The Policy Role of Corporate Carbon Management: Co-regulating Ecological Effectiveness

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Abstract
The United Nations Intergovernmental Panel on Climate Change (IPCC) has called for private sector participation in global carbon governance and corporations now seem to be heeding the call at an unprecedented scale. Both critics and proponents of corporate social responsibility (CSR) interpret this as a necessary but uncertain development. Business response has demonstrably failed in the past. Contributing to the CSR and private environmental governance effectiveness literature, this article argues that while voluntary corporate climate governance efforts are essential and improving, they are far from sufficient for meaningful decarbonization. Through an evaluation of the three main underlying corporate carbon management practices (target setting, carbon pricing and carbon reporting), the article highlights how company efforts create business advantage (e.g. risk management) but fall short on ecological effectiveness (i.e. absolute carbon reduction). In response, the paper argues the importance of greater climate policy co-regulation. This includes indirect enabling by governments and the IPCC to encourage incremental improvements in company efforts. It also includes more direct, state-led prescriptive interventions coordinated across supply chains and supported by international organizations, to ensure corporate participation and deeper transformative change to business models, industry structures and consumptive patterns at the root of the global climate crisis.

Policy Implications
- Voluntary corporate carbon target-setting, pricing and reporting initiatives are increasing but lack sufficient business ambition, implementation scale, and consistency.
- While businesses are leading economic efficiency carbon intensity improvements, ecological effectiveness (absolute carbon reduction) remains elusive and worsening.
- Deep decarbonization will require governments to re-integrate direct carbon reduction prescriptions alongside indirect enabling climate policies.
- UNFCC and UNEP organizations will also need to strengthen support for the monitoring and accountability functions of key intermediaries, as well as, adopt more specific climate goals and objectives to include investment and dematerialization targets.

The climate policy role of business
In the lead up to the United Nations Climate Change Conference (COP21) in December 2015, corporate carbon management commitments and initiatives rapidly accelerated (Chan et al., 2018; Hsu et al., 2015). Major multinational companies pledged to meet science-based carbon reduction targets including achieving carbon neutral ‘net zero emissions’. Firms from around the globe committed to 100 per cent renewable energy sourcing to decarbonize their operations. Industry sectors introduced certification standards for managing and mitigating carbon and achieving zero deforestation in their global supply chains. Many companies including financial institutions trumpeted their intentions to divest fossil fuel assets and set an internal price on carbon. And newly formed industry-led coalition groups such as We Mean Business and RE100 brought corporations together in unprecedented numbers to encourage ambitious commitments and to advocate for state-regulated global climate policy.

Many celebrated the ‘Paris rise’ as the achievement of a tipping point whereby a critical mass of corporations across all sectors stepped up to decarbonize their operations away from fossil fuels and help drive forward a clean energy economy. In many ways, the surge and ambition of the Paris COP21 company announcements met precisely the appeal governments, advocacy groups and governance scholars had been making for over three decades: corporations are major contributors to the global warming problem and therefore need to be a part of the governance solution (Hoffmann, 2011; Newell and Paterson, 2010). Climate change governance experts agree that business measures such as science-based reduction targets, carbon pricing, renewable energy substitution and active support of strong
government climate policy are essential to carbon reduction progress (Hoffman, 2007; Lovins, 2005). With companies now seemingly embracing these ‘best practices’, it would appear that the prospects for advancing effective global carbon governance have significantly improved.

The extent to which corporate-led carbon management efforts can be relied on to achieve essential carbon reductions is, however, highly uncertain (Trexler and Schendler, 2015) and contested (Wright and Nyberg, 2015). Skepticism is great given the history of corporations challenging the science of climate change, blocking climate regulation and failing to follow through on promises (such as in the high-profile case of British Petroleum and their ‘green wash’ commitment in 2000 to go ‘beyond petroleum’). InfluenceMap – the London-based NGO that tracks how corporations influence climate policy – calculates that 45 per cent of the world’s largest companies are active in blocking climate legislation. Research on the weaknesses of voluntary industry self-regulation also makes clear that corporations will not solve climate change on their own (Short, 2013). Business will, however, obviously need to play a major role in innovation and implementation.

Corporate investment in research and development is necessary. Companies have the resources and technological capacity to innovate and implement clean energy solutions, and with the right incentives can move more swiftly than governments (Ball, 2015; Kolk, 2015; Patchell and Hayter, 2013). The business-led NGO Ceres has called on companies to contribute to the ‘clean trillion’; the estimated one trillion in additional investment is needed every year to limit global warming. Global companies can also provide new governance innovation through experimentation (Hoffmann, 2011) and by leveraging their supply chain power to drive transnational corporate sustainability and carbon management improvements (Gereffi et al., 2005). Voluntary corporate sustainability as a mechanism of global environmental protection is, however, far from reliable or effective (Dauvergne and Lister, 2013). On its own, it may even make the problem worse. Critics argue that industry-led voluntary climate environmental initiatives lack absolute GHG mitigation potential in their design (Michaelowa and Michaelowa, 2017) and as Wright and Nyberg (2015) stress, encourage a delusional rhetoric that gives the appearance of progress while distracting from stricter regulation and necessarily disruptive solutions.

Industry failure to lead a sustainability transformation on its own should not be a complete surprise. Corporations are hard-wired to guard their business interests. In what is referred to as the ‘innovation dilemma’, firms have a big stake in the status quo, and thus, tend to focus on current business models rather than adopt new technologies or structures to meet future needs (Christensen, 1997; Gunther, 2016). For large companies in particular, this means risk aversion and a default position to preserve rather than challenge and change the systems of global production and consumption that sustain their profitability and also drive the global climate crisis. Government’s role in setting and investing in a more transformative vision for companies is therefore, critical. As Mazzucato (2013) highlights, critical innovations in recent decades (e.g. pharmaceutical discoveries, the Internet, the iPhone and the like), have been spurred by public sector not private sector investments. Successful transformation to a clean energy economy will need to be strategically guided and aided by governments with a coherent vision and the right tools and approaches to help companies navigate a feasible and effective pathway forward. A climate policy mix that integrates and raises the bar on private governance initiatives alongside strong, clear public sector leadership is critical.

The article begins with a review and assessment of the progress of the three central corporate carbon management strategies: target-setting, carbon pricing and carbon reporting (as supported and encouraged by several international collaborative climate initiatives). In each case, it is found that business efforts are falling short. The nature of the limitations of the business strategies in terms of their climate policy relevance are explained. The paper then turns to the question of governance beyond voluntary corporate efforts toward greater ecological effectiveness (i.e. absolute carbon reductions). Indirect and direct prescriptive and voluntary climate change policy approaches to meaningfully transform business practice and achieve essential positive global ecological outcomes are articulated. The paper concludes with discussion of the significance and implications of co-regulation for climate governance progress.

**Stuck in the status quo?**

Corporate climate action up until now has comprised fluctuating business interest with accompanying periods of optimism, ultimately producing insignificant carbon reduction outcomes. In the early 2000s, many companies were aware but waiting – poised and watching for the right time to implement carbon strategies (Hoffman, 2007; Kolk and Pinkse, 2005). With the unprecedented rise of corporate commitments leading to the Paris Conference, hope has resurfaced that a threshold of industry engagement has been finally reached and a new business trajectory launched.

Over the course of a year in 2015, business interest in climate change strategy went from a trickle to a torrent. More than a third of the world’s largest companies with combined total revenues of $19.2 trillion recorded climate initiatives in the UN’s NAZCA database (Hsu et al., 2015). In what Falkner (2015) refers to as the ‘subterranean politics of climate change’, non-state actors including companies engaged in an unprecedented way in the Paris conference lobbying for strong diplomatic effort and also taking on their own actions.

Although the wave of new commitments constitutes an encouraging trend of mounting corporate enthusiasm, the role of business actors in private climate governance is not new (Falkner, 2010; Pulver, 2011). As the literature well-documents business-led collaborative governance initiatives such as the Carbon Disclosure Project (CDP) (created 2000), WWF’s Climate Savers program (created 1999) and WRI and WBCSD’s GHG Protocol (created 1998) along with many
The effectiveness of corporate carbon management

The literature, both critical and supportive of industry-led climate governance converges in agreement that corporate measures are necessary for de-carbonization and the transformation to a ‘clean economy’. Achieving this will require major economic disruption. Fossil fuels will ultimately need to be left in the ground. To get there, businesses have been called upon to adopt carbon management strategies. Evaluating the progress on the main management strategies that underpin corporate efforts (target-setting, pricing, reporting) confirms increased company engagement but also serious shortcomings in ambition and implementation and meaningful carbon reduction outcomes.

Target-setting

The IPCC calculates that global GHG emissions need to decrease by approximately 85 per cent by 2050 in order to stabilize the global climate. So far, the ambition and implementation of both the public and private sectors have fallen far short. In reaction to inadequate corporate carbon target-setting, pressure has mounted for companies to adopt ‘science-based targets’, that is, to set emissions reduction targets in line with what scientists say is necessary to keep global warming below 2 degrees celsius. Spurred by the Science-based Targets Initiative – a joint initiative of WRI, WWF, CDP and the UN Global Compact – companies are signing on, with big brands leading. In September 2015, prior to COP21, 60 companies including Coca-Cola and General Mills committed to setting science-based targets. Currently, 448 companies have pledged support with 124 of these setting science-based targets.

Companies are adopting carbon-reduction targets to help manage business risk and keep ahead of imminent climate change regulations. Also, companies are seeing the opportunity to capture economic benefits. The CDP has promoted the business case for more ambitious carbon reduction targets that produce competitive advantages, including increased savings and increased return on investment (CDP 2014). In what the CDP and WWF refer to as ‘the 3 per cent Solution,’ a 2020 science-based emissions target for the US economy, they calculate, breaks down to about a 3 per cent average annual carbon reduction by all US companies and approximately $190 billion in net savings to businesses (CDP & WWF 2013).

While carbon reduction target setting by businesses is not new, science-based targets are an emerging development in corporate carbon management strategy. Setting carbon reduction targets that extend across the supply chain (addressing scope 3 emissions), although highly inconsistent, is also a rising trend. Walmart was the first company to set a science-based supply chain carbon target with their 2010 announcement to reduce 20 million tonnes of carbon from their supply chain by 2015. Although they increased their target in 2016 to 1 billion tonnes by 2030 (Project Gigaton), the company admits (in their 2016 Global Responsibility Report), ‘the combination of new facilities, new equipment in existing facilities and increasing sales volumes creates an uphill battle on reducing [our] absolute carbon emissions’.

Increasingly, in spite of the challenges many companies, particularly from the retail sector, are adopting long range aspirational pledges. Under The B Team initiative companies are committing to achieving ‘net zero emissions’ by 2050 by such means as reducing emissions through renewable energy projects, reforestation and offsets. Going beyond these net-zero pledges, Unilever has even announced they will become ‘carbon positive’ by 2030. By this, they claim
they will eliminate fossil fuels from their operations and directly support the generation of more renewable energy than the company consumes. Although the GHG impact of all of Unilever’s products continues to rise (8 per cent increase since 2010), their sales are growing at a faster rate (30 per cent) which the company promotes as significant net carbon ‘intensity’ improvement.

Recent corporate carbon-reduction pledges have raised some hopes for climate governance progress, but have also renewed skepticism that this is simply more advanced corporate greenwash. ‘Net zero’ allows for business-as-usual: total emissions continue to increase but are justified through improved efficiency and offsetting. Big aspirational company sustainability pledges (for business reputational gains) that never achieve actual pollution reductions (e.g. such as BP’s beyond petroleum claim) have been well-documented and demonstrated. As Newell and Paterson (2010) note, although the Oxford Dictionary word of the year in 2006 was ‘carbon neutral’, there was no accompanying carbon management progress.

In the instances of company carbon reduction improvements, understanding and evaluating company carbon targets and actual reductions is difficult. The extent of this issue is evident in the WRI’s CAIT Climate Data Explorer Business platform – an interactive database of corporate emissions and emission reduction targets using company data provided by the CDP. As Table 1 illustrates, even with the recent science-based targets under the SBTI, the target level ambition, baselines and emissions sources (direct, indirect) all vary, making assessments and comparative evaluations very challenging, if not impossible.

Probing the CAIT database reveals some companies have carbon intensity reduction targets while others have absolute reduction targets. Very few incorporate scope 3 (indirect supply chain) emissions and those that do, vary considerably in what activities they include (e.g. business travel, product transportation, emissions from contracted suppliers). Furthermore, there is no standardized approach to determine the science-based target level for a company. The SBTI lists seven different calculation methods. Corporate sustainability pundit Marc Gunther concludes that the company pledges are incoherent: ‘Companies get to pick the baseline year from which they will make reduction and decide for themselves whether they will cut 5 per cent, 20 per cent or 50 per cent, and by when. It’s a game where all the players get to set their own rules’ (Gunther, 2015).

In summary, in the absence of regulated, unified standards, corporate carbon target-setting (although essential) remains too inconsistent and unreliable as a climate policy tool for ensuring and improving corporate performance and accountability. More rigorous science-based target-setting can help to achieve climate governance improvements. However, companies are not achieving this on their own.

### Table 1. Variance in ‘science-based’ carbon target-setting

<table>
<thead>
<tr>
<th>Science-based target</th>
<th>ENEL SpA</th>
<th>NRG Energy</th>
<th>Pfizer</th>
<th>Kellogg’s</th>
<th>Dell Inc.</th>
<th>Coca-cola</th>
<th>P&amp;G</th>
<th>Sony</th>
<th>General mills</th>
<th>Thalys</th>
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<tbody>
<tr>
<td></td>
<td>25% reduction in scope 1 from 2007 levels by 2020</td>
<td>50% reduction in scope 1 + 2 + 3 from 2012 levels by 2030</td>
<td>20% reduction in scope 1 + 2 from 2012 levels by 2020</td>
<td>65% reduction in scope 1 + 2 from 2015 levels by 2050</td>
<td>50% reduction in scope 1 + 2 from 2012 levels by 2020</td>
<td>50% reduction in scope 1 + 2 below 2007 levels by 2020</td>
<td>30% reduction in scope 1 + 2 emissions from 2010 levels by 2020</td>
<td>42% reduction below 2000 levels by 2020. Zero carbon footprint by 2050 (90% reduction over 2008 levels by 2050)</td>
<td>28% reduction scope 1 + 2 + 3 from 2010 by 2025 across supply chain</td>
<td>41.4% intensity reduction per passenger km in scope 1 + 2 + 3 from 2008 levels by 2020.</td>
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</table>

Source: WRI CAIT Database. Available at: http://cait.wri.org/business/.
two major factors. First, the regulatory threat is now visible. State commitment to climate action is growing (Andonova et al., 2017). Nachmany and Setzer (2018) calculate that in the 6 years leading up to the Paris Agreement (2009–2015), states introduced between 100 and 143 new climate change laws per year, resulting in all 179 signatory or ratifying countries to the Paris Agreement now having at least one law or policy on climate change on the books. Second, access to capital increasingly hinges on corporate carbon management. Investors are now requesting carbon emissions reductions strategies, carbon emissions disclosures, and estimates of climate change risk to the business. Pricing provides an important proxy signal to put these business programs and strategies into practice.

While the adoption of carbon pricing is on the rise, there are significant issues. A lack of consistency in price-setting methodologies and levels is making the instrument’s effectiveness uneven and unreliable. Fundamentally, carbon prices are being set too low. This is true among governments as well as companies. Eighty-five per cent of the world’s emissions are currently priced at less than $10 tCO2e (tonne of CO2 equivalent) (World Bank, 2015). However, to drive a shift in investment, a transition to a clean energy economy, and achievement of a 2 degree target, analysts estimate that the price needs to be at least in the range of $80–$120 tCO2 e (World Bank, 2015).

There is no standard carbon pricing mechanism. Among governments that have set a price there is wide variance, even between neighboring jurisdictions. Norway’s carbon tax, for example is $3 versus Sweden’s at $130 tCO2e (World Bank, 2015). The levels at which companies set internal carbon prices also vary to a large degree (See Table 2). This variance can be largely attributed to the company’s assessment of carbon risk, as well as the different motivations in setting the price signal, whether intrinsic (e.g. justifying internal carbon management programs) or extrinsic (e.g. preparing for carbon legislation and meeting financial institution expectations). The lack of a meaningful price signal from governments is contributing to uncertainty in carbon market valuation, and, ultimately, the inconsistency of adoption and level of effectiveness of the carbon pricing mechanism within companies.

To help rectify the problem among governments, the World Bank and OECD developed a set of carbon pricing principles (the ‘FASTER principles’) to ensure fairness, transparency, cost effectiveness, etc., and the WRI developed a handbook on carbon pricing for US policymakers. In the absence of a standardized public carbon pricing framework for businesses, voluntary initiatives to guide corporate carbon pricing have emerged such as the Business Leadership Criteria on Carbon Pricing (BLCCP). These criteria provide guidance to companies to implement internal carbon pricing and to advocate for government policy to establish a consistent external carbon price. The criteria do not provide a specific price level (the guides admit it is a complex exercise) but rather define best practice as setting a carbon price ‘high enough to materially affect investment decisions to drive down GHG emissions’ (UN Global Compact, 2015, p. 3). Similar to carbon target-setting advice, companies are encouraged to adopt science-based approaches to pricing whereby the price level is set to induce the absolute carbon reductions necessary to limit global warming.

The main challenges that companies face with implementing an internal carbon price include the lack of a consistent price-setting method; the lack of clarity, certainty and consensus about state-led climate policies; and the complexity of setting an optimal price that is feasible yet effective for both their business and the environment (UN Global Compact, 2015). In the absence of a clear methodology and meaningful price signals from established carbon markets, carbon pricing effectiveness within companies is widely variable and under-achieving so far, particularly in terms of spurring the business changes necessary for absolute cuts in global GHG emissions.

### Table 2. Variance in internal carbon prices of consumer goods companies, 2015

<table>
<thead>
<tr>
<th>Company</th>
<th>Carbon price</th>
<th>Market</th>
</tr>
</thead>
<tbody>
<tr>
<td>Canadian tire</td>
<td>$6.36–$30</td>
<td>Consumer goods retailer</td>
</tr>
<tr>
<td>Tiger brands</td>
<td>$8.93</td>
<td>Packaged food manufacturer</td>
</tr>
<tr>
<td>Chicken of the sea</td>
<td>$10.25</td>
<td>Packaged seafood manufacturer</td>
</tr>
<tr>
<td>Walt disney</td>
<td>$10.20</td>
<td>Consumer goods manufacturer &amp; media producer</td>
</tr>
<tr>
<td>Nestlé</td>
<td>$15.47</td>
<td>Packaged food manufacturer</td>
</tr>
<tr>
<td>Sainsbury</td>
<td>$25.09</td>
<td>Supermarket</td>
</tr>
<tr>
<td>Kering</td>
<td>$69.59</td>
<td>Luxury apparel &amp; accessories retail group</td>
</tr>
<tr>
<td>Coop</td>
<td>$154.74</td>
<td>Supermarkets, department stores, food manufacturing</td>
</tr>
</tbody>
</table>

Source: CDP (2015, p. 6)

Reporting

Transparency is critical for holding companies to their climate change pledges and for determining their carbon reduction progress. While corporate carbon accountability through disclosure has always been important, the imperative of corporate carbon reporting is now even more pronounced with the vast number of voluntary commitments spurred by the COP21 meeting in Paris. Although companies are pledging and announcing increased carbon accountability initiatives, most are not reported so it is unclear whether business is making any progress or contribution.

Sparked by investor demands, a clearer business case for carbon reporting is, however, emerging. Although Sullivan and Gouldson (2012) have argued that the financial incentive for carbon disclosure has been overestimated, the dynamic appears to be changing. For example, Kleimeier and Viels (2016) find that companies can save upwards of $1.3 million every year for every 1 per cent reduction in their carbon emissions – just from the lowered charges on their debt. With business benefits such as cheaper access to capital, corporations are not only looking to voluntarily
disclose, some like Tesco and H&M are also now calling for mandatory reporting to generate competitive advantage over high GHG-emitting laggards.

With the aim of minimizing business risk within their investment portfolios, financial organizations have joined the CDP to encourage and facilitate more consistent and widespread carbon reporting. As of 2016, 827 institutional investors with assets of US$100 trillion participated. However, despite it being the world’s largest repository for self-reported corporate carbon data, there are problems with the comparability, understandability and reliability of the CDP data (Andrew and Cortese, 2011), making it difficult for investors to accurately assess companies. The situation is compounded by companies failing to report consistently and share the information reported to CDP in their annual financial and sustainability reports. The KPMG (2015:11) reporting survey concludes, ‘corporate carbon reporting needs an overhaul’. Companies vary in what they report and how they report it both within and between different jurisdictions and industry sectors making it ‘all but impossible’ to accurately compare one company’s carbon performance with another’s (KPMG, 2015, p. 11).

Consistent and accurate carbon measurement underpins effective reporting and is a long-standing problem across all sectors. In January 2007, for instance, Tesco’s CEO announced the company’s plan to go ‘carbon neutral’ by 2050 and to be the first company to measure and label the carbon in all product lines sold through its stores to the Carbon Trust’s carbon footprint label. While the company followed through in calculating the supply chain carbon footprint of approximately 1,100 of its 70,000 products and labeling 500, ultimately they canceled the initiative after only 3 years (in January 2012). The cancelation, Tesco (2009) explained, was due to high cost, little consumer interest, lack of labeling by other brands, and the lack of a standardized product carbon measurement system.

Fundamentally, carbon reports are self-declaration statements and this has caused concern with data reliability (Kolk et al., 2008). To address these concerns, many large global companies have hired professional auditors to conduct third party assurance assessments of their methodologies and the integrity of their carbon data (LeBaron et al., 2017). As a result of challenges to the consistency of the assurance audits, the International Accounting and Assurance Standards Board (IAASB) has, in turn, introduced a carbon assurance standard (ISAE 3410). Further recent attempts at standardization to make carbon reporting a more effective tool for businesses, include the voluntary framework developed by the Climate Disclosure Standards Board (CDSB) – a consortium of businesses and environmental NGOs – to assist companies in integrating investor-relevant climate information into their financial reports.

While carbon reporting remains an essential governance mechanism for holding corporations to account for their voluntary carbon management commitments, the data challenges and evidence of poor reporting quality, demonstrate the failure of the mechanism as an effective climate governance instrument. Mandatory carbon reporting can lead to improved carbon management (Matisoff, 2012) but relies on effective enforcement which unfortunately is difficult and lacking. As explained in the next section, finding the optimal policy mix of voluntary and mandatory corporate carbon management mechanisms that will serve market interests to manage business risks as well as the ecological imperative of total global carbon emission reduction is, therefore, critical (Knox-Hayes and Levy, 2011; Sullivan and Gouldson, 2012).

To summarize, in assessing the three main corporate carbon management approaches, there is some progress and potential, however, major weaknesses and challenges, as well. While, ideally, there are governance benefits to engaging with private efforts (individually and collaboratively) so as to advance carbon accountability and improve performance, policy makers need to be keenly aware of the limits. As argued in the final sections of this article, a voluntary business management approach has large a potential to be economically significant to companies in providing risk management and business opportunity. Less certain is the potential of unregulated private efforts to be ecologically significant to society in terms of absolute global carbon reductions. Transformation toward a clean energy economy and a sustainable future within planetary boundaries will necessarily require greater state engagement.

Co-regulating ecological climate governance

Climate change is not a discrete problem and there is no simple ‘silver bullet’ (Prins and Rayner, 2007). Ecologically-focused climate governance efforts that aim to achieve absolute total global carbon emission reduction (beyond intensity improvements) will require a range of efforts. ‘We need all hands on deck’, UN Secretary-General, Ban Ki Moon declared at the Paris COP 21 (Hale, 2016, p. 14). Closing the ‘ambition gap’ between projected global emissions levels and the goal of limiting global temperature warming to below 2 degrees Celsius (UNEP, 2017) will require experimental technological and governance innovation through strong state and non-state actor participation.

While the post-COP 21 climate regime positions non-state corporate actors increasingly at its core (Hale, 2016), as evaluated above, company efforts to set their own targets, price and report on carbon emissions are an unreliable means to promote or leverage this potential private innovative capacity. As Weinfurter (2015) explains, ‘it could be tempting to cast [corporate] efforts as a crucial path away from the stalled international response to climate change but they aren’t ambitious or reliable enough to replace national actions’. The regulatory state remains essential.

The climate policy mix

Private climate governance can influence state-based climate policy and public policy makers can influence private rule makers through a number of innovative means. Ideally, voluntary corporate management can serve as a complementary mechanism to strong state-led environmental policy, helping to reinforce and ratchet-up government
efforts (Green, 2016; Lister, 2011). The co-regulatory carbon governance potential cuts across all policy stages from agenda-setting and rule making to implementation and enforcement. In terms of policy agenda-setting and rule making (i.e. establishing policy goals, objectives and carbon reduction requirements), company carbon reduction target-setting ideally aligns with and helps to fortify, translate and strengthen the international emission reduction goals. Internal company carbon pricing ideally contributes to decarbonization of the economy by establishing a strong market signal to spur renewable energy investment, innovation and the adoption of new business processes. And company carbon reporting ideally serves as a supplementary transparency and accountability enforcement mechanism to facilitate identification and monitoring of corporate laggards (to penalize) and corporate leaders (to reward).

In each case, firm-level private carbon governance mechanisms have the potential to reinforce existing climate policies and possibly strengthen them (i.e. raise the carbon target, pricing, investment and reporting levels), as well as pave the way for strengthened state policies by demonstrating feasibility. As Selin and Vandeveer (2005, p. 369) summarize, corporate climate initiatives can potentially provide both disruptive and smoothing effects on domestic and international policy through four overall pathways: feasibility demonstration, market creation, policy diffusion and learning, and norm creation and promulgation. Yet caution is necessary in assuming this private governance ideal in view of the insufficiency and unreliability, as shown, of company management efforts to-date to produce ecologically-meaningful carbon reduction outcomes.

In response to such skepticism and shortcomings, companies are collaborating to develop self-regulatory guidelines to facilitate greater business participation, standardization and oversight. However, many companies also have an interest in intentionally keeping these management approaches inconsistent and ineffective. Strategically partial and varying sustainability metrics can give the appearance of transparency and accountability while avoiding the implementation costs of an actual business transformation (LeBaron et al., 2017). State oversight and intervention is, therefore, essential to climate governance in order to call out misleading and evasive carbon management practices of corporate laggards and to facilitate greater rewards and progress by leading companies aiming to make a true difference.

At the domestic level, governments have a range of approaches and measures they can employ to increase corporate performance and accountability and potentially ‘unleash’ private sector capacity and investment in climate solutions. These range from co-regulatory facilitation of industry self-regulation (i.e. enabling, endorsing or mandating private carbon management efforts) to direct strengthening of state-led regulatory measures (i.e. prescriptive enforcing of corporate GHG reductions). Adopting the right blend of public and private measures has failed to this point. Getting the policy mix correct is a critical element underpinning future climate governance success.

**Indirect co-regulatory climate governance**

Given the limits of company-led carbon management efforts, governments play an important indirect role in overseeing action, ensuring fairness and raising the bar on industry self-regulatory initiatives. This includes establishing policies, programs, standards and guidelines to more directly guide, harmonize and monitor company target-setting, pricing and carbon reporting (Table 3). As Anthony Giddens argues, the role of government shouldn’t be confined to just spurring companies and then leaving them alone to implement. Rather, in what he defines as the ‘ensuring’ state, governments are ‘expected or obligated to make sure such processes achieve certain defined outcomes – in the case of climate change, the bottom line is meeting set targets for emissions reductions’ (Giddens, 2009, p. 9). These co-regulatory efforts by the state are important for engaging businesses and achieving incremental carbon reductions (Andonova et al., 2017; Chan et al., 2015). Indirect facilitative state engagement will encourage important adjustments and tweaks in business practice. However, for greater systemic transformations that break the ‘lock-in’ reliance on fossil fuels and go deeper toward addressing and resolving the root causes of the global climate crisis (tied to entrenched business models and economic assumptions), more direct regulation will be required to steer beyond incremental carbon management. As Widerberg and Pattberg (2015a, p. 49) stress, effective harnessing of corporate capacity will not simply involve smoothing a pathway for corporate plans. It will also need to be disruptive, requiring a ‘radical break with current trends in company emission patterns and performance’. Companies cannot be expected to voluntarily seek such a radical alteration of the systems that are enabling and sustaining their business profitability. Facilitating corporations to manage their own carbon reduction efforts is important but more direct state intervention, as outlined in the next section, will also be essential.

**Direct regulatory governance**

Effective climate governance that has global environmental protection as the priority outcome will require the transformation and constraint of global economic activity to within ‘planetary boundaries’. However, rather than setting limits, CEO climate policy recommendations to government tend to emphasize measures to spur and guide growth, investment and accumulation with as little business disruption as possible. (see: UN Global Compact-Accenture, 2015 CEO survey). Although ‘upside’ financial incentives are important to attract corporate engagement, much more direct and environmentally-driven regulatory measures will be necessary for companies to integrate meaningful ecological outcomes into their decision-making.

Transition to a clean energy economy is obviously an enormous challenge. Analysts estimate that 1/3 of all oil reserves and 1/2 of gas reserves will need to remain in the ground and 80 per cent of coal reserves unused (McGlade and Ekins, 2015). While recent increasing corporate
engagement is encouraging, the underlying contribution of the structure and assumptions of the global economic system to the climate change crisis cannot be overlooked. As Newell and Paterson (2010, p. 7), state ‘the origins of climate change are in the ways that the economy has been organized; the technologies, sectors, imperatives and patterns of growth that have led to increasing CO2 emissions’. Solutions, they argue, will therefore require ‘an enormous transformation of how capitalism operates … including restructuring or dismantling huge economic sectors on which the whole of global development has been based’ (Newell and Paterson, 2010, pp. 8–9). Markets cannot be expected to spontaneously re-organize to this degree.

Over 10 years ago, Socolow et al. (2004) estimated that just seven groups of existing technologies could stabilize GHG emissions. The major problem is politics. Specifically, this includes the lack of political will (Jaccard, 2016) and inadequate knowledge and understanding to implement the right policies (Patchell and Hayter, 2013). Governments (at all levels) are, so far, failing. Policies will need to go beyond enabling business and relying on spontaneous decarbonization (Pielke, 2018) toward direct interventions that target deeper, disruptive, systemic change (away from fossil fuels) to meet critical decarbonization timelines. This includes implementing coordinated direct measures across supply chains – from upstream production, to manufacture and distribution, right through to downstream retail consumption.

Upstream production

As the Climate Accountability Institute reports, the climate crisis of the 21st century has been caused largely by just 90 companies – 83 energy companies and seven cement manufacturers (Heede, 2014). Over a 260 year period (1751–2010), these companies produced 2/3 of the cumulative global emissions of industrial carbon dioxide and methane. They drive the current carbon-intensive growth model and control large fossil fuel reserves (Heede and Oreskes, 2016). Direct prescriptive measures to disrupt ‘business-as-usual’ emissions in these upstream sectors include: capping fossil fuel extraction; banning coal extraction and export; and eliminating fossil fuel subsidies.

<table>
<thead>
<tr>
<th>Table 3. State co-regulation of corporate carbon management</th>
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<tbody>
<tr>
<td>Facilitative government climate policy</td>
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<tr>
<td>Carbon reduction target-setting</td>
</tr>
<tr>
<td>• Establish a national GHG reduction target that aligns with UNFCCC including base and target year</td>
</tr>
<tr>
<td>• Establish a standard for companies that defines the base and target year and provides a consistent methodology for calculating science-based targets that align with national target and ecological impacts</td>
</tr>
<tr>
<td>Internal Carbon pricing</td>
</tr>
<tr>
<td>• Set a national carbon price and advocate for the establishment of a global carbon market</td>
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<td>• Develop a guideline to standardize the pricing methodology and define minimum pricing levels for achieving required carbon reductions</td>
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<tr>
<td>GHG reporting</td>
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<td>• Mandate GHG emission reporting</td>
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<tr>
<td>• Conduct independent assurance audits on carbon reports</td>
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<tr>
<td>• Establish standardized reporting metrics that include ecological limits and impacts and not just business risk and investment measures</td>
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<tr>
<td>• Conduct monitoring and unannounced, on-the-ground &quot;spot inspections&quot; of corporate carbon strategy implementation</td>
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Manufacture & distribution

To go beyond incremental to transformational progress, stricter manufacturing rules will need to be applied to address the escalating global material throughput and waste generation. This includes regulations to discourage planned product obsolescence design and to encourage circular economy, ‘closed loop’ extended producer responsibility. Distribution, which has largely gone under the policy radar will also require more direct regulation. This includes clearly defining and establishing reduction targets for the ‘scope 3’ GHG emissions associated with all forms of transport such as automotive, rail, air and in particular, maritime shipping which moves 90 per cent of global traded goods (Lister, 2015).

Downstream consumption

And finally, as a driver of the global economic system that is feeding the climate change crisis, the impacts of accelerating consumerism will also require attention and intervention (Ivanova et al., 2016). Direct policy measures such as bans on single use products and packaging; surcharges to internalize the social and environmental costs of high churn ‘discount goods’; and the regulation of product carbon
labeling so that consumers can make better choices are all critical.

**Governing pathways forward**

The 2015 Paris Agreement entrenched the role of corporate climate governance and fueled expectations for and renewed optimism about voluntary business responses. After over two decades of pretense, corporate climate commitments and initiatives have increased. However, as this article shows, while corporate carbon initiatives have risen, the underpinning management mechanisms of target-setting, pricing and reporting reveal major weakness and short-comings in business ambition, implementation and consistency. Although there are increasing economic efficiency examples of carbon intensity improvements, examples of ecological effectiveness (i.e. reduced absolute cumulative industrial emissions) remain elusive and worsening. Overall, the tweaking of business-as-usual pathways through voluntary efforts is achieving some uncertain incremental success but falling demonstrably short of in terms of the scale of action, level of engagement and movement toward deeper decarbonizing and economic transformation. State regulation through indirect and direct means, as argued and outlined, is essential – not just to leverage (endorse, facilitate, monitor) voluntary corporate efforts but also to prescribe direct decarbonization.

Corporate engagement is occurring in the context of the evolving shift in the global climate policy regime from a prescriptive ‘targets and timetables’ approach to a ratchetting ‘pledge and review’ paradigm of the recent Paris Agreement (Falkner, 2016). Within the new paradigm, governance is diffuse with multiple actors including corporations expected to catalyze action alongside the state. As Bäckstrand and Kuyper (2017) summarize, the polycentric climate governance landscape and challenge is largely theorized in two ways: a top-down lens that there is a carbon reduction ‘gap’ (in state pledges) that can be addressed through the orchestration of voluntary private efforts to meet the 1.5 degree target (Abbott, 2017; Hale and Roger, 2014); and a bottom-up perspective that there is institutional ‘gridlock’ (Víctor, 2011) and systemic carbon ‘lock-in’ (Seto et al., 2016) that non-delegated, non-state actor entrepreneurial efforts can disrupt, thereby facilitating new ‘catalytic pathways’ to learning and decarbonization (Bernstein and Hoffmann, 2018). The top-down policy lens starts with the climate goal and works back to the implementation activity. The bottom-up begins with the experimental activity which then projects forward an emergent route to potential impact(s). Both policy directions have important climate governance merit, yet neither policy approach has been effective, so far.

The findings of this paper regarding the rise, yet, underlying weakness of voluntary corporate climate efforts suggest the need to not just strengthen both approaches but also re-integrate more direct prescriptions within global climate governance. For the UNFCCC and UNEP, in particular, this will mean providing stronger support for the monitoring and accountability reporting functions of key intermediaries (such as the Marrakech Partnership, and business-responsibility focused organizations such as the CDP, UN Global Compact and Global Reporting Initiative). And moving beyond gridlock (Hale et al., 2017) will also mean strengthening the normative global climate policy framework with more specific goals and objectives that apply across all different industrial sectors and jurisdictions and that can mobilize and direct all businesses toward deeper change (i.e. renewable energy investment and dematerialization targets).

With atmospheric carbon levels continuing to rise, consensus is mounting that climate policy is adrift. Top-down legal and administrative processes are in an institutional gridlock due to the high complexity and divergence of interests and incentives, and bottom-up efforts lack sufficient engagement, scale, coordination, accountability and effective steering to induce the necessary innovation, learning and decarbonization outcome. Pielke (2018) argues there is an urgent need for governments to open up and expand the ‘policy envelope’ to address the impotence of efforts to date. UNFCCC climate policy models, he argues for example, vastly overestimate ‘spontaneous decarbonization’ (i.e. default global economic energy efficiency gains and dematerialization in the absence of regulation) with the consequence that the strength of the policy ambition required is greatly under-estimated. Essential policy targets of lifestyle and industrial structure are ignored. As Dauvergne (2018) stresses, the underlying priority of the current policy regime is not planetary stability but rather ‘more production efficiency, corporate profits, economic growth and investment in technology’. Rather than confronting the exploitation underlying climate change, he adds, a reliance on bottom up, voluntary processes is ‘legitimizing and normalizing the coming crisis’. Corporations can be important ‘catalyzing agents’ for change but without a more prescriptive direction focused on ecological effectiveness, the pathway forged will ultimately serve to reinforce rather than transform the social, technological, political and economic systems underpinning the global climate crisis.

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**References**


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