UNIVERSITY OF CAMBRIDGE | Energy Policy Research Group

Climate targets, executive compensation, and corporate strategy

EPRG Working Paper 2029

Cambridge Working Paper in Economics 2098

Robert A. Ritz

Abstract Since the 2015 Paris Agreement, climate change – and wider environmental, social and governance (ESG) issues – have risen to board-level on the corporate agenda. Under increasing pressure from institutional investors, companies are reformulating their strategies for a climate-constrained world. A novel aspect of the emerging corporate response is that executive compensation is being linked to climate targets. At the world's largest energy companies, climate metrics now make up 8% of CEO's short-term incentive plans. This paper explains the case for corporate climate action, summarizes the use to date of climate-linked management incentives, and presents a framework for understanding their benefits and design challenges.

Keywords Balanced scorecard, corporate climate action, corporate strategy, ESG, executive compensation, management incentives

JEL Classification L21 (firm objectives), M12 (executive compensation), Q54 (climate change)

Contact Robert Ritz (r.ritz@jbs.cam.ac.uk)
Publication October 2020

Climate targets, executive compensation, and corporate strategy

Robert A. Ritz[1]
Energy Policy Research Group
Judge Business School
University of Cambridge

This version: October 2020

Abstract

Since the 2015 Paris Agreement, climate change—and wider environmental, social and governance (ESG) issues—have risen to board-level on the corporate agenda. Under increasing pressure from institutional investors, companies are reformulating their strategies for a climate-constrained world. A novel aspect of the emerging corporate response is that executive compensation is being linked to climate targets. At the world's largest energy companies, climate metrics now make up 8% of CEO's short-term incentive plans. This paper explains the case for corporate climate action, summarizes the use to date of climate-linked management incentives, and presents a framework for understanding their benefits and design challenges.

Keywords: Balanced scorecard, corporate climate action, corporate strategy, ESG, executive compensation, management incentives

JEL codes: L21 (firm objectives), M12 (executive compensation), Q54 (climate change)

1. Introduction

With the 2015 Paris Agreement to limit global warming to well below 2 degrees, climate change has moved back up the policy agenda. Governments around the world are developing policies to help achieve global climate targets. At the same time, climate change—and wider environmental, social and governance (ESG) issues—have risen to board-level on the corporate agenda. Across the corporate sector, companies are reformulating their strategies for a climate-constrained world—and there is growing appetite for experimentation with low-carbon products and business models.

Pressure from institutional investors is an important driver of this process. Back in 2015, Mark Carney, as Governor of the Bank of England, warned the financial community about the implications of climate change for the value of investment portfolios.[2] Over the last 2 years, investors have mounted pressure on listed companies to measure and disclose their exposure to climate change—and to formulate corporate strategies that are "Paris-consistent". A central role is played by investor coalitions like

[1] An early version of this material was presented at the Cambridge EPRG-MIT CEEPR International Conference in September 2019. I am grateful to Felix Grey, Kevin Massy, Julian Metherell and David Reiner for helpful comments and discussion and to Olivia Chen for excellent research assistance. All views expressed and any errors are my own. Author contact: r.ritz@jbs.cam.ac.uk

[2] See Mark Carney (2015). Breaking the Tragedy of the Horizon: Climate Change and Financial Stability. Bank of England, Speech at Lloyd's of London, 29 September 2015.

Climate Action 100+, a group with over $40 trillion in assets under management.[3] Closely related, the Task Force on Climate-Related Financial Disclosures (TFCD) has developed a set of principles for the voluntary corporate disclosure of climate risks. Companies ranging from Barclays to BP and Shell to Nestlé to airline group IAG have set targets for "net zero" emissions. Unlike national climate policy initiatives, investor-driven corporate climate action has global reach.

A novel aspect of the emerging corporate response is that executive compensation is starting to be aligned with company-level climate targets. In December 2018, Shell announced that it will from 2020 onwards tie the incentive pay of its CEO and senior management to company-wide carbon targets. During 2019, several other major oil & gas companies, including BP and Chevron, under shareholder pressure resolved to incorporate carbon targets into executive pay. BHP, one of the world's largest miners, also uses a climate target in its CEO pay; electricity companies are exploring similar ideas. Companies in other sectors like heavy industry and transport—including airlines, aluminum, cement and steel—are under increasing pressure to decarbonize and will face similar questions. In short, carbon emissions are emerging as a driver of long-term corporate value—and companies are beginning to embed them in their management incentives as a key performance indicator.

This paper addresses the "what, why, and how?" of linking executive pay to climate metrics. As a business practice, this raises important questions that straddle environmental concerns and corporate governance—the 'E' and the 'G' in ESG. Section 2 explains the rationale for corporate climate action to fill the gap left by government-led climate policy. Section 3 presents an overview of the use of climate-linked metrics in CEO incentive plans at five of the largest energy companies (BP, Chevron, ExxonMobil, Shell, Total) and a case study of the key design choices at Shell. Climate-linked incentives account for 8% of short-term and 4% of long-term incentive pay at these companies, alongside financial and operating metrics. Section 4 develops a set of principles for incentive pay through which to understand the benefits of including climate metrics in a balanced scorecard and the challenges in terms of incentive design. Section 5 presents concluding comments on how the practice of linking executive pay to climate metrics might be refined over time.[4]

2. Why corporate climate action?

To understand the rationale for corporate climate action, it will be useful to sketch out a benchmark in which it is *not* needed, based on the economist's ideal of a putting a price on carbon emissions.[5] The social cost of carbon (SCC) reflects the monetized value of climate damages to the planet; it probably stands at around $50 per ton of CO_2 today and its value rises over time (based on a combination of climate science,

[3] See Bloomberg Businessweek (2019). Green, Rich, and Intimidating. Finance, 15 April 2019 and The Economist (2020) Green Investing: Hotting Up, 20 June 2020 for useful overviews of the rising influence of institutional investors on climate and ESG issues.

[4] A number of important issues are beyond the scope of this paper. This includes the proper level of executive pay as well as design aspects such as vesting schedules and clawback rules. This paper focuses on whether climate metrics should have a non-zero weight in incentive pay. It also does not deal explicitly with reputational and other non-monetary incentives related to climate change.

[5] For another exposition of the ideal of a global carbon price, see Chapter 8 of Jean Tirole (2017). *Economics for the Common Good*. Princeton, NJ: Princeton University Press. Its intellectual antecedents date back 100 years to Arthur C. Pigou (1920). *The Economics of Welfare*. London: Macmillan. In principle, the same outcome can be achieved with a global carbon tax or by a carbon trading system that controls the quantity of global emissions.

economics and ethics).[6] Suppose, therefore, that a global carbon price—covering *all* countries and *all* sectors—is set according to this price trajectory so as to reflect climate damages. Suppose further that financial, labour, and product markets, are fully competitive and efficient. This climate-policy design aligns the private interests of individual actors in the economy with wider social interests. Efficient policy corrects for the climate externality and efficient markets take care of the rest—achieving an efficient resource allocation.[7]

From a corporate perspective, an efficient global carbon price means that the problem of climate change will be reflected in product market prices—and hence appropriately priced into corporate decision-making. Therefore, precisely to the extent they are relevant, global climate damages are also reflected in every company's profits—and in its stock price. In turn, there is no need for voluntary corporate climate action beyond simply responding to market signals. Suitable incentives for management can be provided by linking executive pay to the company's stock price; there is no point in using any additional performance metrics—be it financial metrics or non-financial metrics related to ESG.

There are two further implications for climate targets at the corporate level. First, while emissions need to be correctly measured along the value chain to properly implement the carbon price, there is no need for company-specific or product-specific emissions limits—these would just drive up the overall cost of abatement. Second, the global carbon price sidesteps any need to distinguish between different scopes of emissions, notably between Scope 1 emissions from own production and Scope 3 emissions that include the value chain.[8] Every entity across the global economy is exposed to the SCC on its own emissions so a firm's customers and suppliers also face a carbon price on the emissions they generate and factor this into their own demand and supply decisions.

This line of argument, turned on its head, suggests corporate climate action can be warranted due to the presence of failures of policy and markets. First, a large "policy gap" remains in government-led climate action: a global carbon price does not look likely any time soon. Governments have introduced a wide array of policies on carbon pricing, emissions standards, and subsidies for renewables. Yet, of all polluting firms around the world, only European power generators— subject to an auction-based price of around \$30/tCO_2 in the EU's carbon trading system—face a carbon price anywhere near the level of the SCC.[9] Second, it is clear that financial, labour and product markets do not operate efficiently in all places and at all times. That is, other market failures sit alongside the climate problem: market power exercised by large

[6] It has been estimated that the ambition of the 2015 Paris Agreement requires a global carbon price of at least \$40-80 per ton of CO_2 in 2020, rising to \$50-100/tCO_2 by 2030. See Carbon Pricing Leadership Coalition (2017). *Report of the High-Level Commission on Carbon Prices*. World Bank Group.

[7] The resulting distribution of the global pie will be unequal, with some countries and firms affected more strongly than others; at least in principle, this could be addressed with financial transfers.

[8] Scope 1 are direct emissions from own production, Scope 2 are indirect emissions from the consumption of purchased electricity, and Scope 3 are all other indirect emissions that occur in the value chain of the reporting company. See the Greenhouse Gas Protocol, https://ghgprotocol.org.

[9] There are currently 57 carbon-pricing policies covering 20% of global emissions but existing policies focus disproportionately on the power sector and their average carbon price is far less than \$10/tCO_2 and therefore well below any central estimate of the SCC. See World Bank (2019). *State and Trends of Carbon Pricing*. Washington DC: World Bank Group.

companies, systemic crises in financial markets, underinvestment in R&D and innovation, and so on. This means that a global carbon price alone may not be enough to deliver on climate targets in an efficient manner. Hence the potential for corporate climate action to help fill the policy gap.

Institutional investors are increasingly asking the corporate sector to take on a leadership role in the low-carbon transition—and on wider ESG issues. Over the last five years, investors have collectively come to the realization that climate change puts at risk the value of their portfolios. The implication is that, if the Paris climate targets are to be achieved, stakeholders other than governments need to step in. As a result, there is a move away from the idea of a global carbon price towards granular firm-specific emissions trajectories embedded in carbon-reduction targets at the corporate level. Underlying this is a heightened fear that the world is approaching a "tipping point" in terms of the damages due to climate change.

At the same time, there is mounting evidence—and belief among investors—that companies with better ESG performance also do better in the stock market. The traditional economics argument is that ESG activities cannot be value-enhancing because they divert resources from direct productively activities; they might nonetheless be pursued because they benefit the social reputation of the firm's management.[10] However, over the last 20 years, a number of studies have found that companies with better ESG metrics, for example, on employee satisfaction, also tend to perform better in the stock market.[11] In short, there is a growing belief amongst investors that making money and "doing good" can go hand-in-hand.[12]

Alongside this increased demand for corporate climate action by investors, it has also become much cheaper for companies to supply. Traditional economic thinking is centered on the notion that emissions cuts are costly for firms; in the absence of government regulation, the corporate sector does not have a strong incentive to go green. Yet the last decade has seen enormous declines in the costs of renewables such as solar and wind as well as in facilitating technologies like battery energy storage.[13] For heavy consumers of electricity, such as technology companies like Apple or Google, renewable power purchase agreements (PPAs) are now often cheaper than legacy fossil-based power sourcing. Similarly, for energy companies, investing in low-carbon technologies is much more financially attractive than in the past. In addition, evolving consumer and societal preferences mean that customers are increasingly willing to pay extra for greener products. As a result, the traditional trade-off between emissions cuts and firm value is relaxed. Indeed, for new entrants with a green

[10] This view is most famously articulated by Milton Friedman (1970). The Social Responsibility of Business Is to Increase Its Profits. *New York Times Magazine*, 13 September 1970, 122–126.

[11] See e.g. Alex Edmans (2011). Does the Stock Market Fully Value Intangibles? Employee Satisfaction and Equity Prices. *Journal of Financial Economics* 101(3), 621–640 and Robert G. Eccles, Ioannis Ioannou, and George Serafeim (2014). The Impact of Corporate Sustainability on Organizational Processes and Performance. *Management Science* 60(11), 2835–2857. This is an active research area in financial economics.

[12] Investment portfolios that screen holdings on socially responsible investment (SRI) criteria can outperform. It is possible to construct portfolios that match the overall expected risk-return profile of traditional stock indices but with 50% less expected exposure to climate-related risks—together with a free option on outperformance when climate policy tightens. See Mats Andersson, Patrick Bolton, and Frédéric Samama (2016). Hedging Climate Risk. *Financial Analysts Journal* 72(3), 13–32.

[13] Early policy support for renewable roll-outs, notably in Germany and China, has had large spillover benefits for the rest of the world. The large costs borne by German consumers are now water under the bridge but have fundamentally altered the forward-looking abatement calculus for everyone else.

business model or a polluting firm whose production technology is significantly cleaner than its rivals', the trade-off is reversed: tighter carbon regulation is positive for firm value.

3. Climate-linked incentives in executive compensation

Climate-linked incentive pay at the energy majors

Given its public visibility and carbon-intensive ways, the energy industry has been at the forefront of ESG-related pressure from institutional investors—and executive pay linked to climate targets is now emerging as a business practice at some of the world's largest corporations. Figure 1 presents a high-level overview of 2019 CEO remuneration plans at the five largest privately-owned oil & gas companies—BP, Chevron, ExxonMobil, Shell, and Total. It distinguishes between two types of incentive pay: the short-term incentive plan (STIP) underlying annual bonus payments and the long-term incentive plan (LTIP) typically paid out as stock-based compensation.[14] Despite their superficial similarities as global oil & gas businesses, there is large variation in compensation practices across these companies.

Traditional financial metrics dominate short-term and, especially, long-term incentives. All companies use total shareholder return (TSR) as a key performance indicator in their LTIPs; its weight, however, varies widely from 100% at Chevron, over an undisclosed weighting at ExxonMobil, to 22.5% at Shell. Other financial metrics are widely employed alongside TSR, notably return on average capital employed (ROACE) in LTIPs and different cash flow metrics in STIPs. All companies employ relative performance evaluation against a peer group in their LTIP financial metrics, notably again on TSR. On average, financial metrics account for 62% in STIPs and 90% across the companies' LTIPs.

Other performance measures—including non-financial metrics—also play an important role, especially in short-term pay. BP, Chevron and Shell place weights ranging from 15% to 50% on their operating performance in STIPs, including metrics like production volume and plant availability. Moreover, an ESG metric, here labelled "Health & Safety", has a long-standing role in the energy industry to measure safety events and employee injuries. This metric is used by all companies as part of STIPs (except at ExxonMobil) with weights as high as 20% at BP. Finally, all companies except Chevron employ a "strategic objectives" metric that captures CEO milestones on the implementation of corporate strategy.

Against this background, all companies employ CEO incentives that are, in quite different ways, linked to climate metrics. For short-term incentives, all except ExxonMobil use a metric related to the reduction of GHG emissions, with weights up to 10%. At Shell, this is the carbon emissions intensity of its upstream, refining, chemicals, and integrated natural gas business units. ExxonMobil is the only company with short-term pay based solely on financial performance; Total is the only company with explicitly-labelled performance measure on corporate social responsibility (including its climate performance, with 8% weight in its STIP). On average, climate-related metrics make up 8% of short-term incentive pay.

[14] Figure 1 is based on CEO incentive plans that started in 2019 and pay out in future years according company-specific vesting periods; other incentive plans pay out in 2019 but commenced in previous years.

	Short-term incentive plan (STIP)	Long-term incentive plan (LTIP)
BP	**Financial performance** (50%) - Operating cash flow (20%) - Replacement cost profit (20%) - Upstream unit production costs (10%) **Operating performance** (20%) **Health & Safety** (20%) **Environment** (10%) - Sustainable emissions reduction (10%)	**Financial performance** (70%) - TSR (relative to peers) (50%) - ROACE (20%) **Strategic objectives** (30%) - Upstream shift to gas and advantaged oil - Downstream market-led growth - Low-carbon venturing - Growth in gas, power and renewables
Chevron	**Financial performance** (70%) - Earnings per share, net cash flow and other metrics (40%) - ROACE and other metrics (30%) **Operating performance** (15%) - Production volume and other metrics **Health & Safety, and Environment** (15%) - Safety metrics - Methane emissions intensity	**Financial performance** (100%) - TSR (absolute & relative to peers)
ExxonMobil	**Financial performance** - Annual earnings - Earnings per share	**Financial performance** - TSR (absolute & relative to peers) - ROACE (absolute & relative to peers) - Cash flow from operating activities (absolute & relative to peers) **Health & Safety** **Strategic objectives** - Methane reduction and other metrics
Shell	**Financial performance** (30%) - Cash flow from operating activities (30%) **Operating performance** (50%) - Production volume and other metrics **Sustainable development** (20%) - Health & safety (10%) - GHG emissions intensities (10%)	**Financial performance (90%)** - TSR (relative to peers) (22.5%) - ROACE growth (relative to peers) (22.5%) - Free cash flow (22.5%) - Cash flow from operations growth (relative to peers) (22.5%) **Energy transition (10%)** - Reduction in net carbon footprint - Growing power business - Advanced biofuels technology and CCUS
Total	**Financial performance** (62%) - Net debt-to-equity ratio (17%) - Return on equity (17%) - Pre-dividend organic cash breakeven (17%) - ROACE (relative to peers) (11%) **Health & Safety, and Environment** (16%) - Safety metrics (10%) - GHG emissions (6%) **Strategic objectives** (22%) - Negotiations with producing countries (8%) - Growth in gas, power and renewables (6%) - Corporate social responsibility, including climate performance (8%)	**Financial performance** (100%) - TSR (relative to peers) (33.3%) - Net cash flow per share (33.3%) - Pre-dividend organic cash breakeven (33.3%)

Figure 1: Performance metrics used in 2019 CEO incentive plans

Notes: Author discretion applied in categorizing metrics. ExxonMobil does not disclose individual weights. Total's weights renormalized to sum to 100%. Climate-linked metrics shown in green.[15]

[15] Sources: BP Annual Reports 2018 and 2019; Chevron Corporate Responsibility Report 2018; Chevron Proxy Statement 2020; Exxon Proxy Statement 2020, Exxon Energy and Carbon Summary 2019 and 2020; Shell Annual Reports 2018 and 2019, Shell Sustainability Reports 2018 and 2019, Remuneration Committee Roadshow Presentation 2020; Total Form 20-F 2018 and 2019.

Long-term CEO incentives linked to climate are employed at BP, ExxonMobil and Shell. BP and Shell do this by way of "strategic objectives". At BP, this includes venturing into low-carbon businesses and growth in its power and renewables businesses; Shell has a dedicated "energy transition" metric that features a reduction target for its life-cycle emissions ("net carbon footprint") as well as growth targets for its power business, advanced biofuels, and carbon capture systems. Unlike others, ExxonMobil features the reduction of methane emissions as a strategic objective in its LTIP. At the opposite end, Chevron and Total link long-term incentives solely to financial performance, and Chevron exclusively relies on TSR. On average, climate-related metrics make up 4% of long-term incentive pay.[16]

The divergence between European and US companies is evident. European players, notably BP and Shell, use "broad" climate-linked incentives that relate to corporate strategy, for example, growing their low-carbon businesses and reducing company-wide emissions reductions. By contrast, Chevron and ExxonMobil employ "narrow" climate-linked incentives related to emissions reductions of individual business units, with a focus on methane. More broadly, ESG metrics—including both climate- and safety-related metrics—make up an average of 18% (STIP) and 10% (LTIP) of incentive pay across the five companies; this breaks down into 25% (STIP) and 13% (LTIP) for the European players against 8% (STIP) and 0% (LTIP) for the US players. Overall, this picture is consistent with European oil & gas majors embracing the energy transition more strongly than their US peers.

Will the practice of linking executive compensation to climate metrics spread to other companies and sectors? Within the energy industry, the weights placed on climate metrics may further increase and the practice may be adopted by smaller players and, potentially, even by state-owned companies.[17] In other sectors, electricity companies are actively exploring similar ideas while BHP, a large mining company already uses a climate target in its CEO's STIP (4% weighting), and has announced "increased weighting, specificity and transparency on climate change".[18] Elsewhere, companies in heavy industry and transport—including airlines, aluminum, cement and steel—are under increasing pressure to align themselves with the Paris ambition. The experience to date of the oil & gas sector may offer a roadmap of how this challenge can be managed in terms of incentive design.

Designing climate-linked incentives: The case of Shell

The case of Shell illustrates the details of designing incentive pay linked to climate ambition. Among the large oil & gas companies, Shell has been a leader in beginning to re-shape its corporate strategy for a low-carbon world, and is explicit about its ambitions to "thrive in the energy transition" and "sustain a strong societal license to operate". On the climate front, this includes long-term goals of reducing the net carbon footprint of its business, and, as of April 2020, a "net zero" target for 2050 oil & gas

[16] The introduction of climate-linked incentives has displaced financial metrics. For example, in their 2019 LTIPs, both BP and Shell reduced weights placed on ROACE and other financials to accommodate their strategic climate objective; in Total's 2019 STIP, the weight on the debt-to-equity ratio was cut.
[17] BP's 2020 CEO incentive plan increased "sustainable emissions reduction" from 10% to 20% of the STIP.
[18] See Financial Times (2019). BHP to increase CEO compensation linked to climate change. 17 September 2019.

production.[19] As seen, Shell is currently unique among the energy majors with climate-linked metrics representing 10% of both its CEO short- and long-term incentive plans.

METRIC DESCRIPTION - Which metric? - How much? - By when?	**Business unit GHG intensity** GHG intensity of refining, chemicals, upstream & integrated gas	**Energy transition** -Reduce net carbon footprint by 2-3% by 2021 towards long-term goals of 20% reduction by 2035 and 50% reduction by 2050 -Growth of power business -Advanced biofuels technology -Development of CCUS capacity
CLIMATE DESIGN		
Emissions reduction or strategic objective?	Emissions reduction	Emissions reduction and strategic objectives
Business unit(s) or company-wide?	Business units	Company-wide and business units
Scope 1, 2, or 3 emissions?	Scope 1 and 2 (90% of operated emissions covered)	Scope 1,2 and 3 (with small caveats)
Absolute emissions or emissions intensity?	Emissions intensity	Absolute emissions
INCENTIVE DESIGN		
Short-term or long-term incentive?	Short-term	Long-term
Scorecard weighting?	10%	10%
Own performance or relative to peers?	Own performance	Own performance
Linear or threshold pay?	Linear (with discretion)	Threshold (with discretion on individual weights)

Figure 2: Climate-linked performance metrics in 2019 Shell CEO incentive plan[20]

Figure 2 synthesizes Shell's two climate-linked performance metrics around a framework of key questions, categorized into the metrics' climate design and pay design. The metric used in Shell's STIP is based on reductions in the emissions intensities of several business units: refining, chemicals, upstream and integrated gas. In terms of climate design, it is an emissions target—albeit framed in terms of emissions intensity rather than the absolute level of emissions—that covers Scope 1 (direct production) and Scope 2 (purchased electricity) emissions. Targets based on emissions intensities are often seen critically by environmentalists as they do not rule out increases in the absolute level of emissions due to production growth. In terms of incentive design, the metric is based on Shell's own performance—rather than its relative performance compared to a peer group; incentive payments accrue

[19] In April 2020, at the height of the Covid-19 crisis, Shell introduced a "net zero" emissions target for Scope 1 emissions from oil & gas production by 2050 as well as tighter targets for its overall net carbon footprint of a 30% cut by 2035 (replacing 20%) and a 65% cut by 2050 (replacing 50%). See Financial Times (2020). Shell steps up climate goals despite twin crisis. 16 April 2020.

[20] Sources: Shell Annual Reports 2018 and 2019, Shell Sustainability Reports 2018 and 2019, Remuneration Committee Roadshow Presentation 2020, Shell Net Carbon Footprint (NCF) Additional Information, The Net Carbon Footprint (NCF) Model: Methodology.

incrementally with reductions in emissions intensities (rather than only once when a threshold value is reached).

The "energy transition" metric used in Shell's LTIP differs from this in several design elements. It combines a company-wide long-term goals for absolute emissions reductions to 2030 and 2050 with strategic objectives for the growth of new low-carbon businesses and technologies. In this sense, it features both lagging and leading climate indicators. The emissions-reduction goals are measured in terms of "net carbon footprint" (life-cycle emissions, including Scope 3).[21] These metrics are also based on Shell's own performance but leave a degree of discretion to its remuneration committee around the thresholds at which additional incentive pay occurs and around the breakdown of the 10% scorecard weighting into its four components. The remuneration committee can decide to allocate greater emphasis to the carbon footprint metric, and expects the weighting on the energy-transition metric to increase over time and.[22] In sum, the long-term climate incentive is significantly broader and more explicitly quantified in its ambition.

4. Designing climate-linked incentives: Principles, benefits, and challenges

Principles for incentive design

Incentive programs for top management are a key ingredient of corporate governance, and at major corporations are often centered around stock-based compensation to help align the interests of shareholders and managers. Incentives are a powerful tool, compelling in theory but hard to get right in practice; the history of organizations is littered with examples of well-intentioned incentive programs that turned out to be dysfunctional. These often involve managers being able to game the performance measure (e.g. using accounting tricks) or being inadvertently incentivized to pursue a different goal from what is good for the firm (e.g. pumping short-term results at the expense of long-term value).[23]

A large literature on the economics of incentives provides a set of high-level principles for the design of executive pay: which performance metrics to use and how to combine them.[24] These four principles are useful for thinking about the "why?" and "how?" of linking management incentives to a company's climate performance.[25]

---

[21] These emissions range from the upstream purchase of goods and services (including transportation) to the downstream consumer use and afterlife of products.

[22] The same 10% weighting in long-term incentive pay on the energy transition metric was in 2019 applied to around 150 senior managers at Shell, and is expected to broaden to 16,500 employees in 2020.

[23] The classic reference on dysfunctional incentives is Steven Kerr (1975). On the Folly of Rewarding A, While Hoping for B. *Academy of Management Journal* 18, 769–783.

[24] Recent overviews of this literature include Alex Edmans and Xavier Gabaix (2016). Executive Compensation: A Modern Primer. *Journal of Economic Literature* 54(4), 1232–1287 and Bengt Holmström (2017). Pay for Performance and Beyond. *American Economic Review* 107(7), 1753–1777. At the heart of the incentive problem between the "principal" (shareholders, represented by the board of directors) and the "agent" (senior management) lies an information asymmetry: the board is imperfectly informed about the details and value of management's actions. Were the board perfectly informed, it could "force" optimal behavior with an algorithm that specifies the desired course of action for management in each possible state of the world. Then it would be sufficient to pay the CEO a fixed wage—along with sending an infinitely detailed letter of instructions. With information asymmetries, an incentive package becomes a valuable tool to guide and motivate management—even if the alignment with shareholders' interests will never be perfect.

[25] The first principle is based on George P. Baker (1992). Incentive Contracts and Performance Measurement. *Journal of Political Economy* 100(3), 598–614. The other three principles are known in the literature as the

Principle 1: Align executive pay with corporate strategy and long-term value

Executive pay should be aligned with corporate strategy which in turn should aim at value creation over the long term. This is traditionally associated with total shareholder return (TSR). Since the Global Financial Crisis in the late 2000s, long-term value creation for many sectors is increasingly tied to government regulation.

Principle 2: Optimize the overall risk-reward profile of executive pay

The intensity of incentives—the fraction of executive pay that is linked to performance—needs to strike a balance between risk and return. Few people are willing to work for a zero salary with their income potentially entirely dependent on the vagaries of the stock market; a fixed salary alone provides no incentive to go the extra mile nor any indication of how to prioritize between different courses of action.

Principle 3: Use actionable performance metrics that reflect management value-added

Additional performance measures—alongside those tied to the stock price—can be useful insofar as they contain information about a company's long-term prospects that is not fully captured by the stock price. These performance measures should, in addition, be actionable in that top management can influence them.

Principle 4: Balance incentives across multiple tasks and proximate objectives

In the presence of multiple—and perhaps competing—proximate objectives, it is desirable for management incentives to be well-balanced across different tasks. Otherwise the danger is excessive focus on a subset of tasks at the expense of everything else.

The design of incentives linked to climate performance begins with accurate information on a company's carbon emissions. Widely-used financial metrics like ROACE are produced during the normal course of business; increasingly, this also includes carbon emissions. Regulation has made many companies invest in accurate emissions measurement; for the purpose of providing management incentives, this now comes at zero incremental cost. Some companies are also providing voluntary disclosure of their carbon emissions to investors. Accurate measurement helps to create an actionable performance measure (Principle 3). A caveat is that this has so far focused on emissions from a company's own operations (Scope 1); the measurement of emissions along the value chain (Scope 3) is less well-developed.

Given that a firm's carbon emissions are being adequately measured, should they be part of an incentive program? For the benchmark with efficient markets and efficient policy, the answer is no: all relevant information about the quality of management and the long-term value of the firm is already captured in the stock price. Executive pay for climate targets can only lead to value-reducing distortions further down the road. However, in the presence of climate-policy failures and wider market failures, incentives linked to climate performance can become useful.

Strategic considerations

An increasing number of carbon-intensive companies is reaching the diagnosis that their long-term value depends on cutting emissions. Corporate strategies are being

"incentives-insurance trade-off", the "incentive intensity principle", and the "equal compensation principle"; see Paul Milgrom and John Roberts (1992). *Economics, Organization and Management*. New York: Prentice-Hall.

reformulated for a climate-constrained world and big changes to business models will be needed. Corporate transformation comes in two main parts: the first is reducing emissions of existing high-carbon business units; the second is growing new low-carbon businesses, products, and technologies. In many cases, therefore, carbon-heavy activities will operate side-by-side with more innovative and greener initiatives. A similar challenge exists across the board for companies that wish to survive the low-carbon transition.[26] In short, climate concerns have become a central aspect of long-term firm value across many sectors, and, by Principle 1, there is a case for reflecting this in management incentives and executive pay.

Many companies use a balanced scorecard to gauge their performance in a holistic fashion; a key aspect of the scorecard is that it often features non-financial metrics—including ESG factors—that capture a company's proximate objectives.[27] By Principle 3, it makes sense to use such additional performance measures as part of an incentive package to better capture the value-added of top management. One important reason is that stock markets can be short-termist so a company may rely on other metrics to provide a longer-term perspective on its performance. This is particularly salient for companies with complex strategies and high levels of innovation that the stock market may struggle to understand. It is also an important consideration for those that operate green and less green business units under a single corporate roof. This complexity will need to be reflected in the balanced scorecard, making climate-linked incentives particularly attractive to such companies.

A subtle challenge underlying the use of balanced incentives evolves around potential conflicts between individual performance metrics. A well-known example is that too strong a focus on increasing market share—for example, by way of aggressive product pricing—can come at the expense of profitability and firm value. The traditional concern about ESG metrics is that, while perhaps "nice to have", they are costly to deliver and it is shareholders who will ultimately pay. Similarly, the easiest way for many companies to reduce their carbon emissions, in the short term, is simply to cut production—which may again stand in direct conflict with firm value. Such conflicts, however, have recently been significantly relaxed. First, many businesses are discovering that cutting carbon—increasingly aided by technologies like artificial intelligence (AI) and machine learning (ML)—can go hand-in-hand with cutting costs, for example, because it reduces waste.[28] Second, companies are increasingly subject to carbon pricing in the jurisdictions in which they operate; this additionally rewards emissions reduction and helps align it with firm (and social) value. Third, evolving consumer preferences and rapid progress in clean technologies have already relaxed this trade-off; over the longer haul, low-carbon innovation can facilitate higher sales

[26] So far, only few companies have undergone full-scale transformations from "brown" to "green"; a notable example is Orsted, Denmark's formerly state-controlled oil & gas company, now one of the world's largest renewable energy companies. For a contrary view that advocates a "harvest" strategy for oil & gas companies to maximize the remaining value from fossil assets but argues against transformation due to the absence of competitive advantage, see Dieter Helm (2017). Burn Out: The Endgame for Fossil Fuels. Yale University Press.

[27] See Robert S. Kaplan and David P. Norton (1996). *The Balanced Scorecard: Translating Strategy into Action*. Boston: Harvard Business School Press.

[28] This raises a deeper question: if the measurement of carbon emissions is useful in designing management incentives, then why did firms not always measure them? One response is that this is *prima facie* evidence of non-maximizing behaviour by firms. Another response is that setting up measurement systems is costly and may be worth doing only given a regulatory requirement. See Geoffrey Heal (2008). *When Principles Pay: Corporate Social Responsibility and the Bottom Line.* New York: Columbia University Press for related discussion.

for a given climate target. Fourth, even if the trade-off still exists in the short run, it may vanish in the long run—especially if a business runs the risk of losing its "social license to operate".

Many carbon-intensive companies sell into commodity markets—such as oil, iron ore, and steel—that are susceptible to boom-bust swings in prices and profits. Likewise, their corporate mindset also seems to swing back-and-forth between a focus on growth and a focus on profitability. This is reflected in balanced scorecards: metrics like production targets and market share are the "growth mode" while others like ROACE are the "profitability mode". A greater sectoral focus on climate targets may impart greater discipline in capital allocation, favouring profits over growth. In terms of production, the last barrel of oil extracted looks less attractive. In terms of investment, growth by way of high-cost projects—often also environmentally more suspect—looks slightly less good. Including climate-linked incentives in executive pay cannot solve the underlying problem but may provide a nudge towards value over volume.

Basing corporate strategy and management incentives on climate targets can affect the pursuit of M&A activity. Within a multi-business firm, the divestiture of a high-carbon business unit looks increasingly attractive. Large players in oil & gas and power generation have already been repositioning their asset portfolios along such lines; divesting a coal business scores a quick win in signaling climate action to investors and boosting ESG credentials. Unfortunately the *global* climate benefit of such M&A activity is less clear—unless the operation or lifetime of the business is altered by the deal.[29] A private equity buyer might employ a "harvest" strategy that leads to the business dying faster than it otherwise would have (perhaps because it no longer gets cross-subsidized by another division). Another reason is that the buyer runs a more climate-efficient operation than the seller, for example, with a capability to implement carbon capture systems (CCUS). By contrast, for a company that is committed to a single line of business—a niche player or infrastructure asset—the only way to deliver on climate targets is to make the existing business greener.

Incentive considerations

Management incentives linked to climate metrics can be formulated in different ways, as illustrated by Figure 2. First, they can be narrow, pertaining only to individual business unit(s), or broad, covering the whole company. Second, they can be formulated directly in terms of carbon emissions or indirectly in terms of the growth of low-carbon businesses, products, and technologies. Third, emissions targets can be designed as a reduction in the absolute level of emissions or as a reduction in emissions intensity of a product or business. The most ambitious and environmentally-definitive combination—a broad company-wide climate target for the level of emissions—will be most attractive for companies seeking to align their strategies with the 2015 Paris Agreement. This climate metric, in turn, should be particularly suitable for inclusion in a long-term incentive plan.

An important lesson from the history of incentive design is that use of "non-linear" performance targets can distort management incentives. Consider a sales target under

[29] This concern is similar to the debate about measuring a country's emissions in terms of its production or consumption. Offshoring carbon-intensive manufacturing cuts production-based emissions but leaves consumption-based emissions unchanged insofar as demand is instead served by imports from elsewhere.

which a manager receives a fixed bonus if the threshold is met at year-end and gets no bonus otherwise. Incentives to try hard are very weak if the target looks unattainable, very strong when the target is *almost* reached, and zero if the sales target is locked in before the year is over. This volatility in the return to managerial effort is unlikely to be well-aligned with value creation, especially Principles 1 and 2. Moving the goal posts around once the target has been met does not help as any anticipation of this by managers would undermine the credibility of the incentive program in the first place. Therefore, a linear incentive scheme that offers continuous rewards for extra performance is usually a better choice. Applied to climate-linked incentives, this argues for payments to be linked to continual emissions reductions rather than binary targets.

Tying climate-linked incentives to a company's supply-chain emissions is puzzling in that it seems to contradict Principles 2 and 3. Scope 3 emissions are (a) difficult to measure correctly and (b) significantly beyond management control. This suggests that including them in executive pay is likely to be counterproductive: they blur the signals about management's performance and expose executives to uncontrollable risks.[30] Through this perspective, basing incentives on Scope 1 emissions from own production has greater appeal. Granted, over time, management may switch to cleaner suppliers and find ways to help customers reduce emissions arising from product use. Instituting climate-linked incentives based on Scope 3 emissions also raises the return to measuring them correctly in the first place. All the same, it is worth bearing in mind that the recent corporate history of measuring consumer emissions is not a happy one, as illustrated by the Volkswagen "Dieselgate" scandal. In the climate-policy arena, Scope 3 emissions are the direction of travel but there may a rocky road ahead.

At the same time, climate-linked incentives based on value chain emissions can help align with a more climate-ambitious corporate strategy. In May 2019, Shell sold two carbon-neutral cargos of liquefied natural gas (LNG) to Japanese buyers, Tokyo Gas and GS Energy, for which the carbon-intensity of the natural gas was offset by bundling the sale with carbon credits from Shell's portfolio of "nature-based solutions": forestry assets that act as "carbon sinks" with negative emissions. This is an initial example of how a strategic focus on life-cycle emissions creates a product that is valued by greening customers and may constitute a first-mover advantage over competitors. Incentive considerations point to the risks inherent in basing executive pay on supply chain emissions. Yet this example suggests that strategic considerations may increasingly point to a focus on Scope 3 emissions—especially as emissions measurement improves across the value chain.

Executive compensation can also become susceptible to concerns about "paying for luck". There is significant evidence that incentive pay appears to reward top managers simply for being lucky. For example, the profitability of many energy companies varies strongly with the price of crude oil—which is essentially beyond management control. Nonetheless, the evidence is that energy CEOs are paid systematically more when the oil price happens to be high. This transfers wealth from shareholders to management—and is sometimes interpreted as evidence of excessive value extraction

[30] There are wider concerns about double-counting: the Scope 3 emissions of one firm may be the Scope 1 emissions of another. But this seems tangential to the provision of incentives by an individual firm.

by CEOs.[31] In a similar way, linking incentives to a company's climate performance raises the prospect of pay for luck. If global climate policy turns out to be tighter than expected, this will push down corporate emissions without necessarily being evidence of management performance. If climate incentives are linked to Scope 3 emissions, things become even more complex: should a CEO get a bigger bonus if one of the company's suppliers finds a lower-carbon way of delivering its product?

To sidestep such concerns, executive pay can instead be based on a company's *relative* performance. The volatility of commodity prices, for example, creates obvious challenges: an outstanding management effort may look mediocre because of a crash in the oil price while a price spike can make average effort look brilliant. These fluctuations obscure management effort and expose executives to uncontrollable risks. The principles of incentive design suggest that it is preferable for such "noise" to be filtered out by using measures of a company's relative performance. One option is to compute a normalized profitability metric that tries to filter out the impact of the oil price. Another option is to base incentive pay on the firm's performance relative to a peer group of comparable companies. Indeed, this is common practice for traditional performance metrics; for example, in determining executive pay, a company's TSR is often compared to that of a peer group. In a similar way, climate-linked incentives could be based on a company's emissions reductions relative to its peers. An immediate concern is that this requires confidence that peers' emissions are accurately measured and are indeed sufficiently comparable (for example, in terms of the scope of emissions). However, as emissions measurement improves over time and the practice of climate-linked incentives becomes more widespread, the opportunities for relative performance evaluation should be enhanced.

Finally, instituting climate-linked incentives can, over time, affect the "match" between a firm and its employees. In the short term, using climate targets as a performance measure will affect the decision-making of existing management. Over time, a greener incentive scheme may affect which "old" employees are retained—and also which "new" employees join the firm. So providing incentives linked to climate targets may be a two-way process: they strengthen the match between the firm and its future workforce—and this, in turn, makes the incentive scheme itself more effective.[32] This effect is especially salient for an incentive scheme that affects a large fraction of a company's workforce, not just senior management. It can signal commitment to a new climate-friendly corporate strategy and thereby encourage employees to pursue innovation and invest in firm-specific human capital that is consistent with the new strategy. More broadly, changes in the incentive structure can help reinforce the evolution to a new corporate culture, especially if prospective employees have greener preferences than previous generations.

5. Conclusion

Executive compensation linked to company-level climate targets is emerging as a novel aspect of the corporate response to the low-carbon transition and ESG-driven

[31] See Marianne Bertrand and Sendhil Mullainathan (2001). Are CEOs Rewarded for Luck? The Ones without Principals Are. *Quarterly Journal of Economics* 116(3), 901–932 and Lucas Davis and Catherine Hausman (2018). Are Energy Executives Rewarded For Luck? Energy Institute at Haas, Working Paper 293.

[32] A two-way interaction between incentive pay and employee turnover was first shown in the context of performance-related pay in the US automotive sector by Edward P. Lazear (2000). Performance Pay and Productivity. *American Economic Review* 90(5), 1346–1361.

pressure from institutional investors. A number of energy companies already use climate-linked incentives for their top management, and similar ideas are being actively considered by electricity and mining companies. The issue will become increasingly acute for other emissions-intensive sectors like airlines, aluminium, cement, and steel. In a way that would have seemed surprising even 5 years ago, carbon emissions are emerging as a key performance indicator and the financial sector may turn out to be a major force in solving the climate problem.

Climate-linked incentives can be useful in several ways to businesses that have realized that their long-term value is tied to their climate performance. They can strengthen the alignment between high-level corporate strategy and management incentives in the organization. In this process, they help institutionalize that attention is paid at board-level to the climate implications of business decisions. As part of a company's balanced scorecard, they can increase the weight attached to ESG metrics, and thereby provide a constructive signal to institutional investors—and to potential employees—about the future of the business.

So far, the use of climate-linked incentives involves a degree of experimentation, and there will be scope for refinement over time. This is good business practice: see what works and then make adjustments so as to avoid unintended consequences. A central challenge is whether to design incentives based on emissions from own production or to include the supply chain; incentive considerations point to the former while strategic considerations increasingly favour the latter. Over time, as emissions measurement improves across the value chain, "holistic" climate incentives will become more attractive. Unlike traditional metrics like TSR, climate-linked incentives in the energy industry so far do not include evaluation against a peer group. As the practice becomes more widespread, the scope for relative performance evaluation will increase—to better reflect management contribution rather than "pay for luck".

Linking top management incentives to climate targets should be particularly attractive to emissions-intensive companies that wish to transform their businesses to survive the low-carbon transition. Such companies will need to be ambidextrous: on one hand, re-optimizing legacy businesses to extract their remaining value and, on the other, investing in new low-carbon products and technologies for future growth. Ample options for capital allocation exist between green and less green businesses, which can be guided by linking management incentives to climate targets alongside other sustainability tools like adjusted criteria for investment decisions and the use of internal carbon prices. The experience to date of the oil & gas sector may offer a roadmap of how this challenge can be managed in terms of incentive design.