

Oil and power industries' responses to EU emissions trading: Laggards or low-carbon leaders?

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Abstract

How have petroleum and power companies and their European industry associations responded to the EU Emissions Trading System (ETS)? Responses can be political, directed externally towards the initiation and reforms of the EU ETS itself, or internally and market-based, directed at low-carbon solutions. Proactive response strategies shape companies' leadership potential. Variation in responses is explained by two models that differ in assumptions about corporate behaviour as well as the wider multilevel regulatory context in which companies operate. Responses are found to have converged within the two industries, with reactive companies following the proactive ones. Secondly, responses between the two industries increasingly diverge, with the power industry becoming much more proactive than the petroleum industry. The main explanation is found in the differing relevance of the two models and the wider regulatory context, particularly differing exposure to international competition and weak international climate agreements.

Keywords

Climate policy, EU ETS, oil industry, power industry, corporate strategies, leadership.

Introduction

Energy industries are pivotal to achieve decarbonisation of energy supply because they are a major source of the climate change problem and because their entrepreneurship is called for in developing solutions. In 2005, the EU launched its climate policy flagship – the Emissions Trading System (EU ETS) – to spur more ambitious corporate climate strategies in these and other industries. Since then, the EU has reformed the ETS in several rounds. We analyse strategic responses of individual companies and associations representing petroleum and electric power supply industries to the evolving ETS. Based in the corporate strategy literature, we distinguish between ‘proactive’ and ‘reactive’ corporate strategies emerging from political responses to the introduction and reforms of the EU ETS, and adaptation in the market through action to reduce carbon emissions in the short and long term.

Major petroleum and power companies are important agents of change (Bach 2019 – this volume). Such actors have the capacity to act as pioneers ‘ahead of the troops’ or leaders that seek to attract followers and to exercise different types of leadership/pioneership (Lieberink and Wurzel 2017, Skjærseth 2017). Our contribution links the literature on corporate strategies to leadership by relating political responses to external leadership ambitions and market adaptation to internal leadership ambitions (Lieberink and Wurzel 2017). Actual leadership takes place if laggard companies follow the leaders to bring about more ambitious collective industry-association actions and positions. To what extent and how did corporate strategies emerge and consolidate under the evolving EU ETS, from the system’s initiation until the recent reforms for 2030? Under what conditions did the EU ETS affect the strategies and leadership of the energy companies, individually and collectively?

We explain variation in response strategies based on literature on the relationship between regulation and corporate strategies (Skjærseth and Eikeland 2013). We develop two ‘models’ based on different behavioural assumptions of how we expect companies to respond to the EU ETS. However, the EU ETS is obviously not the only factor shaping corporate strategies. To further explain and identify conditions for corporate responses, we analyse the EU ETS as a governance system related to other climate regulations (Homsy and Warner 2015). Our contribution thus also informs the debate on whether different mixes of multilevel and polycentric governance facilitate corporate leadership (Lieberink and Wurzel 2018). These ‘top-down’ and ‘bottom-up’ governance types resonate with two key EU ETS features that shape companies’ room for exercising leadership. On the one hand, the ETS is an EU-level, harmonised and mandatory cap-and-trade system for the installations/companies operating within the system. On the other hand, ETS companies have significant independence and autonomy to shape their short- and long-term strategies within the system and their respective industry branches. An underlying theme in this contribution is whether this balance between ‘bottom-up’ polycentric and ‘top-down’ multilevel types of governance is ‘right’ for leadership to emerge. We expect leadership to emerge to the extent that governance mixes trigger continuous proactive change while simultaneously providing sufficient room for independent adaptation and responses across different industries and companies.

We contribute on three fronts to the literature on the relationship between emissions trading and corporate climate strategies within a wider governance approach (e.g. Ellerman *et al.* 2010, Meckling 2011, Skjærseth and Eikeland 2013). First, we offer a new ‘model’-based approach to studying this relationship grounded in various assumptions of corporate behaviour. Second, we link the corporate strategy literature to leadership and types of governance. Third, we contribute empirically by comparing corporate responses to the EU ETS in the petroleum and electric power industries. To our knowledge, such studies have been lacking.

For the petroleum and electric power sectors, we selected two companies within each sector – ExxonMobil and Shell, and Vattenfall and RWE respectively – according to two criteria. First, differences in climate strategies prior to the EU ETS, to shed light on the regulatory conditions under which different strategies emerge and change. Second, they are major players in the oil and electricity markets, which give them leadership potential within European industry associations for the electric power and petroleum sectors – Eurelectric and Europa/Fuels Europe.

We build on multiple sources, including companies’ self-reporting, secondary information and interviews with representatives from companies and industry associations.¹ We list the interviewees at the end.

Analytical point of departure

We develop two alternative ‘models’ that will generate different expectations about ‘reactive’ and ‘proactive’ corporate response strategies to the EU ETS based on different rationality assumptions about corporate behaviour.² These strategies are ideal-typical opposite poles, and we cannot expect real-life companies engaged in a wide range of activities to fit perfectly with such opposite extremes. The aim is to assess the degree of fit between expectations and observations in the content and direction of corporate strategies from before the EU ETS was adopted. *Political response* indicates whether companies support more stringent regulation, or actively resist and oppose regulation. *Market responses* refer to compliance measures; these include carbon-abatement measures, trading to compensate for abatement, and measures to spur innovation in long-term low-carbon solutions (Kolk and Pinkse 2004, 2008).³ Corporate response strategies relate to leadership/pioneership through different degrees of internal and external ambitions (Lieberink and Wurzel 2017). High external (political) support and internal (market) ambitions allow companies to become a leader. Conversely, low internal and external ambitions make companies potential laggards.

‘Reactive’ corporate responses: potential laggards

This model sees the firm as a unitary rational profit-maximising agent that adopts its strategies on the basis of full information of the relative costs of various alternatives (Gravelle and Rees 1981, Ambec *et al.* 2011). The model is static: prior to regulation, companies would have adapted optimally in the output and input markets at levels reflecting marginal income equalling marginal costs. Any new environmental regulation, like the EU ETS, would impose net costs on the company, eroding profits and competitiveness, unless all competitors are subject to similar regulatory costs.⁴ The EU ETS will thus appear as a regulatory threat (Bohr, 2016). Politically, we expect that companies will oppose the system. Observed opposition expressed in position papers to EU ETS consultations will be in line with this expectation.⁵

As for market responses, companies will comply by adopting only low-cost incremental business-as-usual abatement options. They will base the actual choice of options on cost-ranking, in line with the least-cost compliance principle.⁶ Contrary behaviour would be illogical within this model where full-information profit-maximising companies have already discovered all the ‘low-hanging fruits’ and taken advantage of those opportunities before regulation was put into place (Ambec *et al.* 2011). We expect business-as-usual activities in the short term, and weak focus on new low-carbon innovation for the longer term. Observation of only short-term compliance measures and minor engagement in long-term low-carbon solutions and R&D will support this model.

Table 1. ‘Reactive’ corporate response model

Key external explanatory factor	Behavioural assumption	Wider economic, social and political context	Expected response to ETS
Mandatory regulation	Rationality and profit maximisation: minimisation of new regulatory costs	Irrelevant for explaining (change in) strategic decisions	Reactive strategy: Political opposition and only low-cost market adaptation. Potential laggard.

‘Proactive’ corporate responses: potential leaders

This alternative model sees the firm as only boundedly rational (Cyert and Marsh 1963). Companies strive for profits, but are unable to make optimal choices – because of market failures, organisational inertia, and managers being constrained in information and in cognitive capacity for making explicit and timely calculations of optimality (Simon 1976, Cyert and Marsh 1963). Instead, companies base their decisions on sequential attention, risk averseness, and standard operating procedures, habits and routines (Cyert and Marsh 1963).

Based on such assumptions, Porter and van der Linde (1995) hypothesised a different view of the relationship between regulation and corporate strategies. They suggested that appropriate environmental regulation could generate new attention of companies to earlier non-apprehended opportunities, spur learning about resource inefficiencies and technological improvements, reduce uncertainty about future investments, create pressures to motivate innovation offsetting compliance costs, and in fact strengthen the international competitiveness of regulated companies. This model would predict political support for the ETS, since companies should rapidly discover and focus on new business opportunities. Dynamically, we expect the discovery of new opportunities to increase political support over time for a stringent EU ETS. Support for an increasingly stringent ETS expressed in position papers will be in line with this expectation.

As to market response, the model predicts that companies will start searching for new market opportunities beyond business-as-usual, in order to create early-mover advantages. We can expect incremental innovation (short-term abatement measures beyond what is needed for compliance) and long-term R&D directed at *new* large-scale innovation, since company management has re-directed attention toward opportunities previously unheeded. Observations of beyond compliance abatement measures and upscaling of engagement in new long term low carbon solutions and R&D investments will fit proactive market responses.

Table 2. ‘Proactive’ corporate response model

Key external explanatory factors	Behavioural assumption	Wider economic, social and political context	Expected response to ETS
Mandatory regulation	Bounded rationality: myopic attention and search for new market opportunities	Dynamic competition relevant for explaining (change in) strategic decisions	Proactive strategy: Support of increasingly stringent regulation and new low carbon market

			opportunities found and acted upon. Potential leader.
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Factors conditioning corporate ‘proactive’ responses

The models above predict similar responses by all companies that the EU ETS regulates. In a real-world situation, however, both company-internal and external factors may condition such responses. Space constraints do not permit full empirical examination here of company-internal factors, such as variation in organisational structures, management and capability to act on changes in the external environment (Teece 2007, Kolk and Pinkse 2008). Moreover, we limit our discussion to the ‘proactive’ response model that corresponds with potential leadership, specifically addressed in this volume.

Firstly, companies and sectors differed in carbon-intensities of technologies inherited from before the EU ETS was adopted, entailing that the regulatory costs from the EU ETS would differ between companies. The EU ETS would accordingly be more stringent for carbon-intensive companies. Porter and van der Linde (1995) added ‘stringency’ of the regulation as a conditioning factor for spurring companies to start focusing on long-term learning and innovation. We would expect to see more ‘proactive’ responses in companies facing the highest regulatory costs from the EU ETS: highly carbon-intensive companies that faced allowance deficits and had to pay for allowances.

Secondly, the regulatory risks of the ETS could differ across companies and sectors, due to differences in international trade- and competition-intensities. Porter and van der Linde (1995) formulated such regulatory risks as other conditioning factors for environmental regulations to spur the search for early-mover advantages and innovation – implying that a regulation should be developed in line with or just slightly ahead of other countries. This means that we will not expect trade-intensive companies exposed to competition from outside the EU ETS area to respond proactively unless they expect other countries to follow up with similarly stringent climate regulation. By contrast, we can expect ‘proactive’ responses from companies that are not exposed to international competition. This factor directs attention to the alignment between the EU ETS and international climate agreements.

Porter and van der Linde (1995) also added another conditioning factor for a regulation to spur competitive advantage through innovation: that it should be aligned with other regulatory measures so as to create synergy rather than confusing regulatory signals. Variation in response between sectors and companies may be expected, depending on whether other sector-specific EU and national regulations send regulatory signals consistent with those of the EU ETS.

Summing up, we expect the EU ETS to shape proactive strategies when carbon-intensive companies can be depicted as boundedly rational actors and are exposed to a regulatory framework that is stringent, aligned with other relevant policies at EU and national levels, and promotes a level playing-field internationally. Proactive strategies characterised by high external (political) and internal (market) ambitions may result in actual leadership to the extent that laggards follow, and allow more ambitious collective positions and action by industry-associations. We based these expectations related to the ‘proactive’ model on the assumption that the regulatory design of different governance types matter for leadership to emerge.

Responses to the EU ETS

EU ETS reforms

We explore individual corporate and collective industry responses in three ETS phases demarcated by reforms to the system: initial responses to the establishment of the ETS; responses to the 2008 revision; early responses to the revision initiated in 2015.

From its inception in the late 1990s, the EU ETS has evolved with the formal adoption of the EU ETS Directive in 2003 and launch of the carbon market in 2005 (Skjærseth and Wettestad 2008). The EU significantly revised the system in 2008 for 2013–2020, and from 2015 for 2021–2030 (Skjærseth and Wettestad, 2010). A contested design issue was how to set the cap that determined the stringency of the system in terms of emissions reduction. Initially, member states demanded national control over allocation. In 2008 they accepted centralised allocation, with the EU-level cap set to ensure reduction in emissions by 2020. Also contested through all phases was the method of allocation: free allowances, or auctioning. Member states gradually accepted more auctioning for the period 2013–2020, with mandatory auctioning for power companies as the main rule and a gradual phase-in for energy-intensive industries exposed to international competition, including petroleum companies.⁷ Reforms from 2015 for 2021–2030 have also triggered a conflict regarding how to counter the considerable build-up of surplus allowances (European Commission, 2015).

The reformed ETS from 2008 formed part of a larger EU climate and energy package that included binding policies on sectors not covered by the ETS, renewables, carbon capture and storage (CCS), energy efficiency, fuel quality and car emissions (Skjærseth *et al.* 2016). Together, these policies aim at reducing emissions and increasing energy efficiency and the share of renewables in primary energy consumption by 20% by 2020. For 2030, emissions within the EU are to be reduced by at least 40% compared to 1990 levels. The long-term EU vision is an 80–95% reduction of emissions by 2050.

Initial corporate responses

Initial responses to the EU ETS varied significantly between companies in the power and petroleum industries. Within the electric power industry, Vattenfall, which had mainly operated non-fossil energy plants in its home market Sweden (hydropower and nuclear), became a major operator of coal power on the continent. RWE, which originated as the main operator of coal-based power in Germany, became more diversified, particularly after acquisitions of natural gas. Although the two companies became more similar in their carbon-intensities in the market, clear differences existed in how they viewed the climate change problem and their strategic role in dealing with it. *Time* magazine hailed Vattenfall's CEO for his leading role in spurring global political action (Eikeland 2013, p. 5-7). In 2001, Vattenfall became the first power company in Europe to adopt a long-term strategy for developing CCS to make its coal-powered plants carbon-neutral. RWE pursued a far more reluctant climate strategy, acknowledging the climate problem but emphasising the scientific uncertainties (Eikeland 2013, p. 61). The variation between the two companies became evident in their differing political *responses* to the emerging EU ETS: Vattenfall proactively supported the initiation of the ETS, whereas RWE was strongly opposed (Eikeland 2013, RWE 2001, p. 31).

Petroleum companies with significant and comparable operations in Europe also displayed highly differing climate strategies when the EU ETS was initiated (Skjærseth 2013). Shell acknowledged the problem and supported the Kyoto Protocol; it had pioneered company

internal emissions trading and adopted GHG emissions targets and measures with significant long-term implications for mode of operation and business orientation. Conversely, ExxonMobil saw the problem merely as a ‘legitimate concern’; it opposed the Kyoto Protocol and had not adopted GHG emissions targets and measures (Skjærseth and Skodvin 2003, Skjærseth 2003). This variation continued with highly differing political responses to the initiation of the EU ETS. Shell proactively supported the idea, whereas ExxonMobil lobbied actively against the initiation of the EU ETS (Skjærseth 2013).

Significant differences appeared also in the political responses from European industry associations. Europia (now FuelsEurope) accepted the EU ETS only reluctantly, as a non-mandatory pilot for a larger global system (Skjærseth 2013). Eurelectric’s response evolved from early scepticism to becoming largely positive towards a mandatory system (Eurelectric 2002, Eikeland 2013). Eurelectric’s support increased after association-initiated allowance trade simulations showed that the power industry could gain from the EU ETS spurring higher power prices. These results also dampened RWE’s opposition to the EU ETS (RWE 2003, p. 23).

Once the EU launched the ETS in 2005, *market responses* varied, with electric power companies generally implementing abatement measures more far-reaching in scope and scale than petroleum companies and what they needed for short-term compliance (Eikeland and Skjærseth 2013). Both sectors implemented many typical no-regret solutions (energy efficiency), low-cost solutions (buying allowances) and measures demanded by the ETS (monitoring, reporting and verification) as well as establishing new trading desks. The companies in both sectors increased their R&D focus on developing and demonstrating CCS technology. For the electric power companies, this signified a *new* technology field. For petroleum companies, upscaled activities represented deeper involvement in a technology already familiar to them, with CO₂ captured and injected as compressed gas to increase production from mature oil fields.

Within both industries, we find a clear trend whereby companies converge in market responses, in the sense that those lagging behind in GHG-mitigation efforts caught up with the companies that had pioneered such efforts. In the power industry, we can see this with both RWE and Vattenfall increasing their investments in developing CCS technology, renewable energy and other low-carbon solutions year-on-year after the ETS started up (Eikeland 2013).

Shell and Exxon likewise demonstrated convergence in scaling up activities that had been part of their business since long before the EU ETS: energy-efficiency efforts and investments in CCS. Exxon in particular reported good achievements in energy efficiency, and set targets for reducing emissions from flaring. A notable change appeared: Exxon now took a softer position on climate policy. In 2007, Exxon acknowledged responsibility in helping to alleviate the climate problem and halted its funding of several anti-climate lobby groups. It also accepted carbon pricing by international taxation, but not cap-and-trade (Exxon Citizen Report 2007, Skjærseth 2013, p.112).

We find that the introduction of the first mandatory European climate regulation – the EU ETS – apparently did affect corporate strategies. The direction of strategic responses did initially fit well with ‘reactive’ laggards (Exxon, RWE) and ‘proactive’ potential leaders (Vattenfall, Shell) with higher internal and external ambitions. Strategies converged over time with the reactive catching up with the more proactive companies.

Responses to the 2008 reform

The 2008 EU ETS reforms triggered new political responses. In its position paper on the ETS revision proposal, Europa for the first time explicitly accepted the ETS in light of concerns about climate change (Europa 2008). Exxon still opposed emissions trading, but its softer stance on climate policy increased the leverage of pro-ETS companies like Shell to shape the association's position. This said, Shell and Exxon, as well as Europa, lobbied fiercely against more stringent regulation of the petroleum companies (Europa 2010a). The Commission proposed to treat oil refining on a par with other energy-supply activities and to subject it to full auctioning (European Commission 2006). The petroleum sector prevailed, gaining recognition as an 'energy-intensive sector' to be allocated free allowances based on benchmarks from 2013. By contrast, Vattenfall, RWE and Eurelectric now supported full auctioning of allowances for the electric power industry (Eurelectric July 2007, Skjærseth and Eikeland 2013).

We must view the initial post-2008 *market* responses in light of carbon prices that rose to nearly EUR 30/tonne. In 2009, 61 CEOs of the major European electric power companies, including RWE and Vattenfall, signed an industry declaration on de-carbonising electricity supply in Europe by 2050 (Eurelectric 2009a). This followed a Eurelectric-initiated scenario study indicating that the costs of achieving carbon-neutral electricity supply would be nearly offset by saved allowance payments and revenues from higher electricity tariffs under the EU ETS (Eurelectric 2009b). Both Vattenfall and RWE continued converging in more proactive market responses: setting quantitative short- and long-term GHG emissions-reduction goals, increasing R&D in low-carbon solutions, greater pace in investments in renewables, signalling more investments in natural gas-based power and an end to new coal investments (Eikeland 2013, p. 65).

Beyond this, the petroleum companies adapted by refreshing R&D in low-carbon solutions such as CCS and advanced biofuels for transport, and brushing up on low-carbon energy future scenario planning. Shell continued preparing for an alternative long-term future by incorporating expected costs of CO₂ emissions into its financial planning of, and decisions on, major projects. Climate policy also gained a more prominent place in Exxon's Outlook for Energy, including expected carbon prices (ExxonMobil 2010, Coll 2011).

After carbon prices plunged from around 2009, we observe growing differences between the industries in market adaptation activities. However, one change is shared among all companies in both industries: the cancellation of planned large-scale CCS demonstration projects (Skjærseth *et al.* 2016).

The electric power industry experienced massive increases in investments in renewable energy fuelled by national subsidies: both Vattenfall and RWE carried out strategic shifts and major restructuring to accommodate stepped-up investments (Vattenfall 2015, *Handelsblatt Global* 2016). Most electric power companies, including Vattenfall and RWE, also signed a new Eurelectric-organised agreement promising no new coal plants in Europe after 2020 (*Guardian* 2017). For their part, petroleum companies have been painting a gloomy picture of future opportunities for the European refining industry because of the decreasing demand for petroleum products and reduced refinery margins (Europa 2010a, Skjærseth 2013). They perceived that a combination of factors caused this trend: costs of the EU ETS, tighter fuel specifications, restrictions on car emissions, and support for non-fossil fuels.

New political initiatives for fixing the EU ETS to counter falling carbon prices came in 2012 with the Commission's proposal to postpone or 'backload' auctioning of 900 million

allowances, spurring new political responses by companies and industry associations. Europaia and Exxon now joined with a range of other associations representing energy-intensive industries in strong opposition, claiming this would increase the costs for the industries. Shell supported backloading, emphasising that higher carbon prices would increase the funding available from the set-aside of auctioning revenues from the ETS specified for development of CCS and innovative renewable energy technologies (NER300 programme).

Eurelectric, unlike Europaia, strongly supported backloading and other more permanent structural measures as necessary for the EU to signal commitment to a strong ETS (Eurelectric January 2013). Vattenfall gave firm support to backloading, but RWE was reluctant, arguing that the measure was unnecessary because the cap would ensure GHG emissions reductions even without the price signal (Vattenfall 2013, RWE 2013).

Despite such company differences, we find a clear trend of growing difference in responses between the two industry associations. Eurelectric increasingly lobbied for making the ETS more stringent, in line with the preferences of Vattenfall and other leading member-companies adapting most proactively in the market. Europaia lobbied to keep the ETS lenient, compromising between the preferences of the ‘leading’ and ‘lagging’ member companies supporting and opposing the system.

Differences have also been reaffirmed recently in the negotiations on the revised EU ETS for 2021–2030. The main part of this reform has dealt with imbalances between supply and demand of allowances, with the aim of raising the carbon price. A more stringent cap and measures to withdraw surplus allowances from the carbon market have responded to this challenge.⁸

Political responses to these reforms by FuelsEurope (previously Europaia) reaffirm that the oil industry operating in Europe accepts the ETS as the EU’s main climate-policy instrument, to be kept as lenient as possible (FuelsEurope 2014, 2015). ExxonMobil still opposes cap-and-trade, characterising it as unnecessarily costly, complex and ineffective (Tillerson 2010, CDP 2015). Nevertheless, Exxon supported the Paris Agreement and has urged President Trump not to withdraw US participation (*Financial Times* 2017).⁹ In contrast, Vattenfall, RWE and Eurelectric have supported a stringent EU ETS for 2030 as a cornerstone of the EU’s energy and climate policy (Eurelectric May 2016). For example, Eurelectric acknowledges that the EU 40% target for 2030 is in the lower end for achieving decarbonisation by 2050 and has supported a stringent ETS cap and measures to deal with allowance surplus and bring carbon prices up (Eurelectric May 2016).

The upshot is that the petroleum and power companies and their industry associations have responded increasingly divergently to ETS reforms. The petroleum industry has declared high EU ETS allowance prices based on a stringent system to be a threat to surviving in Europe. This indicates that actual leadership towards high climate ambitions has not emanated within Europaia. Conversely, the electric power industry association has reached the opposite conclusion: higher ETS allowance prices based on a stringent system is a preferred option for securing remuneration of past investments and incentivising new low-carbon investments in the future. This indicates that actual leadership that laggards follow has occurred in the case of Eurelectric.

Summing up observed strategic responses

The first observation is that political and market responses, while mixed, have been converging between companies within the same industry, with ‘reactive companies’ catching up with the most ‘proactive’ ones to different degrees. The second observation is one of increasingly diverging political responses from the industry associations. Europaia came to accept the EU ETS but lobbied against reforms that would make the system more stringent, whereas Eurelectric has increasingly supported reforms that would make the system more stringent. In essence, corporate climate strategies within the sectors have become more similar, whereas differences between the petroleum and electric power industries have increased.

Explaining responses

Our analysis starts from two ‘reactive’ and ‘proactive’ responses models that depict corporate behaviour differently, thus providing alternative expectations for corporate responses to the EU ETS, and potential leadership. Some elements of the responses observed across all companies correspond well with what we could expect from companies portrayed by the first ‘reactive’ corporate responses model ‘as minimisers of regulatory costs’, already fully informed and optimally adapted. This includes cases where companies have opposed the EU ETS or specific design elements and have implemented typical low-cost and no-regret solutions, such as energy-efficiency. Moreover, Exxon’s opposition to cap-and-trade and Europaia’s sustained political reluctance towards making the system more stringent correspond to expectations from this model.

In contrast, we can better explain Eurelectric’s proactive political response, and even more so, the power companies’ dynamic development of external climate ambitions, toward supporting greater stringency in the EU ETS by the alternative ‘proactive’ corporate responses model. This model portrays companies as only ‘boundedly rational’, leaving them with the potential to discover new commercial opportunities from attention triggered by regulation, such as the EU ETS. This shows that the ETS may stimulate leadership characterised by high climate ambitions. The ETS spurred Eurelectric to conduct industrial joint trade simulations that generated collective learning about new income opportunities stemming from higher electricity prices (Skjærseth and Eikeland 2013).

After the ETS was up and running, we observe upscaling of R&D and long-term innovation efforts for low-carbon solutions particularly in the power industry, corresponding with expectations from the dynamic ‘proactive responses’ model. The Eurelectric-conducted joint scenario projects showing opportunities for industry expansion in a low-carbon future were important. Recognition that these opportunities could disappear if the ETS broke down triggered political acceptance of mandatory auctioning when the system was up for reform in 2008. This model thus explains also Eurelectric’s growing support of a more stringent ETS. Eurelectric justified its support by citing the importance of a market signal to sustain attention to future low-carbon solutions.

Even the more temporary supportive position of ExxonMobil and Europaia are explicable by the ‘proactive responses’ model, as major oil companies saw opportunities for developing low-carbon solutions like CCS, for which auctioning revenues were set aside under the 2008 reform.

Thus, we see that both ‘cost minimisation’ and ‘new market opportunities’ responses have shaped different *elements* of the companies’ and industry associations strategies over time.

This implies first that EU ETS has had mixed effects on pre-existing proactive and reactive corporate strategies through two different behavioural mechanisms. Second, it implies that the two behavioural models are insufficient to fully explain the increasingly divergent responses by the oil and power industries.

Factors conditioning proactive responses

We can better explain some additional variation in responses by accounting for factors at different governance levels, held to condition responses under the ‘proactive response model’. We observed that, despite stimulating new attention and efforts towards developing long-term low-carbon solutions across industries and companies, we recorded the most extensive proactive learning and innovation responses in the electric power industry where internal and external climate ambitions increased.

First, for an environmental policy instrument to trigger new attention and learning, and thus the emergence of climate leaders, it should be ‘stringent’. All four companies were highly carbon intensive (coal, oil, gas) and potentially vulnerable to stringent climate regulation. However, the power industry became exposed to significantly more stringent regulation than the oil industry. After the ETS came about, most electric power companies emerged with a deficit of allowances compared to actual emissions, whereas petroleum companies came out roughly in balance (Skjærseth and Eikeland 2013). For the second trading period, the ETS was made more stringent for the electric power industry (partly auctioning) and even more so for the third trading period (full auctioning). In contrast, continued free allowances provided less stringent pressure on the petroleum industry. As expected, increasingly stringent regulation for the power companies correspond with increasingly ‘proactive’ strategies.

Secondly, adding regulatory market risk as a conditional factor could help further explain the variation in response between the petroleum and electric power companies and industries, and in particular the trend of diverging political responses between the industry trade associations. Some initial market risk (regulation slightly ahead of competitors) would be necessary to trigger attention and development of new opportunities in companies – but sustained differences in regulatory costs and market risks could also create competitive disadvantage, thus backfiring on strategic response. The electric power industry was not exposed to risk from international competition due to very low transmission capacity in and out of the EU area. The petroleum industry was more exposed, as trade in and out of the EU was growing because of the mismatch between production and consumption of petrol versus diesel.

The 2009 Copenhagen climate negotiations could have led to a reduction in such market risks, with other nations committing to more stringent climate policies, including carbon pricing. However, the failure of the Copenhagen talks and the establishment of a federal US cap-and-trade system may help to explain the opposition of the petroleum industry to making the ETS more stringent in later reforms. In fact, European energy-intensive industries reacted to Copenhagen by voicing fears that the EU could become a permanent lone-mover in climate policy (rather than a leader that would be followed by others), which would rob the industries of potential early-mover advantages. The extent to which the 2015 Paris Agreement will level the playing field remains to be seen. Difference in regulatory market risk has prevailed and it adds to our understanding of diverging responses. As this difference between the power and petroleum industries has remained roughly constant over time, low market risk has interacted with increasing ‘stringency’ and shaped more proactive strategies and leadership potential in the power industry.

A third conditioning factor was that environmental regulations should be co-ordinated at various governance levels to provide synergies with the EU ETS. Inconsistent regulations have affected all companies and both sectors. At a general level and in addition to failed international action, all four companies and the two industry associations are exposed – indirectly or directly - to roughly the same inconsistencies in EU climate- and energy policies. One example is that other EU energy and climate policies (energy efficiency and renewable energy policies specifically) contributed to depress already falling allowance prices, counteracting the intended effects of the EU ETS (Skjærseth and Eikeland 2013). Another example was carbon storage policies adopted at the national level that led petroleum and electric power companies alike to cancel planned large-scale demonstration projects. Such CCS-technology deployment problems are particularly unsettling for petroleum companies, since their core product – fossil fuels – makes CCS or equivalent technologies the only viable option currently available for decarbonisation. The electric power industry, by contrast, has more flexibility in decarbonisation, since its core product – electricity – is an energy carrier, not a specific primary fuel. These observations indicate that companies’ flexibility to cope with inconsistencies appears more important than inconsistent regulation for explaining increasing divergence and leadership potential.

The latter point also draws attention to internal corporate factors, to which we have not given much attention in our contribution. We could better explain different response strategies within the same sectors, such as between Shell and ExxonMobil, by including management and capability to act on changes. Still, we can offer a cautious conclusion as to the conditions affecting corporate response strategies. The positive impact of regulation on proactive strategies and potential leadership is likely to increase when it is ‘stringent’ and not too far ahead of other countries, to avoid competitive disadvantages for companies exposed to international competition. Low regulatory market risk and high regulatory stringency seems to interact in promoting proactive strategies and leadership.

Conclusions

Our first question was directed at assessing change in corporate response strategies from when the ETS was initiated until the recent reforms for 2030. We examined how the response strategies of major energy companies evolved and aggregated as collective positions in industry associations. Within both the petroleum and electric power industries, our first conclusion is that political responses to the EU ETS converged as the regulation evolved. This was to varying degrees followed in the market by implementation of low-carbon solutions for the short and long-term. In essence, the EU ETS as the first EU climate regulation to affect energy companies was instrumental in getting the more ‘reactive’ companies to follow the more ‘proactive’ ones in support of regulation and adaptation in the market.

Our second conclusion concerns different and increasingly divergent responses to the evolving ETS between the petroleum and electric power industries. Both industry associations accepted the initiation of the EU ETS, with Eurelectric more supportive than Europaia. Europaia maintained its acceptance of the regulation but consistently opposed making it more stringent, followed by growing concerns about competitiveness and carbon leakage. We have seen how the power companies strengthened their internal and external climate ambitions and that Eurelectric became increasingly supportive of a stringent EU ETS, followed by radical market ambitions aimed at decarbonising power supply in Europe. This observation indicates that the ETS helped spur actual leadership within the power industry by which the laggards followed, here illustrated by RWE and Vattenfall.

Our second question aimed at explaining variation in responses. We began with two ‘models’ of corporate behaviour. Here our main conclusion is that both models – the ‘reactive’ response model based on minimisation of regulatory costs and the ‘proactive’ response model based on short-sighted myopic attention and search for new market opportunities – explain different elements of corporate responses in different phases. However, the dynamic ‘proactive’ response model best represents how the ETS gradually triggered new lines of attention, learning and innovation in the electric power industry.

The extent to which the EU ETS triggered proactive responses and potential leadership has been conditioned by the wider set of regulations at different levels of governance. As to ‘stringency’ connected to the instrument itself, the ETS still deviates from this condition, although the 2008 revision brought the electric power industry closer to such an ideal regulatory situation, corresponding with the increase in proactive behaviour. This shows that cap-and-trade has significant potential to spur leadership when it is sufficiently stringent. The EU has not achieved full alignment between policies at the EU and national levels, as seen in national regulation of CCS deployment. Finally, the failure of the 2009 Copenhagen climate conference to get other countries to commit to set GHG emissions reduction goals led European industries to ask whether the EU ETS would bring permanent regulatory disadvantages rather than early-mover advantages. Differing exposure to international competition in the absence of international climate regulation is probably the most important factor that has conditioned differing responses in the petroleum and electric power industries. Unlike the petroleum industry, the electric power industry is not exposed to competition beyond Europe. The Paris Agreement *may* level the playing field for the petroleum industry in the long run. Exxon Mobil’s support of Paris appears promising in this regard.

The focus on the dynamic interaction between the EU ETS and corporate response strategies has also taken us a step towards understanding how climate leadership may be realised through the ability of industry-level associations to spur collective learning about opportunities and to decide on collective response strategies. There are various avenues for improving knowledge about corporate strategies and leadership. In terms of theory, our approach could be expanded to explore internal company factors more systematically and how individual and societal norms may affect corporate strategies. Empirically, more studies of corporate actors in different industries are needed, because private-sector companies will be the key transformation agents in dealing with the long-term challenge of climate change. In particular, we need a better understanding of how industry-level associations aggregate and integrate corporate strategies, and their roles in exercising leadership.

The conclusions indicate first that the ‘proactive’ response model – emphasizing the ‘stringency’ of public regulation – is mostly compatible with multilevel governance that assumes a strong role for governing authorities. Second, the balance between ‘top-down’ multilevel regulation and ‘bottom-up’ polycentric autonomy also seems to matter for companies’ strategies and leadership to emerge. Specifically, our contribution shows how the EU ETS has enabled leadership in the power industry. In this industry, increasing ‘stringency’ imposed from the ‘top’ combined with wide room for companies to choose their own response strategies have triggered proactive strategies and leadership among many corporate actors. Finally, the study has shown that the effect of governance systems on corporate strategies and leadership is conditioned by specific individual and collective actor characteristics. Low exposure to international competition and high flexibility to decarbonise has interacted positively with increasing regulatory ‘stringency’ and independence for companies to shape their own response strategies. This interaction led to increasingly proactive strategies and leadership in the power industry.

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Interviews

Chris Beddoes, European Petroleum Industry Association, Europa (15 September 2011, personal).

David Hone, Shell Climate Change Advisor (29 June 2011, phone).

Hans van der Loo, Head European Union Liaison, Shell International (13 April 2011, personal).

Ingvild Skare, Environmental Advisor, ExxonMobil Exploration and Production Norway AS (2 March 2011, phone).

Norbert Herlakian, ExxonMobil, R&S Climate Change Advisor, EMEA Biofuels Venture Mgr. Brussels (12 April 2011, personal).

Jesse Scott, Head of Unit Environment & Sustainable Development Policy, Eurelectric (26 April 2012, personal).

John Scowcroft, Head of Unit Environment and Sustainable Development, Eurelectric (17 November 2010, personal).

Susanne Nies, Head of Unit Energy Policy & Generation, Eurelectric (23 April 2012, personal)

Trym Edvardson, Environmental Discipline Specialist, Shell Upstream International Europe (22 February 2011, phone).

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¹ We have used interviews as background information.

² The EU ETS is a mandatory system that will entail costs for all installations/companies included compared to a situation without the EU ETS. We therefore rule out ‘indifference’ and assume that all actors will respond in one way or another.

³ A more drastic response would be relocating production to other countries with less stringent climate policies.

⁴ For the EU ETS, the cap on emissions and price on CO₂ will charge a company for previous free production of by-products and add administrative costs, diverting capital away from other investments.

⁵ Space does not permit a systematic analysis of lobby activities over time.

⁶ Non-compliance is not considered a relevant choice, as penalties were set significantly higher than the market price for allowances.

⁷ The EU introduced a special benchmark regime: free allowances for the most energy-efficient installations.

⁸ The EU adopted the Market Stability Reserve in 2015, aimed at creating a better balance between supply and demand of allowances and improving resilience to economic fluctuations/shocks. The revised ETS Directive also introduced a gradual ‘invalidation’ of surplus allowances from 2024, opportunities for unilateral cancellation of allowances and a more stringent cap of emissions (2.2 % annual linear reduction factor as against the current 1.74 %).

⁹ The company argues that Paris is good for gas and business. In 2010, Exxon merged with the US-based XTO Energy, becoming one of the largest gas producers in the world.