

When Transparency Clouds Action. Denial and Inertia in the Oil and Gas Industry: An analysis of Corporate Earnings Calls, 2007-2020

Abstract

Will corporate transparency -- operationalized as public disclosure of financial data and executive engagement with outside analysts and investors -- stimulate organizational change? To answer this question, we analyze 889 corporate earnings calls from 24 major US-listed oil and gas companies from 2007-2020, a time in which the destructive forces of climate change became impossible to ignore. Our findings suggest that corporate transparency reproduces climate change denial and legitimizes organizational inertia. Instead of bringing attention to the industry's ominous challenge, executives use the platform to invoke three distinct but partially overlapping frames of denial which are adopted or silently accepted by the audience. *Skeptics* either circumvent or silence discussions of climate change. *Faux pragmatists* rely on implicatory denial; they downplay the severity of the crisis and reframe climate change as an evolutionary phase that the industry must go through. *Enthusiasts* take a rosy approach. They focus on business opportunities and fail to acknowledge the gravity of climate change. Corporate transparency is widely seen as a marker of efficiency and good governance, but our study suggests that openness can reproduce denial and contribute to organizational denial.

Introduction

The flames spread quickly. California was arid after a seven-year drought, and all it took was a faulty electric transmission. Outside the town of Paradise, fleeing residents jammed the tree-lined roads and gradually, and then suddenly, the standstill was engulfed by toxic smoke and intensifying heat. Fire crews who later tried to reach the town had to plow through abandoned vehicles with bulldozers (Nicas et al. 2018). The devastating "Camp Fire" carried on for nearly three weeks in the fall of 2018 and became the sunny state's most destructive. It killed 86, burned down more than 18,000 homes, and displaced tens of thousands. In the following weeks, global fossil fuel companies like ExxonMobil, Shell, and BP started reporting earnings from the final quarter of the year in public meetings with private investors and professional analysts. In such corporate earnings calls, typically held quarterly, executives disclose financial information, present their plans for the future, and invite questions from analysts and investors. The job of analysts, who usually represent investment banks, is to assess corporate strategies and earnings potential in the short and near term. Private investors operate with different timelines, but are repeatedly encouraged to think at least five years ahead. Neither group of audience members is incentivized by quarterly bonuses and other short-term goals that drive oil and gas companies to delay the energy transition (Kenner and Heede 2021, Foster 2002). We investigate to what degree organizational structures that promote transparency and rational debate with outsiders can bring attention to long-term challenges. As Stark (2011) has argued, systems that construct friction can facilitate innovation, as actors are pushed to be more reflective about what they have taken for granted. Specifically, we ask if open engagement with investors and analysts can mitigate short-termism, create a space for deliberation on climate change's long-term challenges, and stimulate change in an industry characterized by denial and inertia (Dunlap and McCright 2011; Supran and Oreskes 2017; Brulle 2020).

Sociologists have long been concerned with how organizations change over time (Hannan and Freeman 1977; DiMaggio 2009). Capitalist firms, which collaborate and compete to gain material rewards and ensure survival, face external and internal pressure to change and *avoid* change. Change creates opportunities for innovation and expansion (Stark 2011; Fligstein and McAdam 2012), but incumbents have much to lose if things go wrong and often resist it (Hannan and Freeman 1977; 1984; Grant and Jones 2004). Sources of change include external macro events such as wars and political revolutions (Stark 2011), financial crises (Westney 2009), and internal market dynamics, such as when competitors introduce

(seemingly) better ways of doing things (Meyer and Rowan 1977; DiMaggio and Powell 1983; DiMaggio 2009; Fligstein and McAdam 2012). Sources of inertia, often associated with organizational age (Grant and Jones 2004), include financial considerations, uncertainty, risk aversion, path dependence, internal and external power dynamics, and legitimacy issues (Munck af Rosenschöld et al. 2014). We bring attention to the mechanisms that produce inertia. We argue that one mechanism that contributes to inertia is corporate transparency. Openness is widely seen as a marker of efficiency and good governance (Healy and Palepu 2001; Bushee et al. 2003; Augustine 2012), but our findings suggest that this is a ceremonial myth. Rather than bringing attention to the fossil fuel industry's existential threat, earnings calls produce and reproduce particular forms of denial that enable stakeholders to continue to evade the issue and thus reproduce inertia.

Denial, defined as a strategic avoidance of the truth, is an actively produced social condition that reflects and extends existing power structures (Zerubavel 2006; Norgaard 2011; Cohen 2013). Denial is initially expressed when interaction partners tacitly agree to deny something they know, to avoid costs such as pain, fear, or embarrassment. It is structurally reinforced when a growing number of people participate, by adding their silence, by using euphemisms and neutralizing language, or by drawing on and engaging with institutionalized forms of denial, such as bureaucracy, legal and historical documents, and traditions and cultural norms that have taught people to pay attention to certain things and ignore others (Cohen 2013). In earnings calls, which are carefully ordered and moderated, executives and a cordial and mostly supportive audience jointly withstand the pressure to change by invoking various frames of denial.

Our main theoretical contribution is explaining how corporate transparency reproduces denial and inertia. We explain how a social system that ostensibly promotes disclosure, openness, and debate instead silences, deflects, undermines, and reframes uncomfortable truths. Specifically, we find that stakeholders resist change by invoking and reproducing three distinct but partially overlapping denial frames: 1) literal denial and strategic silence, 2) downplaying of implications, and 3) deflection and rosy interpretation. Zerubavel (2006) has argued that the setting of interaction contributes to denial by inviting specific forms of engagement and discouraging others. Our findings suggest that earnings calls neutralize debate and reproduce denial and inertia. While corporate spin-doctoring is nothing new, we bring attention to how transparency and engagement with outsiders legitimize corporate frames. When presented frames are vocally embraced or silently accepted by the audience, they are reproduced and normalized.

The second contribution of our paper is methodological. To study how actors in the oil and gas industry discuss climate change, we measure the prevalence of relevant topics in 889 earnings calls using a novel approach that combines inductive and deductive logic. First, we create comprehensive dictionaries for words associated with topics of interest (e.g., emissions and renewables). To find words for our topic dictionaries, we search through all earnings call transcripts using machine learning and read corporate reports and letters and relevant research (Overland and Sovacool 2020). Next, we count the prevalence of all topic words in the earnings calls. To validate and expand on our topic models, we qualitatively analyze keyword-specific text excerpts from the same earnings calls. We call this method, which combines inductive word discovery, deductive measures, and qualitative validation for Inductive-Deductive Topic Modeling.

After a brief review of the literature on inertia, transparency, and denial, and an overview of our research methods, we present our findings in two parts. First, we report quantitative measures of our topic models. Second, we typify the denial frames that emerge from our qualitative analysis and analyze how conversations changed in 2020, a year of great upheaval.

Stalling Change Through Openness and Denial

Organizational change is feasible when decision-makers hear, understand, and legitimize arguments for reform (Agocs 1997). It becomes *likely* when incumbent firms are challenged by innovative competitors (Hannan and Freeman 1984; Fligstein and MacAdam 2012), or when new, seemingly efficient practices become the way things are done, e.g., in response to global competition between firms (DiMaggio 2009). Change can also come about due to external pressure (DiMaggio and Powell 1983). One example is the oil and gas industry, which faces increased pressure to reform (World Bank 2020) as evidence of the destructive force of climate change mounts (Figure 1; Hoffert 2010). Crises can stimulate innovation, as pressing concerns require new thinking and problem-solving (Ladegaard 2020) or impair it (Stark 2011). Organizations are more willing to risk experimentation when they have sufficient resource buffering (forms of capital, such as money, people, machines, information, and technology) and institutional buffering (sources of legitimacy, e.g., social expectations, professional norms, or regulation) (Miner et al. 1990).

Sources of organizational inertia include financial considerations, risk aversion, path dependence, internal and external power dynamics, legitimacy issues (Munck af Rosenschöld et al. 2014), and positively biased work cultures that oversee weaknesses (Cerulo 2006). Large, enduring, and successful organizations often resist change because their survival depends on predictability, reliability, and accountability (Hannan and Freeman 1977; 1984; Grant and Jones 2004; Brulle and Norgaard 2019). Organizations want to avoid change because it's costly, as shifts in one area necessitate action in others, the outcome of change is always uncertain (especially if organizational relationships are cut), and change can undermine reputation and authority. Organizational inertia is thus typically attributed to structural constraints. In the oil and gas industry, fossil fuel divestment is impaired by pervasive short-termism (Foster 2002; Dunlap and McCright 2011; Supran and Oreskes 2017; Brulle 2020; Kenner and Heede 2021) and risk aversion (Brulle and Norgaard 2019). In the literature, inertia is often treated as a given, associated with age, and included in explanatory models (e.g., Hannan et al. 2004). And yet, mechanisms of inertia remain under-examined. We explain how inertia is perpetuated by social systems that ostensibly promote openness.

Transparency is seen as a marker of good governance (Augustine 2012), a civilizing force (Bennis et al. 2008), and a driver of market efficiency, as informed investors can act with confidence, which in turn enables fundraising (Healy and Palepu 2001). But transparency can obscure more than it reveals (Moore 2018). For example, sharing complex and unfiltered government data does not equal comprehensibility, and may end up overloading and confusing issues rather than clarifying them. Our findings suggest that although transparency continues to be a central goal in private and public sectors, it may not produce the intended outcomes. Meyer and Rowan (1977) famously argued that organizations adopt organizational forms not because they are objectively efficient, but because they help legitimize their operations as they *appear* more efficient. Firms will therefore at times adopt practices and structures that do little to improve business, at the expense of alternative (and potentially more fruitful) organizational forms (Stark 2011). We argue that corporate transparency can undermine change. Rather than stimulating action by disclosing information and inviting discussion, openly shared data can be silenced and reframed in ways that reproduce denial and inertia.

Structural denial supports inertia because denial becomes more difficult to penetrate over time (Zerubavel 2006; Vinitzky-Seroussi and Teeger 2010; McGoey 2012; Cohen 2013). Many societies are based on forms of cruelty, discrimination, repression, or exclusion, which are known about but never openly acknowledged because states and their citizens construct and reproduce denial and inertia (Cohen 2013). Denial is structured by bureaucracy, legal texts, historical documents, traditions, and cultural scripts, which make people pay attention to certain things and ignore others (Cerulo 2006; Zerubavel 2006; Freudenburg and Alario 2007; Vinitzky-Seroussi and Teeger 2010; McGoey 2012; Delmestri and Goodrick 2016). As denial is created within social systems, it is shaped by and reproduces existing power structures. Denial is more likely to compel bystanders to play along if it is backed by elites (Zerubavel 2006) and covered and veiled in ways that make it difficult to attack (Freudenburg and Alario 2007; Vinitzky-Seroussi and Teeger

2010), for instance, in an institutional order that represses disruptive emotions and status quo challenges (Delmestri and Goodrick 2016), or in cultures that emphasize positivity (Cerulo 2006) or humility and conformity (Nordgaard 2011). The setting is also important (Zerubavel 2006). In public meetings, participants are pressured to abide by dominant definitions of the situation, especially if there are many attendees. Moreover, the setting's order might contribute to denial by inviting particular forms of engagement and discouraging others. A case in point is earnings calls, where a fixed agenda determines what participants are supposed to find important, followed by a moderated Q&A session with limited talking time for each speaker. The order of things steers our attention.

Climate change denial, primarily perpetuated by fossil fuel companies (Supran and Oreskes 2017; Kenner and Heede 2021), is a key obstacle to mitigation (Brulle 2020). Climate change denial is difficult to challenge because predictions are uncertain, contested, and lack salience (Kahneman, quoted in Marshall 2015). In recent years, fossil fuel companies increasingly acknowledge that climate change is real. Instead of outright denying the phenomenon, firms downplay its societal implications and advocate for small changes determined by scientific, political, and economic elites (Wetts 2020). Rhetorical changes are reflected in corporate action: firms now delimit the climate change problem to fit within their goals of profit maximization (Wright and Nyberg 2017) or rely on greenwashing (Delmas and Burbano 2011). It has been argued that transparency can stimulate change, because if firms are compelled by regulation or public pressure to release information on their environmental performance, people can monitor and hold decision-makers accountable (Delmas and Burbano 2011), and if they legitimize arguments for reform, change becomes possible (Agocs 1997). However, our study suggests that openness and engagement with outsiders may do the opposite -- reproduce denial and thus legitimize inertia. When no-one calls for action, inaction is justified.

Making Sense of “Big Text Data”

How can we analyze large document collections? One popular option is topic modeling. Typically using algorithms such as Latent Dirichlet Allocation (LDA), topic models map recurring relationships between words and identify clusters, which researchers then review and label (Blei 2012). This mainly unsupervised approach is useful for measuring salient themes and frames. Fligstein et al. (2017) used topic modeling to document how macroeconomic language dominates discussions at Federal Reserve meetings, and DiMaggio and colleagues (2013) analyzed how newspapers changed their coverage of government support of art. Topic models can work through large datasets with minimal input from researchers (Bail 2014), but automatically discovered topics can be difficult to interpret, as topic models do not automatically detect the appropriate number of topics in a text (Blei 2012). Quantitative models that aim to simplify the topic selection process suggest that a given corpus contains between 8-100 topics (most often somewhere between 20-30 topics) (Zhao et al. 2015). In practice, researchers typically determine the appropriate range of topics by trial and error, by evaluating each topic by salient words, based on exclusivity and probability of inclusion.

Topic models are poorly suited for capturing rare topics and distinguishing between closely related ones. In such cases, systematic keyword searches are more useful, as researchers can compile and search for terms known to represent particular topics. However, conventional keyword searches are overly deductive (Bail 2014). When researchers look for topics defined in advance, based on their sense of which terms are well suited to address theoretical questions of interest, their findings might include false negatives if researchers fail to include indigenous language that would be discovered by the inductive topic models discussed above. Finally, simple keyword searches eschew the broader context of words within sentences.

We have developed a middle-ground approach that we call Inductive-Deductive Topic Modeling (IDTM). Our method combines the inductive discoverability of LDA topic models with the precision of deductive keyword searches. Moreover, IDTM has a manageable learning curve for scholars unfamiliar with

computational methods, generates easily interpretable and replicable results, and includes a qualitative validation component that elucidates keyword contexts and tests the validity of the quantitative findings. We discuss IDTM's six steps after presenting our empirical case.

Data on the Oil and Gas Industry

We analyze how private investors, professional analysts, and business executives in the oil and gas industry discuss climate change issues in corporate earnings calls from 2007-2020. This period is marked by intensified environmental distress and increased public and political pressure to cut emissions. Corporate earnings calls are performative interaction rituals that follow the format of quarterly earnings reports, as required for companies listed on U.S. exchanges, and include a moderated Q&A session (Crawford Camiciottoli 2010). They start with a presentation on financial results and forecasts, in which corporate executives project confidence in their ability to generate shareholder value. The audience is the finance community, particularly the professional analysts and existing and potential investors who listen in and/or plan to ask questions. For our study, we collected earnings call transcripts from firms that MarketWatch categorizes as "major oil and gas" companies from SeekingAlpha. To ensure that our list of companies includes all major US-listed oil and gas companies, we reviewed additional lists of global gas and petroleum businesses and added one missing firm to the dataset. In total, we collected 889 transcripts from 24 companies (Table 1).

[Table 1 and 2]

Inductive-Deductive Topic Modeling

We followed six steps to measure the prevalence of climate change topics in the transcripts (Table 2). Although we initially followed the steps sequentially, we also crisscrossed between the steps when necessary. We started by compiling a dictionary of climate change terms, drawing on internal and external sources. We gathered words from shareholder letters, transcripts, sustainability reports, and Overland and Sovacool's (2020) dictionary, which includes technical, scientific, and political terms related to climate change.

Next, we divided our keywords into five major topics: emissions, regulation, global warming, renewables, and disasters. We revised our topics several times, informed by our quantitative and qualitative steps (see below). For instance, we decided to merge two topics, "international governance" and "national policy," into one topic -- "regulation" -- as thematic overlaps made it difficult to distinguish the two.

In the third step, we created a neural-network machine learning model for word embedding, which converts all words in a given corpus to vectors and maps their geometric relationships. Words are plotted in a three-dimensional vector space in which their location is determined by context and term co-occurrences. For instance, the semantic neighborhood of "climate_change" includes "global_warming" and "decarbonization" (Figure 2). After creating the vector space, we inductively searched for related terms and phrases for each topic. We generated lists of 300 words located near each topic and added select terms to their respective topics (Table 3). (Most suggested words had a cosine score above .5, where 1.0 is identical.) This helped us discover important indigenous language. For example, when we searched for "global_warming," we found that oil executives often use terms such as "dual_challenge," referring to the perceived need to both increase the amount of and access to energy worldwide and to reduce emissions associated with energy use and production. The vector space searches were vital for disaster-related terms, which were not part of Overland and Sovacool's dictionary. To train our machine learning model, we used the word2vec package in R (Schmidt 2015) and a large corpus of 13,500 earnings-calls transcripts from nearly 500 energy companies, as well as the original dataset of 889 transcripts. Our model completed five iterations, with 200 vectors, four threads, and 12 windows. We

found that once the training was completed and the model was set up, it was intuitive to use. (Our code will be made available on GitHub.)

[Figure 2 and Table 3]

In our fourth step, we assessed ambiguous topic words by reading through concordances (text excerpts with a specified number of words before and after each word of interest). For instance, after reviewing concordances of “risk,” we decided to exclude the word because it was often used in contexts unrelated to climate change. Next, we counted our topics across time and visualized the results.

Finally, we analyzed the context of all keywords associated with the two topics that became more prevalent over time: renewables and emissions (Figure 2). We created concordances with 250 words before and after each topic keyword, randomized their order, and read until reaching data saturation. We first read about 400 concordances from 2007-2019, and then, due to observed changes, another 400 from 2020 only. In total, the qualitatively analyzed concordances amounted to about 200,000 words. Whenever a concordance missed important context, we read the relevant section from the complete transcript. In our analysis, we first did a round of open coding. We then developed basic descriptive measures of our observations and designed a schema for focused, theoretical coding. For example, we noted that several executives said that they invest in renewables to hedge against decreased demand for fossil fuels. This descriptive code became a measure of the theoretical code “implicatory denial” (Cohen 2013), which captures how some actors accept that climate change is happening but downplay the implications. As we worked through several rounds of coding, we often returned to our coding sheet, wrote research memos, and discussed interpretations and potential revisions until we achieved full coding consensus. Three ideal types of denial emerged from this work: silencing, implicatory denial, and rosy interpretation. As actors often invoke multiple logics in their statements, they were not confined to the three categories. For instance, some actors primarily invoke implicatory denial but at times invoke silence by evading a difficult investor question. By treating invocations of denial as our unit of analysis, we note that denial is a performative act -- people draw on different frames of denial, depending on their context.

Climate Change Topics

In light of mounting political and popular pressure to reduce emissions and intensifying climate-change-related destruction, executives in the oil and gas industry have sound reasons to plan for a future beyond fossil fuels. Business legitimacy is under threat, and investors and analysts may question their long-term sustainability. We find some evidence of change. The total count of climate change keywords in our data does increase over time, especially towards the end of the examined period. In earnings calls from 2020, a year marked by the Covid-19 pandemic, a stock market crash, plummeting energy prices, and reduced economic activity, most transcripts (74%) contains at least five climate change keywords, a significant bump from 2019 (46%) and a leap from the earliest year in our data, 2007 (14%) (Table 5). These figures suggest that talk about climate change issues increased from 2007-2020.

[Table 5]

Upon closer examination, we find that the increase is almost exclusively about renewables and emissions, and these conversation topics are treated as unrelated to climate change (Figure 3). Although oil and gas executives talk more about renewables, they do not acknowledge why these alternative energy sources are necessary and instead focus on diversifying their energy portfolio. When they talk about emissions, they avoid direct engagement with climate change and focus on increasing efficiency. The audience engages with renewables and emissions, but is similarly silent on climate change. Executives, analysts, and investors are also silent on the most tangible consequence of climate change: extreme weather events. Adding to existing studies of climate denial (Dunlap and McCright 2011; Supran and Oreskes 2017; Brulle 2020),

these findings suggest that corporate transparency and engagement with outsiders do not create the kind of friction that encourages critical reflection about the status quo (Stark 2011).

[Figure 3]

Discussion of wildfires, floods, snowstorms, and hurricanes was stable over time, even as the severity increased (Figure 1). The exception was 2008, in which an unusually destructive cyclone season caused billions of dollars worth of damage and killed more than 1,000 (mostly in Haiti). The year included hurricane Ike, the second most costly storm in the Americas at the time. Ike has since fallen to the sixth most costly storm, after Sandy (2012), Harvey, Irma, and Maria (2017), but those hurricanes did not increase discussion about natural disasters.

Executives, analysts, and investors rarely discuss regulation. However, the Paris Agreement, which received global media coverage throughout 2015 and was adopted by 196 nations towards the end of the year, was followed by a modest uptick in related discussion. In the three years preceding the agreement (2013-2015), each transcript contained on average 0.58 regulation terms. In the following three years (2016-2018), the ratio was 1.03. The year the United States withdrew from the agreement, 2017, the ratio was 1.37, the second-highest in the data collection period (after 1.56 in 2020). Despite these patterns, the most salient finding is the low frequency of regulatory discussions. There is little movement between 2007-2020, and although the ratio for 2016-2020 is more than twice that of the preceding nine years (1.18 vs. 0.48), industry actors devote little talking time to regulatory pressure.

Global warming, which includes keywords like `climate_action` and `climactic_change`, is the rarest of the five topics. From 2007-2020, keywords associated with global warming appeared only 0.57 times per transcript and appeared zero times in 2007 and 2008. Our qualitative analysis below confirms that global warming is a rare subject, even when earnings calls participants discuss related topics such as renewables and emissions. This finding suggests that industry actors talk over and around the climate crisis, even when they engage with practical challenges and potentially mitigating factors.

As noted, talk about emissions and renewables increased in recent years. From 2007 to 2016, emissions keywords appeared an average of 0.86 times per transcript. From 2017 to 2019, the mean rose to four times per transcript, and in 2020, 14 times per transcript. Discussion of renewables followed a similar trajectory, with an average of 0.70 keywords per transcript in 2007-2016, then four keywords per transcript 2017-2019, and 13.25 in 2020.

Most of the increase is carried by European firms (Figure 4 and 5). From 2007 to 2017, the mean count of emissions keywords per transcript was pretty even between regions, with 1.17 for European firms, 1.04 for U.S. and Canadian firms, and 0.81 for firms in other nations. However, European firms outpaced the rest in 2018-2020, with 15 emissions keywords per transcript, compared to 4.73 for North American firms and 3.77 for other firms. The trends diverged further for renewables. From 2007 to 2013, renewables keywords appeared once per transcript for European firms, 0.54 for American and Canadian firms, and 0.18 for other firms. In the period 2014-2020, renewables discussions increased modestly for North-American and “other” countries, but skyrocketed for European firms, from 6.48 (2014-2017) to 19.19 (2018-2020). At the highest point, in 2020, renewables and emissions keywords appeared 32 and 24 times per transcript for European firms. Within the renewables topic, words associated with solar and wind power occurred most frequently and far more than words associated with electric vehicles, hydrogen, biomass, and geothermal power.

[Figure 4 and 5]

The primary difference between European oil and gas corporations and their global peers is their regulatory context. In Europe, greater emissions regulation and public interest in climate change encourage firms like BP and Shell to invest more in renewable energy and reduce emissions, whereas in the U.S., low regulation and mistrust of environmental science encourage inertia (Pulver 2007). European firms also collaborate with states, which are often their part-owners, on climate policies, while more independent companies in North America are likely to try and block approval of climate policies after they have been drafted by the government (Mildenberger 2020).

Our topic models show that actors in the oil and gas industry recently started to express interest in renewables and emissions, but climate change is not acknowledged as a threat to the industry. Despite mounting popular and political pressure to slow global warming and growing scientific evidence of the disastrous consequences of doing business as usual, industry actors resist change. To better understand how they contribute to inertia in a time of changing narratives, we qualitatively analyze the two topics that increased in later years.

Agents of Inertia

Corporate earnings calls are public and highly structured interaction rituals conducted via telephone or the Internet. They start with a presentation on financial results and forecasts, in which corporate executives aim to project confidence in their stewardship and the company's future returns to gain the trust of professional analysts and existing and potential investors, some of whom partake in the moderated Q&A session that follows. Although all publicly listed companies in the United States are required to file quarterly earnings, the calls are voluntary and aim at engaging stakeholders, increasing transparency, and gaining the trust of the global finance community (for details, see Crawford Camiciottoli 2010).

To highlight the agency of our subjects, we have developed three ideal-type actors. People we call *skeptics* literally deny or dismiss climate change and related topics. They might say that contemporary climate change is substantially the same as previous energy shifts, e.g., from coal to oil, or they decline to invest in renewables because they wait for the “right moment” to do so. *Faux pragmatists* draw on a pragmatic narrative based on the false premise that modest change is sufficient because climate change is “not as bad as they say.” *Enthusiasts* invoke rosy interpretations. They see climate-change-related challenges as opportunities for growth but undermine, disregard, or ignore the need for transformation. They all fail to acknowledge that climate change poses an existential threat to the industry and the world.

[Table 4]

Skeptics - Denial by Silencing

Skeptics sometimes say that climate change isn't happening, but for the most part, they evade talking about it, dismiss related questions, critique renewables and regulations, and undermine the gravity of the climate crisis. Like Stern et al.'s neoskeptics (2016), they also emphasize that the future is uncertain.

In ExxonMobil's shareholder meeting in 2014, a private investor asked if the company would shift some of its capital to “clean energy” investments. This was a rare case of an outsider raising the climate change issue. CEO Rex Tillerson said the technology is not ready “without a lot of government support mandates and regulations.”

I prefer not to invest in opportunities that live and die by government mandate ... what the government gives [they might] just as easily take away the next day and you got a non-performing asset.

Tillerson says ExxonMobil is better off carrying on as usual, and with that, ended the conversation about climate change, as the moderator moved on to another private investor, who starts by noting that he is “very proud of the company” and inquires how “we” can improve the value of the ExxonMobil brand in a time of rising gas prices. For the most part, Skeptics are silent about climate change, which makes it difficult to study, but in the rare cases when the issue is discussed, analysts, investors, and executives are on the same page. One example is requests for greater transparency around corporate climate change policies. At a 2017 ConocoPhillips shareholder meeting, a proposal that the corporation disclose whether executives are incentivized to “promote resilience to low carbon scenarios” failed to pass, with 93% of present shareholders abstaining or voting against it. ExxonMobil shareholders asked the corporation to set GHG emissions goals in both 2012 and 2013, and both times the resolutions failed to pass, with only 27% in favor. Skeptics sometimes shift conversations away from climate change. In a 2013 earnings call, Tillerson responded to a rare question about what ExxonMobil plans to do about “the crisis that’s facing the planet.” Tillerson first questions whether climate change is indeed happening, as the “last 10 years’ temperatures had been relatively flat,” and then shifts the focus to the “great social challenge” of serving energy to the world: “what good is it to save the planet if humanity suffers in the process of those efforts[?]” By framing the company as a socially conscious actor that lifts global living standards, ExxonMobil diverts attention away from climate change.

Many analysts share Tillerson's qualms about renewables and are skeptical about the energy transition's potential for returns. When the CEO of TotalEnergies discussed investments in alternative energy sources, Martijn Rats, a Morgan Stanley analyst, questioned the margins involved in such projects. “Does it require [a] lot of money, sort of chasing these renewables opportunities?” In a BP earnings call in late 2018, John Rigby of UBS said he “fully supports” efforts to reduce and improve emissions but added that he is “a little nervous” about how investments in alternative energy sources can create shareholder value. “[It is unclear] what the financial outcome is likely to be ... [when do] investors and analysts get to judge what the financial returns on these kinds of investments are?” The analyst worried that BP was moving too quickly and responding to external pressure on climate issues rather than earnings opportunities. Similarly, Rats, the Morgan Stanley analyst, suggested that big decisions, regardless of the “good intentions” behind them, ought to be made with investors in mind. BP CEO Bob Dudley agreed:

The world's going to a low carbon future ... The speed of this transition over the next few decades [is] highly highly uncertain depending on technology, societal preferences, government policies ... and big bets are risky. So we're going to be cautious about this.

Dudley acknowledged that change is risky and that caution is imperative.

As noted above, two topics drive most of the increase in 2020: renewables and emissions. We find that literal denial was rare in 2020, but skeptics are not wholly absent. During a Q3 earnings call, Neil Mehta of Goldman Sachs asked if ExxonMobil plans to set emission targets, as many other companies have done. The response was that the company aims to reduce “carbon intensity over time” but is focused on meeting growing energy demands. In ExxonMobil’s annual meeting the same year, CEO Darren Woods said that solar and wind are “going to play an important role [but] they don't solve the climate challenge,” and investing in renewables is akin to “moving down the energy value chain.” They have “looked at this” and do not think they can “justify” it to their shareholders. “Today, we don't see that opportunity.” In a Q1 earnings call, Husky’s CEO Rob Peabody made a similar statement in response to a question from Chris Varcoe at Calgary Herald about the prospects of increased regulation:

I'm absolutely in favor of pursuing renewable energy ... but let's also understand that's not a big export industry ... so we need another export industry ultimately if you're going to replace oil and gas.

Peabody acknowledged that renewables are needed but claimed that fossil fuels are irreplaceable, so Husky will not change its business model. Providing alternatives is not their concern, and neither are the consequences of fossil fuel expansion. The “operator” then announces that the Q&A has reached its end and brings the word back to Peabody “for any closing remarks.” There is typically little or no room for

follow-up questions, and the executive always gets the last word. In a Q3 earnings call, Hess' chief executive, John Hess, starts his opening statement by acknowledging the global push for emission cuts but pointedly notes that their business will not be affected:

If all the pledges of the Paris climate agreement were met, oil and gas would still be 46 % of the energy mix in 2040. The energy transition will take time.

Skeptics in 2020 accept that the narrative has shifted as emissions and renewables have become mainstream talking points but avoid engaging with such topics, often by separating themselves from them.

Skeptics ignore the environmental implications of their business operations and sidestep climate-related questions by pivoting to other topics and reasserting the importance of shareholder value. Climate change is rarely outright denied but often minimized and ignored.

Faux Pragmatists - Implicatory Denial

Executives speak pragmatically about the oil and gas industry's pressure to adapt to climate change. But their pragmatism is based on the false premise that climate change is "normal" and that incremental change is sufficient.

In a 2016 earnings call, BP's CEO Bob Dudley described the company's shift from oil and coal to gas as a "natural transition [that will] lead us to the low carbon future." The "energy transition" is framed as an evolutionary phase rather than a crisis that requires decisive action. Dudley also notes that it will be "very hard" for BP to "lead" on this transition "if the government incentives aren't there." Faux pragmatists may support change, but only modest change, and only under specific conditions that support their ability to "maximize shareholder value," e.g., calling for states to create new markets. In a 2019 Q3 earnings call, Shell's CEO Ben van Beurden said the company's aim is not only to generate "industry-leading cash flows" but also "to maintain a strong societal license to operate and to thrive in the energy transition." The executive's example, from his opening statement:

Shell's retail business is helping its service stations and customers reduce, reuse, and repurpose waste across its operations and supply chain with initiatives from incentivizing reusable cups and bags to converting plastic waste into eco-bricks.

Shell aims to maintain a "social licence" to operate, not by investing in renewables or phasing out emission-intensive businesses, but by reducing plastic waste at their gas stations. A similar example is ConocoPhillips' "environmental stewardship." This initiative, noted in a 2019 earnings call, includes tree planting in Canada. Faux pragmatists acknowledge climate change but downplay its implications and the required action. Their minor initiatives, such as incentivizing reusable cups and tree planting, receive no attention from investors and analysts.

At times, faux pragmatists frame investments in non-fossil fuel projects as hedges against climate change. However, these investments are modest and incommensurate with climate change predictions. Mark Little, Suncor's CEO, said in a 2019 earnings call that the company aims to reduce "greenhouse gas intensity" by 30% by 2030, in part by investing in wind farms across Canada:

When you look at some of these little equity positions that we've taken as we explore some of these technology pieces ... our view is that the world is changing. We can be a part of this.

By investing in wind farms, Suncor is starting to prepare for an energy transition. Unlike skeptics who believe that the cost of changing the status quo is too steep to get started, faux pragmatists make modest adjustments to the winds of change. The audience sometimes expresses skepticism. Benny Wong of Morgan Stanley and Asit Sen of Bank of America both asked Mark Little about the expenditures of Suncor's "a little bit more sustainability-focused" ventures. Little says Suncor is exploring the future of energy, but reassures the analysts. "Do we see massive money going into this? Certainly not."

In 2020, faux pragmatists primarily framed renewables and emission cuts as means to reduce costs. In an earnings call from Q3, ConocoPhillips outlined plans to pursue oil and gas assets with lower greenhouse gas emissions, but to reassure analysts and investors, CEO Ryan Lance added that “we’re not talking about spending hundreds of millions of dollars of capital to go deliver this.” At times, faux pragmatists welcome regulation. In a Q3 earnings call, Chevron CEO Pierre Breber said:

We support the Paris Accord, we believe the future of energy is lower carbon, [and] we expect more policy, [but] I think it gets to ... getting the balance between those worthwhile policy goals and providing affordable reliable energy that the world economies need ... no one has an open checkbook in Chevron ... we’re going to pursue the opportunities that are good for the environment [and] good for our shareholders.

2020’s low energy prices are seen as temporary and not as a window for change. In a Q1 call, Prashant Rao of Citigroup asked Suncor’s CEO if the pandemic year’s low oil price might speed up the switch to renewables. Mark Little responded:

All energy markets have taken a hit ... oil, renewables, electrical projects and such associated with it ... our commitment to returning shareholder value has not changed, the strategy of the corporation hasn’t changed.

Others, like Chevron’s Pierre Berber, noted that the outcome of 2020’s presidential election was unlikely to spur change:

Energy is essential as the economy and the world economies recover from this pandemic ... we think whichever governments in the US or in other countries the economy will be a priority coming out of this [pandemic] and we think energy will be a big part of that.

In a year of change, faux pragmatists focus on a return to normal.

As skepticism declines, faux pragmatism increases. Corporations acknowledge climate change but downplay its implications. Faux pragmatists might set emission targets and explore renewables, but the energy transition is not urgent. Is it better to do something rather than nothing? We argue that in the face of the climate crisis, it is not. By understating the climate crisis and claiming that they have done their part by doing a little, faux pragmatists contribute to structural denial and industry inertia. Faux pragmatist frames may delay change, for instance by delimiting policy to industry-acceptable actions such as technological solutions that allow for the continued use of fossil fuels (Lamb et al. 2020).

Enthusiasts - Rosy Interpretation

Enthusiasts in the oil and gas industry see climate change as a golden opportunity for market expansion, much like some real estate investors view natural disasters (Klein 2007). They highlight climate-related business initiatives not because they may mitigate climate change, which they rarely mention, but because they anticipate profit. These actors are economic elites who ignore the structural origins of climate change and engage in ideological denial to advocate for strategies that fail to address the root causes of the problem (Petersen et al. 2019). We call this type of denial rosy interpretation -- actors acknowledge climate change but gloss over its challenges and deflect its consequences.

Some enthusiasts invest in nascent markets for alternative energy products. Neste, a Finnish engineering services company, highlighted renewables projects in their earnings calls. In their 2018 Q4 earnings call, a Neste executive, Panu Kopra, said:

[We] lead the transition to renewable products ... based on a growing market demand for low-carbon solutions in transport, cities, aviation, polymers, and chemicals. [This] enables us to help more and more customers to make their business more sustainable.

In the same meeting, Neste’s dedicated renewables head, Kaisa Hietala, explained why demand for their products is unaffected by oil price fluctuations:

Our customers [are] cities, fleets, municipalities who have made a commitment to reduce the carbon footprint, and there the varying oil price is not seen as a key driver for renewables.

As noted above, analysts are often skeptical of plans that take a company away from fossil fuels. Pasi Väisänen from the Danish bank Nordea asked why Neste's margin for a particular renewables product was so high: "have you actually seen a customer complain about the price?" Neste's renewable head responded that they are currently "the only player who is really playing a global game here," adding that they are selling a new category of products. "We are not ... selling tonnes or liters. We are selling greenhouse gas reduction."

While Neste has entered a niche market that is directly tied to the push away from fossil fuels, TotalEnergies casts its net wide. Here's Alexis Vovk, the company's marketing head, in the opening statement of a 2019 earnings call:

[Our strategy is] to grow in low-carbon businesses by ... serving the growing EV charging business [and] we are taking the advantage of the development of natural gas in road transportation by building an extensive network of NGV stations in Europe ... we are also preempting the breakthrough in marine transportation that LNG is making by ... building a strong position ... on the maritime routes between Europe and Asia. Lastly we are looking at hydrogen.

TotalEnergies envisions a global low-carbon future for multiple transportation means. By diversifying their bets, a move also reflected in their recent name change, they attempt to make the future less uncertain.

By calling for regulatory intervention, incumbents justify their inaction. At the 2016 Statistical Review of World Energy, James Skinner of the New Economics Foundation rightly notes that there's "a gap in reality" between what the industry is doing "and the kind of changes will have to be made if we are going to get anywhere near" the Paris climate goals. BP's CEO Spencer Dale responds that "we need to see more policy action ... carbon pricing ... [will create] incentives [and then] the market and the business community will allocate capital." ConocoPhillips also supports regulation. During a 2017 earnings call, Meredith Block of Rockefeller & Company noted that USA's departure from the Paris Agreement "could have negative unforeseen consequences" for shareholders, as the country will be absent from global regulation negotiations. CEO Ryan Lance responded that the US should "participate in the Paris Accord. [It] is something we'll continue to support as a company." Incumbents benefit from international agreements because aligned climate commitments increase predictability and pave the way for new markets, such as the low-emissions technologies ConocoPhillips invests in.

Enthusiast frames were more prominent in 2020. Executives see renewables not just as hedges but as promising investments. In a Q2 earnings call, Thomas Adolff of Credit Suisse asked OMV CEO Rainer Steele if he believes gas should be a part of the energy transition and future regulation in Europe. Steele responds:

Yeah of course we are missing a link to natural gas the green deal ... I would like to see a bit more brave politicians, yeah supporting the initiatives that we step out of coal ... I am convinced the future of Europe is natural gas ... I can smell the potential.

Some companies set their own emission targets. In a Q4 earnings call, Eni executives announced an energy "transformation" plan, partly driven by the view that oil will "peak" in 2025, including increased renewable investments and carbon-neutral operations by 2050. In a Q3 earnings call, BP announced that it would continue to invest in "green" ventures. Preempting investor concern, they also noted that they would only invest in high-margin projects.

Enthusiasts talk about renewables and emissions, but not climate change. By decoupling newfound business opportunities in renewables and emissions from the climate crisis, they contribute to its structural denial. Enthusiasts might reduce some of their emissions and diversify their portfolios, but they fail to address that their most significant contribution to climate change is fossil-fuel production. Incumbents often justify their own inaction by calling on states to make new markets, which they can

potentially dominate. Until such opportunities arise, firms will only take limited action. Despite their enthusiasm for alternative energy markets, their initiatives remain incommensurate with the severity of the climate crisis, which they mostly fail to acknowledge.

Discussion

Executives' information disclosure and engagement with investors and analysts reproduce particular forms of denial that enable all stakeholders to evade the topic of climate change. That is, climate change is not ignored *despite* corporate transparency, but in part because of it. In a space that is ostensibly designed to foster critique and debate about corporate planning, industry actors neglect to engage with the climate crisis and related challenges, and thus they legitimize inertia. When actors in the oil and gas industry on rare occasions acknowledge climate change, they ignore, downplay, or gloss over its implications.

Time is often on the side of the deniers, as denial carries the weight of the past and becomes increasingly difficult to challenge (Zerubavel 2006; Vinitzky-Seroussi and Teeger 2010; Cohen 2013; McGoey 2012), but this is not the case in the oil and gas industry, which faces existential threats. Because organizations are more capable of innovation when they have abundant legitimacy and resources (Miner et al. 1990; Stark 2011), the best time for transformation is now. That is, the industry is running against time not only because catastrophic climate change threatens to upend human life, but also because the social conditions that support organizational change are eroding.

In a discussion about denial and inertia, it can be helpful to reflect on what acknowledgement and change would have looked like, if industry actors accepted that climate change has existential implications for energy production and consumption. Primarily, executives could have discussed their long-term plans for navigating a monumental energy transformation. They could have said: "if climate scientists are right about their forecasts, and they have been fairly accurate thus far, we need to phase out fossil fuels in the coming decades. We are planning for that future, by doing X, Y, and Z." "We expect that the destructive consequences of climate change will intensify in the next decades, and therefore, we also expect that the popular and political pressure on the oil and gas industry will increase. We are preparing for this by doing X, Y, and Z." Analysts and investors could have asked executives: "What are your plans for phasing out fossil fuels?" "You say that fossil fuel demand will continue to increase. But the consensus among climate scientists is that increased fossil fuel consumption will have destructive consequences. How do you navigate this landscape?" "In the coming decades, what portion of your business do you expect non-fossil fuels to be?" Such questions are extremely rare in our earnings calls data.

Industry actors may be perpetuating inertia because of short-termism (Foster 2002; Kenner and Heede 2021) but also because they struggle to accept their role in perpetuating climate change. Organizations sometimes fail to foresee crises due to positive biases, even when they have relevant information at hand. A prominent example is the US mortgage crisis of 2007 and 2008 (Fligstein et al. 2017). Cerulo (2006) argues that organizations that underscore and foreground only the best characteristics of their activities will skew their perspectives of quality. Under such "positive asymmetry," executives who work to strengthen their firm's position in a given industry, and the analysts and investors who assess them, are likely to overlook flaws and threats and highlight their capacities for effective change and survival. Of the discussed denial frames, rosy interpretation is probably the clearest indicator of a positive asymmetry in the oil and gas industry. Still, the others—implicatory denial, deflection, and strategic silencing—also reinforce this positive bias by failing to acknowledge sobering climate predictions and the need to change.

The patterns of denial and inertia in the oil and gas industry are peculiar, as the climate crisis is a highly *likely* event. That is, inertia is not reproduced because people struggle to imagine worst-case scenarios, which is the premise for Cerulo's theory, but because they fail to acknowledge and act upon the scientific consensus. Our findings suggest that information, even when persuasive, abundant, and congruent

(Agocs 1997), will fail to punctuate denial-based inertia if it is deeply embedded in social structures. In the oil and gas industry, denial in open meetings between stakeholders is structured by the setting, which controls communication flows aligned with the interest of corporate participants. It is also possible that networks support the public reproduction of inertia. Although this factor is beyond the scope of the present study, we observed that most questions were raised by a core group of analysts who participated frequently, some over several years, and were on a first-name basis with executives, and appeared to share a similar educational background.

Concluding Thoughts

In a period marked by natural disasters, climate agreements, fossil fuel divestments, and a widespread push for policy action, actors in the oil and gas industry talk more about emissions and renewables, but continue to deny climate change. These findings are ominous because denial becomes more rigid over time (Zerubavel 2006; Vinitzky-Seroussi and Teeger 2010; Cohen 2013; McGoe 2012), and because incumbent firms are less likely to initiate reforms when their resources and legitimacy are under threat (Miner et al. 1990; Stark 2011).

In our view, the impetus for change in the energy industry needs to come from regulation and state-incumbent alliances that sometimes drive organizational change and innovation (Miner et al. 1990; Stark 2011; Fligstein and McAdam 2012), as seen in European energy companies (Pulver 2007; Mildenberger 2020). However, as industry actors deny climate change with different frames, tactics, and behaviors, it seems likely that some will embrace external incentives more decisively than others, and the industry may diverge. One additional, unexplored avenue for change can be found in rare acknowledgments of the high stakes involved. In one of Neste's earnings calls, CEO Peter Vanacker told shareholders that one of the company's goals was "building a healthier planet for our children." In doing so, he acknowledged, ever so briefly, that climate change poses a concrete threat to the future of human life on the planet. Such comments counter the denial that pervades earnings calls. Fligstein and McAdam (2012) argue that change in industries is partly driven by people's "existential ballast," as efforts to propel any project forward depend on shared meanings and a collective sense of identity. Surely, averting catastrophic climate change qualifies as such a project. However, to say that these rare moments of clarity can, on their own, transform the industry would be a rosy interpretation of our data.

References

- Augustine, D. (2012). Good practice in corporate governance: Transparency, trust, and performance in the microfinance industry. *Business & Society*, 51(4), 659-676.
- Agocs, C. (1997). Institutionalized resistance to organizational change: Denial, inaction and repression. *Journal of Business Ethics*, 16(9), 917-931.
- Bail, C. A. (2014). The cultural environment: Measuring culture with big data. *Theory and Society*, 43(3-4), 465-482.
- Bennis, W., Goleman, D., & O'Toole, J. (2008). *Transparency: How leaders create a culture of candor..* John Wiley & Sons.
- Blei, D. M. (2012). Probabilistic topic models. *Communications of the ACM*, 55(4), 77-84.
- Brulle, R. J. (2020). Denialism: organized opposition to climate change action in the United States. Pp. 328-341 in David Konisky (Ed.) *Handbook of Environmental Policy*. Edward Elgar Publishing, Northampton MA.

Brulle, R. J., & K. M. Norgaard. (2019). "Avoiding Cultural Trauma: Climate Change and Social Inertia." *Environmental Politics* 28 (5): 886–908.

Bushee, B. J., Matsumoto, D. A., & Miller, G. S. (2003). Open versus closed conference calls: the determinants and effects of broadening access to disclosure. *Journal of accounting and economics*, 34(1-3), 149-180.

Cerulo, K. A. (2008). *Never saw it coming: Cultural challenges to envisioning the worst*. University of Chicago Press.

Cohen, S. (2013). *States of denial: Knowing about atrocities and suffering*. John Wiley & Sons.

Crawford Camiciottoli, B. (2010). Earnings calls: Exploring an emerging financial reporting genre. *Discourse & Communication*, 4(4), 343-359.

Delmas, M. A., & V. C. Burbano. (2011). "The Drivers of Greenwashing." *California Management Review* 54 (1): 64–87.

Delmestri, G., & Goodrick, E. (2016). Looking away: Denial and emotions in institutional stability and change. In *How institutions matter!* Emerald Group Publishing Limited.

DiMaggio, P., Nag, M., & Blei, D. (2013). Exploiting affinities between topic modeling and the sociological perspective on culture: Application to newspaper coverage of US government arts funding. *Poetics*, 41(6), 570-606.

DiMaggio, P. (Ed.). (2009). *The twenty-first-century firm: changing economic organization in international perspective*. Princeton University Press.

DiMaggio, P. J., & Powell, W. W. (1983). The iron cage revisited: Institutional isomorphism and collective rationality in organizational fields. *American sociological review*, 147-160.

Dunlap, R. E., & McCright, A. M. (2011). Organized climate change denial. *The Oxford handbook of climate change and society*, 1, 144-160.

Fligstein, N., & McAdam, D. (2012). *A theory of fields*. Oxford University Press.

Fligstein, N., Stuart Brundage, J., & Schultz, M. (2017). Seeing like the Fed: Culture, cognition, and framing in the failure to anticipate the financial crisis of 2008. *American Sociological Review*, 82(5), 879-909.

Foster, J. B. (2002). II. Capitalism and ecology: The nature of the contradiction. *Monthly Review*, 54(4), 6.

Freudenburg, W. R., & Alario, M. (2007). Weapons of Mass Distraction: Magicianship, Misdirection, and the Dark Side of Legitimation 1. *Sociological Forum* 22(2), 146-173.

Grant, D., & Jones, A. W. (2004). Do Manufacturers Pollute Less Under the Regulation-Through-Information Regime? What Plant-Level Data Tell Us. *The Sociological Quarterly* 45(3), 471–86.

Hannan, M. T., Pólos, L., & Carroll G. R. (2004). The Evolution of Inertia. *Industrial and Corporate Change* 13(1), 213–42.

- Hannan, M. T., & Freeman, J. (1977). The Population Ecology of Organizations. *American Journal of Sociology* 82(5), 929-964.
- Hannan, M. T., & Freeman, J. (1984). Structural Inertia and Organizational Change. *American Sociological Review* 49(2), 149-164.
- Healy, P. M., & K. G. Palepu. (2001). "Information asymmetry, corporate disclosure, and the capital markets; A review of the empirical disclosure literature." *Journal of Accounting and Economics* 31: 405-440.
- Hoffert, M. I. (2010). Farewell to fossil fuels?. *Science*, 329(5997), 1292-1294.
- Kenner, D., & R. Heede. (2021). "White Knights, or Horsemen of the Apocalypse? Prospects for Big Oil to Align Emissions with a 1.5 °C Pathway." *Energy Research & Social Science* 79: 102049.
- Ladegaard, I. (2020). Open secrecy: How police crackdowns and creative problem-solving brought illegal markets out of the shadows. *Social Forces*, 99(2), 532-559.
- Lamb, W. F., G. Mattioli, S. Levi, J. T. Roberts, S. Capstick, F. Creutzig, J. C. Minx, F. Müller-Hansen, T. Culhane, & J. K. Steinberger. (2020). "Discourses of Climate Delay." *Global Sustainability* 3: e17.
- Marshall, G. (2015). *Don't even think about it: Why our brains are wired to ignore climate change*. Bloomsbury Publishing USA.
- McGoey, L. (2012). The logic of strategic ignorance. *The British journal of sociology*, 63(3), 533-576.
- Meyer, J. W., & Rowan, B. (1977). Institutionalized organizations: Formal structure as myth and ceremony. *American journal of sociology*, 83(2), 340-363.
- Mildenberger, M. (2020). *Carbon Captured*. MIT Press.
- Miner, A., T. L. Amburgey, & T. M. Stearns. (1990). "Interorganizational Linkages and Population Dynamics: Buffering and Transformational Shields." *Administrative Science Quarterly* 35:689-713.
- Moore, S. (2018). Towards a sociology of institutional transparency: openness, deception and the problem of public trust. *Sociology*, 52(2), 416-430.
- Munck af Rosenschöld, J., Rozema, J. G., & Frye-Levine, L. A.(2014). Institutional Inertia and Climate Change: A Review of the New Institutional Literature: Institutional Inertia and Climate Change. *Wiley Interdisciplinary Reviews: Climate Change* 5,(5), 639-48..
- Nicas, Jack, et al. (2018). "Forced Out by Deadly Fires, Then Trapped in Traffic." *The New York Times*, The New York Times, 11 Nov. 2018, www.nytimes.com/2018/11/11/us/california-fire-paradise.html.
- Norgaard, K. M. (2011). *Living in denial: Climate change, emotions, and everyday life*. MIT Press.
- Overland, I. & Sovacool, B. K. (2020). The misallocation of climate research funding. *Energy Research & Social Science*, 62, 1-13.
- Petersen, B., D. Stuart, & R. Gunderson. (2019). "Reconceptualizing Climate Change Denial: Ideological Denialism Misdiagnoses Climate Change and Limits Effective Action." *Human Ecology Review* 25 (2): 117-41.

Pulver, S. (2007). Making Sense of Corporate Environmentalism: An Environmental Contestation Approach to Analyzing the Causes and Consequences of the Climate Change Policy Split in the Oil Industry. *Organization & Environment* 20(1), 44–83.

Schmidt, B. (2015). Vector space models for the digital humanities. *Ben's Bookworm Blog*. Accessed October, 25, 2015.

Stark, D. (2011). *The sense of dissonance*. Princeton University Press.

Stern, P. C., J. H. Perkins, R. E. Sparks, & R. A. Knox. (2016). “The Challenge of Climate-Change Neoskepticism.” *Science* 353 (6300): 653–54.

Supran, G., & Oreskes, N. (2017). Assessing ExxonMobil's Climate Change Communications (1977-2014). *Environmental Research Letters* 12.

Vinitzky-Seroussi, V., & Teeger, C. (2010). Unpacking the unspoken: Silence in collective memory and forgetting. *Social forces*, 88(3), 1103-1122.

Westney, D. E. (2009). Japanese enterprise faces the twenty-first century. In *The twenty-first-century firm* (pp. 105-144). Princeton University Press.

Wetts, R. (2019). “Models and Morals: Elite-Oriented and Value-Neutral Discourse Dominates American Organizations’ Framings of Climate Change.” *Social Forces*, 98(3): 1339-1369.

World Bank. (2020). State and Trends of Carbon Pricing 2020. *World Bank Group*. <https://openknowledge.worldbank.org/handle/10986/33809>

Wright, C., & Nyberg D. (2017). An Inconvenient Truth; How organizations translate climate change into business as usual. *Academy of Management Journal* 60(5),1633-1661.

Zerubavel, E. (2006). *The elephant in the room: Silence and denial in everyday life*. Oxford University Press.

Zhao, W., Chen, J. J., Perkins, R., Liu, Z., Ge, W., Ding, Y., & Zou, W. (2015). A heuristic approach to determine an appropriate number of topics in topic modeling. *BMC bioinformatics* 16(13), 1-10.

Figures and tables

Figure 1. U.S. Billion-Dollar Disasters per Year, 1980-2020. Data from National Centers for Environmental Information.

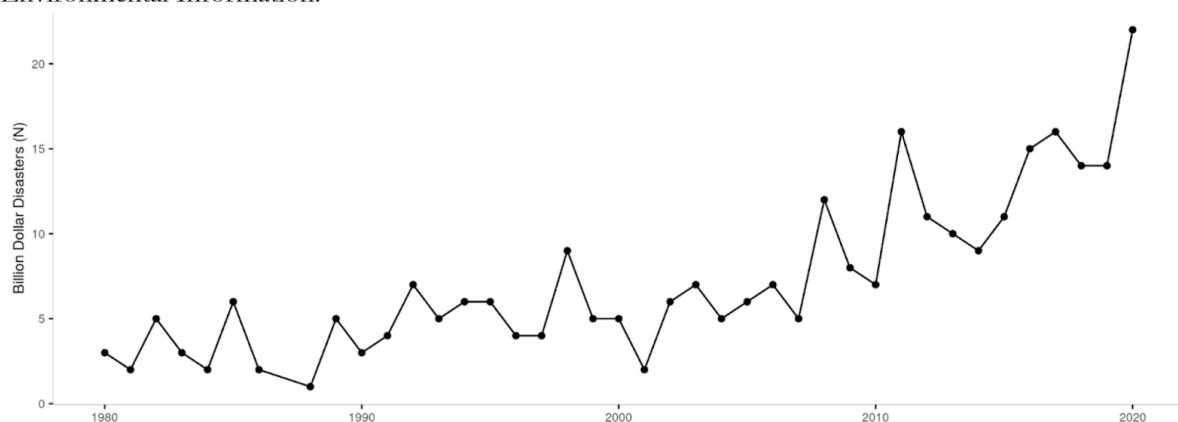
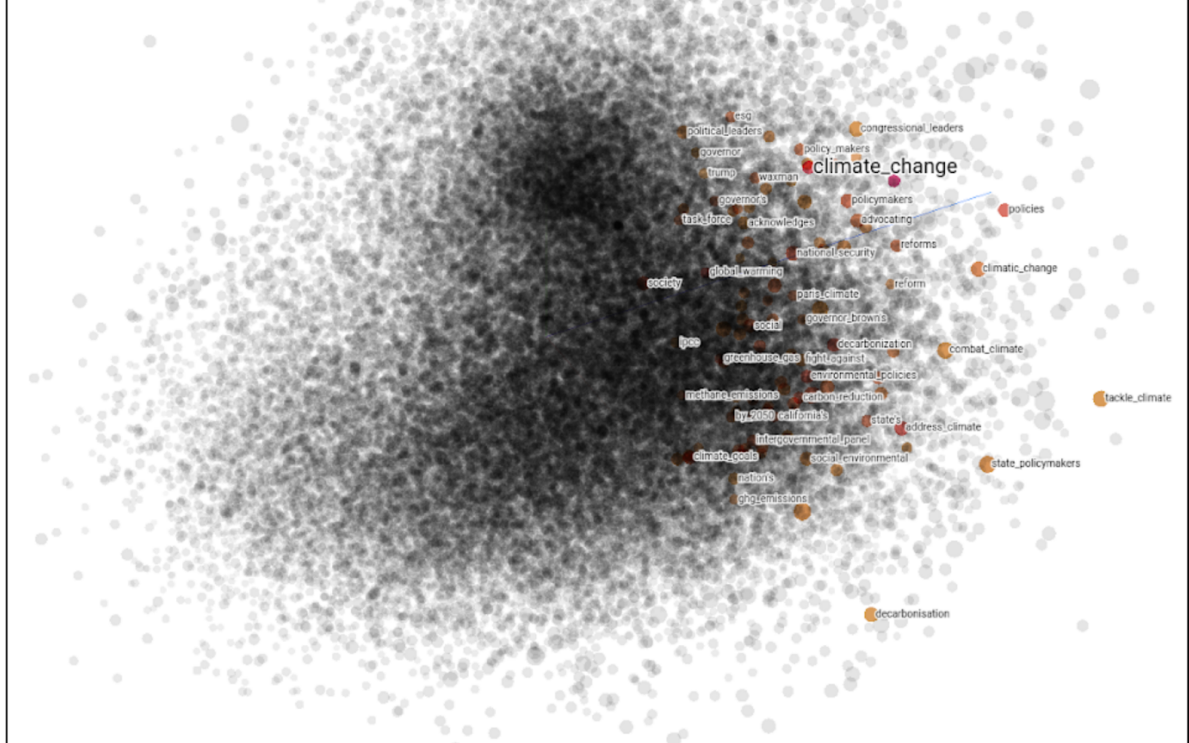
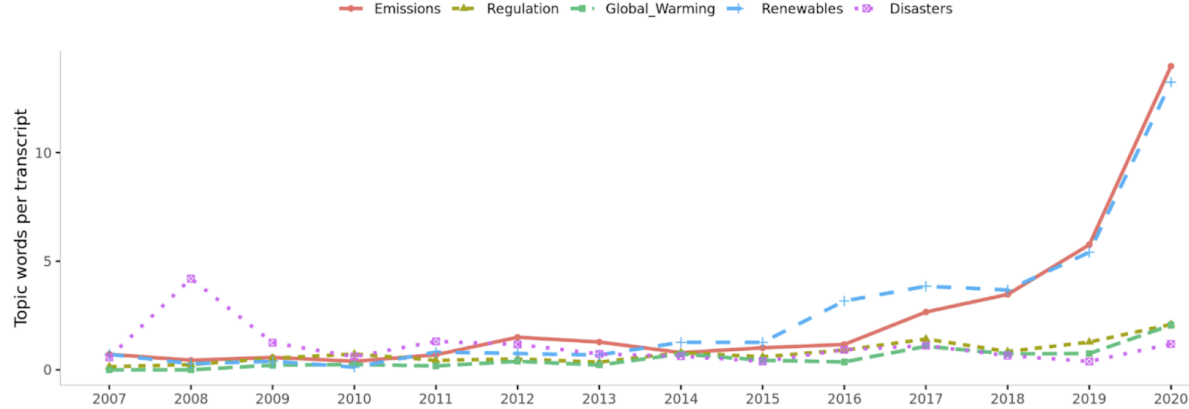


Figure 2. Transcript data projected in a three-dimensional vector space. We have highlighted the term “climate_change” and its semantic neighborhood, based on cosine scores.



Note: we include this conceptual figure not to present evidence, but to illustrate how word embeddings enable word discovery by identifying semantic neighborhoods and spatial relationships between terms of interest.

Figure 3. Topic keyword frequency in 889 earnings calls in the period 2007-2020.



Figures 4 and 5. Discussion frequency of renewables and emissions in major oil and gas firms headquartered in Europe, North America, and other countries.

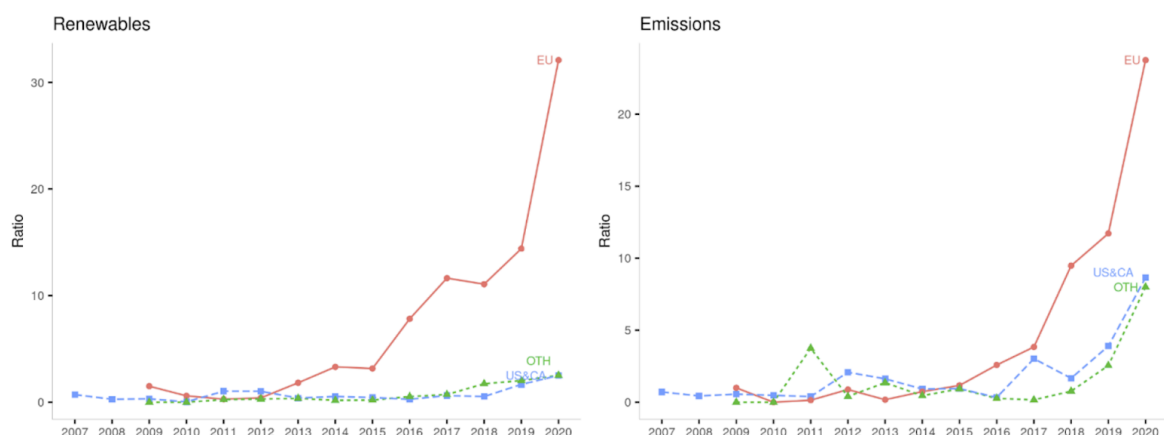


Table 1. Transcripts from US-Listed Major Oil and Gas Companies. **North American/EU Companies.**

Company Name	Transcripts	Total Word Count	Mean Word Count	SD Word Count
<i>BP</i>	80	971,130	12,139	4,887
Chevron	64	624,963	9,765	2,406
ConocoPhillips	71	717,376	10,104	4,255
<i>Ecopetrol</i>	34	291,229	8,566	1,840
<i>Eni</i>	41	332,280	8,104	2,888
ExxonMobil	67	817,997	12,209	4,812
<i>Galp Energia</i>	11	93,286	8,481	1,656
<i>Gazprom</i>	12	65,251	5,438	1,143
Hess Corporation	57	538,419	9,446	3,676
Husky Energy	39	268,596	6,887	1,940
Imperial Oil	14	133,739	9,553	1,942
<i>Lukoil</i>	14	101,998	7,286	1,225
Marathon Oil	59	503,434	8,533	2,857
Murphy Oil	55	496,431	9,026	4,218
<i>Neste Oyj</i>	24	244,681	10,195	2,436
<i>OMV AG</i>	24	198,659	8,277	2,154
<i>Repsol</i>	27	269,175	9,969	2,942
<i>Rosneft</i>	17	89,198	5,247	1,653
<i>Royal Dutch Shell</i>	41	563,885	13,753	2,930
<i>Sasol</i>	21	207,779	9,894	3,014
Suncor	54	455,273	8,431	2,999
<i>TotalEnergies</i>	27	362,052	13,409	7,461
<i>Woodside</i>	13	117,444	9,034	1,949
<i>YPF Sociedad Anonima</i>	23	226,661	9,855	2,120

Table 2. Inductive-Deductive Topic Modeling (IDTM)

1. Compile a keyword dictionary based on internal and external sources.
2. Assort keywords into meaningful topics.
3. Use machine learning to inductively discover additional topic words in the data.
4. Assess word ambiguity by reviewing words in their context. Refine topic dictionaries.
5. Do a deductive search for compiled topics.
6. Qualitatively analyze concordances (keywords in context) for validation.

Table 3. Dictionary Expansion Following IDTM Word Discovery

Emissions	Regulation	Global Warming	Renewables	Disasters
27 → 83	7 → 30	5 → 13	15 → 71	-

Table 4. Actor types, denial types, and examples.

Skeptics	Faux Pragmatists	Enthusiasts
Literal Denial, Silencing	Implicatory Denial	Rosy Interpretation, Deflection
Actors say little about climate change and related issues. Instead, they highlight other “sustainability” or “harm-reducing” issues, e.g., energy poverty and oil spills.	Actors are selectively transparent about some climate change-related information or plans, but resistant to questions on the topic.	Actors invest in new technology and industries to promote growth.
Discussion of climate change includes literal denial of scientific realities.	Executives tout diversified portfolios, but say that they are focused on conventional revenue sources.	Executives highlight non-fossil fuel activities, especially in opening and closing statements, and tie the company’s identity to non-fossil fuels.
Climate change-related policies are viewed unfavorably or reluctantly.	Environmental policies are viewed in neutral terms, as something to adapt to rather than advocate for.	Discussion of renewables deflects from the limited nature of the investment compared to fossil fuel.
Energy transitions are framed as ordinary steps in a natural, evolutionary process.	Actors discuss efforts to reduce emissions, but without changing their fossil fuel business.	The company has institutionalized the drive for renewables, e.g., by having a head of renewable energy or goals for decarbonization.
Actors doubt the efficacy of alternative energy sources.	“When you look at some of these little equity positions that we’ve taken as we explore some of these technology pieces ... our view is that the world is changing. We can be a part of this.” - Suncor, 2019.	Climate change policies are viewed as opportunities.
“If all the pledges of the Paris climate agreement were met, oil and gas would still be 46 % of the energy mix in 2040. The energy transition will take time.” - Hess, 2020.		“[We] lead the transition to renewable products ... based on a growing market demand for low-carbon solutions in transport, cities, aviation, polymers, and chemicals.” - Neste, 2018.

Table 5. Count of transcripts that include more than 10 or more than 5 climate change terms

year	transcripts (N)	> 10 cc terms	percent	> 5 cc terms	percent
2007	7	0	0%	1	14%
2008	25	5	20%	10	40%
2009	28	1	4%	6	21%
2010	33	1	3%	4	12%
2011	39	3	8%	6	15%
2012	64	4	6%	12	19%
2013	82	5	6%	11	13%
2014	67	4	6%	7	10%
2015	75	9	12%	14	19%
2016	77	8	10%	17	22%
2017	86	13	15%	26	30%
2018	102	21	21%	33	32%
2019	112	41	37%	52	46%
2020	91	54	59%	66	73%