Mandatory Carbon Disclosure: Evidence from France*

Thomas Bourveau[†] **Alexandre Garel**[‡] **Arthur Romec**[§]

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Abstract

We examine firms' response to a carbon disclosure mandate imposed on French firms with more than 500 employees by the *Grenelle II* law. We find that only half of the firms subject to the mandate comply and file at least one carbon report between 2014 and 2021. Conditional on filing a report, virtually all the firms report their scope 1 and scope 2 emissions. However, only a fraction of the firms report their scope 3 emissions. Similarly, we document considerable heterogeneity in firms' decisions to provide an action plan to reach targeted reductions in future carbon emissions. Importantly, the propensity to file a carbon report and to include an action plan is lower for firms in more carbon-intensive industries. Finally, we find that expected carbon emission reduction is associated with the actual reduction in emissions, especially for firms that provide clear action plans with quantitative metrics.

Keywords: Mandatory disclosure, carbon emissions, climate change, CSR reporting

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[†]Columbia University, Graduate School of Business - tb2797@columbia.edu
[‡]Audencia Business School - agarel@audencia.com
[§]Toulouse Business School - arthur.romec@gmail.com

1 Introduction

Transparency regulation has become a common policy tool used by regulators in their efforts to curb climate change (Bolton et al. 2021). Multiple jurisdictions already mandate that public firms disclose their carbon emissions. Acknowledging that regulating public firms alone might induce some reallocation effects and shift the problem from public to private firms, regulators have started to craft regulations targeting both public and private firms. For example, in Europe, the Corporate Sustainability Reporting Directive (CSRD) is progressively rolling out environmental disclosure mandates to public and private firms starting in 2024. More recently, Singapore and the state of California adopted laws mandating carbon reporting for public and private firms. Despite these regulatory initiatives, very little is known about how to design such disclosure mandates to reach the desired goals, especially in the context of private firms (Christensen et al. 2021). In this paper, we evaluate the impact of a carbon disclosure mandate on private firms in France.

In 2010, the French government adopted the *Grenelle II* law. The law stipulates that starting in 2012, French organizations with more than 500 employees must produce a carbon emission report and update it every three to four years. This report should disclose firms' direct and indirect (i.e., scope 1 to scope 3) carbon emissions and include the methodology used to estimate those emissions. The report should also contain firms' carbon emission reduction targets, along with a transition plan describing the actions the firm will implement to reach its target. Companies are required to upload their report to the web portal of the French ecological transition agency (ADEME). In evaluating this disclosure regulation, we have three specific research objectives: (1) assess companies' compliance with the disclosure mandate, (2) analyze the content and the quality of the reports disclosed by firms, and (3) evaluate whether the expected carbon emission reductions –given firms' transition plans– are associated with actual reductions in carbon emissions.

To build our sample, we obtain legal and financial information on French firms from CapFinancials. We exclude companies with fewer than 500 employees to restrict our sample to firms subject to the carbon disclosure mandate and we exclude publicly listed companies. Public firms are subject to capital markets' demand for ESG-related information, and they often disclose such information voluntarily to access and/or retain large institutional investors (Azar et al. 2021; Cohen et al. 2023; Ilhan et al. 2023; Robinson et al. 2023). Thus, as we wish to evaluate the disclosure mandate without conflating our inferences with pressures that public firms normally face on their reporting, we focus on private firms subject to the law. This procedure yields a sample of 2,124 unique eligible private and for-profit firms. Next, we retrieve all the carbon emission reports available from the website of the French ecological transition agency (ADEME) for the period 2014-2021. Finally, we merge our sample of firms that are subject to the mandate with firms that uploaded their reports to the ADEME website. This leaves us with a sample of 1,546 carbon reports issued by 1,137 unique companies.

We start our analysis of the disclosure mandate by focusing on firms' compliance choice. Among 2,124 unique eligible private firms with more than 500 employees, only 1,137 (about 53%) report their carbon emissions at least once, indicating that despite the mandatory nature of the disclosure, there is a lot of non-compliance. Furthermore, while firms are supposed to update their report at least every three to four years, our data reveal that a large proportion of firms report only once during our sample period when in fact most firms should have submitted at least two reports. This relatively low compliance rate is not surprising, as the financial sanctions for non-compliance were initially very low (though they were raised in 2019 and again in 2023), and we did not find evidence of active enforcement by the regulatory agency or the courts.

Next, we examine the determinants of firms' decision to comply with the disclosure mandate by issuing a carbon report or not. Our data reveal some interesting patterns. First, we find that larger and older companies are more likely to report. This finding is

consistent with larger firms facing greater pressure from their stakeholders to disclose their carbon emissions. We also find that firms in carbon-intensive industries are significantly less likely to file a report, which is consistent with these companies being more reluctant to publicly reveal the extent of their contribution to global carbon emissions. This result is also consistent with the idea that firms in carbon-intensive industries are reluctant to commit to reducing their carbon emissions (Bolton and Kacperczyk 2023a).

Next, we turn to our second research objective and analyze the content of the carbon reports themselves. For this analysis, we restrict the sample to complying firms. We examine the information disclosed in the carbon reports along three dimensions: i) disclosure of carbon emissions, ii) information related to the methodology, and iii) information disclosed in action plans. First, we find that all companies report their scope 1 and scope 2 carbon emissions. By contrast, only 47% of companies report their scope 3 carbon emissions. We observe an increase over time in the fraction of companies reporting scope 3 emissions. We also observe substantial variation across industries. For example, the fraction of firms reporting their scope 3 emissions ranges from about 30% of companies in the utilities sector to about 85% in the finance and insurance industry. We also examine the determinants of the likelihood to report scope 3 carbon emissions. Consistent with our results for the compliance analysis, we find that conditional on reporting, larger firms are more likely to report scope 3 emissions. This association is consistent with larger firms being subject to more pressure from stakeholders and/or larger firms having better information system to estimate their carbon emissions. Interestingly, we also find that firms with greater scope 1 and 2 emissions are less likely to report their scope 3 emissions.

Second, we examine the information related to the methodology companies used to compute carbon emissions. Specifically, firms are required to provide information on the sources and documents used to quantify their carbon emissions, on the organizational perimeter considered (i.e., the entities owned or controlled by the company that are considered in the calculation), and on possible uncertainties in their computations. While all companies report

their scope 1 and scope 2 emissions, we observe that only 52% (47%) of them report information related to the methodology used to compute scope 1 (scope 2) emissions. Unsurprisingly, the fraction of firms reporting information related to the methodology used to compute their scope 3 emissions is even lower (31%). Even fewer companies report information regarding specific aspects of their methodology. For example, only 43% provide information related to the uncertainties in the computation of carbon emissions, and only 25% provide information related to the organizational perimeter considered for the computation. These inconsistencies affect the comparability of the information across firms, thereby significantly reducing the usefulness of the reported information.

Third, we examine firms' carbon emission reduction objectives and the information disclosed in action plans to achieve these objectives. We find that 96% of firms provide an emission reduction objective regarding scope 1 and 2 emissions. Likewise, 97% (94%) of firms provide action plans for scope 1 (scope 2) emissions. However, the fraction of firms with missing scope 3 action plans is large (64%). Consistent with our previous results, we find that larger firms are more likely to have action plans for scope 3 emissions, but firms in brown industries are less likely to have them. Similarly, firms with larger reported scope 1 and 2 emissions are more likely to have missing action plans for scope 3 emissions. We also find similar patterns associated with the length of the action plan (a proxy for its ambition).

To further examine the content of action plans, we manually parse them to collect granular information on three dimensions. Specifically, we identify which companies' action plans mention i) a scientific methodology for their carbon reduction targets, ii) an audit of their estimation process, and iii) a horizon. We observe that only 9% of companies mention a scientific methodology (e.g., SBTi) in their action plans, and only 2% of them mention an external audit.[1] This last finding contrasts with the fast increase in audits of environmental metrics by public firms (Gipper et al. 2023). Only 17% of companies mention a horizon in their action plans. These figures suggest that for most companies, the quality of the infor-

[1]The Science-Based Target Initiative (SBTi) defines and promotes best practice in science-based target setting in the context of climate change (e.g., Freiberg et al. 2021)

mation provided in their action plans may not be sufficient to represent a real commitment (Bolton and Kacperczyk 2023a).

Using our manual parsing, we also identify firms that provide quantitative metrics and objectives in their action plans to achieve their self-imposed carbon emission reduction targets. Quantitative metrics set an implicit commitment to future disclosure and help stakeholders form expectations to monitor firms' behavior (Leuz and Verrecchia 2000). Specifically, we create an index on a 0 to 3 scale that identifies i) missing action plans, ii) action plans without any quantitative metrics or objectives, iii) action plans with quantitative metrics or objectives that are not directly related to carbon emissions, and iv) action plans with quantitative metrics or objectives that are related to carbon emissions. We observe that most companies do not provide any quantitative metrics in their action plans. Specifically, 75% (79%) of action plans related to scope 1 emissions (scope 2 emissions) do not have any quantitative metrics. The fraction of scope 3 action plans without any quantitative metrics is even larger (i.e., more than 90%). This finding indicates that while virtually all firms have an emission reduction objective, only a small fraction provides a quantification of the expected emission reductions associated with the different actions described in their transition plan. This lack of quantitative information in action plans casts doubts regarding the credibility of the stated emission reduction objective. Analyzing the determinants of the informational quality of action plans, we find that larger firms and firms with lower carbon emissions have higher-quality action plans.

Finally, we turn to our third and last research objective and examine the link between characteristics of the carbon report and future carbon emissions. We caution the reader to interpret this last analysis with a grain of salt as we are able to track the evolution of carbon emissions only for the small subsample of firms that submitted at least two reports during our sample period. Furthermore, as in the case of carbon commitments (Bolton and Kacperczyk 2023a), the low compliance with the regulation suggests that the decision to submit (at least two) carbon emission reports in our sample is largely voluntary. This implies that our

analysis does not allow us to capture the impact of a binding disclosure mandate and likely reflects the preferences of firms already dedicated to reducing their carbon emissions (Leuz and Wysocki 2016). Empirically, we focus on the change in carbon emissions between two reports and link it to the characteristics of the previous report. We find evidence that the expected carbon emission reduction in the report is associated with the actual reduction in carbon emissions. We also find that providing quantitative metrics in the action plans is associated with a stronger reduction in carbon emissions.

Transparency regulations have recently gained momentum as a powerful policy tool to influence agents' behavior (Dranove and Jin 2010; Leuz and Wysocki 2016). Disclosure mandates differ from other regulatory interventions that impose a ban or taxes on certain activities. Indeed, disclosure mandates rest on the assumption that a sender will release some public information to a receiver that will "price" back the information, ultimately inducing the sender to change its behavior. It is important to design disclosure mandates to make sure that this feedback loop mechanism does not break. The carbon disclosure mandate that we evaluate in this paper does not seem to empower the receiver to induce meaningful changes. Indeed, the disclosure equilibrium post regulation is characterized by a significant lack of compliance. Conditional on compliance, there is great heterogeneity in disclosure about scope emissions and action plans. This lack of compliance is stronger for firms in carbon-intensive industries.

To inform the regulators, we speculate on some possible explanations for this disclosure equilibrium. First, prior literature on financial reporting suggests that enforcement is critical to ensure the success of disclosure regulation (Christensen et al. 2016). Lack of enforcement actions coupled with the very low initial financial penalty might contribute to this lack of compliance. Second, while there is a reporting template that provides formatting guidelines, the lack of guidance on the method to estimate carbon emissions might explain the heterogeneity in reporting.[2] This heterogeneity reduces the comparability of the reports and thus

[2]Similarly, in the context of human capital, Bourveau et al. (2023) find that a principle-based disclosure mandate targeting public firms leads to increased heterogeneity in disclosed quantitative metrics.

their usefulness in empowering stakeholders to make decisions in capital, product, and labor markets. Third, the regulation does not explicitly state the targeted group of stakeholders, and it requires firms to upload their reports to the website of the ADEME, a regulatory agency with low visibility. Unfortunately, prior research has established that decentralized disclosure of non-financial information (e.g., sustainability reports) has limited impact on market participants (Haley et al. 2023), and disclosure via a centralized platform with low visibility leads to the same outcome (Christensen et al. 2017).

Our results make two contributions to the literature. First, we contribute to the literature on voluntary disclosure of non-financial information. Given the lack of enforcement and the 53% compliance rate, the decision to comply with the mandate is akin to a voluntary disclosure choice. Christensen et al. (2021) conjectured that similar economic forces drive firms' decisions to provide financial and non-financial information. As the preparation costs often decrease with firm size, we find that larger private firms are more likely to disclose.[3] Our descriptive evidence suggests that private firms fail to adopt common measurement standards (e.g., ISO, SBTi) and auditing, which contrasts with the voluntary practices of public firms (e.g., Bochkay et al. 2023a,b; Gipper et al. 2023; Demers et al. 2024). Importantly, we find that firms operating in carbon-intensive industries are less likely to disclose information, as releasing "worse" carbon reports might trigger negative responses in the capital, labor, or product markets. Ultimately, this regulation created a credible platform for a small subset of eligible *private* firms to voluntarily commit to carbon reduction. By focusing on private firms, our results complement the findings of Bolton and Kacperczyk (2023a), who document that firm-level commitments to reduce carbon emissions are more prevalent among the *public* firms that have lower carbon emissions to begin with.

Second, our paper contributes to the growing literature on the real effects of disclosure

[3]Size is also correlated with the voluntary disclosure of non-financial information in other settings, including carbon emissions (e.g., Depoers and Jerome 2016) and biodiversity disclosure (von Zedlitz 2023). However, firm size is negatively correlated with the provision of voluntary information on CEO pay ratio (LaViers et al. 2024).

mandates in the context of non-financial information.[4] Specifically, our paper closely relates to recent studies examining the consequences of the carbon disclosure mandate for public firms in the U.K. on various outcomes including strategic environmental disclosure, cost of capital, financial performance, divestitures, and future carbon emissions (Bolton and Kacperczyk 2021a; Downar et al. 2021; Ecker and Keeve 2023; Grewal et al. 2023; Jouvenot and Krueger 2021). Our results are also related to studies examining the impact of the Greenhouse Gas Reporting Program (GHGRP) on the emissions of specific facilities in the United States (Tomar 2023; Yang et al. 2021). Our setting differs from these two regulatory interventions in two important ways. First, it applies to all firms (both public and private) above a fixed size threshold and irrespective of their carbon emission intensity. Second, it requires companies not only to disclose their carbon emissions but also to provide their objectives of future carbon emission reductions and an action plan to achieve them. Our analysis suggests that the effect of the disclosure mandate on future carbon emissions differs depending on the nature and quality of the information provided in carbon emission reports.

2 Institutional Background

2.1 Legal Background

On July 12, 2010, the French government adopted the *Grenelle II* law (or law n°2010-788). The law complements and implements the *Grenelle I* law adopted the year before, which established France's national commitment to the environment and the fight against climate change. Specifically, the *Grenelle I* law formalizes 268 engagements from the *Grenelle de l'environnement*, a set of multi-party debates and meetings aiming to take key environmental decisions to ensure sustainable development and reduce greenhouse gas emissions.

As part of the *Grenelle II* law, Article 229-25 of the French environment code requires all public and private mainland French companies with more than 500 employees to produce

[4] A stream of studies focuses on the impact of cross-country ESG disclosure mandates (e.g., Krueger et al. 2021; Gibbons 2023; Wang 2023; Lu et al. 2023).

a report of their greenhouse gas emissions.[5] In addition to disclosing their carbon emissions, firms must also include in their report an overview of the actions they plan to take to reduce their greenhouse gas emissions. Companies should make their carbon emission report publicly available and update it at least every three years. The first carbon report was due by the end of 2012.

The article has been amended several times since 2010, but its core principles have remained the same. A December 2015 amendment reduces the frequency with which companies should submit their carbon reports to every four years and introduces a financial penalty of €1,500 for failing to provide a carbon report. Law 2019-047 raises the maximum penalty for non-compliance to €10,000 (€20,000 for repeated non-compliance). Decree 2022-982 of 2022 makes it possible to provide a consolidated carbon emission report for the different entities in a business group. The decree also modifies the perimeter of the emissions to be considered and requires companies to incorporate significant indirect emissions in their report. Finally, the last amendment made in October 2023 further raises the maximum penalty for non-compliance to €50,000 (€100,000 for repeated non-compliance).

The French carbon disclosure mandate has several important features. First, like the upcoming regulations in the European Union, the State of California, and Singapore, it requires both public and private companies to disclose their carbon emissions. By contrast, the climate disclosure mandate implemented by the U.K. applies only to publicly listed companies. Similarly, the U.S. Greenhouse Gas Reporting Program studied by Tomar (2023) imposes a disclosure mandate on large emitting facilities. Second, carbon reports have been released for about a decade, which provides a reasonably long time series to offer some insights about what to expect from a general carbon disclosure mandate. Third, as discussed in greater detail in the next section, the disclosure mandate goes beyond simply requiring firms to report their emissions: it also requires them to include details on their methodologies and future plans. This enables us to collect information on firms' current plans and relate

[5]The obligation to produce a carbon emission report also applies to public entities including the State, regions, departments, and cities with more than 50,000 inhabitants.

this information to firms' future actions.

2.2 Template of the carbon emission report

In this section, we describe the format of the carbon reports and the different items that companies are required to provide. Carbon reports have seven sections: i) company information, ii) carbon emissions (scope 1 to 3 emissions), iii) additional information, iv) objectives of future emission reduction and action plans to achieve them, v) a presentation of the firm's activities, vi) the methodology used for the computation of carbon emissions, and vii) the contact information of the person responsible for the carbon report. Appendix A presents screenshots of the carbon report filed by the company Lohr Industrie that show the information reported in the seven aforementioned sections.

Panel A shows a screenshot from the company information section. It includes, among other things, the company's name, location (departement), identifier (SIREN), number of employees, and industry. Panel B shows a screenshot from the carbon emissions section. Companies are required to report their direct and indirect greenhouse gas emissions related to 22 categories. The carbon emissions section includes two subsections presenting the amount of carbon emissions (in tons of CO2) and the relative importance (in percentages) of each category of the firm's total carbon emissions. The information is then aggregated to compute the scope 1, scope 2, and scope 3 emissions. Panel C shows a screenshot from the additional information section. In this case, Lohr Industrie reports the amount of avoided emissions. Panels D and E show screenshots from the section on carbon emission reduction targets and the action plans to achieve them. Firms should provide an objective for both direct and indirect emissions. Likewise, they should provide separate action plans for scope 1 to 3 emissions in which they describe the actions and initiatives to reduce their future carbon emissions. Panel F shows a screenshot from the section on the firm's activities. Panel G shows a screenshot from the methodology section. In the methodology section, firms should report information on the method they used to compute carbon emissions, possible uncertainties

in the calculation, and the sources and documents used to compute the carbon emissions. Finally, Panel H shows a screenshot of the contact information section, which provides the name, email, and phone number of the employee responsible for the carbon report.

3 Data and Sample Construction

3.1 Sample construction

To construct our sample, we start with all the carbon emission reports available from the ADEME website.[6] First, we drop reports filed by public entities, cooperatives, associations, and foundations. We keep only reports filed by companies (i.e., entities defining themselves as an "Entreprise").[7] We also drop reports filed by overseas companies in order to focus on mainland companies.[8] We further restrict our sample to carbon emission reports filed between 2014 and 2021 since, at the time of collection (i.e., February 2023), the data for the year 2022 were incomplete. We also exclude listed companies.[9] As mentioned previously, public firms face greater demand for ESG-related information, in particular carbon emission disclosures, from large institutional investors (Azar et al. 2021; Cohen et al. 2023; Ilhan et al. 2023). Moreover, as discussed in Section 2.1, a key feature of the French carbon disclosure mandate is that it also applies to private firms, unlike the U.K. mandate studied by Bolton and Kacperczyk (2021a), Downar et al. (2021), Jouvenot and Krueger (2021), and others. Finally, we exclude companies with fewer than 500 employees to restrict our sample to firms subject to the carbon disclosure mandate.

We obtain accounting data on French companies from CapFinancials. Every French

[6]Recall that companies are required to make their carbon emission report publicly available by uploading it to the ADEME website. This implies that companies do not disclose their carbon emissions privately and confidentially to the regulator.

[7]We manually check whether the resulting entities are companies (some of them were public entities, associations, or foundations that had mislabeled themselves).

[8]The mandate's legal requirements differ slightly for mainland and overseas French companies. For example, the disclosure mandate applies to all mainland companies with more than 500 employees, but it applies to overseas French companies with more than 250 employees.

[9]We identify publicly listed companies using a name-matching approach based on the entire universe of stocks listed on Euronext.

company that files its financial statements is covered by CapFinancials. All French companies have to disclose their financial statements to the local commercial court, with the exception of a few companies below a certain size and with a specific legal status. However, given our focus on companies with more than 500 employees, we can safely assume that there is no systematic bias in CapFinancials' coverage. Our main sample consists of "compliant" firms (i.e., private companies with more than 500 employees that have filed at least one carbon emission report over our sample period) for which we have accounting data from CapFinancials. Our main sample comprises 1,137 unique companies (8,406 firm-year observations) that have filed 1,546 carbon emission reports over the period 2014-2021.

For our compliance analysis, we also generate a sample of non-compliant companies. This sample consists of companies covered by CapFinancials that meet the 500-employee threshold and are therefore subject to the carbon disclosure mandate but never submitted a carbon emission report over the period 2014-2021. This sample comprises 987 unique firms (6,914 firm-year observations).

3.2 Summary statistics

Table 1 reports the summary statistics for the samples of compliant firms (Panel A) and non-compliant firms (Panel B). For both samples, we winsorize continuous accounting variables at the 1st and 99th percentiles. Appendix B provides the variable definitions. Compliant firms tend to be larger and older than non-compliant firms. The average compliant firm has total assets of €1.7 billion, has sales of €640 million, and is about 37 years old. The average non-compliant firm has total total assets of €740 million, has sales of €310 million, and is about 30 years old. In both samples, the average ROA is 2%, and the average ratio of debt to total assets is 14% for compliant firms and 15% for non-compliant firms.

4 Empirical analysis

4.1 Compliance analysis

We begin our evaluation of the disclosure mandate by examining firms' compliance decision. Among the 2,124 unique eligible firms that have more than 500 employees and are covered by CapFinancials, only 1,137 (about 53%) submit at least one carbon emission report over our sample period. This result indicates that although submission is mandatory, there is a lot of non-compliance. This relatively low compliance rate is not surprising since, as discussed previously, the financial sanctions for non-compliance were initially very low. Even though Law 2019-47 raised the maximum penalty for non-compliance to €10,000 (€20,000 for repeated non-compliance), this represents about 0.003% (0.006%) of the average sales of non-compliant firms. In October 2023, the maximum penalty for non-compliance was further raised to €50,000 (€100,000 for repeated non-compliance), perhaps in response the relatively low compliance rate and the need to increase the financial penalty to incentivize companies to report their emissions.

Next, we examine how the compliance rate differs depending on firm size and across industries. Figure 1 reports the percentage of unique compliant firms by decile of total assets. A clear pattern emerges: the compliance rate gradually increases as we move from the smallest to the largest companies. While the compliance rate is about 30% among small companies (about 20% for the first decile and less than 40% for the second decile), it reaches approximately 70% for the largest companies. This result is not surprising, as large firms are likely to have greater means to estimate their carbon emissions, and they are likely to face greater pressure from their stakeholders to disclose them. Firms are also required to state their objectives regarding future carbon emission reductions and the actions they will take to achieve them; hence, the size patterns may also be explained by larger firms having a greater propensity to commit to reducing their carbon emissions (Bolton and Kacperczyk 2023a). Figure 2 reports the percentage of unique compliant firms across industries. The

compliance rate exhibits substantial variation across industries and ranges from about 30% in the education and health sectors to about 75% in the manufacturing and utilities sectors. We note that even among some carbon-intensive industries for which carbon disclosure would be arguably more important, the compliance rate remains relatively low. For example, the compliance rate is slightly above 50% in the transportation industry. This result is consistent with the recent evidence by Banerjee et al. (2023), who argue that strategic considerations are at play in firms' decision to issue climate disclosures.

Finally, we examine the determinants of firms' decision to comply with the disclosure mandate. The French carbon disclosure does not require companies to report their carbon emissions every year. Our tests therefore examine the determinants of the compliance decision in the cross-section. Specifically, Table 2 reports the results of regressions where the dependent variable is a dummy variable that is equal to one if the firm submits at least one carbon emission report over the sample period. The independent variables are the average values of the firm's characteristics over the sample period. The results indicate that firm size and age are significant predictors of the compliance decision. This is true whether or not we control for industry fixed effects. These results corroborate the evidence from Figure 1 showing that the fraction of compliant firms increases with firm size. The results also indicate that firms with more debt are less likely to comply with the disclosure mandate. This effect is plausible. First, prior evidence suggests that financial constraints increase firms' toxic emissions (Xu and Kim 2022).[10] Second, firms with more debt may be constrained in their ability to raise additional financing and to invest in green initiatives to reduce their carbon footprint, which makes them less likely to commit to reducing their future carbon emissions. By contrast, profitability does not explain the decision to comply with the disclosure mandate. Results from Column 6 show that firms in brown industries are significantly less likely to file a report. This effect is consistent with the idea that firms in carbon-intensive industries are reluctant to reveal the extent of their contribution to global carbon emissions. As mentioned

[10]Bolton and Kacperczyk (2021b, 2023b) report that leverage positively correlates with carbon emission level and growth.

earlier, firms must state their objective regarding future carbon emission reduction. From this perspective, the lower propensity of firms in carbon-intensive industries to file a carbon emission report is also consistent with the idea that firms in carbon-intensive industries are reluctant to commit to reducing their carbon emissions (Bolton and Kacperczyk 2023a).

Our compliance analysis focuses on whether a firm issues a carbon report or not during our sample period. However, the law also requires firms to update their carbon emission report at least every three years. This implies that several firms should submit more than one report over our sample period. Figure 3 shows the number of firms reporting their first carbon emission report per fiscal year. We observe that a significant number of companies submitted their first report in 2014 and 2015, the first two years of our sample period. Firms that issued their first report in 2014 should submit a second one by 2017 and a third one by 2020. However, we observe that 68% of compliant firms file only one carbon report, 29% issue two reports, and only 3% submit more than two reports during our sample period. We further find that among 903 unique companies for which we have data three years after the issuance of their first carbon report, only 77 (about 8.5%) issue a second report during the next three years.

4.2 Content of carbon emission reports

In this section, we examine the information disclosed in the carbon emission reports. This content analysis is based on a sample of 1,546 carbon emission reports filed by 1,137 unique complying firms. We examine the content of carbon emission reports along three dimensions: i) disclosure of carbon emissions, ii) information related to the methodology, and iii) information disclosed in action plans.

4.2.1 Disclosure of carbon emissions

We start our content analysis of carbon emission reports by examining the disclosure of carbon emissions. Table 3 provides summary statistics for the 1,546 carbon reports. We

observe that all companies report their scope 1 and scope 2 emissions in their report. The scope 1 and scope 2 carbon emissions for the average (median) firm in our sample amount to 85,953 (3,384) and 8,263 (471) tons of CO2, respectively. By contrast, only 47% of companies report their scope 3 carbon emissions. Among companies reporting their scope 3 emissions, the average (median) level is 330,000 (3,145) tons of CO2. As shown in Figure 4, the fraction of firms reporting their scope 3 emissions in their carbon report increases over time. The time trend in the reporting of scope 3 emissions is likely to be strengthened by Decree 2022-982, which requires companies to incorporate significant indirect emissions in their report.

Figure 5 reports the fraction of firms reporting their scope 3 carbon emissions across industries. We observe substantial variation across industries. For example, the fraction of firms reporting their scope 3 emissions ranges from less than 25% of companies in the utilities sector to about 85% in the finance and insurance industry. The high percentage in the finance and insurance industry may be due to the requirement that French institutional investors disclose how they incorporate ESG issues into their investment decisions and how they contribute to the climate transition (Article 173 of the Energy Transition for Green Growth Act). It could also be explained by the fact that financial firms have mainly indirect emissions through their investment in and financing of carbon-intensive firms.

On top of disclosing their carbon emissions, almost all companies (96%) report an objective for the future reduction of their scope 1 and 2 emissions. However, among the firms reporting their scope 3 emissions, only 57% (27% of firms in the entire sample) report an objective for the future reduction of their scope 3 emissions. As for the reporting of scope 3 emissions, Figure 4 indicates a time trend in the fraction of companies providing an objective for the reduction of their future scope 3 emissions. In Figure 5, we observe substantial variation across industries in the fraction of firms that provide such an objective.

Finally, we examine the determinants of the likelihood of reporting scope 3 emissions and providing an objective for the reduction of future scope 3 emissions in a regression setting. All regressions include industry and year fixed effects. The results are reported in Table 4

and show that larger firms have a greater propensity to report their scope 3 carbon emissions. Consistent with our findings in the compliance analysis, this result indicates that, conditional on submitting a carbon report, larger firms are more likely to report their scope 3 emissions. We also observe that firms with greater scope 1 and 2 emissions are less likely to report their scope 3 emissions. Carbon-intensive firms also have a significantly lower propensity to provide an objective for the reduction of their scope 3 emissions. This latter result is consistent with the idea that carbon-intensive firms are less likely to make commitments to reduce their carbon emissions (Bolton and Kacperczyk 2023a). Finally, the results indicate that the likelihood of reporting scope 3 emissions and an objective regarding their reduction does not depend on whether the firm submits its first carbon report. This finding suggests that firms do not learn or acquire expertise over time regarding the computation of scope 3 emissions.

Overall, the results from this section indicate that although all compliant companies disclose their scope 1 and 2 emissions, less than half of them report their scope 3 emissions, and there is large variation across industries. We also observe a time trend in the fraction of companies reporting their scope 3 carbon emissions.

4.2.2 Methodology

In addition to disclosing their carbon emissions, firms should also include in their carbon reports information about the methodology they used to calculate or estimate their carbon emissions. In particular, firms should provide information on five different items. The first item relates to uncertainties in the computation or estimation of their carbon emissions. The second item is the exclusion of some sources of carbon emissions. In theory, as discussed on Section 2.2, companies are required to report their carbon emissions related to 22 sources (see Appendix C). However, firms can exclude sources of carbon emissions if they only marginally contribute to carbon emissions, or if there is no methodology or data available to calculate the carbon emissions. The third item relates to the sources and documents used to quantify

companies' carbon emissions. Fourth, companies should also provide information related to the possible recomputation of their carbon emissions. In theory, companies should not change their methodology or calculation of carbon emissions between two reports. Any change of calculation or methodology should be justified, and ADEME recommends redoing the calculation of the previous reports using the new methodology to facilitate comparison over time. Finally, companies should provide information regarding the organizational perimeter (i.e., the entities owned or controlled by the company that are considered in the calculation of carbon emissions).

The descriptive statistics from Table 3 indicate that while all companies report their scope 1 and scope 2 emissions, only half of them provide information regarding the method used to quantify their carbon emissions (52% for scope 1 emissions and 47% for scope 2 emissions). Unsurprisingly, the fraction of firms reporting information related to the method used to compute scope 3 emissions is even lower (31%). The fraction of firms reporting information on the subcomponents of their methodology is even lower. Only 43% of firms provide information related to the uncertainties in the computation of their carbon emissions. The fraction of firms reporting information on the exclusion of some sources of carbon emissions (37%) or on the sources of information and documents used to compute their carbon emissions (35%) is even lower. Only 25% provide information related to the organizational perimeter considered in the computation of the carbon emissions. This may be because many firms in the sample are small companies that do not own or control other entities. Finally, only 22% of carbon reports include information related to recalculation issues.

In Panel B of Table 4, we examine the determinants of the likelihood of providing information related to the methodology used to compute carbon emissions. We find that none of the firm characteristics we consider predict the likelihood of providing information related to the methodology. This is true whether we consider scope 1, scope 2, or scope 3 emissions. Likewise, none of the firm characteristics predict the likelihood of providing information related to uncertainties, exclusions, documents and sources of information, recomputation

issues, or the organizational perimeter considered in the computation of carbon emissions. One exception is that carbon-intensive firms are more likely to provide information related to the uncertainties in the computation of carbon emissions.

Overall, the results from this section indicate that only about half of the companies provide information on the method used to compute their carbon emissions. Even fewer companies provide information regarding specific aspects of their methodology such as the organizational perimeter or the uncertainties in the calculation of the carbon emissions. These results suggest that the reports in our sample lack comparability, which reduces stakeholders' ability to sort companies by type to nudge them to take actions in a desired direction.

4.2.3 Action plans

In this section, we examine the information disclosed in action plans. Firms are required to provide a separate action plan for the reduction of their scope 1, 2, and 3 emissions. In these action plans, firms are required to provide information regarding the actions and initiatives they will take to achieve their emission reduction objectives.[11] We start by examining the likelihood of providing an action plan. As shown in Table 5, Panel A, only 3% (6%) of carbon reports have missing action plans for scope 1 (scope 2) carbon emissions. Unsurprisingly, the fraction of missing action plans for scope 3 emissions is much larger (64%).

In Table 5, Panel B, we examine the determinants of the likelihood of having missing action plans for scope 3 emissions. The results from Column 1 show that larger and older firms are significantly less likely to have missing action plans for scope 3 emissions. We also find that carbon-intensive firms and firms in brown industries are significantly more likely to have missing action plans for scope 3 emissions. Both results are consistent with our previous findings and further confirm that carbon-intensive firms are less likely to commit to reducing their future carbon emissions.

[11] As discussed in section 4.2.1, almost all firms provide an reduction objective for scope 1 and 2 emissions.

At the intensive margin, we also consider the length of the action plan as a proxy for its ambition. Specifically, for each action plan, we compute the number of characters as a proxy for the action plan's level of detail. Descriptive statistics in Table 5, Panel A show that the average action plan for scope 1 (scope 2) emissions has about 1,013 (610) characters. Unsurprisingly, the average action plan for scope 3 emissions is even shorter (301 characters). In Panel B, Columns 2 to 4, we examine the determinants of the length of action plans for scope 1, 2, and 3 emissions. In all columns, the dependent variable is the natural logarithm of the number of characters in the action plan. We find that firms in brown industries have significantly shorter action plans for scope 1 and 3 emissions. Firms with greater scope 1 and 2 emissions have longer action plans for scope 1 emissions but shorter action plans for scope 2 emissions. Finally, the results indicate that action plans for scope 1 and scope 2 emissions are significantly shorter when firms submit their first carbon reports.

To further examine the content of action plans, we manually parse them to collect more granular information on three dimensions. Specifically, we identify which companies mention i) a scientific methodology, ii) an audit, and iii) a horizon in their action plans. We find that only 9% of companies mention a scientific methodology (e.g., SBTi, ISO certification 14001 or 50001) in their action plans, and even fewer companies (about 2%) mention an audit. These figures contrast with the fast increase in public firms' use of environmental metrics. For example, Gipper et al. (2023) document a striking increase in ESG assurance: a growing the number of U.S. listed firms have various metrics of their ESG report verified by third parties. These audits help improve firms' carbon reporting by reducing omissions and errors (Gipper et al. 2024). The lack of auditing thus casts doubt on the reliability of the data disclosed in our sample of carbon emission reports. Finally, only 17% of companies mention a horizon in their action plans. This more granular analysis of action plans suggests that for most companies, the quality of the information provided in their action plans may not be sufficient to mark a real commitment to decrease future carbon emissions.

Using our manual parsing, we also identify firms that provide quantitative metrics and

objectives in their action plans. Specifically, we create an index on a scale of 0 to 3 that identifies i) missing action plans, ii) action plans without any quantitative metrics or objectives, iii) action plans with quantitative metrics or objectives that are not directly related to carbon emissions, and iv) action plans with quantitative metrics or objectives that are related to carbon emissions. To illustrate our coding of the informational quality of action plans, Appendix D provides transcripts of action plans for scope 1 emissions with values of our index ranging from 1 to 3.

Figure 6 reports the distribution of our index of action plans' information quality for scope 1, scope 2, and scope 3 emissions. Most companies do not provide any quantitative metrics in their action plans. Specifically, 75% (79%) of action plans related to scope 1 emissions (scope 2 emissions) do not have any quantitative metrics. Unsurprisingly, the fraction of action plans related to scope 3 emissions without any quantitative metrics is even larger (more than 90%). These figures indicate that while almost all firms tick the boxes by stating an emission reduction objective and providing an action plan, only a small fraction provides meaningful information and quantifies the emission reductions to be expected from the different actions mentioned in their transition plans. The descriptive statistics reported in Table 5, Panel A corroborate that the average informational quality of action plans is low. Specifically, the average value of our index of information quality is 1.22 (1.11) for action plans related to scope 1 (scope 2) emissions. The average value of our index of informational quality is 0.38 for action plans related to scope 3 emissions, which reflects the large number of firms that have missing action plans for scope 3 emissions. In Panel B, Columns 5 to 7, we analyze the determinants of the information quality of action plans. We find that larger firms tend to have higher-quality action plans for scope 3 emissions. Firms in brown industries have lower-quality action plans for scope 1, scope 2, and scope 3 emissions. Firms with greater carbon emissions have lower-quality action plans for scope 3 emissions. Finally, we find that the quality of action plans for scope 1 and scope 2 emissions is lower in firms' first reports than in their subsequent reports. These findings are consistent with the previous

results indicating that action plans for scope 1 and scope 2 emissions are significantly smaller when firms submit their first reports.

Overall, the results from this section reveal ample heterogeneity across compliant firms in the informational quality of their action plans to achieve their objectives of future carbon emission reduction. Notably, the small fraction of companies mentioning an audit, a scientific methodology, and quantitative metrics casts doubt on whether the action plans mark a real commitment.

4.3 Carbon emission reports and future carbon emissions

In this section, we turn to our third research objective and examine the link between characteristics of the carbon emission report and future carbon emissions. Specifically, we focus on the change in carbon emissions between two reports and link it to the characteristics of the previous report. By definition, we can track the evolution of carbon emissions only for the subset of firms that submit at least two reports. As mentioned earlier, only 29% of firms submit more than one report. As in the case of carbon commitments (Bolton and Kacperczyk 2023a), the decision to submit (at least two) carbon emission reports is therefore largely voluntary, which implies that our setting does not allow us to have a precise identification.

Table 6 reports regressions of the percentage change in scope 1 and 2 carbon emissions between two reports on firm and report characteristics. We find that the number of years between the two reports is negatively associated with the change in scope 1 and 2 emissions. This result is plausible, as submitting a second report after a greater number of years gives companies more time to take actions to reduce their carbon footprint. The results also indicate that the carbon emission reduction expected in the previous report is associated with the actual reduction in carbon emissions. This result is consistent with the notion that the statement of an objective regarding carbon emission reduction marks a real commitment. However, it should be interpreted cautiously, as it is possible that only companies that have indeed achieved their emission reduction objective choose to issue a second carbon report.

Finally, we also find evidence that the informational quality of action plans is associated with a stronger reduction in carbon emissions. This result holds if we exclude firms with missing action plans, which suggests that providing quantitative metrics plays a key role in the reduction of carbon emissions. These results are consistent with the notion that quantitative metrics set an implicit commitment to future disclosure.

Overall, the results from this section show that the statement of a carbon emission reduction objective and the informational quality of the action plans to achieve these objectives play a role in the actual reduction of carbon emissions. As mentioned previously, these results should be interpreted with caution since the decision to submit at least two reports is endogenous.

5 Discussion & Conclusion

In this study, we conduct the first evaluation of the carbon disclosure mandate imposed by the Grenelle II law on French firms with more than 500 employees. Several interesting patterns emerge from our descriptive analysis. First, we find that only half of the firms subject to the mandate comply with the regulation and file at least one carbon report between 2014 and 2021. Second, conditional on filing a report, virtually all the firms report their scope 1 and scope 2 estimated emissions. However, most firms do not report their scope 3 emissions. Third, there is tremendous heterogeneity in the content of the reports with respect to the action plans, which include a lot of boilerplate statements. These patterns are typically worse in carbon-intensive industries. Finally, we find that firms with high-quality action plans achieve a stronger reduction in their future carbon emissions.

To inform the regulators, we speculate on some possible explanations behind this disclosure equilibrium. We see three potential limitations to this disclosure mandate that may explain its lack of success: (1) lack of enforcement, (2) lack of comparability among reports and limited awareness about the public repository, and (3) the lack of clearly identified stakeholders. First, prior literature on financial reporting suggests that enforcement is critical to

ensure the success of disclosure regulation (Christensen et al. 2016). Absence of evidence on enforcement actions coupled with the very low initial financial penalty might contribute to this lack of compliance. Consistent with this interpretation, civil servants in charge of enforcing compliance with the regulation acknowledged that their inspections had a primarily pedagogical objective (Sénécat 2023). Other commentators cited the lack of financial penalty to explain the lack of compliance with the regulation (e.g., Fisher and Eisele 2023). In addition to the lack of public enforcement against non-compliance, we found no evidence of mechanism in place that imposes costs on the company for failure to meet its self-imposed carbon emission reduction targets (e.g., Armour et al. 2022).

Second, despite the existence of a reporting template that provides formatting guidelines, the lack of guidance on the method to estimate carbon emissions might explain the heterogeneity in reporting.[12] This heterogeneity reduces the comparability of the reports and their usefulness in empowering stakeholders to make decisions in capital, product, and labor markets. Furthermore, the regulation requires companies to upload the reports to the website of the ADEME, a regulatory agency with low visibility. Unfortunately, prior research has established that decentralized disclosure of non-financial information (e.g., sustainability reports) has limited impact on market participants (Haley et al. 2023), and disclosure on a centralized platform with low visibility leads to the same outcome (Christensen et al. 2017). The lack of comparability combined with the low visibility of the disclosed information increases the information acquisition and processing costs for shareholders, thereby reducing the impact of the information in the economy (Blankespoor et al. 2020).

Third, the regulation did not explicitly state the targeted group of stakeholders. Prior research has documented that market participants in public equity markets value climate disclosure (Griffin et al. 2017; Grewal et al. 2019; Johnson et al. 2020; Bolton and Kacperczyk 2021a; Grewal et al. 2021). In our setting, the lack of liquidity in capital markets among private firms may not generate sufficient demand for this information from investors to

[12]Similarly, in the context of human capital, Bourveau et al. (2023) find that a principle-based disclosure mandate targeting public firms leads to increased heterogeneity in disclosed quantitative metrics.

encourage full compliance with the regulation. While investors do not seem to constitute the target audience of this disclosure mandate, regulators should design the law so that the frequency and sophistication of the required disclosure meet the information needs of other stakeholders, including industry peers (Tomar 2023; Keeve 2024), customers (e.g., Leonelli et al. 2024), or employees (Choi et al. 2023). A more carefully designed disclosure mandate would help these stakeholders use the disclosed information to induce changes among the disclosing firms.

Overall, our results suggest that despite early intentions to produce useful information about the carbon emissions of an unusually wide range of firms, this French regulatory intervention faced multiple potential pitfalls. The large amount of non-compliance with the letter and the spirit of the regulation prevents the supply of credible information to meet the demand of and empower contracting and non-contracting stakeholders (Friedman and Ormazabal 2024). These results should be relevant to policy makers, especially now as the European Union is progressively rolling out an ambitious non-financial disclosure mandate through its Corporate Sustainability Reporting Directive (CSRD).

References

Armour, J., Enriques, L., and Wetzer, T. (2022). Mandatory corporate climate disclosures: Now, but how? *Columbia Business Law Review*, 2021:1085–1147.

Azar, J., Duro, M., Kadach, I., and Ormazabal, G. (2021). The Big Three and corporate carbon emissions around the world. *Journal of Financial Economics*, 142:674–696.

Banerjee, S., Chen, A., Li, M., Mehrotra, V., and Vijayaraghavan, R. (2023). Voluntary climate disclosures: A tale of two venues. Working Paper (SSRN link).

Blankespoor, E., deHaan, E., and Marinovic, I. (2020). Disclosure processing costs, investors' information choice, and equity market outcomes: A review. *Journal of Accounting and Economics*, 70:101344.

Bochkay, K., Choi, S., and Hales, J. (2023a). 'Mere puffery' or credible disclosure? the real effects of adopting voluntary ESG disclosure standards. Working Paper (SSRN link).

Bochkay, K., Hales, J., and Serafeim, G. (2023b). Disclosure standards and communication norms: Evidence of voluntary sustainability standards as a coordinating device for capital markets. Working Paper (SSRN link).

Bolton, P. and Kacperczyk, M. (2021a). Carbon disclosure and the cost of capital. Working Paper (SSRN link).

Bolton, P. and Kacperczyk, M. (2021b). Do investors care about carbon risk? *Journal of Financial Economics*, 142(2):517–549.

Bolton, P. and Kacperczyk, M. (2023a). Firm commitments. Working Paper (NBER link).

Bolton, P. and Kacperczyk, M. (2023b). Global pricing of carbon-transition risk. *Journal of Finance*, 78:3677–3754.

Bolton, P., Reichelstein, S., Kacperczyk, M., Leuz, C., Ormazabal, G., and Schoenmaker, D. (2021). Mandatory corporate carbon disclosures and the path to net zero. Working Paper (SSRN link).

Bourveau, T., Chowdhury, M., Le, A., and Rouen, E. (2023). Human capital disclosures. Working Paper (SSRN link).

Choi, J., Pacelli, J., Rennekamp, K., and Tomar, S. (2023). Do jobseekers value diversity information: Evidence from a field experiment. *Journal of Accounting Research*, 61:695–735.

Christensen, H., Floyd, E., Liu, L., and Maffett, M. (2017). The real effects of mandated information on social responsibility in financial reports: Evidence from mine-safety records. *Journal of Accounting and Economics*, 64:284–304.

Christensen, H., Hail, L., and Leuz, C. (2016). Capital-market effects of securities regulation: Prior conditions, implementation, and enforcement. *Review of Financial Studies*, 29:2885–2924.

Christensen, H., Hail, L., and Leuz, C. (2021). Mandatory CSR and sustainability reporting: Economic analysis and literature review. *Review of Accounting Studies*, 26:1176–1248.

Cohen, S., Kadach, I., and Ormazabal, G. (2023). Institutional investors, climate disclosure, and carbon emissions. *Journal of Accounting and Economics*, 76:101640.

Demers, E., Hendrikse, J., and Metzner, M. (2024). TCFD reporting: Early evidence related to the future of global climate-related disclosures. Working Paper (link).

Depoers, F. amd Jeanjean, T. and Jerome, T. (2016). Voluntary disclosure of greenhouse gas emissions: Contrasting the Carbon Disclosure Project and corporate reports. *Journal of Business Ethics*, 134:445–461.

Downar, B., Ernstberger, J., Reichelstein, S., Schwenen, S., and Zaklan, A. (2021). The impact of carbon disclosure mandates on emissions and financial operating performance. *Review of Accounting Studies*, 26:1137–1175.

Dranove, D. and Jin, G. (2010). Quality disclosure and certification: Theory and practice. *Journal of Economic Literature*, 48:935–963.

Ecker, F. and Keeve, T. (2023). Managing corporate emission disclosures through divestitures. Working Paper (SSRN link).

Fisher, R. and Eisele, B. (2023). Bilan carbone : "les entreprises non conformes n'ont pas intégré les enjeux climat dans leur stratégie"'. *Le Monde (link)*.

Freiberg, D., Grewal, J., and Serafeim, G. (2021). Science-based carbon emissions targets. Working Paper (SSRN).

Friedman, H. and Ormazabal, G. (2024). The role of information in building a more sustainable economy: A supply and demand perspective. Working Paper (SSRN link).

Gibbons, B. (2023). The financially material effects of mandatory nonfinancial disclosure. *Journal of Accounting Research (forthcoming)*.

Gipper, B., Ross, S., and Shi, S. (2023). ESG assurance in the United States. Working Paper (SSRN link).

Gipper, B., Sequeira, F., and Shi, S. (2024). Carbon accounting quality: Measurement and the role of assurance. Working Paper (SSRN link).

Grewal, J., Hauptmann, C., and Serafeim, G. (2021). Material sustainability information and stock price informativeness. *Journal of Business Ethics*, 171:513–544.

Grewal, J., Richardson, G., and Wang, J. (2023). Effects of mandatory carbon reporting on unrepresentative environmental disclosures. Working Paper (SSRN link).

Grewal, J., Riedl, E., and Serafeim, G. (2019). Market reaction to mandatory nonfinancial disclosure. *Management Science*, 65:2947–3448.

Griffin, P., Lont, D., and Sun, E. (2017). The relevance to investors of greenhouse gas emission disclosures. *Contemporary Accounting Research*, 34:1265–1297.

Haley, S., Shaffer, M., and Sloan, S. (2023). Do sustainability reports contain financially material information? Working Paper (SSRN link).

Ilhan, E., Krueger, P., Sautner, Z., and Starks, L. (2023). Climate risk disclosure and institutional investors. *Review of Financial Studies*, 36:2617–2650.

Johnson, J. A., Theis, J., Vitalis, A., and Young, D. (2020). The influence of firms' emissions management strategy disclosures on investors' valuation judgments. *Contemporary Accounting Research*, 37(2):642–664.

Jouvenot, V. and Krueger, P. (2021). Mandatory corporate carbon disclosure: Evidence from a natural experiment. Working Paper (SSRN link).

Keeve, T. (2024). Peer effects in ESG ratings: Evidence from gender pay gap disclosures. *Working Paper (SSRN link).*

Krueger, P., Sautner, Z., Tang, D., and Zhong, R. (2021). The effects of mandatory ESG disclosure around the world. Working Paper (SSRN link).

LaViers, L., Sandvik, J., and Xu, D. (2024). CEO pay ratio voluntary disclosures and stakeholder reactions. *Review of Accounting Studies*, 29:109–150.

Leonelli, S., Muhn, M., Rauter, T., and Sran, G. (2024). How do consumers use firm disclosure? Evidence from a randomized field experiment. *Working Paper (SSRN link).*

Leuz, C. and Verrecchia, R. (2000). The economic consequences of increased disclosure. *Journal of Accounting Research*, 38:91–124.

Leuz, C. and Wysocki, P. (2016). The economics of disclosure and financial reporting regulation: Evidence and suggestions forfuture research. *Journal of Accounting Research*, 54:525–622.

Lu, H., Peng, Q., Shin, J.-E., and Yu, L. (2023). Migration of global supply chains: A real effect of mandatory ESG disclosure. Working Paper (SSRN link).

Robinson, S., Rogers, J., Skinner, N., and Wellman, L. (2023). Environmental disclosures and ESG fund ownership. Working Paper (SSRN link).

Sénécat, A. (2023). L'échec du bilan carbone "obligatoire", symbole du mépris des enjeux climatiques. *Le Monde (link).*

Tomar, S. (2023). Greenhouse gas disclosure and emissions benchmarking. *Journal of Accounting Research*, 61:451–492.

von Zedlitz, G. (2023). Mind the gap?! The current state of biodiversity reporting. Working Paper (SSRN link).

Wang, L. (2023). Transmission effects of ESG disclosure regulations through bank lending networks. *Journal of Accounting Research*, 61:935–978.

Xu, Q. and Kim, T. (2022). Financial constraints and corporate environmental policies. *The Review of Financial Studies*, 35(2):576–635.

Yang, L., Muller, N., and Liang, P. (2021). The real effects of mandatory CSR disclosure on emissions: Evidence from the Greenhouse Gas Reporting Program. Working Paper (NBER link).

Figure 1. Percentage of compliant firms by size decile

This figure reports the percentage of compliant firms by decile of average total assets (2014 - 2021).

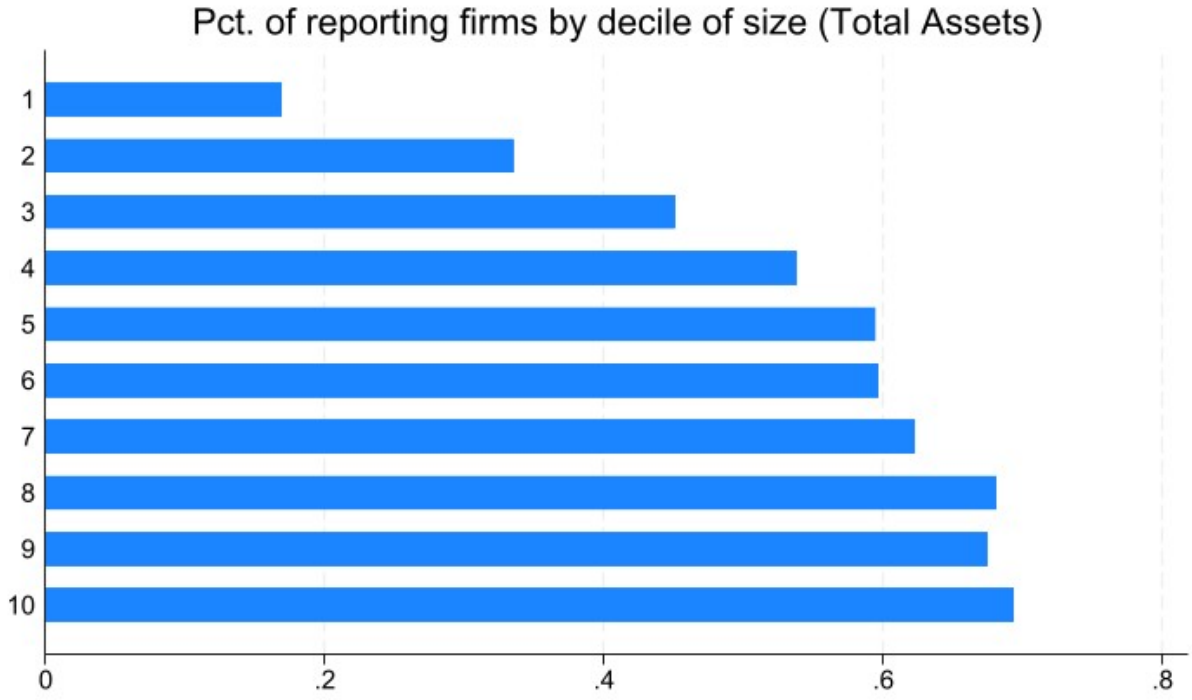


Figure 2. Percentage of compliant firms by one-digit-NAF industry

This figure reports the percentage of unique compliant firms by one-digit-NAF industry (if at least 10 firms) over 2014 - 2021.

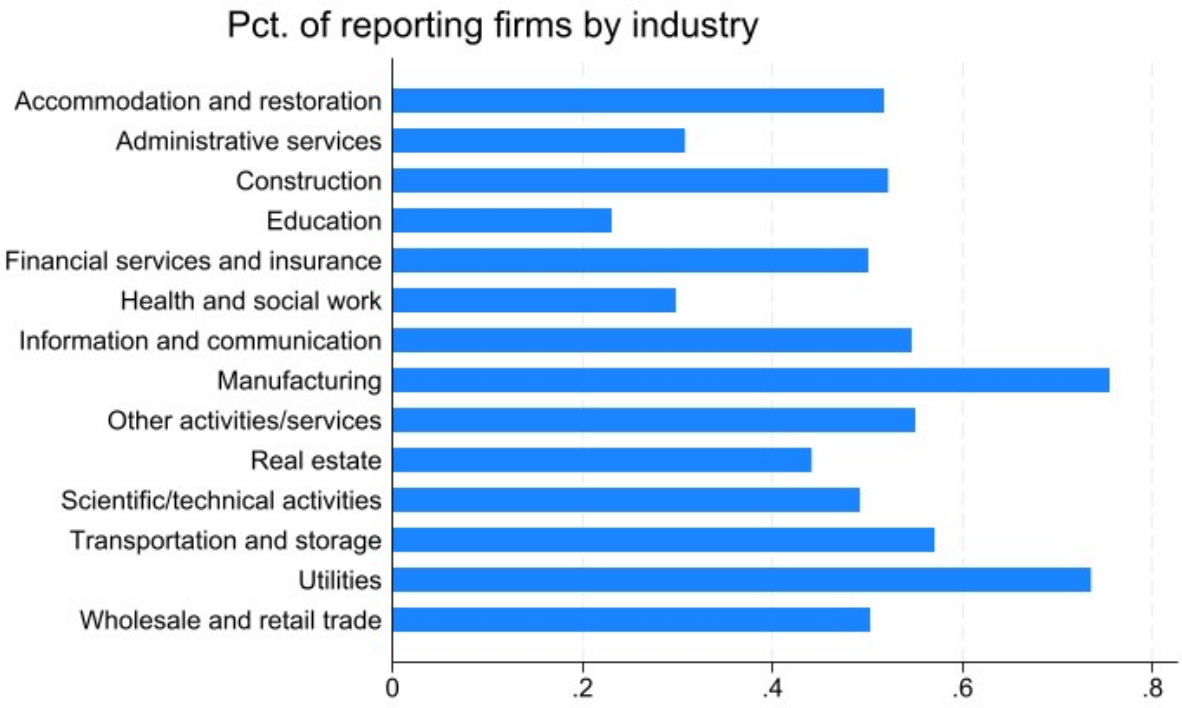


Figure 3. Distribution of unique compliant firms by fiscal year of first report

This figure reports the distribution (count) of compliant firms by year of first report over 2014-2021.

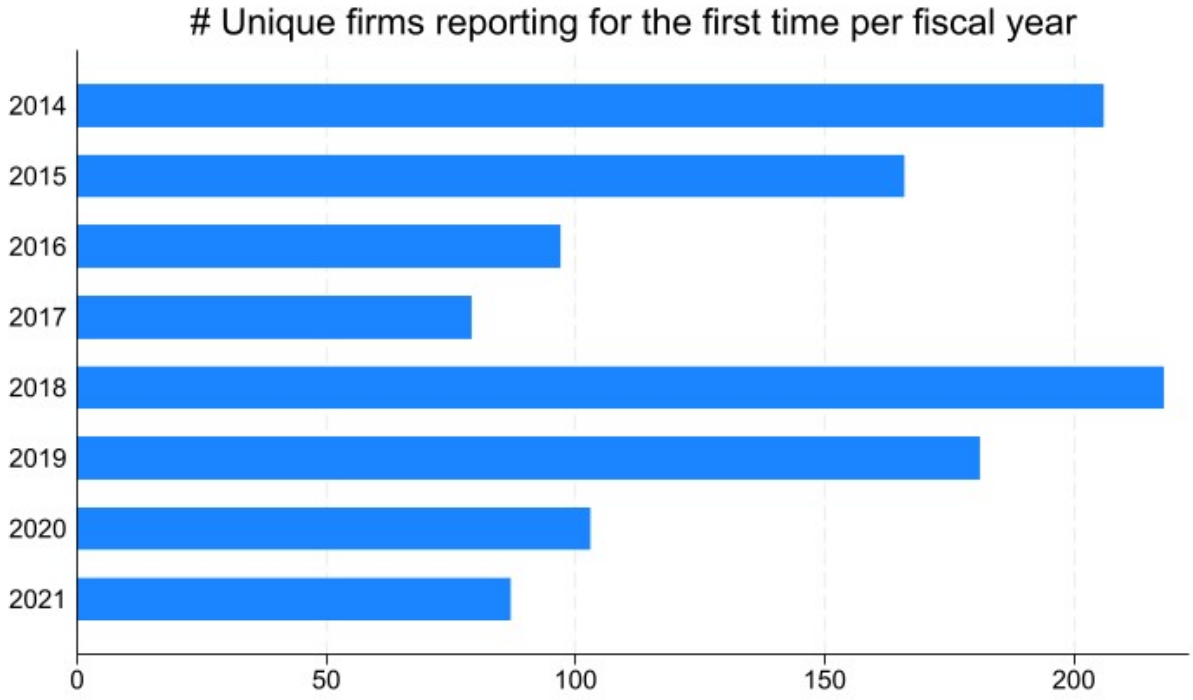


Figure 4. Completeness of Scope 3 items over time

This figure reports the percentage of compliant firms that reports on several Scope 3 items over the fiscal years of first reporting.

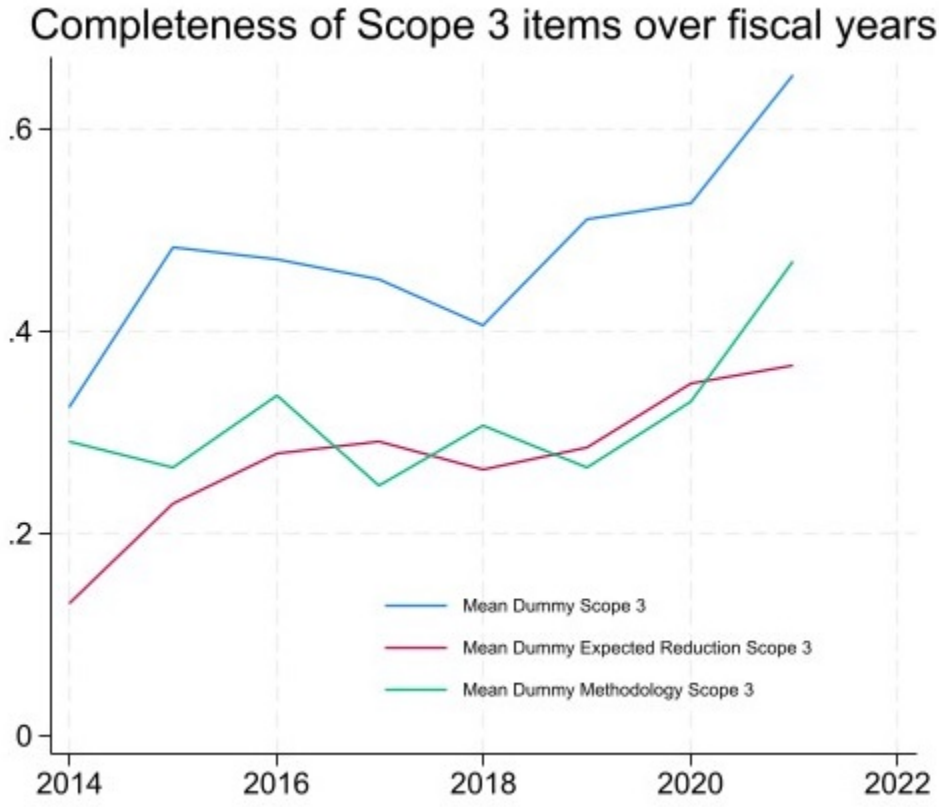


Figure 5. Completeness of Scope 3 items by industry

This figure reports the percentage of compliant firms that reports on several Scope 3 items by industry (if at least 10 firms).

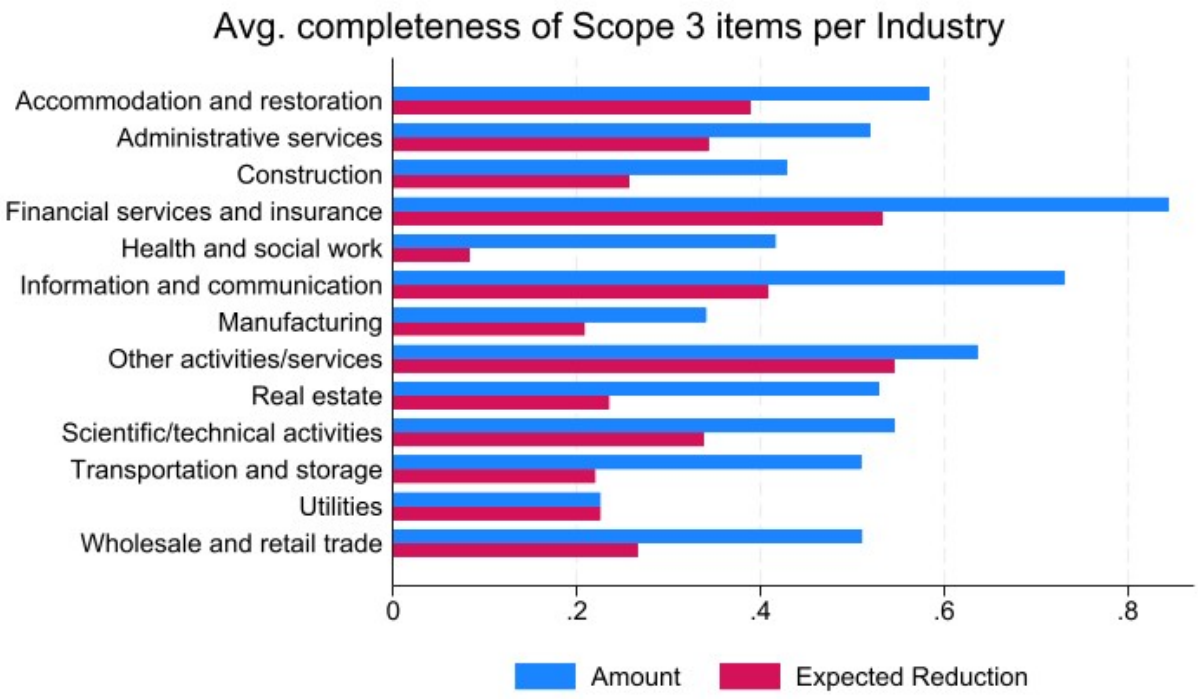


Figure 6. Distribution of quality scores by Scope

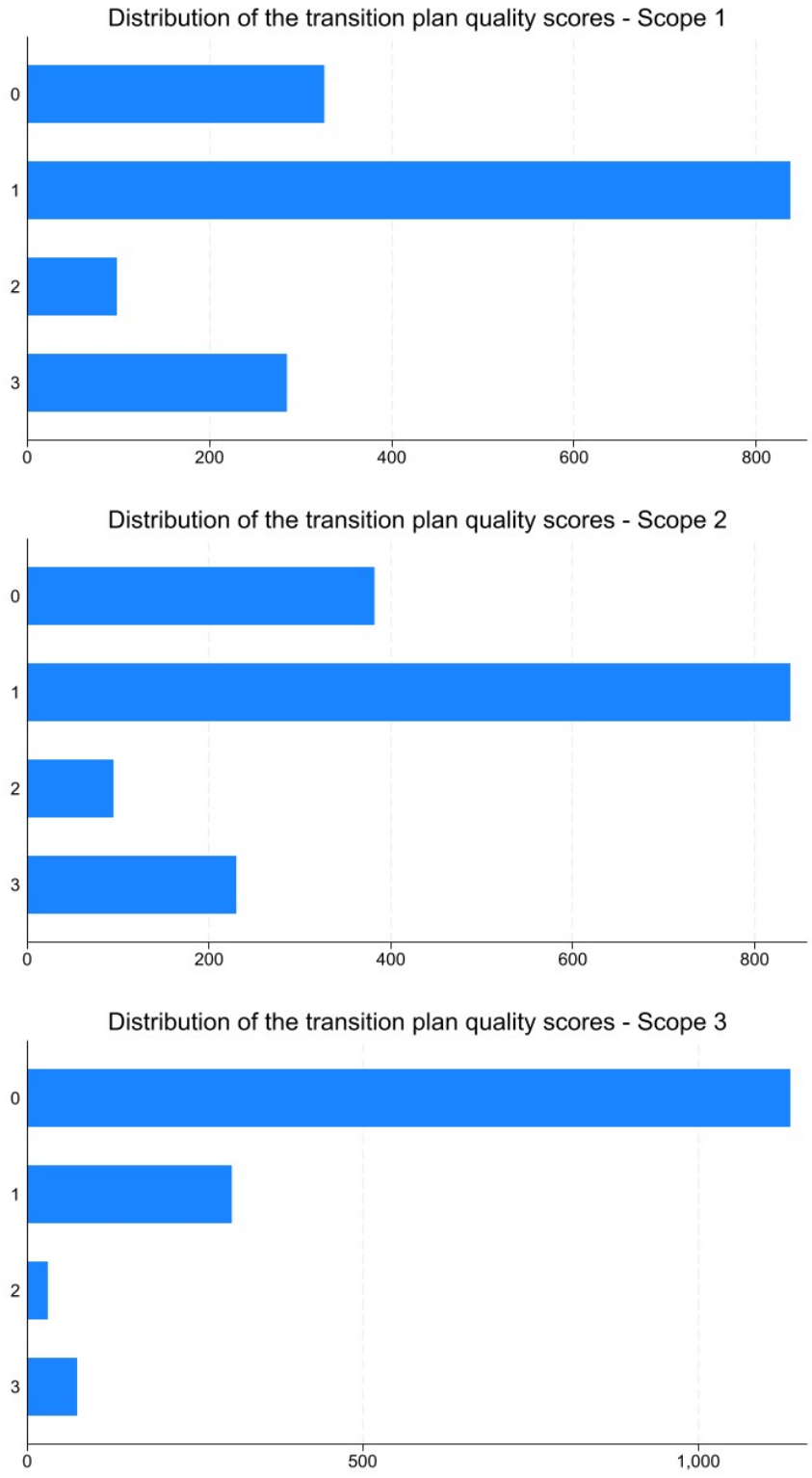


Table 1. Summary statistics

This table reports summary statistics for the samples of compliant (Panel A) and non-compliant firms (Panel B). Appendix B provides the variable definitions.

Panel A. Firm-year observations for the compliant sample (2014 - 2021)

Variables	#Obs.	Mean	S.D.	0.25	Mdn	0.75
Total Assets	8,406	1.70E+09	2.00E+10	6.40E+07	1.50E+08	3.60E+08
Ln(Total Assets)	8,406	18.89	1.60	17.97	18.82	19.71
Sales	8,243	6.40E+08	3.00E+09	9.20E+07	2.00E+08	4.60E+08
Ln(Sales)	8,200	19.15	1.34	18.36	19.12	19.95
Leverage	8,406	0.14	0.18	0.00	0.06	0.21
ROA	7,927	0.02	0.10	0.00	0.03	0.07
Age	8,406	37.22	24.25	20.00	32.00	51.00
Ln(Age)	8,406	3.43	0.71	3.04	3.50	3.95
Brown Dummy	8,357	0.32	0.47	0.00	0.00	1.00

Panel B. Firm-year observations for the non-compliant sample (2014 - 2021)

Variables	#Obs.	Mean	S.D.	0.25	Mdn	0.75
Total Assets	6,914	7.40E+08	1.60E+10	2.00E+07	6.70E+07	1.90E+08
Ln(Total Assets)	6,914	17.92	1.81	16.82	18.02	19.07
Sales	6,742	3.10E+08	1.90E+09	3.80E+07	9.60E+07	2.20E+08
Ln(Sales)	6,708	18.33	1.41	17.48	18.39	19.22
Leverage	6,914	0.15	0.20	0.00	0.06	0.23
ROA	6,629	0.02	0.11	0.00	0.03	0.07
Age	6,914	29.64	22.15	15.00	26.00	38.00
Ln(Age)	6,914	3.16	0.79	2.77	3.30	3.66
Brown Dummy	6,882	0.28	0.45	0.00	0.00	1.00

Table 2. Decision of reporting GHG emissions

This table reports the result of cross-sectional OLS regressions of the decision to report on GHG emissions on a series of potential determinants. For each firm, we average the value of the independent variables over 2014-2021 (i.e., there is one observation per company in the regression). Firms that reports on GHG emissions are eligible firms that report at least once over the period 2014-2021 (*Report Dummy = 1*). Firms that do not report on GHG emissions are eligible firms that do not report, even once, over the period 2014-2021 (*Report Dummy = 0*). Standard errors are robust to heteroskedasticity and reported in parentheses. Constant terms are not reported. ***, **, and * refer to significance at the 1%, 5%, and 10% levels, respectively. Appendix B provides the variable definitions.

Report Dummy	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Average Ln(Sales)	0.109***				0.099***	0.104***	0.082***
	(0.007)				(0.008)	(0.008)	(0.009)
Average Leverage		-0.137**			-0.146**	-0.153**	-0.130**
		(0.065)			(0.064)	(0.064)	(0.066)
Average ROA			0.071		-0.050	-0.075	-0.007
			(0.135)		(0.134)	(0.134)	(0.134)
Average Ln(Age)				0.113***	0.073***	0.072***	0.064***
				(0.013)	(0.014)	(0.014)	(0.014)
Brown Dummy						-0.051**	-0.043
						(0.024)	(0.038)
#Obs.	2,096	2,124	2,085	2,124	2,077	2,067	2,067
R-squared	0.093	0.002	0.000	0.032	0.107	0.110	0.151
One-Digit NAF Industry FE	No	No	No	No	No	No	Yes

Table 3. Descriptive statistics on GHG emission reports

Panel A reports the mean values of the dummy variables coding for whether the company reports on a given item. Panel B shows the summary statistics on Scope 1, 2, 3 reported emissions. Appendix B provides the variable definitions.

Panel A. Disclosure completeness

Variable	Mean
Dummy Total Emission	1.00
Dummy Scope 1	0.99
Dummy Scope 2	0.98
Dummy Scope 3	0.47
Dummy Expected Reduction Scope 1 & 2	0.96
Dummy Expected Reduction Scope 3	0.27
Dummy Single Reduction Objective	0.66
Dummy Sustainable Development Policy	0.52
Dummy Methodology Scope 1	0.52
Dummy Methodology Scope 2	0.47
Dummy Methodology Scope 3	0.31
Dummy Methodology Incertitude	0.43
Dummy Methodology Exclusion	0.37
Dummy Methodology Sources	0.35
Dummy Methodology Recomputation	0.22
Dummy Methodology SIRET Considered	0.25

Panel B. Reported Scope 1, 2, and 3 emissions (tCO2e)

Variable	#Obs.	Mean	S.D.	0.25	Mdn	0.75
Total Scope 1	1546	85952.92	1.00E+06	824	3384.29	10050
Total Scope 2	1546	8262.76	60235.17	131.13	470.6	1786
Total Scope 3	1546	1.50E+05	2.90E+06	0.00	0.00	2503
Total Scope 3 (if reported)	727	3.30E+05	4.30E+06	679	3145	27220
Pct. Total Scope 1	1545	59.97	35.82	27.36	72.80	88.81
Pct. Total Scope 2	1545	16.00	20.64	2.06	8.14	20.76
Pct. Total Scope 3	1545	24.04	36.74	0.00	0.00	34.15
Pct. Total Scope 3 (if reported)	727	51.63	34.77	20.03	41.93	89.57

Table 4. Determinants of reporting completeness

This table reports the results of OLS regressions of dummy variables coding for whether an item has been disclosed on accounting variables, a dummy variable that is equal to one if the report is the first one submitted by the company, the amount of reported Scope 1 and 2 emissions, and industry (one-digit NAF codes) as well as year fixed effects. Panel A reports the results on Scope 3 current and expected emissions. Panel B reports the results on the methodological items. Standard errors are robust to heteroskedasticity and reported in parentheses. Constant terms are not reported. ***, **, and * refer to significance at the 1%, 5%, and 10% levels, respectively. Appendix B provides the variable definitions.

Panel A. Completeness of Scope-3 current and expected emissions

	(1) Report on Scope-3 Emission Amount	(2) Report on Scope-3 Emission Expected Reduction	(3) Report on Scope-3 Emission Expected Reduction If Scope 3 Emissions are Reported	(4) Report on Scope-3 Emission Expected Reduction If Scope 3 Emissions are Reported
Ln(Sales)	0.051***	0.009	0.001	-0.042**
	(0.013)	(0.011)	(0.019)	(0.018)
Leverage	0.069	-0.042	-0.122	-0.233**
	(0.078)	(0.070)	(0.119)	(0.116)
ROA	0.305**	0.048	-0.360	-0.247
	(0.149)	(0.135)	(0.243)	(0.236)
Ln(Age)	0.029	0.027	0.025	0.028
	(0.018)	(0.016)	(0.030)	(0.029)
First Report	0.044	0.008	0.019	0.026
	(0.032)	(0.029)	(0.049)	(0.048)
Brown	0.014	-0.002	-0.075	-0.059
	(0.040)	(0.036)	(0.068)	(0.066)
Ln(Scope 1&2 Emissions)	-0.037***	-0.023***	-0.027*	
	(0.008)	(0.007)	(0.014)	
Ln(Scope 3 Emissions)				0.044***
				(0.008)
#Obs.	1,417	1,417	642	641
R-squared	0.119	0.067	0.081	0.123
Industry Fixed Effects	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes

Panel B. Completeness of the methodological items

	(1) Report on Method. Scope 1	(2) Report on Method. Scope 2	(3) Report on Method. Scope 3	(4) Report on Method. Scope 3 If Scope-3 Emissions Reported	(5) Report on Method. Incertitude	(6) Report on Method. Exclusion	(7) Report on Method. Sources	(8) Report on Method. Recomputation	(9) Report on Method. SIRET
Ln(Sales)	0.001	0.002	0.016	0.003	-0.005	0.006	0.001	0.013	0.005
	(0.013)	(0.013)	(0.012)	(0.018)	(0.013)	(0.013)	(0.012)	(0.011)	(0.011)
Leverage	0.037	0.017	-0.009	0.009	0.020	0.014	-0.040	0.094	-0.106
	(0.081)	(0.081)	(0.074)	(0.115)	(0.080)	(0.078)	(0.076)	(0.066)	(0.071)
ROA	-0.082	0.013	-0.074	-0.265	0.080	0.047	0.144	-0.100	-0.086
	(0.156)	(0.156)	(0.143)	(0.234)	(0.154)	(0.150)	(0.147)	(0.128)	(0.135)
Ln(Age)	-0.012	-0.012	-0.016	-0.087***	-0.003	0.018	0.020	-0.007	0.019
	(0.019)	(0.019)	(0.017)	(0.029)	(0.019)	(0.018)	(0.018)	(0.016)	(0.017)
First Report	-0.002	0.015	0.016	0.008	-0.032	-0.028	-0.029	0.014	-0.060**
	(0.033)	(0.033)	(0.031)	(0.048)	(0.033)	(0.032)	(0.031)	(0.027)	(0.029)
Brown Dummy	0.030	0.034	-0.014	0.033	-0.011	-0.007	-0.031	-0.061*	0.014
	(0.042)	(0.042)	(0.039)	(0.066)	(0.041)	(0.040)	(0.040)	(0.034)	(0.037)
Ln(Scope 1&2 Emissions)	0.009	0.005	-0.011		0.016*	-0.001	0.016**	-0.005	0.000
	(0.008)	(0.008)	(0.008)		(0.008)	(0.008)	(0.008)	(0.007)	(0.007)
Ln(Scope 3 Emissions)				0.029***					
				(0.008)					
#Obs.	1,417	1,417	1,417	641	1,417	1,417	1,417	1,417	1,417
R-squared	0.045	0.042	0.061	0.123	0.057	0.047	0.056	0.047	0.052
Industry Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Table 5. Transition plans

Panel A reports descriptive statistics on the transition plans for Scope 1, 2, and 3 emissions. Panel B reports the regressions results of action plan characteristics on accounting variables as well as industry and fiscal year fixed effects. Columns 4 to 6 are conditional on the transition plan being present and report ordered logistic regression results, whereby the dependent variables are quality scores ranging from 1 to 3 for transitions plans on Scope 1, Scope 2, and Scope 3 emissions. Standard errors are robust to heteroskedasticity and reported below in parentheses. Constant terms are not reported. ***, **, and * refer to significance at the 1%, 5%, and 10% levels, respectively. Appendix B provides the variable definitions.

Panel A. Descriptive statistics on transition plans

Variable	#Obs.	Mean	S.D.	0.25	Mdn	0.75
Dummy Empty Plan Scope 1	1,546	0.03	0.16	0.00	0.00	0.00
Dummy Empty Plan Scope 2	1,546	0.06	0.23	0.00	0.00	0.00
Dummy Empty Plan Scope 3	1,546	0.64	0.48	0.00	1.00	1.00
Size Plan Scope 1 (#Chars)	1,546	1013.37	1393.59	193	505	1295
Size Plan Scope 2 (#Chars)	1,546	609.85	1010.29	80	251	705
Size Plan Scope 3 (#Chars)	1,546	300.73	810.85	0	0	204
Quality Plan Scope 1	1,546	1.22	0.98	1.00	1.00	1.00
Quality Plan Scope 2	1,546	1.11	0.94	1.00	1.00	1.00
Quality Plan Scope 3	1,546	0.38	0.75	0.00	0.00	1.00
Mention Scientific Methodology	1,546	0.09	0.28	0.00	0.00	0.00
Mention Audit	1,546	0.02	0.13	0.00	0.00	0.00
Mention Temporal Horizon	1,546	0.17	0.37	0.00	0.00	0.00

Panel B. Determinants of action plan characteristics

	(1) Empty Plan Scope 3	(2) Plan Size Scope 1	(3) Plan Size Scope 2	(4) Plan Size Scope 3	(5) Plan Quality Scope 1	(6) Plan Quality Scope 2	(7) Plan Quality Scope 3
Ln(Sales)	-0.046***	-0.006	-0.007	0.109	0.057	0.057	0.287***
	(0.012)	(0.035)	(0.042)	(0.068)	(0.051)	(0.051)	(0.061)
Leverage	-0.020	0.183	-0.199	0.279	-0.337	-0.605*	0.134
	(0.075)	(0.214)	(0.259)	(0.431)	(0.317)	(0.317)	(0.382)
ROA	0.029	-0.731*	-0.453	-0.705	-1.267**	-0.635	-0.255
	(0.143)	(0.410)	(0.494)	(0.896)	(0.618)	(0.624)	(0.755)
Ln(Age)	-0.042**	0.111**	0.014	-0.115	0.002	-0.099	0.144
	(0.017)	(0.050)	(0.061)	(0.114)	(0.074)	(0.074)	(0.096)
First Report	-0.020	-0.156*	-0.261**	-0.114	-0.374***	-0.383***	-0.043
	(0.031)	(0.087)	(0.104)	(0.173)	(0.129)	(0.129)	(0.154)
Ln(Scope 1&2 Emissions)	0.028***	0.098***	-0.054**	-0.026	0.023	-0.013	-0.164***
	(0.008)	(0.022)	(0.026)	(0.047)	(0.032)	(0.032)	(0.041)
Brown Dummy	0.065*	-0.310***	-0.279**	-0.395	-0.303*	-0.282*	-0.361
	(0.039)	(0.111)	(0.135)	(0.264)	(0.164)	(0.163)	(0.230)
#Obs.	1,417	1,380	1,332	493	1,417	1,417	1,417
R-squared	0.111	0.098	0.045	0.103	-	-	-
Industry Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Table 6. Reduction in reported emissions

This table reports the results of regressions of the change in reported emissions between two reports, firm characteristics, and indicators of the quality of their previous transition plan. Right-hand-side variables are the ones of the first report. Standard errors are robust to heteroskedasticity and reported below in parentheses. Constant terms are not reported. ***, **, and * refer to significance at the 1%, 5%, and 10% levels, respectively. Appendix B provides the variable definitions.

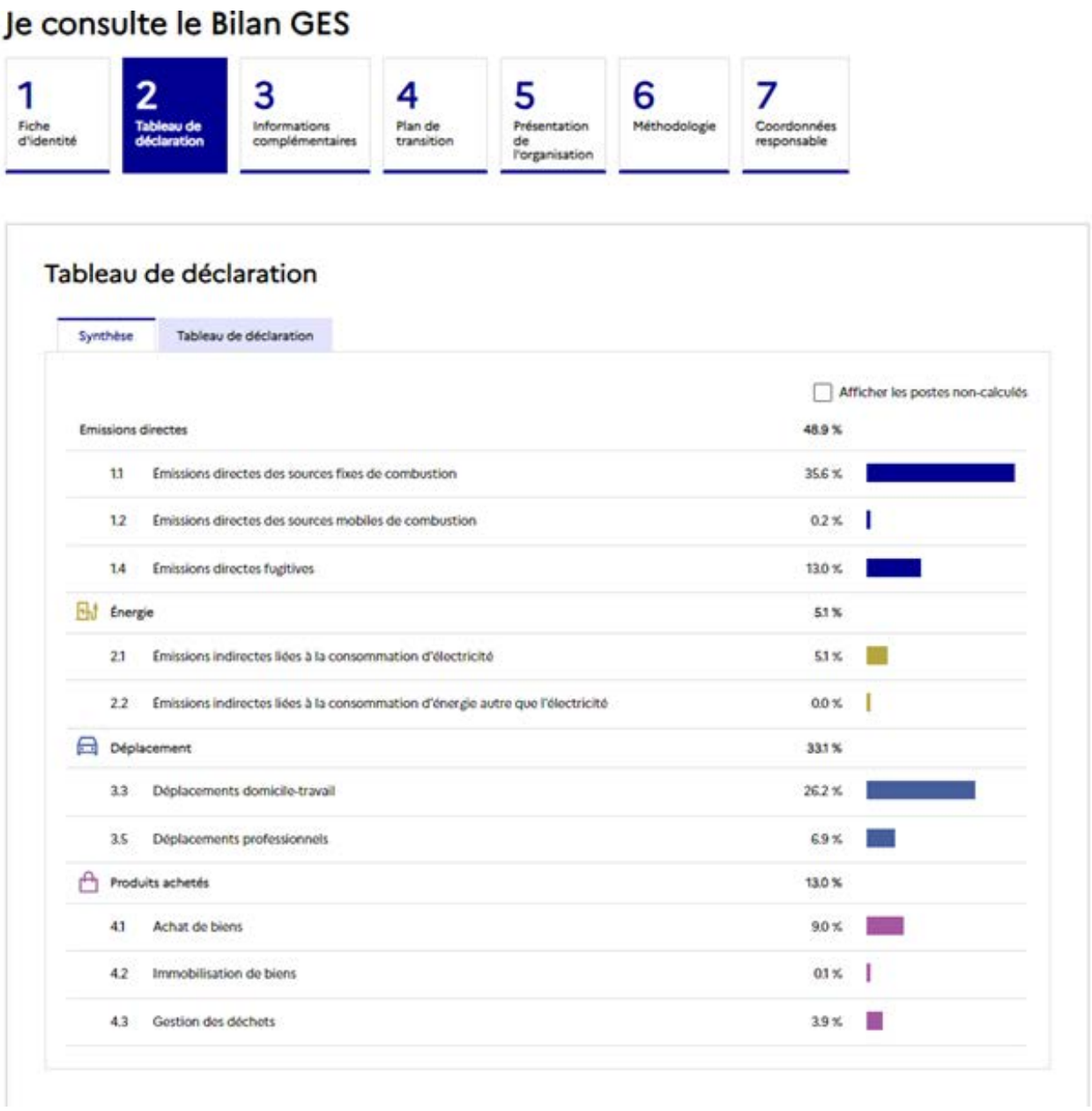
	(1)	(2)	(3)
Pct. Change in Scope 1&2 Emissions			If Plans not Empty
Ln(Sales)	0.009	0.006	0.005
	(0.020)	(0.019)	(0.022)
Leverage	0.031	0.009	0.116
	(0.119)	(0.118)	(0.129)
ROA	0.012	-0.021	-0.072
	(0.232)	(0.229)	(0.256)
Ln(Age)	-0.009	-0.009	-0.023
	(0.033)	(0.032)	(0.035)
#Years Btw. Reports	-0.041**	-0.038**	-0.034*
	(0.016)	(0.016)	(0.018)
L. Ln(Scope 1&2 Emissions)	-0.018	-0.018	-0.017
	(0.013)	(0.013)	(0.015)
L. Expected Reduction (Scope 1&2)	-0.266**	-0.240**	-0.258**
	(0.106)	(0.105)	(0.110)
L. Empty Transition Plan (Scope 1&2)	0.017		
	(0.067)		
L. Avg. Plan Qualiy (Scope 1&2)		-0.055**	-0.067**
		(0.022)	(0.027)
#Obs.	315	315	269
R-squared	0.077	0.096	0.092
Industry Fixed Effects	Yes	Yes	Yes

Appendix A. Template of a carbon emission report

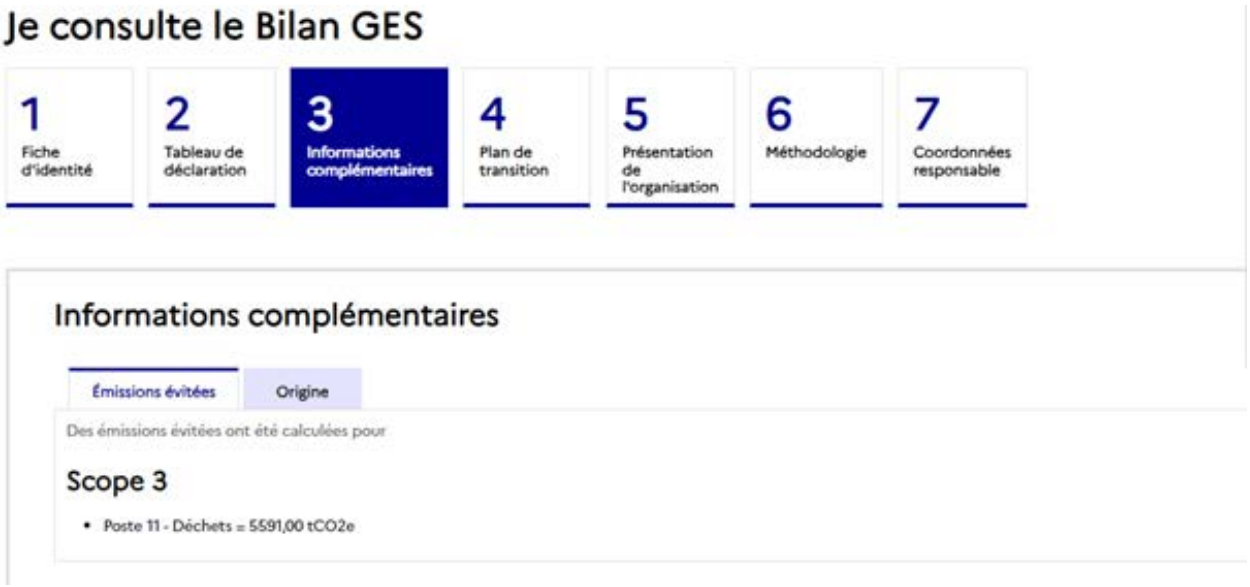
This Appendix presents a template of a carbon emission report. Specifically, we report screenshots of the different sections of the carbon report emission filled by the company Lohr Industrie as it appears on the ADEME website. Panel A shows the section related to company information. Panel B shows the section related to the reporting of carbon emissions. Panel C shows the section related to additional information. Panels D and E show the section related to the objectives of future emission reduction and of the action plans to achieve them. Panel F shows the section related to methodology. Panel G shows the section related to the contact of the responsible of the carbon report.

Panel A. Company information

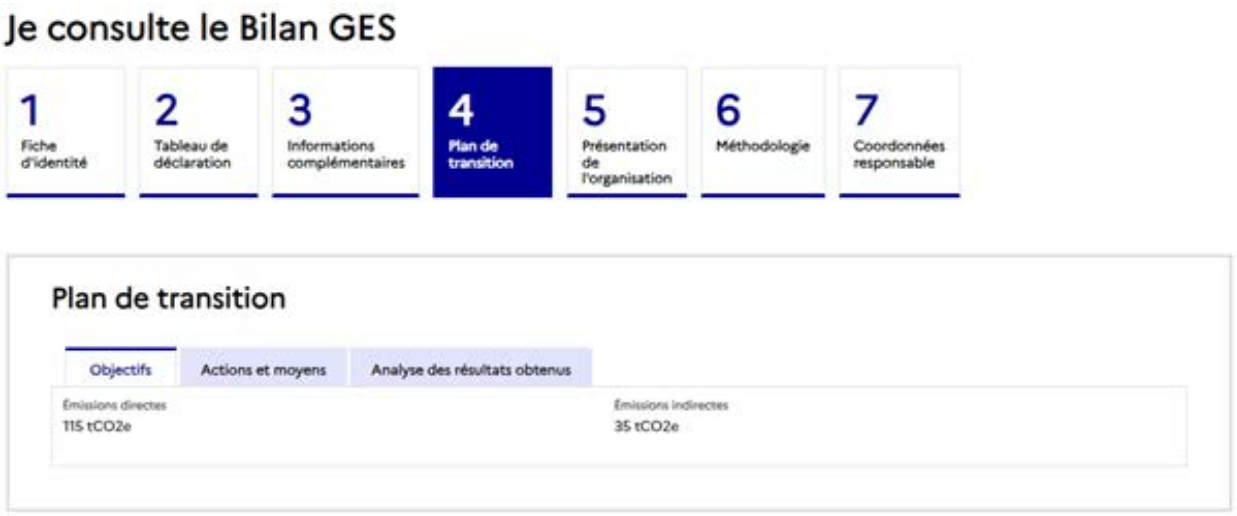
Panel B. Reporting of carbon emissions



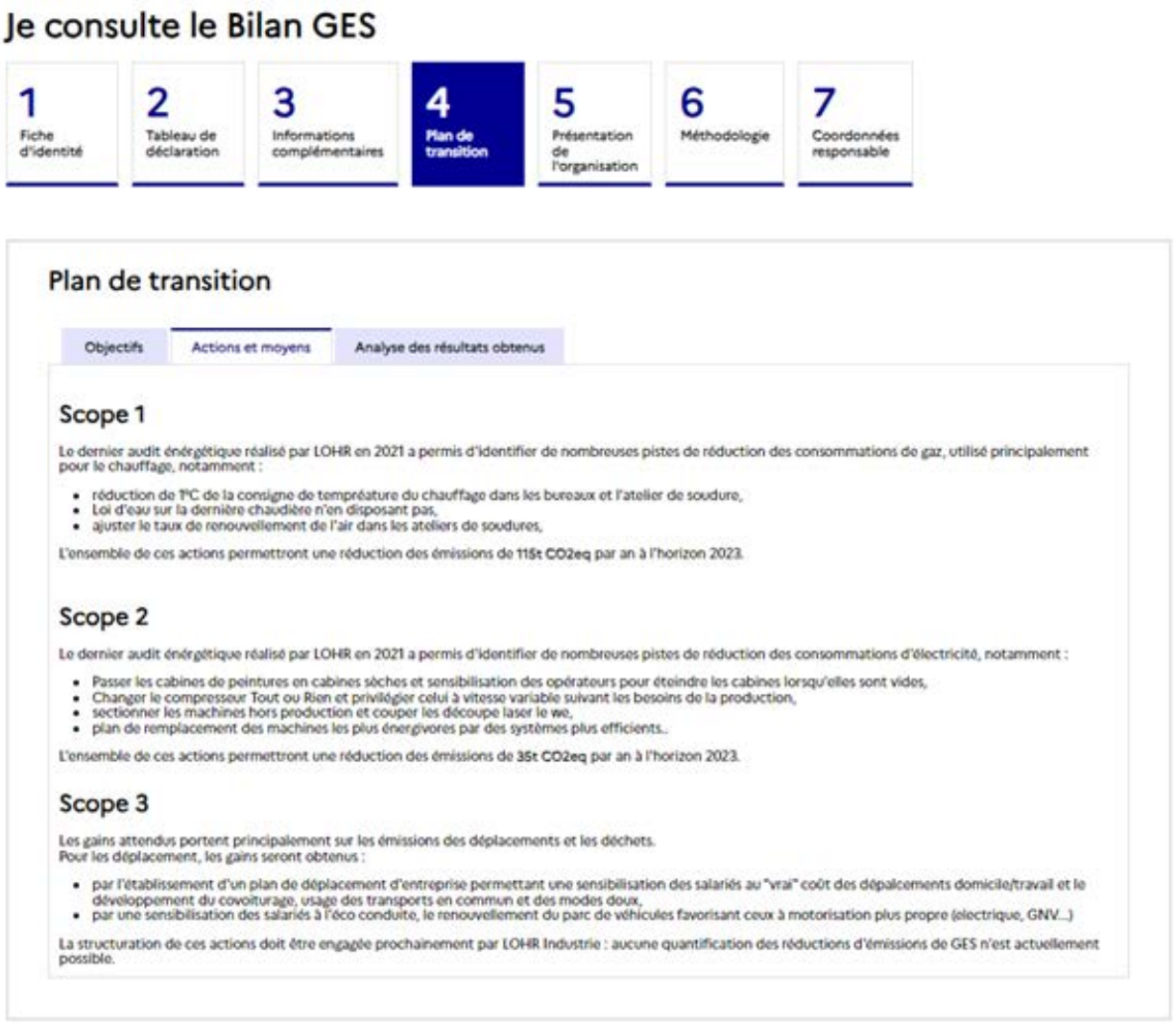
Panel C. Additional Information



Panel D. Objective of future emission reduction

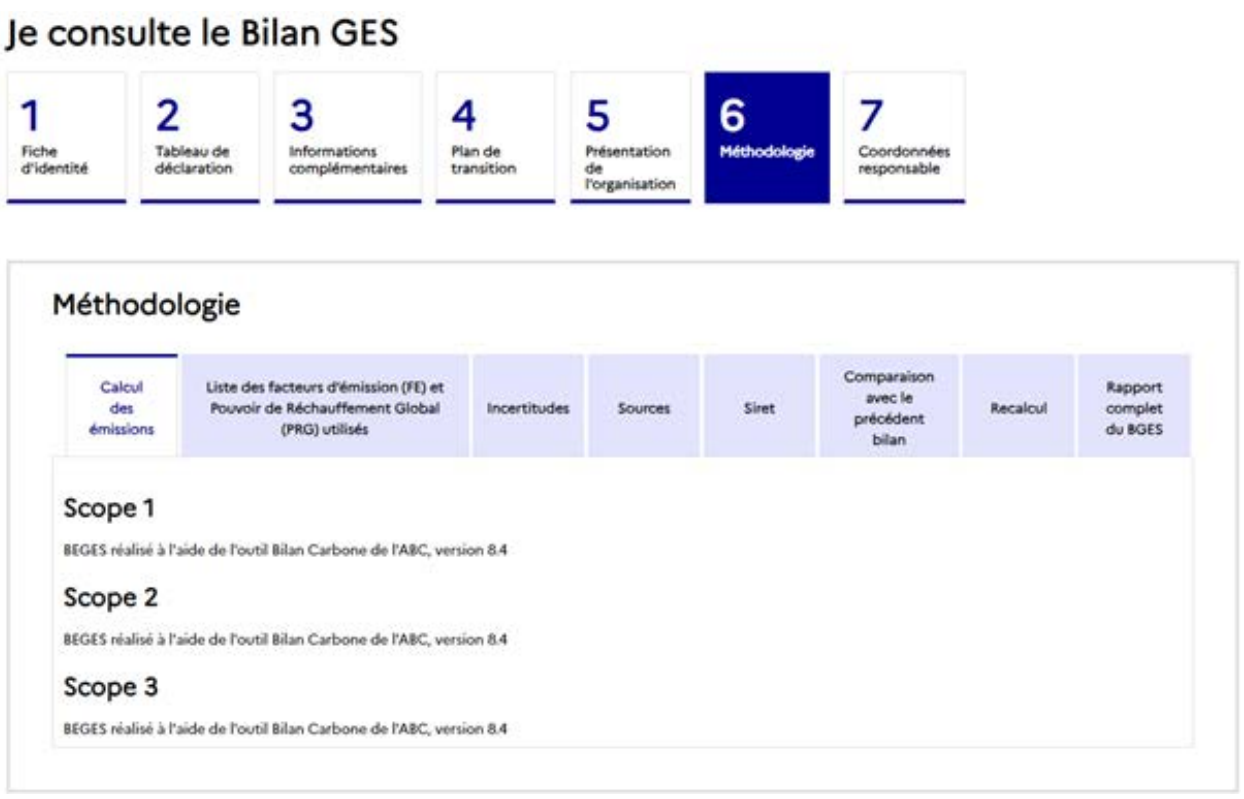


Panel E. Action plans

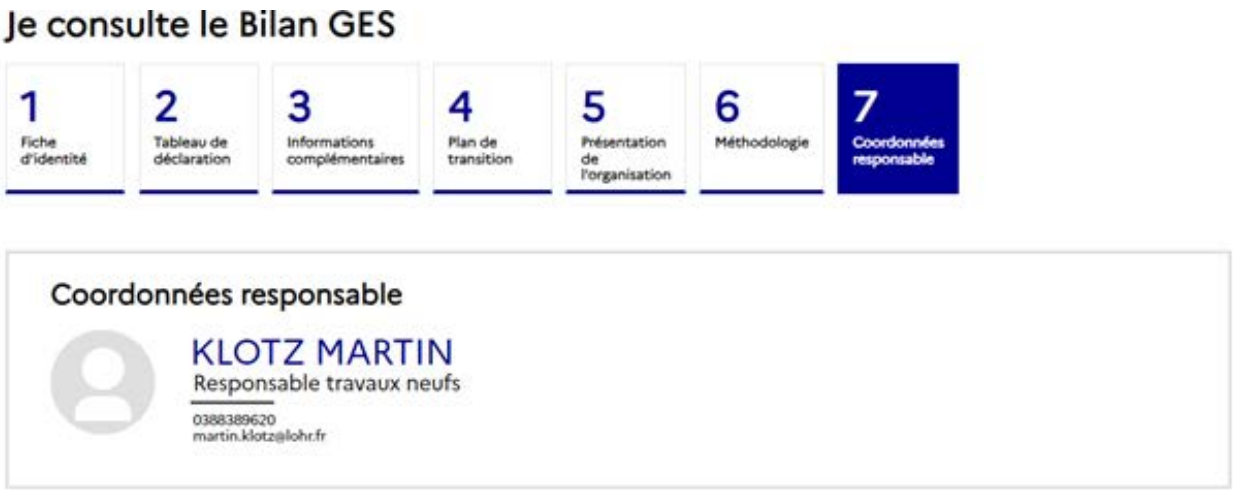


Panel F. Description of the company's activities

Panel G. Methodology



Panel H. Contact of the person in charge of the carbon report



Appendix B. Variable definitions

Variable	Definition	Source
Brown Dummy	Dummy variable equal to one for firms belonging to top carbon emission industries. These industries are petroleum and coal, oil and gas extraction, transportation by air, railroad transportation, water transportation, transportation equipments, primary metal, chemical and allied products, paper and allied products, rubber and miscellaenous products, food and kindred products, general merchandises stores, electricity, gas, and sanitary services.	CapFinancials
Dummy Empty Plan Scope X	Generic dummy variable equal to one if the action plan for Scope X emissions is empty. The variable is successively computed for Scope 1, 2, and 3 emissions	ADEME
Dummy Expected Reduction Scope X	Generic dummy variable equal to one if the firm reports its expected reduction for Scope X emissions. The variable is successively computed for Scope 1, 2, and 3 emissions	ADEME
Dummy Methodology Scope X	Generic dummy variable equal to one if the firm reports information related to the methodology used for the computation of its Scope X carbon emissions. The variable is successively computed for Scope 1, 2, and 3 emissions	ADEME
Dummy Methodology X	Generic dummy variable equal to one if the firm discloses information related to different aspects of its methodology. The variable is successively computed for five items: Uncertainties, Exclusion, Sources, Recomputation, and Organizational parameter.	ADEME
Dummy Scope X	Generic dummy variable equal to one if the firm reports its Scope X emissions. The variable is successively computed for Scope 1, 2, 3, and total emissions	ADEME
Empty Action Plan Scope X	Generic dummy variable equal to one if the action plan for Scope X emissions is empty. The variable is successively computed for Scope 1, 2, and 3 emissions	ADEME
Expected Volume Reduction Scope X	Expected volume reduction in carbon emissions in tCO2e for Scope X. The variable is successively computed for Scope 1, 2, and 3 emissions	ADEME

Variable	Definition	Source
Leverage	[DS(Emprunts obligataires convertibles) + DT(Autres emprunts obligataires) + DU(Emprunts et dettes auprès des établissements de crédit) + DV(Emprunts et dettes financières divers)] / Total Actif Net	CapFinancials
Mention Audit	Dummy variable equal to one if the carbon report mentions an audit in the action plans	ADEME
Mention Scientific Methodology	Dummy variable equal to one if the carbon report mentions a scientific methodology in the action plans	ADEME
Mention Temporal Horizon	Dummy variable equal to one if the carbon report mentions an horizon in the action plans	ADEME
Pct. Total Scope X	Ratio of Scope X emissions to total carbon emissions.	ADEME
Quality Plan Scope X	Index of the informational quality of action plans. The index is computed successively for Scope 1, 2, and 3 emissions. The index takes the value of 0 for empty action plans, 1 for action plans without any quantitative metrics or objectives, 2 for action plans mentioning quantitative metrics or objectives not directly related to carbon emissions, and 3 for action plans mentioning quantitative metrics or objectives related to carbon emissions. Appendix D provides examples of action plans with values of our index ranging from 1 to 3.	ADEME
ROA	Variable (HN) : 5 - BENEFICE OU PERTE (Total des produits - total des charges) / Total Actif Net	CapFinancials
Sales	Variable (FL): chiffre d'affaires net total	CapFinancials
Size Plan Scope X	Number of characters in the text associated with the action plan for Scope X emissions. The variable is successively computed for Scope 1, 2, and 3 emissions	ADEME
Total assets	Variable (CONET): TOTAL GENERAL (I à VI) (net)	CapFinancials
Total Scope 1	Sum of the emission items pertaining to reported Scope 1 emissions (Items 1.1 to 1.5) in tCO2e.	ADEME
Total Scope 2	Sum of the emission items pertaining to reported Scope 2 emissions (Items 2.1 to 2.2) in tCO2e.	ADEME
Total Scope 3	Sum of the emission items pertaining to reported Scope 3 emissions (Items 3.1 to 6.1) in tCO2e.	ADEME

Appendix C. Scope 1, 2, 3 emission items

	Sources of carbon emissions	Scope
Direct Emissions		
1.1	Direct emissions from fixed sources of combustion	Scope 1
1.2	Direct emissions from mobile sources of combustion	Scope 1
1.3	Direct emissions from non-energy processes	Scope 1
1.4	Direct fugitive emissions	Scope 1
1.5	Emissions from biomass (soils and forests)	Scope 1
Energy		
2.1	Indirect emissions from electricity consumption	Scope 2
2.2	Indirect emissions from energy consumption (excluding electricity)	Scope 2
Transport		
3.1	Upstream freight transport	Scope 3
3.2	Downstream freight transport	Scope 3
3.3	Commuting (home-work trips)	Scope 3
3.4	Client and guest trips	Scope 3
3.5	Business trips	Scope 3
Purchased products		
4.1	Purchase of goods	Scope 3
4.2	Fixed assets	Scope 3
4.3	Waste management	Scope 3
4.4	Leasing assets upstream	Scope 3
4.5	Purchase of services	Scope 3
Sold products		
5.1	Use of sold products	Scope 3
5.2	Leasing assets downstream	Scope 3
5.3	End-of-life sold products	Scope 3
5.4	Investments	Scope 3
Other indirect emissions		
6.1	Other indirect emissions	Scope 3

Appendix D. Illustrations of the informational quality of action plans

Action Plans (Original version)	Action Plans (English translation)	Informational quality
- Sensibilisation du personnel Régions à l'éco-conduite - Limitation des déplacements en les remplaçant, quand c'est possible, par des conférences téléphoniques / vidéo- Amélioration de la qualité des indicateurs primaires collectés afin de fiabiliser les informations -Mise en place d'une prime mobilité	-Increase workers' awareness of ecofriendly driving -Limit business trips by replacing them, if possible, by conference or video calls. -Increase the quality of primary indicators collected to improve the reliability of information. -Introduction of a mobility bonus.	1
- Remplacement gobelets plastiques et bouteille par MUG Bio-sourcé et gourde (gain sur les trajets évacuation des déchets) - impossible de faire une projection sur les déplacvement du fait de changement de ploitique nationale sur la gestion de la flotte de véhicule et des résultats déjà obtenus depuis 2011 (- 46 67%)	- Replace plastic cups and bottles with bio-based mugs and reusable bottles (gain on journeys and waste disposal) -Impossible to make forecasts on business trips due to a change in national policy regarding the management of the car fleet and of the results already achieved since 2011 (-46 67%)	1
Renouvellement de 10% de la flotte véhicule thermique en véhicule électrique Mise en place de bornes électriques sur nos implantations de bureaux et sur 20% de nos installation de chantier Engager les collaborateurs dans l'action : Campagne de sensibilisation mensuel sur l'action bas carbone	Renewal of 10% of the fleet of combustion cars with electric cars. Implementation of charging stations at the office locations and on 20% of construction sites. Engage employees to act: Monthly awareness campaign on low carbon actions	2
Passage à une flotte 100% Hyb/Elec en 2022 / Objectif 25% Full Elec en 2023 et 50% en 2025 Installation d'un parc de 1400 bornes de recharge sur l'ensemble des sites (agences, plateformes logistiques et sièges) Plan de rénovation énergétique sur 50 agences par an (PAC, éclairage LED, système de gestion) Mise en place d'un système de management de l'énergie	Transition to a 100% Hybrid/Electric car fleet in 2022 / Objective 25% full electric in 2023 and 50% in 2025. Installation of a park of 1,400 charging stations on the different sites (branches, logistics centers and headquarters) Energy retrofit plan for 50 branches per year (heat pump, LED lighting, management system) Installation of an energy management system	2

Action Plans (Original version)	Action Plans (English translation)	Informational quality
Le dernier audit énérgétique réalisé par LOHR en 2021 a permis d'identifier de nombreuses pistes de réduction des consommations de gaz, utilisé principalement pour le chauffage, notamment : réduction de 1°C de la consigne de tempréature du chauffage dans les bureaux et l'atelier de soudure, Loi d'eau sur la dernière chaudière n'en disposant pas, ajuster le taux de renouvellement de l'air dans les ateliers de soudures, L'ensemble de ces actions permettront une réduction des émissions de 115t CO2eq par an à l'horizon 2023	The last energy audit realized by LOHR in 2021 has allowed the identification of numerous avenues to reduce gas consumption, mainly for heating purposes: reduction by 1°C of the setpoint temperature in the offices and welding workshops, weather dependent setpoint on the last boiler that did not have one, adjust the air renewal rate in the welding workshops. Taken together, these actions will allow us to reduce emissions by 115 tons of CO2 equivalent per year by 2023	3
Etude de remplacement de la chaudière vapeur en date de 1977 (Brûleur en date de 2007) Réduction estimé de 150 t CO2e 1 - Récupération de chaleur sur les compresseurs Réduction estimé de 59 t CO2e selon audit énergétique 6 - Passage au LED sur reliquat Réduction non estimée	Replacement of the water boiler dating from 1977 (burner dating from 2007) Estimated reduction of 150 tons of CO2. Recovery of waste heat on compressors. Estimated reduction of 59 tons of CO2 according to an energy audit. Transition to LED lighting for the remainder. Reduction not estimated	3