments and supranational organisations as one of the main risks that the planet and mankind are facing. A number of recent prominent initiatives, notably the 2015 Paris Agreement and the UN Sustainable Development Goals, aim at mitigating this risk by reducing emissions and, hence, restraining global warming. These developments have a direct impact on the business world and serious implications for specific industries: primarily the extractive industries, which face an urgent need to alter their operations substantially in order to survive in this new reality.[1] Considering that companies in the extractive industry sector are responsible for almost half of global greenhouse gas (GHG) emissions (IRP 2019), climate change can no longer be seen as a side effect of their operations but as central issue for their business model and a core business risk.

Companies in the extractive industry sector possess significant reserves that are expected to yield future economic benefits and related assets can be recognised in their balance sheets, contributing to their stock market valuation. Nevertheless, there is a high risk that such assets may be rendered 'stranded' as a consequence of the recent developments in the fight against climate change (UNU WIDER 2017). Reduced demand for oil and reduced oil prices have led to underperforming wells, with companies abandoning offshore wells (Energypeople 2020) and exploring green alternatives for their future operations (Carbon Tracker Initiative 2020). Moreover, the COVID-19 pandemic appears to have accelerated the decarbonisation of economies. For instance, oil giants such as BP and Shell are now recognising significant asset impairment losses, citing the long-term effects of the pandemic on the demand for fossil fuels (Bousso 2020; Meredith 2020). Nevertheless, the timing and pace of the decarbonisation is an open debate, creating tensions among top executives (Raval and Hook, 2020). In addition, mining companies face conflicting challenges: on the one hand, available mining reserves are increasingly deeper, and their ore grade is increasingly poorer, which heightens companies' demand for energy and water (Rüttinger and Vigya 2016). On the other hand, these companies face considerable regulatory and market pressures to reduce energy and water consumption (UNU WIDER, 2017).

As a result of the recent developments in the fight against climate change, the present value of the estimated future net cash flows generated from the use of these assets can be significantly reduced, which, in turn, would have substantial implications for companies' balance sheets and their market valuations. Hence, companies operating in the extractive industries face a potential shock to their market valuations due to climate change risks. ACCA (2016) notes that such a shock can be mitigated if these risks are known to the market and, hence, they can be incorporated into market participants' valuation processes. Thus, ACCA (2016) calls for relevant climate change risk disclosures to be made by companies. Additionally, at the Rio 2012 Earth Summit, investors called for the integration of material sustainability issues within companies' annual reports (Assembly General, United Nations 2012). Finally, similar calls have been raised for additional disclosures in annual reports (ACCA 2013, 2016; Anderson 2019; BDO 2020) and, significantly, the IFRS Foundation notes that *'companies must consider climate related matters in applying IFRS Standards when the effect of those matters is material in the context of the financial statements taken as a whole'* (IFRS Foundation 2020a:1).

The auditing profession has also shown particular interest in climate change risks and has urged practitioners to consider climate change risks in the audit of financial

1 For instance, in early December 2020, the Danish government announced that no new oil and gas exploration will be permitted in the Danish North Sea with the long-term aim of discontinuing fossil fuel extraction by 2050 (Ambrose 2020).

statements (IAASB 2020) and recommends that material climate-related risks not only be disclosed within the financial statements but also be discussed in the audit opinion (AASB and AUASB 2018). Finally, from a user perspective, capital providers have become increasingly concerned about climate change risks and the need for relevant disclosures. For instance, large investors call for mandatory inclusion of such information in companies' accounts (Mooney 2020) and the Bank of England expects climate change risk-related financial disclosures to become mandatory (Jones 2020). Such disclosures should enable investors to assess companies' risks more accurately and hence their long-term cost of capital, cash flows and valuations, whereas in the absence of solid and informative disclosures about climate change risks, companies may be seen as being unprepared because they have not integrated a key business risk, potentially leading to a decline in investors' confidence (Climate-Related Market Risk Subcommittee 2020).

Against this backdrop and considering previous studies' findings that *'the quality and quantity of these disclosures varies considerably'* (ACCA 2016: 16), with the majority of such information being disclosed in the front end and not in the audited financial statements, as well as the climate change urgency and related developments that we are witnessing in sustainability reporting,[2] our study aims at shedding light upon current climate change-related reporting practices of companies in the extractive industry. The primary objectives of our study are to:

- explore the level and depth of climate-related disclosures provided by companies in the extractive industries in the narrative sections (ie front end) of their annual reports
- explore the level of integration of climate-related information into the accounting policies and relevant financial statements' notes in the financial reporting section (ie back end) of companies' annual reports, and
- identify good climate-related reporting practices in both the front and back ends of the annual reports.

1.2 Method

~~This study analyses the 2019 annual reports of the 60 largest 'polluters' in extractives industries~~ measured by their average Scope 1 and Scope 2 carbon emissions[3] over the period 2016–18. The carbon emissions were retrieved from Thomson Reuters' Eikon database. Companies that do not apply IFRS or equivalent local accounting standards, companies that do not have extractive activities (ie iron and steel producers) and companies with missing annual reports or ~~those~~ not in English are not considered in this study.

In order to address the objectives of our study, two separate research instruments were created. The first one was used to examine the front end of the annual reports and comprised 11 questions that explored reporting practices on 'Reserves and Resources'; 'Scenario Analysis'; 'Business Model'; 'Performance Indicators'; and 'Climate-related Financial Disclosures'. The second instrument was used to examine the back end of the annual reports and comprised 14 questions that explored reporting practices on financial statements notes about Accounting Policies; Impairment Testing; Non-current Assets; Provisions and Contingent Liabilities and; Auditor's Report.

The annual reports of our 60 sample companies were reviewed manually. Our approach was twofold: we first calculated a score based on the number of disclosure items found in each report and we also went deeper and identified reporting practices for each disclosure item.

1.3 Key findings

The central message of this report is that companies do not sufficiently engage with disclosures about their climate change-related risks. Companies are found to provide, on average, overly generic disclosures and they refrain from discussing how climate change risks affect their operations. Furthermore, only a small number of companies acknowledge the central role of climate change on their current and future activities.[4] Our findings indicate that both the front and back ends of companies' annual reports lack clarity and depth of climate change-related disclosures. Also, it has become evident that the

2 During the second half of 2020, a number of important developments took place, with the most prominent of them being: the IFRS Foundation's release of its *Consultation Paper on Sustainability Reporting*, which states that *'developing global sustainability-reporting standards for climate-related information is the most pressing concern'* (IFRS Foundation 2020b: para 41); the announcement by the International Integrated Reporting Council (IIRC) and the Sustainability Accounting Standards Board (SASB) of their intention of merging into a new organisation called The Value Reporting Foundation, aiming at *'providing investors and corporates with a comprehensive corporate reporting framework across the full range of enterprise value drivers and standards to drive global sustainability performance'* (IIRC and SASB 2020); the release of a common statement by the Carbon Disclosure Project, the Climate Disclosures Standards Board, the Global Reporting Initiative, the International Integrated Reporting Council and the Sustainability Accounting Standards Board of their intention of working together and arguing that: *'we have reached a pivotal moment that could usher in progress towards a more comprehensive solution for corporate reporting; one that is urgently needed to improve enterprises' contribution to sustainable development, to help address climate change and to enable more resilient, efficient financial markets'* (Impact Management Project 2020).

3 According to Thomson Reuters' Eikon database, Scope 1 carbon emissions are companies' direct emissions from sources that are owned or controlled by the company. Scope 2 carbon emissions are companies' indirect emissions from consumption of purchased electricity, heat or steam which occur at the facility where electricity, steam or heat is generated. The following gases are considered: carbon dioxide (CO^2), methane (CH4), nitrous oxide (N2O), hydrofluorocarbons (HFCS), perfluorinated compound (PFCS), sulfur hexafluoride (SF6), nitrogen trifluoride (NF3).

4 A similar lack of climate change risk-reporting was noted by Adams (2020) in relation to the airline industry.

two ends of the annual report are relatively disconnected, as companies provide substantially more information about their climate change-related risks in the front end than in the back end. Thus, it would appear that financial reporting does not follow narratives in considering the effects of climate change on companies' operations.

Particularly, the key findings of our analysis can be summarised in the following points.

- Only 60% of the sample companies (36) provide a reserves/resources statement with relevant numerical information, whereas none of them present a detailed assessment of the climate change risks that are pertinent to their projects.
- Fewer than a quarter of our sample (14 companies) provide scenario analysis that considers/discusses climate change risks.
- Only 60% of our sample companies (36) identify addressing climate change risk as an integral part of their business model. Moreover, just 15 of them consider international initiatives for climate change (eg the Paris Agreement) in the discussion of their business model.
- Although most of our sample companies provide some form of climate change-related performance indictors (predominantly carbon emissions), only four companies provide performance indicators where financial and climate change-related information is integrated.
- Only 10% of our sample companies disclose that they incorporate climate change risk in their estimations of future cash flows.
- None of the sample companies identify climate change risk as an important factor in determining their assets' useful lives.
- Although all sample companies capitalise future climate change-related expenses as part of their property, plant and equipment costs or other non-current assets, only one-quarter of them (14) use financial instruments to settle future obligations related to climate change.
- A very small number of our sample companies consider climate change risks in the estimation and recognition of provisions (fewer than 20%) and contingent liabilities (10%), respectively.
- In only 15% of our sample companies' audit reports (9) is climate change risk identified as a key audit matter.

1.4 Conclusions and policy recommendations

Our analysis reveals that, in the front end of their annual reports, companies in the extractive industries acknowledge, to some extent, the impact of climate change risks. Nevertheless, the information provided in the back end and the consideration of climate change-related risks in the judgements and estimates of companies' management rarely have depth and are far from complete. Very few of the sample companies discuss extensively and in a complete manner the impact of climate change risks on their future financial performance. Interestingly, the only financial reporting policy applied by all the companies is the capitalisation of provisions for rehabilitation and restoration expenses, bolstering their balance sheets even though the cash flow implications are rather uncertain.

Our findings can be of interest for accounting standard setters in considering the relevance of current financial reporting standards in communicating climate change-related risks (eg IFRS Foundation 2020a). It is indicated that much more needs to be done to improve such reporting in the financial statements. In particular, our results can be relevant to potential amendments of IAS 1 (ie key estimations and uncertainties) as well as IFRS 6 (Exploration for and Evaluation of Mineral Resources), IAS 36 (Impairment of Assets) and IAS 37 (Provisions, Contingent Liabilities and Contingent Assets) among others. Furthermore, our findings contribute to the current debate over the IFRS Practice Statement 1 Management Commentary suggesting that specific considerations about climate change risks disclosures are needed. Also, regulators and auditors need to consider more fully the quality of compliance and the reliability of relevant estimates. As reported above, the importance of climate change risks is stated in the front end but not in the back end of financial statements, which raises questions over the consistency, relevance and decision-usefulness of these companies' financial reporting.

Finally, it should be stressed that our study focuses on the carbon emissions of the 60 largest polluters in the period 2016–18. Hence, our sample companies are some of the largest companies in the extractive industries. As it is evident in the literature that the level of disclosure is strongly, positively associated with the size of a company, companies that are not examined in this report would be expected to provide, on average, lower levels of disclosure than our findings suggest. Hence, we believe that there is a more urgent need for improving climate change-related disclosures than even our empirical findings indicate.

1.5 Report outline

The next chapter describes the research design, sample selection process, sample identity and research instruments employed for the analysis of the annual reports. Chapter 3 presents and discusses our results. Conclusions are set out in Chapter 4.

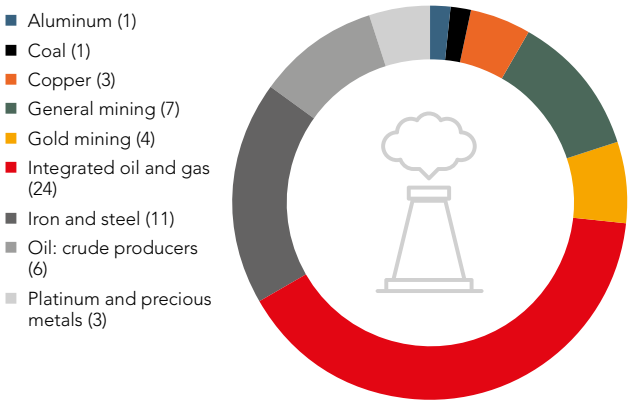
ONLY 60% OF OUR SAMPLE COMPANIES (36) IDENTIFY ADDRESSING CLIMATE CHANGE RISK AS AN INTEGRAL PART OF THEIR BUSINESS MODEL.

2. **Research** approach

2.1 Sample selection

The sample selection started by identifying all ~~the~~ listed companies in Thomson Reuters Eikon database that belong to extractive industries. Specifically, we concentrated on the following industries of the Industry Classification Benchmark (ICB): alternative fuels; aluminum; coal; copper; diamonds and gemstones; general mining; gold mining; integrated oil and gas; iron and steel; offshore drill and services; oil: crude producers; platinum and precious metals. From the companies above, we excluded those that do not have extractive operations, companies that do not apply IFRS or equivalent local accounting standards, companies with missing or non-English annual reports, and companies for which no complete CO_2 Scope 1 and Scope 2 emissions data for the period 2016–18 is available. The latter criterion is used in order to ensure that our companies have exhibited consistently high CO_2 emissions. Subsequently, we retained in our sample the 60 companies with the highest average total CO_2 Scope 1 and Scope 2 emissions over the period 2016–18.

FIGURE 2.1: Sample distribution by industry



After these exclusions, of the 60 companies in our sample half belong to the oil and gas industry (24 integrated oil and gas; and 6 crude oil producers) and the other half are mining companies (iron and steel; general mining; gold; copper; platinum and precious metals; aluminum and coal). Figure 2.1 provides companies' distribution by sub-sectors. As regards their geographic distribution, almost half of the sample companies (29) are based in Europe, 11 in Asia, seven in North America, five in Oceania and four in both Africa and South America (Figure 2.2). ~~Regarding the countries of companies' headquarters,~~ eight companies are from Russia and the UK respectively, seven from Canada, five from Australia and India, four from South Africa, three from Thailand and the remainder are from 15 other countries.

FIGURE 2.2: Sample distribution by geographic region

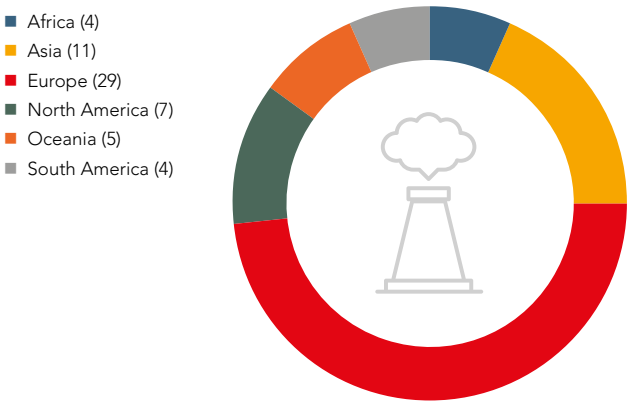


FIGURE 2.3: Average total CO_2 emissions (Scope 1 and Scope 2) by industry for the period 2016–18 and according to their contribution to the total CO_2 emissions of our sample (in million metric tonnes)

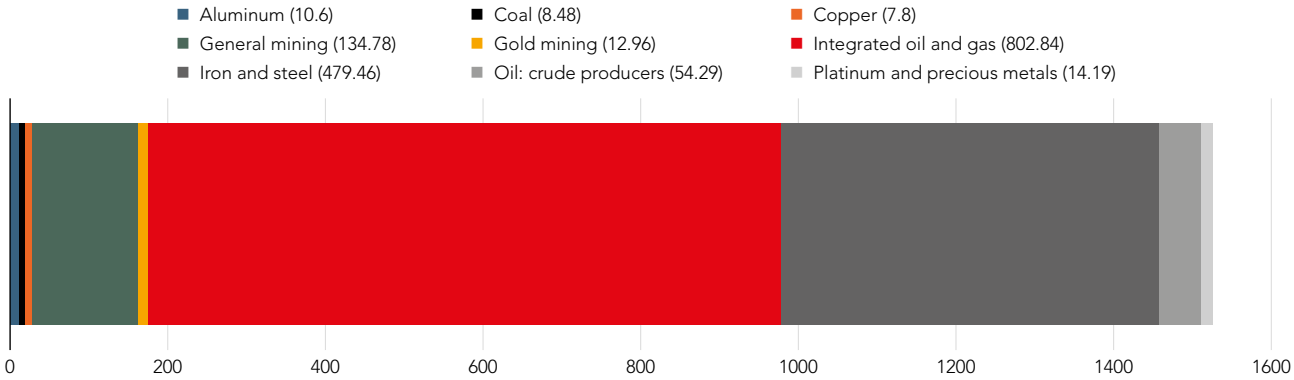


TABLE 2.1: Descriptive statistics of the sample

	N	MEAN	MEDIAN	ST. DEV.
Total assets (in €m)	60	57,499	23,989	77,939
ROA	60	6.33	4.19	9.80
Market capitalisation (in €m)	60	31,336	13,921	38,872

According to Thomson Reuters' Eikon database, the mean total CO_2 Scope 1 and Scope 2 emissions of our sample companies for the period 2016–18 was 1,525m metric tonnes (Figure 2.3). Of these emissions, 57% are attributed to the oil industries (integrated oil and gas and crude oil producers). It is useful to point out that although the iron and steel industry represents 18% of the sample, it contributes more than 30% of the sample's total average carbon emissions.

Finally, Table 2.1 shows that the mean (median) total assets' value of the sample firms is €57bn (€24bn), the mean (median) market capitalisation is €31bn (€14bn) and the mean (median) ROA is 6.33% (4.19%).

2.2 Method of analysis

We first split each annual report in two parts. The first part (ie what we label as the 'Front-end') consists of the narrative section of the annual report and includes the chairman's and CEO's statements, the strategic report (with a particular focus on the discussion of the business model), the 'Environmental, Social and Governance' (ESG) section as well as the 'Executive Remuneration' section. The second part includes the audited financial statements and the corresponding notes, as well as the auditor's report (ie what we label as the 'Back-end'). For each part, we designed a corresponding tailored instrument to capture the extent of the integration of climate change implications in the companies' estimates and judgements about the sustainability of the firm as a whole and specific assets. These are outlined in Appendix B and discussed here in detail.

As far as the Front-end analysis is concerned, the instrument used is motivated by earlier studies in stranded assets, which indicate the areas where companies should enhance their climate change-related reporting (ACCA 2016, 2013). Hence, the instrument focuses on the following dimensions.

- Reserves and resources reporting: whether the company provides a reserves/resources statement with relevant numerical information. Information about the status, longevity and pricing of the reserves is expected to be found. Where the company is found to disclose such reporting, ~~it is then examined to see~~ whether this reporting includes an assessment of climate change-related risks and/or liabilities that are pertinent to the company's projects.
- Scenario analysis: whether the company provides different scenarios for the vulnerability of its assets' values at different price levels, taking into account climate change risks. Specifically, the focus is on whether the company has developed its own scenario

analysis to test the resilience of its operations or has adopted a scenario analysis developed by other organisations (such the International Energy Agency's Sustainable Development Scenario). Where the company had a scenario analysis, the depth of the related disclosures was examined. Specifically, we explored whether the company provides quantitative information about the climate change factors, assumptions and impacts. For instance, if the company adheres to the Paris Agreement, how does that affect its future operations?

- Business model: whether the company discusses its business model in its annual report. If it does so, then it was investigated to see whether it recognises and subsequently addresses climate change risk as an integral part of its business model. Finally, we also examined whether companies that recognise climate change as an important aspect of their business model adhere to international initiatives such as the Paris Agreement and the United Nations Sustainable Development Goals.
- Performance indicators: a first step in each analysis was to consider whether the company discloses climate change-related performance indicators, such as the amount of its carbon emissions and the amount of its capital expenditure that is used to address climate change risks. Second, we considered whether the company adopts an integrated reporting approach by providing performance indicators (PIs) that integrate financial and climate change-related information (for instance, carbon emissions in relation to revenues). Finally, the company's remuneration policy was reviewed to identify whether climate change performance indicators are connected to executives' remuneration.
- Task Force on Climate-related Financial Disclosures (TCFD) recommendations: whether the company follows the recommendations of the TCFD, which *'… has developed a framework to help public companies and other organizations more effectively disclose climate-related risks and opportunities through their existing reporting processes'* (TCFD website). Therefore, following the TCFD recommendations can be seen as a manifestation of the company's commitment to better climate change-related disclosures.

For the analysis of the back end, the instrument was motivated by recent guidance on how financial reporting can satisfy investors' needs for information on climate change-related risks (Anderson 2019; BDO 2020; IFRS Foundation 2020) and it focuses on the following dimensions:

- Accounting policies: ~~as a first step,~~ the accounting policies were reviewed for items that may be affected by climate change risks. Particularly, we examined whether climate change is recognised as an important factor in the company's judgements and sources of estimations uncertainty for its financial instruments, tangible and intangible assets, exploration and evaluation assets, impairment of assets, and provisions and contingent liabilities.
- Impairment testing: the process of impairment testing requires estimation of uncertain future cash flows. As climate change can affect these cash flows, we examined whether climate change risk is recognised as affecting the cash flows and hence the recoverable amounts of tangible, intangible, evaluation and exploration, and financial assets.
- Non-current assets: we explored the notes to the accounts to observe whether they recognise the effect of climate change risk on the company's estimations of its assets' useful economic lives and future cash flows. Further, we explored whether the company capitalises future expenses related to climate change (ie rehabilitation and restoration provisions), whether it uses financial instruments in order to secure funds to settle potential environmental obligations in the future and whether it recognises carbon allowances as intangible assets.
- Provisions and contingent liabilities: companies in the extractive industries are subject to provisions and contingent liabilities mainly related to rehabilitation and restoration costs at the end of the useful life of their resources. Therefore, we examined whether the company discusses the motives, processes and disclosure policies of amounts relevant to environmental provisions. In addition, we examined whether the company faces and discloses contingencies related to its operational impact on the environment.
- Auditor's report: the company's audit~~or~~ report was reviewed to identify whether climate change-related issues and/or risks are identified as key matters in the audit process. For instance, impairment testing of assets in the extractives industries may be heavily affected by climate change risks.

Finally, we recognise that companies may not explicitly mention climate change risks in their back-end notes on their accounting policies, provisions and contingent liabilities although they may provide a discussion of environment-related issues within these specific sections of an annual report. Since these disclosures may indirectly refer to climate change, we considered an extensive discussion over environmental issues to be arguably relevant to climate change.

3. Findings and discussion

3.1 Overall findings

The analysis of our sample reveals that there is a substantial difference between the level of climate change disclosures in the front and back ends of the annual reports. In the front end our sample companies disclose more than 40% of the disclosures identified by our instrument but only 18% in the back end (Figure 3.1). The difference between median levels of disclosure in the front and back ends is even larger (45% and 14% respectively). From the above, it is evident that the two ends of the annual report are disconnected. Companies provide climate change-related information voluntarily in the front end, but this is not manifested in their financial accounts at the back end. Also, the results indicate that there is a much larger variation in the provided disclosures in the front end than the back end (standard deviation of the front end disclosures is 25% whereas of the back end is 13%). This is not surprising if we consider that the front end disclosures are voluntary and hence companies can disclose information up to whatever level they desire, whereas the back end is dictated by a set of accounting standards that does not require explicitly the inclusion of climate change risks in companies' estimations and hence companies disclose, almost in a uniform manner, very little information. Finally, the level of disclosures in the two ends are positively correlated, which indicates that the back end disclosures, although lacking in quantity, follow the front disclosures.

3.2 Front end

3.2.1 Reserves and resources reporting

As indicated in Table 3.1, 36 companies (60% of our sample) provide a reserves/resources statement and all include tabulated numerical information for their reserves/resources.

FIGURE 3.1: Average level of disclosures of the front and back ends

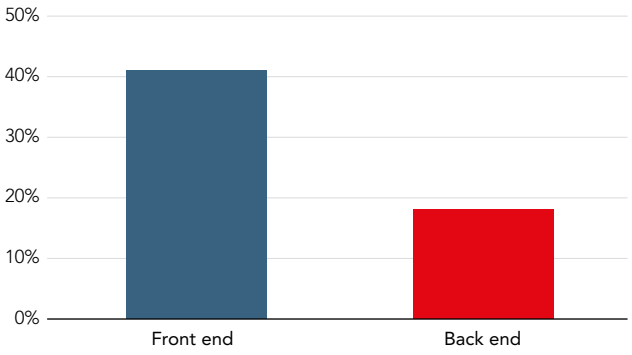


TABLE 3.1: Number of companies that provide a reserves/resources statement that includes relevant numerical information

INDUSTRY	YES	NO
Aluminum	0	1
Coal	0	1
Copper	2	1
General mining	6	1
Gold mining	3	1
Integrated oil and gas	14	10
Iron and steel	3	8
Oil: crude producers	5	1
Platinum and precious metals	3	0
TOTAL	36	24

~~We identified no companies that~~ present an assessment of their climate change risks that is pertinent to their projects. Nonetheless, three South African companies mention climate change-related risks in the description of their reserves, and four South African (again) companies have a separate report about reserves in which an assessment of climate change / environment- related risks is made. The following extract from Anglo American Plc reflects the type of disclosures provided by these seven firms.

'The Ore Reserve and Mineral Resource estimates presented in this report were prepared in accordance with the Anglo American plc Group Ore Reserves and Mineral Resources Reporting Policy. This policy requires that the Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves 2012 edition (the JORC Code) be used as a minimum standard. Some Anglo American plc subsidiaries have a primary listing in South Africa where public reporting is carried out in accordance with the South African Code for Reporting of Exploration Results, Mineral Resources and Mineral Reserves (the SAMREC Code). The SAMREC Code is similar to the JORC Code and the Ore Reserve and Mineral Resource terminology appearing in this section follows the definitions in both the JORC (2012) and SAMREC (2016) Codes….The calculation of Mineral Resource and Ore Reserve estimates are (sic) based on long-term prices determined at the beginning of the second quarter of each year. Ore Reserves are dynamic and more likely to be affected by fluctuations in the prices of commodities, uncertainties in production costs, processing costs and other mining, infrastructure, legal, environmental, social and governmental factors which may impact the financial condition and prospects of the Group'. (Anglo American Plc 2019 annual report: 221)

3.2.2 Scenario analysis

Table 3.2 shows that 14 companies provide a scenario analysis and consider climate change risks ~~in the discussion of this.~~

The extract from Glencore Plc reflects the types of disclosure provided by these 14 firms.

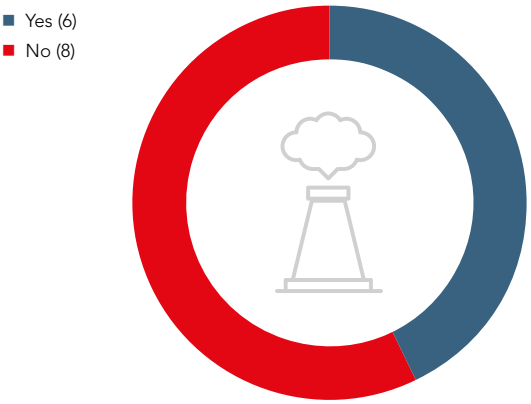
'Our publication 2017 Climate change considerations for our business, evaluated each of our commodity departments against three key scenarios established by the International Energy Agency (IEA) and detailed in its World Outlook 2016 to determine their resilience and assess consequences for the portfolio of commodities we market. Our evaluation took into account price, supply, demand and industry structure, as well as the energy market projections developed by organisations such as the IEA and World Energy Council (WEC), leading climate science projections from the IPCC [the Intergovernmental Panel on Climate Change] and likely shifts in policy and other conditions corresponding to scientific technology and economic changes. As the Paris Agreement requires each signatory country to outline and communicate their post-2020 climate actions, its revised national determined contributions (NDCs) by 2020 and we will provide an updated analysis of Glencore's portfolio resilience in 2021. In the interim, we are continuing to monitor policy developments and review our scenarios on an annual basis, taking into account any material changes to actual or proposed policies'. (Glencore 2019 annual report: 18)

TABLE 3.2: Number of companies that provide a scenario analysis which considers climate change risks

INDUSTRY	YES	NO
Aluminum	1	0
Coal	0	1
Copper	0	3
General mining	4	3
Gold mining	0	4
Integrated oil and gas	7	17
Iron and steel	0	11
Oil: crude producers	1	5
Platinum and precious metals	1	2
TOTAL	14	46

In addition, Figure 3.2 shows that only 6 out of the 14 companies that provide scenario analysis with climate change-related information also provide specific quantitative information about relevant factors, assumptions and impacts.

FIGURE 3.2: Number of companies that provide, within their scenario analysis, quantitative information about the climate change factors, assumptions and impacts of their operations



The following extract from Eni SpA demonstrates a good example of relevant disclosure.

'Our portfolio of oil and gas properties features a large weight of natural gas, the least GHG-emitting fossil energy source, which represented approximately 49% of Eni's production in 2019 on an available-for-sale basis; as of December 31, 2019, gas reserves represented approximately 50% of Eni's total proved reserves of its subsidiary undertakings and joint ventures. The other pillar of our resilient portfolio of Oil & Gas properties is the high incidence of conventional projects, developed through phases and with low CO_2 intensity... We believe that those elements of our portfolio will mitigate the risk of stranded reserves going forward due to risks of lower hydrocarbons demand in response to stricter global environmental constraints and regulations and increasing public sensitivity to the issue of global warming… New projects' internal rates of return are stresstested against two sets of assumptions: i) Eni's management estimation of a cost per ton of carbon dioxide (CO_2), which is applied to the total GHG emissions of each capital project, while retaining the management scenario for hydrocarbons prices; and ii) the hydrocarbon prices and cost of CO_2 emissions adopted in the International Energy Agency (IEA) Sustainable Development Scenario "IEA SDS"' (Eni SpA 2019 annual report: 94).

3.2.3 Business model

Surprisingly, our analysis reveals that almost 25% of our sample companies do not provide an explicit discussion of their business model (Table 3.3).

TABLE 3.3: Number of companies that provide an explicit discussion of their business model

INDUSTRY	YES	NO
Aluminum	1	0
Coal	1	0
Copper	3	0
General mining	6	1
Gold mining	2	2
Integrated oil and gas	19	5
Iron and steel	9	2
Oil: crude producers	2	4
Platinum and precious metals	3	0
TOTAL	46	14

In addition, most of the companies that disclose their business model (36 out of 46), identify addressing climate change risk as an integral part of it (Table 3.4).

TABLE 3.4: Number of companies that identify addressing climate change risk as an integral part of their business model.

INDUSTRY	YES	NO
Aluminum	1	0
Coal	1	0
Copper	2	1
General mining	5	1
Gold mining	1	1
Integrated oil and gas	15	4
Iron and steel	7	2
Oil: crude producers	1	1
Platinum and precious metals	3	0
TOTAL	36	10

The following extract from Eni SpA is an indicative example of how companies identify how they approach climate change risk as an integral part of their business model.

'Eni's business model is focused on creating value for its stakeholders and shareholders through a strong presence along the whole value chain. Eni, as an integrated energy company, contributes, directly or indirectly, to achieve the goals of Sustainable Development (SDGs) of the UN 2030 Agenda, supporting a socially equal energy transition responding through concrete, quick and economically sustainable answers to the challenge of combating climate change and giving access to the energy resources in an efficient and sustainable way, overall. To manage this effectively, Eni integrates organically its industrial plan with the principles of environmental and social sustainability, enlarging its actions along three directives:

1. *operational excellence,*
2. *carbon neutrality in the long term,*
3. *alliance for development'.*
   (Eni SpA 2019 annual report: 4)

Despite the central role of international initiatives such as the Paris Agreement, aimed at *'holding the increase in the global average temperature to well below 2°C above pre-industrial levels…' in order to '…reduce the risks and impacts of climate change'* (UN 2015: Art. 2, para. 1a) only 25% of our sample companies (ie only 40% of those whose consideration of climate risk is an integral part of their business model (15 companies)) make a specific reference to international initiatives for climate change (eg the Paris Agreement) (Table 3.5).

TABLE 3.5: Number of companies that consider international initiatives for climate change (eg the Paris Agreement) in the discussion of their business model

INDUSTRY	YES	NO
Aluminum	1	0
Coal	0	1
Copper	1	1
General mining	1	4
Gold mining	0	1
Integrated oil and gas	7	8
Iron and steel	3	4
Oil: crude producers	0	1
Platinum and precious metals	2	1
TOTAL	15	21

The following extract from Repsol illustrates a good example of how companies consider international initiatives for the climate change in their business models.

'In November, coinciding with the Climate Summit held in Madrid, the Board of Directors reviewed the company's role in the fight against climate change and made progress in its commitment to lead the energy transition in the industry, in line with the objectives of the Paris Summit and the United Nations' Sustainable Development Goals of reducing the increase in the planet's temperature to less than two degrees Celsius with respect to pre-industrial levels… Repsol will therefore focus its strategy on achieving its goal of being a company with net zero emissions by 2050, thus becoming the first in its industry to pursue this ambitious goal'. (Repsol SA 2019 annual report (management report section): 13)

3.2.4 Performance indicators

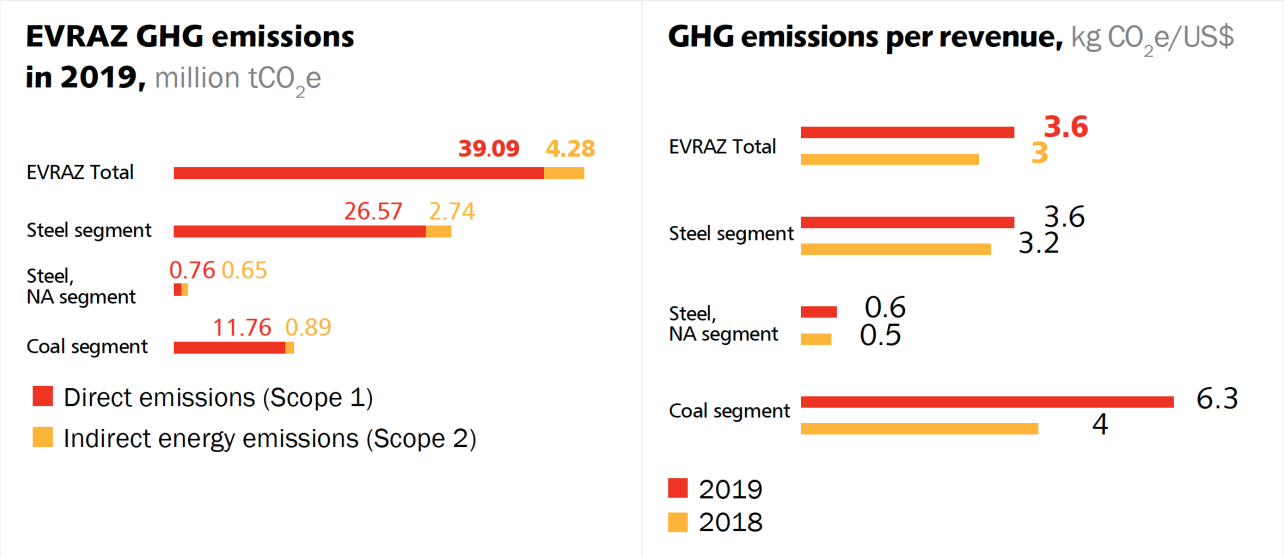
The vast majority of our sample companies (51 out of 60) provide some form of climate change performance indicators (Table 3.6). The most representative indicator relates to the level of carbon emissions. This is usually compared to previous years' related carbon performance. Of those 51 companies, four provide indicators where financial and climate change-related information is integrated. For example, a company measures its carbon emissions as a percentage of its revenues (see extract from Evraz in Figure 3.3). Further, nine companies contrast their climate change-related performance indicators with relevant financial indicators (see extract from Galp Energia in Figure 3.4).

TABLE 3.6: Number of companies that provide climate change-related performance indicators.

INDUSTRY	YES	NO
Aluminum	1	0
Coal	0	1
Copper	3	0
General mining	7	0
Gold mining	2	2
Integrated oil and gas	21	3
Iron and steel	10	1
Oil: crude producers	4	2
Platinum and precious metals	5	0
TOTAL	51	9

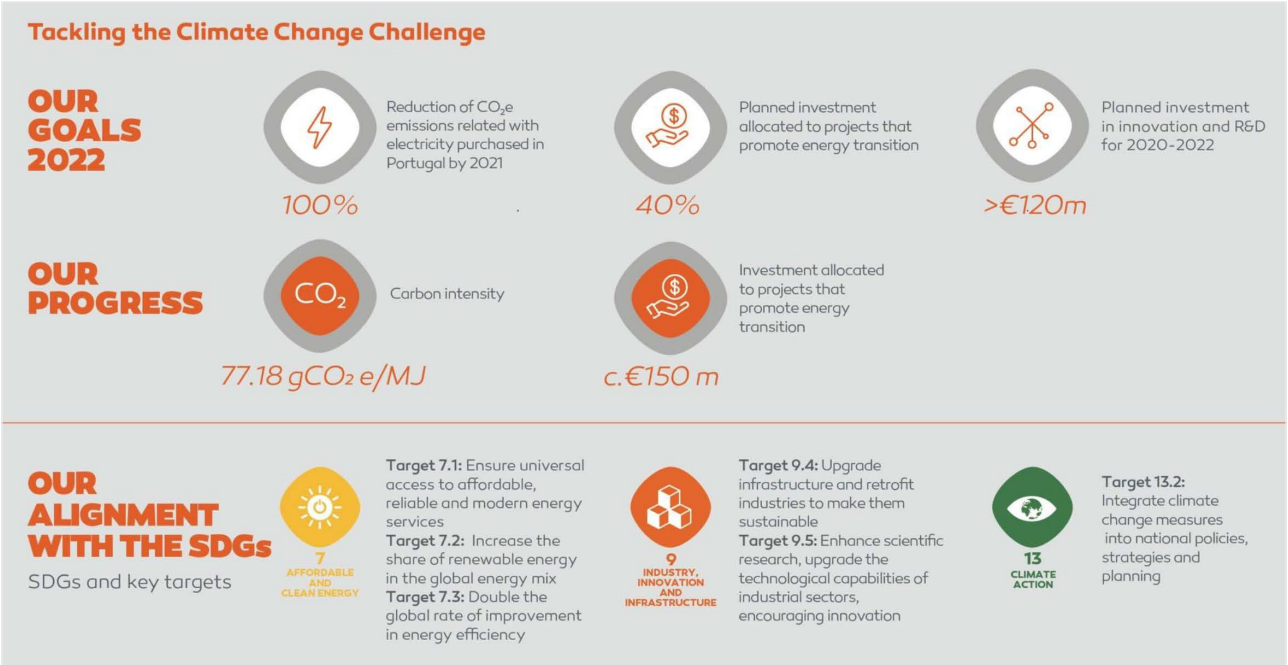
THE MOST REPRESENTATIVE INDICATOR RELATES TO THE LEVEL OF CARBON EMISSIONS. THIS IS USUALLY COMPARED TO PREVIOUS YEARS' RELATED CARBON PERFORMANCE.

FIGURE 3.3: Example from Evraz financial and climate change-related integrated information in its performance indicators



Source: Evraz 2019 annual report: 83

FIGURE 3.4: Example from Galp Energia reporting financial performance indicators alongside climate change-related performance indicators



Source: Galp Energia 2019 annual report: 87

Table 3.7 indicates that only half the companies that provide climate change-related performance indicators link such metrics (or, more broadly, sustainability performance metrics) with their executives' remuneration.

TABLE 3.7: Number of companies that link executives' remuneration to climate change-related performance metrics.

INDUSTRY	YES	NO
Aluminum	1	0
Coal	1	0
Copper	1	2
General mining	5	2
Gold mining	1	3
Integrated oil and gas	12	12
Iron and steel	2	9
Oil: crude producers	2	4
Platinum and precious metals	1	2
TOTAL	26	34

As is shown in the extract from Shell (Figure 3.5), 20% of Shell's executives bonuses are connected to sustainability performance metrics.

FIGURE 3.5: Basis of Shell annual bonuses

2019 annual bonus outcome (audited) [A][B]

Measures	Weight (% of scorecard)
Cash flow from operating activities ($ billion)	**30%**
Operational excellence	**50%**
Production (kboe/d)	12.5%
LNG liquefaction volumes (mtpa)	12.5%
Refinery and chemical plant availability (%)	12.5%
Project delivery on schedule (%)	6.25%
Project delivery on budget (%)	6.25%
Sustainable development	**20%**
Total recordable case frequency (injuries/million hours)	5%
Operational Tier 1 and 2 process safety events (number)	5%
Upstream and Integrated Gas GHG intensity (tonnes of CO_2 equivalent/tonne of hydrocarbon production available for sale)	4%
Refining GHG intensity (tonnes CO_2 equivalent per Solomon's Utilized Equivalent Distillation Capacity (UEDC™))	4%
Chemicals GHG intensity (tonnes CO_2 equivalent/tonne of petrochemicals production)	2%
	100%

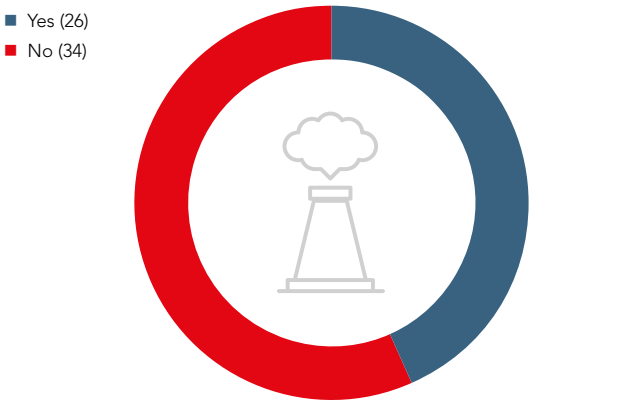
Source: Shell 2019 annual report: 142

3.2.5 TCFD recommendations

Although the Task Force on Climate-related Financial Disclosures (TCFD) is a relatively new endeavour, somewhat fewer than half our sample companies have already followed its recommendations (Figure 3.6) but some of them are even more actively involved in this. For instance, Tata Steel, as shown in the extract, not only follows the recommendations but is also a signatory of the TCFD.

'Climate change is recognised globally as one of the key risks in the 21st century. Tata Steel is a signatory to the Task Force on Climate Related Financial Disclosure (TCFD) and has undertaken a climate change risk assessment study in accordance with TCFD recommendations. Specific mitigation and contingency plans for each of the identified risks are being integrated with the Company's long-term strategy'. (Tata Steel 2019 annual report: 27)

FIGURE 3.6: Number of companies that follow the recommendations of the TCFD



ALTHOUGH THE TASK FORCE ON CLIMATE-RELATED FINANCIAL DISCLOSURES (TCFD) IS A RELATIVELY NEW ENDEAVOUR, SOMEWHAT FEWER THAN HALF OUR SAMPLE COMPANIES HAVE ALREADY FOLLOWED ITS RECOMMENDATIONS, BUT SOME OF THEM ARE EVEN MORE ACTIVELY INVOLVED IN THIS.

3.3 Back end

3.3.1 Accounting policies

Significantly, no company ~~specifically~~ recognises climate change as an important factor in its judgements and sources of estimations uncertainty in the accounting policies of its financial instruments. Only one recognises such a factor in the policies for its tangible and intangible assets, whereas 11 recognise it their impairment testing policy note. Finally, almost one-third of the companies recognise climate change as an important factor in their policy notes for provisions and contingent liabilities. The extracts from BP and BHP illustrate two good examples of such disclosures in relation to these companies accounting policies for intangible assets and provisions, respectively.

'Significant judgement: exploration and appraisal of intangible assets
… BP is in the exploration and appraisal phase in certain Canadian oil sands assets that require further advancement of low-carbon extraction technology in order to achieve optimum development. Sufficient technological progress is expected to be achieved and therefore BP continues to carry the capitalized costs on its balance sheet' (BP 2019 annual report: 160).

'The recognition and measurement of closure and rehabilitation provisions requires the use of significant estimates and assumptions, including, but not limited to:

- *the extent (due to legal or constructive obligations) of potential activities required for the removal of infrastructure and rehabilitation activities (including activities to mitigate the potential physical impact of climate change);…*

…Estimates can also be impacted by the emergence of new restoration techniques, changes in regulatory requirements for rehabilitation, risks relating to climate change and the transition to a lower carbon economy, and experience at other operations'. (BHP 2019 annual report: 200)

3.3.2 Impairment testing

In relation to impairment testing, companies do not recognise climate change risk as an important factor in their assets' estimated future cash flows, as only 10% of them consider it (Table 3.8). The results are even less encouraging when we focus on companies that recognise climate risk as a factor in their recognised impairment losses. Table 3.9 shows that only two companies do so.

TABLE 3.8: Number of companies that consider climate change risk as a factor in their assets' estimated future cash flows

INDUSTRY	YES	NO
Aluminum	0	1
Coal	0	1
Copper	0	3
General mining	1	6
Gold mining	0	4
Integrated oil and gas	5	19
Iron and steel	0	11
Oil: crude producers	0	6
Platinum and precious metals	0	3
TOTAL	6	54

FIGURE 3.7: Number of companies that recognise enviornmental issues inclusive of climate change as an important factor in their judgements and sources of estimations uncertainty in the accounting policies for the following items

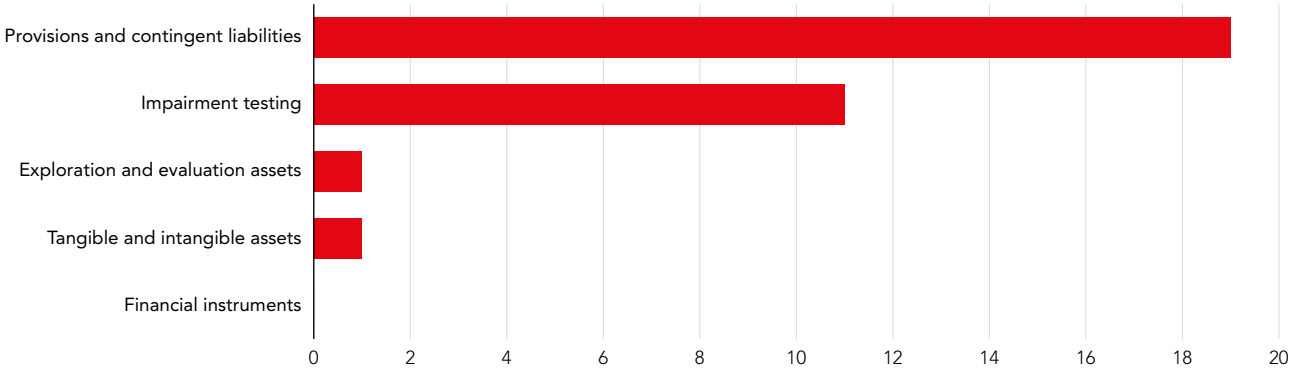


TABLE 3.9: Number of companies that recognise climate risk as a factor in their recognised impairment losses

INDUSTRY	YES	NO
Aluminum	0	1
Coal	0	1
Copper	0	3
General mining	0	7
Gold mining	0	4
Integrated oil and gas	2	22
Iron and steel	0	11
Oil: crude producers	0	6
Platinum and precious metals	0	3
TOTAL	2	58

The extract from Repsol illustrates a good example of a company that considers climate change risk as an important factor in its assets' estimated future cash flows when performing impairment testing. The extract from Total is one of the two cases in our sample companies in which climate change is found to be an important factor in impairment losses:

'The Group has assessed the recoverable amount of its cash-generating units as per the methodology described in Note 3 and the scenarios consistent with its new vision of the market, the expected environment and the new strategic approach. The main assumptions are described below:

…the general nature of the public policies and commitments aimed at the decarbonization of the economy and, therefore, at restricting the use of fossil fuels and the development of new alternative technologies that drive the energy transition and will mean a reduction in the demand for hydrocarbon products in the medium and long term should be noted. This will require companies to have a strategy in place to adapt to the energy transition that Repsol, following the analysis of its Board of Directors, has already begun by assuming decarbonization obligations that are in line with the climate change objectives of the Paris Agreement and the UN Sustainable Development Goals'. (Repsol 2019 annual report (financial statements): 53)

'In this context, given the need for the industry to make very substantial investments to cope with the natural decline of the fields, and meet the oil demand predicted by these scenarios over the next 20 years and given the slowdown in investment observed since 2015 in the oil and gas industry:

- *the crude oil price level considered to determine the recoverable value of CGUs increases from 64$2018 per barrel of Brent in 2019 to 70$2018 in 2025, and would remain stable for the following five years. Afterwards, the price decreases to reach 50$2018 in 2050, in line with the IEA's SDS scenario,*
- *as for gas, the price level considered to determine the recoverable value of CGUs stabilizes in the long term at approximately 6$2018/MBTU for the NBP price (Europe) and 2.6$2018/MBTU for the Henry Hub price (United States).*
- *the future operational costs were determined by taking into account the existing technologies, the fluctuation of prices for petroleum services in line with market developments and the internal cost reduction programs effectively implemented'* (Total SE 2019 annual report: 306)

3.3.3 Non-current assets

None of the sample companies identifies climate change risks as an important factor in determining the useful lives of its assets. At the same time, while all companies are found to capitalise future climate change-related expenses in their balance sheet, only 14 of them use financial instruments to settle future environmental obligations (Table 3.10).

TABLE 3.10: Number of companies using financial instruments in order to settle future environmental obligations

INDUSTRY	YES	NO
Aluminum	0	1
Coal	0	1
Copper	1	2
General mining	2	5
Gold mining	1	3
Integrated oil and gas	5	19
Iron and steel	0	11
Oil: crude producers	2	4
Platinum and precious metals	3	0
TOTAL	14	46

The extract from Sibanye Stillwater is an example of a company that employs financial instruments for settling its future environmental obligations. Companies that employ such financial instruments secure funds in an attempt to render the settlement of these obligations more probable.

'The Group's rehabilitation obligation funds includes equity-linked investments that are fair valued at each reporting date. The fair value is calculated with reference to underlying equity instruments using industry valuation techniques and appropriate models…Annual contributions are made to dedicated environmental rehabilitation obligation funds to fund the estimated cost of rehabilitation during and at the end of the life of the relevant mine. The amounts contributed to these funds are included under non-current assets and are measured at fair value through profit or loss. Interest earned on monies paid to rehabilitation funds is accrued on a time proportion basis and is recorded as interest income... In addition, bank guarantees are provided for funding shortfalls of the environmental rehabilitation obligations' (Sibanye Stillwater 2019 annual report (financial report): 89).

Further, 11 companies capitalise carbon allowances as intangible assets; 10 of them are based in European countries and one in India (Table 3.11).

TABLE 3.11: Number of companies recognising carbon allowances as intangible assets

INDUSTRY	YES	NO
Aluminum	1	0
Coal	0	1
Copper	0	3
General mining	1	6
Gold mining	0	4
Integrated oil and gas	8	16
Iron and steel	1	10
Oil: crude producers	0	6
Platinum and precious metals	0	3
TOTAL	11	49

The Polish company Polskie Gornictwo Naftowe i Gazownictwo is one of our sample companies that recognise carbon allowances as an intangible asset. The extract illustrates how this company treats carbon allowances.

'CO_2 emission allowances
Pursuant to the Act on Trading in Greenhouse Gas Emission Allowances, the Group holds CO_2 emission allowances allocated for individual installations.

The Group classifies emission allowances as:

1. *Acquired for redemption – recognised as intangible assets and measured in accordance with the policies discussed below,*
2. *Acquired for resale – recognised as inventory (Note 6.2.1) and measured initially at cost; at the end of each reporting period they are measured at the lower of cost or net realisable value,*
3. *Received free of charge under the National Allocation Plan – recognised as off-balance-sheet items at nominal value (equal to zero)'.* (Polskie Gornictwo Naftowe i Gazownictwo SA 2019 annual report: 46)

3.3.4 Provisions and contingent liabilities

In relation to provisions and contingent liabilities, 17 companies recognise provisions explicitly related to climate change risks (Table 3.12) whereas only six recognise climate change risk as an important determinant of their contingent liabilities (Table 3.13).

TABLE 3.12: Number of companies that consider climate change-related risks in the estimation of their provisions

INDUSTRY	YES	NO
Aluminum	1	0
Coal	0	1
Copper	0	3
General mining	4	3
Gold mining	0	4
Integrated oil and gas	7	17
Iron and steel	3	8
Oil: crude producers	0	6
Platinum and precious metals	2	1
TOTAL	17	43

TABLE 3.13: Number of companies that identify climate change risk as an important factor in their contingent liabilities

INDUSTRY	YES	NO
Aluminum	0	1
Coal	0	1
Copper	0	3
General mining	0	7
Gold mining	1	3
Integrated oil and gas	4	20
Iron and steel	1	10
Oil: crude producers	0	6
Platinum and precious metals	0	3
TOTAL	6	54

The extract from Shell is a characteristic example of a company's contingent liabilities related to climate change risk.

'Climate change litigation
In the USA, 12 lawsuits have been filed by several municipalities and one state against oil and gas companies, including Royal Dutch Shell plc. The plaintiffs seek damages for claimed harm to their public and private infrastructure from rising sea levels allegedly due to climate change caused by the defendants' fossil fuel products. A similar suit has been filed by a crab fishing industry group claiming harm to their fisheries as a result of alleged ocean-related impacts of climate change. In the Netherlands a case has been filed against Shell by a group of environmental nongovernmental organisations ("eNGOs") and individual claimants seeking a court order that Shell reduce by (net) 100% by 2050 the emissions associated with its business activities and products. Management believes the outcome of these matters should be resolved in a manner favourable to Shell, however, there remains a high degree of uncertainty regarding the ultimate outcome of these lawsuits, as well as their potential effect on future operations, earnings, cash flows and Shell's financial condition'. (Shell 2019 annual report: 236)

3.3.5 Auditor's report

Auditors do not recognise climate change risks in companies' current and future operations. Climate change-related risks that give rise to key audit matters was only recognised on nine occasions (Table 3.14). Figure 3.8 presents one of the few companies whose auditors identify climate change risk as key audit matter.

TABLE 3.14: Number of companies whose auditors acknowledge that climate change gives rise to key audit matters

INDUSTRY	YES	NO
Aluminum	0	1
Coal	0	1
Copper	0	3
General mining	3	4
Gold mining	0	4
Integrated oil and gas	5	19
Iron and steel	1	10
Oil: crude producers	0	6
Platinum and precious metals	0	3
TOTAL	9	51

FIGURE 3.8: Key audit matters as identified in BP's audit report

Summary of our audit approach

Key audit matters	The key audit matters that we identified in the current year are as follows: • Potential impact of climate change and the energy transition (impacting PP&E, goodwill, intangible assets and provisions); • Impairment of upstream oil and gas property, plant and equipment (PP&E) assets; • Impairment of exploration and appraisal assets (included within 'intangible assets' in the Group balance sheet); • Accounting for structured commodity transactions (SCTs) within the integrated supply and trading (IST) function, and the valuation of other level 3 financial instruments (potentially impacting all financial statement accounts, in particular finance debt); • IT controls relating to financial systems (potentially impacting all financial statement accounts); and • Management override of controls (potentially impacting all financial statement accounts).

Source: BP 2019 annual report: 132

4. Conclusions

As mankind intensifies efforts to mitigate the catastrophic consequences of climate change through international initiatives such as the Paris Agreement and the UN Sustainable Development Goals, companies in the extractive industries, being responsible for half of global carbon emissions (IRP 2019), are facing an ever-increasing challenge: to address the urgent issue of climate change and, at the same time, to remain competitive.

These companies have large reserves that may be rendered 'stranded' if governments decide to ban oil production, as Denmark announced recently (Ambrose 2020) or owing to reduced demand (Energypeople, 2020) and commodity prices. The current pandemic has further raised awareness of the importance of preserving the natural environment and has accelerated countries' efforts to adopt environment-friendly policies (Bousso 2020; Meredith 2020) and green energy. In the light of these developments, it is not surprising that the accountancy/auditing profession as well as the investor community and other capital providers, are urging companies to provide more disclosures, in both the front and the back ends of their annual reports, about the climate change-related risks they face, (AASB and AUASB 2018; ACCA 2013, 2016; Anderson 2019; Assembly General, United Nations 2012; BDO 2020; Climate-Related Market Risk Subcommittee 2020; IAASB 2020; Jones 2020).

Our study contributes to these developments by analysing climate change-related disclosures found in the 2019 annual reports of the 60 ~~extractive listed companies~~ with the largest carbon emissions during the period 2016–18 that apply IFRS or local equivalent. Our results indicate an overall low level of the quantity and, to some extent, quality of such disclosures. ~~The vast majority of our sample companies refrain from providing adequate climate change-related disclosures, as an in-depth discussion about the climate change risks they are facing or their impacts on their operations is overall absent.~~

Specifically, our sample companies provide much more information in the front, unaudited, part of their annual reports than in the back end, where they are parsimonious with it. In the latter, most of the companies do not discuss the topic of climate change at all and those that do cover it in a rather superficial manner without providing any numerical information. Even more alarming, the disclosures provided in the front end of the annual reports are not necessarily connected to the limited disclosures and estimates in the back end. This raises potential concerns about the usefulness of the front end disclosures and the reliability and decision usefulness of items recognised in the companies' financial statements (back end), and the consequent overall quality of the annual reports.

In the front end, just over half the companies provide a reserves/resources statement with relevant numerical information but without any reference to the climate change risks that are pertinent to their projects. More importantly, although climate change plays or will play an undoubtedly central role in these companies' operations, only 60% of them identify the need to address climate change risk as an integral part of their business model and only 25% of them consider international initiatives for climate change in the discussion of their business model. Finally, while our sample shows that some companies engage in reporting climate change through performance indicators, very few of them connect these indicators either directly or indirectly to financial performance indicators. Moreover, in most ~~of~~ cases such climate change performance indicators were not linked to executives' remuneration.

In the back end, very few companies engage in reporting estimates or judgements based on their climate change risk. No company recognises climate change risks as an important factor in its assets' useful lives and only 10% of the sample companies disclose that they take into consideration climate change risks when estimating future cash flows for the impairment testing of their assets. In general, provisions and contingent liabilities also fail to reflect climate change risks. While all 60 companies capitalise future climate change-related costs as part of the cost of various non-current assets, only one-quarter of them create relevant savings using financial instruments in order to ensure that they will have the necessary capital to settle these obligations in the future. From an audit perspective, only 15% of our sample auditors' reports identify climate change risk as a key audit matter.

On a more positive note, we have witnessed some encouraging developments during 2020, which could influence companies' future reporting and integration of climate change into their reports. For instance, the sustainable financial agreements Eni SpA signed in 2020 with leading banks link loans and credit lines of more than €4bn to sustainability performance objectives, as outlined in UN SDG 7 'Affordable and clean energy', and to SDG 13 'Climate action' (Eni.com 2020) as well as to other reporting frameworks. This could be a fruitful avenue for future research.

As a closing note, we acknowledge that our research is bounded by two limitations. First, our findings about accounting policies, provisions and contingent liabilities include findings from companies that discuss their environmental impact, without necessarily making explicit reference to climate change. Should a stricter approach have been taken, our results about the back-end ~~disclosures would have been even more negative~~. Second, because one of the aims is to examine the integration of climate change risks into companies' financial statements, our analysis focuses on the companies' annual reports only. We do not consider other reporting media that may include detailed relevant information.

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Appendix A:
Sample companies

COMPANY	COUNTRY	COMPANY	COUNTRY
Integrated oil and gas		**Copper**	
YPF SA	ARGENTINA	KGHM Polska Miedz SA	POLAND
OMV AG	AUSTRIA	Antofagasta PLC	UNITED KINGDOM
Petroleo Brasileiro SA Petrobras	BRAZIL	Kaz Minerals PLC	UNITED KINGDOM
Cenovus Energy Inc	CANADA		
Husky Energy Inc	CANADA	**General mining**	
Suncor Energy Inc	CANADA	BHP Group Ltd	AUSTRALIA
Ecopetrol SA	COLOMBIA	South32 Ltd	AUSTRALIA
Total SE	FRANCE	Teck Resources Ltd	CANADA
MOL Magyar Olajes Gazipari Nyrt	HUNGARY	Imerys SA	FRANCE
Oil and Natural Gas Corporation Ltd	INDIA	Anglo American plc	UNITED KINGDOM
Eni SpA	ITALY	Glencore PLC	UNITED KINGDOM
Petronas Dagangan Bhd	MALAYSIA	Rio Tinto PLC	UNITED KINGDOM
Royal Dutch Shell PLC	NETHERLANDS		
Equinor ASA	NORWAY	**Gold mining**	
Polskie Gornictwo Naftowe i Gaz. SA	POLAND	Barrick Gold Corp	CANADA
Galp Energia SGPS SA	PORTUGAL	Zijin Mining Group Co Ltd	CHINA
Gazprom Neft' PAO	RUSSIAN FEDER.	Polyus PAO	RUSSIAN FEDER.
Gazprom PAO	RUSSIAN FEDER.	AngloGold Ashanti Ltd	SOUTH AFRICA
NK Lukoil PAO	RUSSIAN FEDER.		
NK Rosneft' PAO	RUSSIAN FEDER.	**Iron and steel**	
Novatek PAO	RUSSIAN FEDER.	Fortescue Metals Group Ltd	AUSTRALIA
Repsol SA	SPAIN	Vale SA	BRAZIL
PTT PCL	THAILAND	JSW Steel Ltd	INDIA
BP PLC	UNITED KINGDOM	Steel Authority of India Ltd	INDIA
		Tata Steel Ltd	INDIA
Oil: crude producers		Vedanta Ltd	INDIA
Santos Ltd	AUSTRALIA	ArcelorMittal SA	NETHERLANDS
Woodside Petroleum Ltd	AUSTRALIA	Novolipetsk Steel PAO	RUSSIAN FEDER.
Canadian Natural Resources Ltd	CANADA	Severstal' PAO	RUSSIAN FEDER.
Crescent Point Energy Corp	CANADA	EVRAZ plc	UNITED KINGDOM
CNOOC Ltd	HONG KONG	Ferrexpo PLC	UNITED KINGDOM
PTT Exploration and Production PCL	THAILAND		
		Platinum and precious metals	
Aluminum		Anglo American Platinum Ltd	SOUTH AFRICA
Norsk Hydro ASA	NORWAY	Impala Platinum Holdings Ltd	SOUTH AFRICA
		Sibanye Stillwater Ltd	SOUTH AFRICA
Coal			
Banpu PCL	THAILAND		

Appendix B1.
Instrument for annual report analysis: **Front end**

RESERVES AND RESOURCES REPORTING/STATEMENT	
RRR1	Does the company provide a reserves/resources statement with relevant numerical information?
RRR2	Does the company report an assessment of climate change/environment-related risks and/or liabilities that are pertinent to its projects, including, but not limited to, legislative requirements, assumptions and limitations?
SCENARIO ANALYSIS	
SA1	Does the company provide scenario analysis which considers climate change risks?
SA2	For the companies that provide a scenario analysis as above, do they provide, within this, quantitative information about the climate change factors, assumptions and impacts of their operations?
BUSINESS MODEL	
BM1	Does the company explicitly discuss its business model?
BM2	Does the company identify addressing climate change risk as an integral part of its business model?
BM3	Does the company consider any international initiative for climate change (eg the Paris Agreement) in the discussion of its business model?
CLIMATE CHANGE-RELATED PERFORMANCE INDICATORS (PIS)	
KPI1	Does the company have climate change-related PIs?
KPI2	Does the company integrate financial and climate change-related information into its PIs?
KPI3	Does the company link executives' remuneration to climate change-related performance metrics?
TCFD	
TCFD	Does the company follow the recommendations of the Task Force on Climate-related Financial Disclosures?

Appendix B1.
Instrument for annual report analysis: **Back end**

ACCOUNTING POLICIES	
AP1	Is climate change recognised as an important factor in the company's judgements and sources of estimations uncertainty? – In financial instruments?
AP2	Is climate change recognised as an important factor in the company's judgements and sources of estimations uncertainty? – In tangible and intangible assets?
AP3	Is climate change recognised as an important factor in the company's judgements and sources of estimations uncertainty? – In exploration and evaluation assets?
AP4	Is climate change recognised as an important factor in the company's judgements and sources of estimations uncertainty? – In impairment testing?
AP5	Is climate change recognised as an important factor in the company's judgements and sources of estimations uncertainty? – In provisions and contingent liabilities?
IMPAIRMENT TESTING	
IT1	Is climate change risk recognised to affect the company's future estimated cash flows and hence the recoverable amount of its assets such as property, plant and equipment; mineral resources; evaluation and exploration assets; financial instruments; intangible assets; and goodwill?
IT2	When a company recognises impairments, does it recognise climate risk factors affecting these?
NON-CURRENT ASSETS	
NCA1	Are climate change-related risks considered when estimating the useful lives of the company's assets?
NCA2	Does the company capitalise expenses related to climate change?
NCA3	Does the company use financial instruments in order to settle future environmental obligations? (eg South Africa fund)
NCA4	Does the company recognise carbon allowances as intangible assets?
PROVISIONS AND CONTINGENT LIABILITIES	
PCL1	Does the company consider climate change-related risks in the estimation of its provisions?
PCL2	Does the company identify climate change risk as important factor in its contingent liabilities?
AUDIT REPORT	
AR	Does climate change give rise to key audit matters?

PI-CLIMATE-RISK-EI

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