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North American Business Strategies Towards Climate Change

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Business has become a key part of the fabric of global environmental governance, considered here as the network which orders and regulates economic activity and its impacts. We argue that businesses generally are willing to undertake limited measures consistent with a fragmented and weak policy regime. Further, the actions of businesses act to create, shape and preserve that compromised regime. We examine three types of indicators of business responses in North America: ratings by external organizations, commitments regarding emissions, and joint political action. We find business response to be highly ambiguous, with energetic efforts yielding few results.

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Keywords: Business strategy, Climate change, Governance, Carbon trading

Business has become a key part of the fabric of global environmental governance (Levy, 2005). In their role as investors, polluters, innovators, experts, manufacturers, lobbyists, and employers, corporations are central players in environmental issues. The recognition by governments and NGOs that large firms are not just polluters, but also possess the organizational, technological, and financial resources to address environmental problems, has stimulated consideration of ways to harness and direct these resources toward desirable goals. This acknowledgement of corporate potential has occurred, not entirely coincidentally, in a period of growing concern at a 'governance deficit' at the international level (Haas, 2004; Newell and Levy, 2006; Slaughter, 2004).

During the 1990s, much of the energy of North American business, particularly in sectors related to fossil fuels, was directed toward preventing an international regime to impose caps on emissions of greenhouse gasses (GHGs). Indeed, industry groups such as the Global Climate Coalition and the Climate Council played a major role in preventing the United States from joining the Kyoto Protocol (Levy and Egan, 2003). More recently, many businesses have adopted a more constructive stance that acknowledges the reality of climate change and its responsibility for addressing the issue (Margolick and Russell, 2004). Increasingly, climate change is framed as an opportunity rather than a burden. A recent report from Ceres, a coalition of investors, firms, and environmental organizations, typifies the emerging optimistic view:

Companies at the vanguard no longer question how much it will cost to reduce greenhouse gas emissions, but how much money they can make doing it. Financial markets are starting to reward companies that are moving ahead on climate change, while those lagging behind are being assigned more risk. . . Shareholders and financial analysts will increasingly assign value to companies that prepare for and capitalize on business opportunities posed by climate change (Cogan, 2006, : 1).

This new approach is reflected in high-profile corporate initiatives, such as 'Beyond Petroleum' from BP and 'Ecoimagination' from GE, which indicate that business is taking climate change seriously and anticipates some profitable opportunities. Simultaneously, investors are increasingly alert to the financial risks of neglecting climate change as a strategic issue. Sectors, such as agriculture, insurance, tourism, and real estate, face potential risks from

76	the physical impacts of climate change, such as rising	even companies, that are embracing a range of carbon-related initiatives and strategies.	136
77	sea levels and more frequent and intense storms. Fossil-fuel related sectors are recognizing the inevitability of carbon constraints, with significant impacts on markets and costs. The Carbon Disclosure Project, representing investors with more than \$31 trillion in assets, collects annual data from large multinational corporations about their climate-related risks (Lash and Wellington, 2007). Groups such as the Investor Network on Climate Risk and the Climate Group have played an important role recently in highlighting the risks and opportunities facing various sectors and encourage companies to assess and manage these risks rather than ignore them (The Climate Group, 2005). A more proactive stance is likely to provide companies with some protection against litigation and damage to their reputation and litigation (Wellington and Sauer, 2005), as well as more influence in shaping the detailed mechanisms of climate governance systems, such as allocation and trading of carbon credits.	To explore this apparent paradox, we examine the political economy of the emerging global governance regime for GHG emissions. Global governance here refers to:	137
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97	Meanwhile, local government and voluntary initiatives have emerged in response to the perceived lack of guidance from national and international authorities. In the United States and Canada, individual states and new regional associations are formulating policies in areas usually reserved for Federal action. Recent agreements include the Regional Greenhouse Gas Initiative (RGGI) covering nine Northeastern and Mid-Atlantic States, and the Western Regional Climate Action Initiative, signed by five Western governors; both are centered on emission-trading mechanisms for achieving reductions in greenhouse gas (GHG) emissions. The prospect of mandatory cap-and-trade systems is stimulating a reconsideration of corporate climate strategies. Business journals and consultants proffer advice on carbon management systems that entail, among other activities, assessing risks, conducting emissions inventories, setting targets, and assigning responsibilities (Hoffman, 2006).	the multiple channels through which economic activity and its impacts are ordered and regulated. It implies rule creation, institution building, monitoring and enforcement. But it also implies a soft infrastructure of norms, and expectations in processes that engage the participation of a broad range of stakeholders (Newell and Levy, 2006, p. 149).	143 144 145 146 147 148
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117	These business initiatives represent real and significant organizational changes and financial investments on the part of firms. Yet, the contrast between this beehive of corporate activity and the relentless upward trend in emissions presents something of a paradox. Global carbon emissions in 2005 were 28% higher than in 1990, and show no sign of slowing (EIA, 2005; Wynn, 2006). United States emissions were estimated to be 17% higher in 2005 than 1990 (EIA, 2006), while even many who are parties to Kyoto, including Canada, are on a trajectory to miss their Kyoto targets (UNFCCC, 2005). The disconnect between the growing wave of business action and these disappointing results raises some important concerns. Even more puzzling is the resurgence of corporate political activity in the United States against climate policy initiatives, particularly those emerging at the state level. This renewed opposition to regulation is occurring in the same sectors, and	This conception of governance, which has become prominent in international relations, displaces government from its traditional, sovereign role in establishing and securing order (Rosenau, 1992). Instead, Q1 governance is viewed as a more diffuse form of authority and control operating through a network of actors at multiple levels. Within this system, states act as economic agents concerned about their 'competitiveness' (Palan <i>et al.</i> , 1996), while firms are important political actors with significant policy influence. Bargaining over regime structures and processes engages actors in a complex set of strategic maneuvers in the economic, discursive, and political spheres (Braithwaite and Drahos, 2000; Prakash and Hart, 1999). Markets and the private decisions of firms are themselves part of the fabric of governance, as the day-to-day production, research and marketing practices of large MNCs are decisive in shaping environmental impacts.	149 150 151 152 153 154 155 156 157 158 159 160 161 162 163 164 165 166 167
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		In this paper we argue that the business community has played an important role in shaping the system of global GHG governance, and is generally willing to undertake measures consistent with a fragmented and weak policy regime, while at the same time taking political action to create, shape and preserve that compromised regime. To describe the action businesses take in regards to GHG governance, this paper examines the history and current nature of corporate responses to climate change. In particular, we look at three indicators of the nature of corporate response: reports by outside organizations that document corporate responses and achievements; commitments to action undertaken by firms regarding emissions; and membership of firms in associations or alliances which take collective political action.	168 169 170 171 172 173 174 175 176 177 178 179 180 181 182 183
		We try to explain the paradox between the energetic efforts of firms and the lack of meaningful results by considering the multiple dimensions of a firm's response. The position of firms is not merely for or against action on climate change, nor even along a continuum between those two extremes. Rather, a firm's response to climate change occurs in many dimensions, including political, technological, organizational, financial, and public relations components. The prospect for a relatively weak carbon regime, the considerable uncertainty associated with	184 185 186 187 188 189 190 191 192 193 194

195 markets and technology, and complex nature of possible
196 responses all contribute to firms' responses
197 being ambiguous on many dimensions. Firms are
198 subsequently placing greater emphasis on manage-
199 ment processes, policy influence, and market image
200 than on major investments in low-emission technolo-
201 gies; on emissions trading infrastructure over emis-
202 sions reductions. The ambiguous response creates
203 and legitimizes a vast, bureaucratic, complex GHG
204 system, but one that does not actually require much
205 in the way of emissions reductions.

206 This paper proceeds in four sections, beginning with
207 the history of business response to climate change.
208 We then examine three types indicators of business
209 response: ratings by external organizations, commit-
210 ments regarding emissions, and joint political action.
211 In the discussion and implications section, we look at
212 the prospects a governance regime firms are both
213 responding to and creating. We conclude by placing
214 ambiguous action and the resulting governance
215 regime in historical context.

216 History of Business Response to Climate 217 Change

218 Despite the considerable attention given to potential
219 economic opportunities, the primary issue facing
220 many sectors remains the 'regulatory risk' of higher
221 costs for fuels and other inputs, and lower demand
222 for energy-intensive products (Wellington and Sauer,
223 2005). Measures to control the emissions of GHGs
224 most directly threaten sectors that produce and
225 depend on fossil fuels, including coal, oil, autos,
226 power generation, and airlines. Other energy intense
227 sectors include cement, paper, agriculture, and alu-
228 minium. Companies also face considerable 'competi-
229 tive risk', as changes in prices, technologies, and
230 demand patterns disrupt sectors and entire supply
231 chains. Investments in research and development
232 are highly risky, as low-emission technologies, such
233 as those for renewable energy, frequently require
234 radically new capabilities that threaten to undermine
235 the position of existing companies and open the
236 industries to new entrants (Anderson and Tushman,
237 1990; Christensen, 1997).

238 These risks are not restricted to any particular region,
239 as many of the larger companies involved in these sec-
240 tors are multinational corporations (MNCs) with
241 operations and sales in multiple countries. Moreover,
242 MNCs anticipated that GHG regulation, following the
243 precedent of the 1987 Montreal Protocol for the con-
244 trol of ozone depleting substances, would be subject
245 to a strong global governance regime encompassing
246 most industrialized countries. It is therefore not sur-
247 prising that, beginning in the early 1990s, a wide range
248 of sectors responded aggressively to the prospect of
249 regulation of GHG emissions. U.S.- based companies

were particularly active in challenging climate sci- 250
ence, pointing to the potentially high economic costs 251
of greenhouse gas controls, and lobbying government 252
at various levels. Businesses from across the range of 253
affected sectors formed a strong issue-specific organi- 254
zations, such as the GCC and the Climate Council, to 255
coordinate lobbying and public relations strategies 256
(Gelbspan, 1997; Leggett, 2000; Levy and Egan, 257
2003). Though these organizations were open to inter- 258
national members and were active at the international 259
negotiations to forge a formal GHG regime, they were 260
dominated by North American companies and 261
focused much of their efforts on the U.S. administra- 262
tion. Meanwhile, U.S. energy and auto companies 263
invested little in new technologies that could deliver 264
short to medium term emission reductions(Levy, 265
2005). 266

European industry was far less aggressive in respond- 267
ing to the issue, and displayed a greater readiness to 268
invest in technologies, such as wind power and diesel 269
cars, that would produce modest but relatively quick 270
GHG emission reductions. These divergent strategies 271
defy simple explanation, particularly in the oil indus- 272
try, where companies on both sides of the Atlantic are 273
large, integrated multinationals with similar global 274
profiles and strategic capabilities (Rowlands, 2000). 275
Studies of the oil and automobile industries have 276
pointed to the institutional environment of these firms 277
as important determinants of their strategic responses 278
(Levy and Kolk, 2002; Levy and Rothenberg, 2002; van 279
de Wateringen, 2005). Corporate strategies are driven 280
by perceptions of economic interest that are mediated 281
by the different cultural, political, and competitive 282
landscapes in the United States and Europe. Senior 283
managers of European companies tended to believe 284
that climate change was a serious problem and that 285
regulation of emissions was inevitable, but were more 286
optimistic about the prospects for new technologies. 287
American companies, by contrast, tended to be more 288
skeptical concerning the science, more pessimistic 289
regarding the market potential of new technologies, 290
and more confident of their political capacity to block 291
regulation. Moreover, several large American compa- 292
nies had lost substantial amounts of money in invest- 293
ments in renewable energy and electric vehicles in the 294
1970s, and the painful lessons of that earlier era had 295
become institutionalized in the companies. 296

By 2000, a convergent trend could be discerned as 297
key firms on both sides of the Atlantic moved toward 298
a more accommodating position that acknowledged 299
the role of GHGs in climate change, and the need 300
for some action by governments and companies. In 301
the oil and automobile industries, companies were 302
beginning to invest substantial amounts in low-emis- 303
sion technologies, and were engaging a variety of 304
voluntary schemes to inventory, curtail, and trade 305
carbon emissions. No obvious dramatic scientific, 306
technological, or regulatory developments can 307
account for these changes, but Levy (2005) has 308
pointed to a number of factors. Most significantly, 309

- 310 MNCs are located in global industries with cognitive,
311 normative, and regulatory pressures inducing some
312 measure of convergence in their perceptions of the
313 climate issue and of their interests (Scott and Meyer,
314 1994). On the economic level, competitive pressures
315 and interdependence have compelled companies to
316 respond to each other's moves (Levy, 2005). For
317 example, Toyota's commercial launch of the Prius,
318 a hybrid electric-small gasoline engine car, in the Jap-
319 anese market in 1998, took the industry somewhat by
320 surprise. Most American executives were initially
321 dismissive of the prospects for the car in the United
322 States, based upon GM's experience with electric
323 vehicles. Nevertheless, the American auto companies
324 were nervous that they might fall behind a competi-
325 tor and introduced a number of hybrid vehicles by
326 2006. Similarly, Ford quickly followed Daimler-Benz
327 in investing in fuel cell technology. In the oil indus-
328 try, even Exxon appears to be softening its stance
329 (Mooney, 2005) regarding climate science, while
330 continuing to oppose mandatory emission controls.
- 331 The shift in the position of American industry can
332 also be linked to changing competitive dynamics,
333 strategic miscalculations, and the evolution of new
334 organizations supportive of a proactive industry role.
335 Efforts by the Global Climate Coalition and other
336 industry groups to challenge the science sometimes
337 produced a backlash from environmental groups
338 that damaged the fossil fuel industry's credibility.
339 Environmental groups in Europe and the United
340 States issued a number of reports that documented
341 industry support for some climate skeptics, and
342 accused business of using its money and power to
343 distort the scientific debate (Corporate Europe
344 Observatory, 1997; Gelbspan, 1997; Hamilton, 1998).
345 The growth of new organizations committed to a cli-
346 mate compromise further undermined the GCC's
347 claim to be *the* voice of industry on climate. The
348 Pew Center on Global Climate Change, formed in
349 April 1998, provides not only a channel of policy
350 influence for member companies, but also a vehicle
351 for legitimizing the new position.
- 352 Perhaps the most significant change in the corporate
353 landscape has been the diffusion and increasing legiti-
354 macy of the "win-win" discourse articulating the con-
355 sonance of environmental and business interests.
356 Groups such as the Pew Center actively promote this
357 position; indeed, the win-win paradigm is a key dis-
358 cursive foundation for a broad coalition of actors sup-
359 porting the emerging climate regime. A number of
360 environmentally oriented business associations, such
361 as the Business Council for Sustainable Energy, and
362 the World Business Council for Sustainable Develop-
363 ment, have adopted this perspective. Influential envi-
364 ronmental NGOs in the US, especially the World
365 Resources Institute and Environmental Defense
366 (Dudek, 1996) have initiated partnerships with busi-
367 ness to pursue profitable opportunities for emission
368 reductions. Governmental agencies find win-win rhet-
369 oric attractive for reducing conflict in policy making.
- The apparent reconciliation of viable economic strat-
egies with the environmental case for action on GHG
emissions makes this 'win-win' language of "ecolog-
ical modernization" very attractive (Hajer, 1995).
Ecological modernization puts its faith in the techno-
logical, organizational, and financial resources of the
private sector, voluntary partnerships between gov-
ernment agencies and business, flexible market-
based measures, and the application of environmen-
tal management techniques (Casten, 1998; Hart, 1997;
Schmidheiny, 1992). This optimistic stance has been
buttressed by claims of significant cost savings, such
as BP's announcement in January 2003 that its suc-
cess in reducing emissions by 10% (relative to 1990)
had also generated \$600 million in cost savings.
Wal-Mart's CEO recently stated that reducing green-
house gases would "save money for our customers,
make us a more efficient business, and help position
us to compete effectively in a carbon-constrained
world" (Lash and Wellington, 2007: 96). These initia-
tives generally entail substantial public relations and
advertising efforts to rebrand the companies as
green, particularly around climate change, combined
with substantial investments in research and devel-
opment for low-emission technologies and products.
- ### An Empirical Assessment of Current Business Responses
- Corporate action on climate change appears to be
spreading rapidly and growing in intensity. The
Pew Center and the Climate Group, two organiza-
tions dedicated to promoting business action on cli-
mate change, have documented positive steps taken
by numerous companies as well as the consequent
financial and environmental benefits (Margolick
and Russell, 2004; The Climate Group, 2005). Much
of the corporate activity on climate change is stimu-
lated by the perception of long-term market opportu-
nities in new high-margin, low-emission products
and technologies, as well as cost savings from lower
energy use (Begg *et al.*, 2005; Margolick and Russell,
2004; Reinhardt, 2000; Romm, 1999). The develop-
ment of markets for trading carbon credits presents
a further stimulus.
- Despite this growing tide of corporate activity, no
meaningful progress is being made concerning glo-
bal GHG emissions, and pockets of strong corporate
political opposition remain. It would be easy to con-
clude from observing contemporary patterns of pro-
duction, consumption, and power generation that we
are largely conducting 'business as usual', with only
marginal changes in a few niche markets. An exam-
ination of this apparent paradox requires a more
detailed consideration of various dimensions of
business response strategies. Firms pursue multiple
strategies that include political, technological, orga-
nizational, financial, and public relations compo-

426 nents. Uncertainty regarding the regulatory, techno-
427 logical, and market environment has led to consider-
428 able diversity in responses. Here we focus on three
429 indicators of corporate response to climate change.
430 The first, and most detailed, is an analysis of reports
431 by outside organizations that document corporate
432 responses and achievements, and in some cases rate
433 them with scores. Second, we consider various com-
434 mitments to action undertaken by firms regarding
435 emissions trading. These commitments are generally
436 expressed through participation in associations or
437 alliances in which members commit to individual
438 action. Third, we note business membership in asso-
439 ciations or alliances which take collective political
440 action, some in opposition to mandatory emission
441 controls and some in support of various forms of
442 action. Our methodology does not encompass a com-
443 prehensive survey or statistical analysis of all these
444 various business initiatives and responses, but rather
445 is intended to convey a representative snapshot of
446 the current state of business responses.

447 Reports on Business Responses

448 Four reports by outside groups are analyzed here: by
449 the environmental group Ceres (Cogan, 2006), *The*
450 *Climate Group* (2005), the Pew Center on Global Cli-
451 mate Change's Business Environmental Leadership
452 Council (BELC) (Pew, 2006), and a survey of Cana-
453 dian GHG emitters conducted by Deloitte (2006).
454 The Climate Group is based in London while the
455 other organizations are US-based, though they all
456 have international activities and offices. The reports
457 have different criteria for inclusion and evaluation,
458 but overlap in coverage helps to provide a reasonable
459 indicator of corporate responses. Cogan (2006)
460 profiled 100 of the largest firms in ten carbon-intense
461 industries from energy, industrial, and transportation
462 sectors. All firms have significant US operations but
463 are headquartered in various countries, except for
464 the electric power industry, which includes US firms
465 only. Cogan assessed corporate governance on cli-
466 mate change based on board oversight, management
467 execution, public disclosure, emissions accounting,
468 and strategic planning. The companies were scored
469 with a 100 point checklist, with mean 48.5.

470 *The Climate Group* (2005) describes the achieve-
471 ments of 74 companies that have made measurable
472 progress on GHG emissions or other climate-related
473 action, and have benefited financially from doing
474 so. The data are derived mostly from the companies
475 themselves, and inclusion is based on cooperation.
476 The Pew Center's BELC is a membership organiza-
477 tion. Membership requires a commitment to support-
478 ing climate change science and the responsibility of
479 the business community to take action. Their website
480 (Pew, 2006) lists company profiles, goals and
481 achievements. Joining the Pew Center is a response
482 strategy that was originally an action in opposition
483 to the anti-Kyoto Global Climate Coalition.

The Ceres rankings point to the relatively poor per-
484 formance of US-based companies. Note that the
485 emphasis here is on management and reporting
486 rather than emissions. The 'top ten' list (Table 1)
487 includes four companies from North America, five
488 from Europe, and one from Japan. North American
489 firms are somewhat under-represented among the
490 best performers, but all the bottom twelve companies
491 are from the United States (Table 2).
492

Ceres also found significant differences between
493 industries. In general, chemicals, electric power,
494 and automotive firms have the highest scores; air
495 transport, food, coal, and oil the lowest; and indus-
496 trial equipment, metals, and forest products in the
497 middle. The differences, however, between firms
498 within industries are much greater than the differ-
499 ences between industries – the oil industry contains
500 both the highest and lowest scores. This suggests that
501 the existence of significant space for discretionary
502 managerial action despite competitive and other
503 pressures to conform.
504

In the oil industry, four European companies (BP,
505 Royal Dutch Shell, Statoil, and Total) all rank well
506 above their North American counterparts in climate
507 governance; BP, Total, and Shell have also docu-
508 mented real reductions in carbon emissions (*The Cli-*
509 *mate Group*, 2005); BP and Shell are members of the
510 BELC (Pew, 2006). In contrast, among US oil compa-
511

Table 1 Top Ten Firms in Corporate Governance, Rated by Ceres

BP	Oil and Gas	UK	90
DuPont	Chemicals	US	85
Royal Dutch Shell	Oil and Gas	Netherlands	79
Alcan	Metals	Canada	77
Alcoa	Metals	US	74
AEP	Electric Power	US	73
Cinergy	Electric Power	US	73
Statoil	Oil and Gas	Norway	72
Bayer	Chemicals	Germany	71
Nippon Steel	Metals	Japan	67

Source: (Cogan, 2006).

Table 2 Bottom Twelve Firms in Corporate Governance, Rated by Ceres

UAL	Airline	US	3
Williams	Oil and Gas	US	3
ConAgra	Food	US	4
Bunge	Food	US	5
Foundation	Coal	US	5
Southwest	Airline	US	6
Murphy	Oil and Gas	US	6
Phelps Dodge	Metals	US	6
Arch	Coal	US	8
AMR	Airline	US	9
PepsiCo	Food	US	9
El Paso	Oil and Gas	US	9

Source: (Cogan, 2006).

- 512 nies, only Chevron ranks above average on the Ceres
513 report, only Sonoco is a member of the Pew group,
514 and no US oil firm appears in the Climate Group
515 study. Similarly, the London-based coal and minerals
516 company Rio Tinto scores above average on Ceres
517 and is a member of the BELC, while no US coal pro-
518 ducer has any positive indicators.
- 519 The metals and mining industry clusters into three
520 groups, but not purely along home country lines.
521 The aluminum industry is dominated by North
522 American firms ([International Aluminium Institute,](#)
523 [2006](#)). Alcan in Canada and Alcoa in the United
524 States both rate highly in climate leadership ([Cogan,](#)
525 [2006](#)), participate in the Business Environmental
526 Leadership Council, and have documented large
527 reductions in GHG emissions below 1990 levels
528 ([The Climate Group, 2005](#)). Three overseas steel
529 firms, Nippon of Japan, BHP Billington in Australia,
530 and Anglo American in the UK have above average
531 Ceres scores; while the US steel industry plus Mittal
532 Steel of the Netherlands have very low Ceres scores.
533 The good performance of aluminum manufacturers
534 can be explained, in part, by the high energy inten-
535 sity of the traditional process, which presents more
536 opportunities for reducing GHG emissions and for
537 cost savings.
- 538 The automotive industry also groups into three clus-
539 ters, largely on the basis of nationality. Japan-based
540 Toyota and Honda rate well, according to Ceres,
541 and have large emission reductions documented by
542 the Climate Group; US-based Ford and General
543 Motors are above average according to Ceres and
544 GM has modest achievements in the Climate Group
545 report; the German manufacturers Daimler, Volks-
546 wagen, and BMW all have below average Ceres
547 scores. In contrast with these indicators, it is note-
548 worthy that the European Union has much more
549 stringent fuel efficiency standards than either the
550 United States or Canada, and European manufactur-
551 ers as a group use advanced diesel technology and
552 lighter cars to achieve substantial efficiency improve-
553 ments ([An and Sauer, 2004](#); [Levy and Kolk, 2002](#)).
- 554 The forest product industry, which has a large pres-
555 ence in North America, has been attributed with
556 widely varying indicators. There may be significant
557 opportunities in the sector for reducing power con-
558 sumption, for biomass power and co-generation,
559 and in management of carbon sinks inherent within
560 forests ([Cogan, 2006](#)). Indeed, paper company
561 Norske Canada has some of the most dramatic
562 achievements documented, a 60% reduction in CO₂
563 from 1990 to 2004 ([The Climate Group, 2005](#)). While
564 US-based International Paper and Montreal's Abitibi
565 lead in the Ceres ratings, it is lower ranked Weyerha-
566 user and Georgia-Pacific that are able to document
567 progress according to BELC ([Pew, 2006](#)).
- 568 [Deloitte's \(2006\)](#) survey of 80 large Canadian GHG
569 emitters, primarily in the oil and gas, manufacturing,
and power generation sectors, highlights the gap
between corporate attention and action. Despite the
focus on Canada, the results are likely to be typical
of North America as a whole. Though 80% of firms
ranked GHG emissions management as an issue of
moderate to critical importance, half of the compa-
nies still do not include emission management in
their overall risk management strategy. The survey
found that 91% of respondents claimed to have the
management capability to complete a GHG emis-
sions inventory, and 84% had actually completed
an emissions inventory. Nevertheless, only 46% said
they had the capability to execute the purchase or
sale of emission credits and only 40% had established
internal emissions targets and schedules.
- The most striking feature of business responses to cli-
mate change, as reflected in these reports, is their
inconsistency, ambiguity, heterogeneity, and limited
scope. The heterogeneity in response reflects not only
the degree to which a firm is acting, but also which of
many possible actions it takes. The persistence of dif-
ferences between firms in otherwise homogenous
industries is one indicator of a tentative response.
The large differences in the way the same firms are
viewed by different outside evaluators suggest a
degree of ambiguity as well as the difficulty in mea-
surement and comparative assessment. For example,
Japanese auto manufacturer Nissan has a corporate
governance score below the German manufacturers
– the lowest rated automaker by Ceres. Yet it has
documented GHG emissions reductions on par with
highly ranked Toyota and Honda ([The Climate
Group, 2005](#)). Among industrial equipment manu-
facturers, large American and European firms (Swiss
ABB, GE and UTC in the US) are noted for their cor-
porate governance ([Cogan, 2006](#); [Pew, 2006](#)), but
poorly ranked Caterpillar has documented greater
GHG reductions than UTC, while ABB and GE do
not appear in the Climate Group Report.
- ### Commitments on Carbon Trading
- Several private emissions trading schemes exist
wherein firms agree to limit their emissions and
trade GHG credits. Reasons for this might include a
hope to prevent the imposition of mandatory restric-
tions, the shaping of future trading systems, estab-
lishment of baselines, or hope for a competitive
advantage by gaining trading experience. The Chi-
cago Climate Exchange, for example, is a private ini-
tiative by companies who voluntarily commit to limit
GHG emissions and engage in trading to meet those
commitments. The Chicago Climate Exchange (CCX)
opened in October 2003 with twenty-two members,
including American Electric Power and Ford. CCX
(www.chicagoclimatex.com) now has about 60 full
members who trade emissions, and many more that
provide or purchase offsets. Full members have large
GHG emissions and commit to reducing emissions
from North American operations by one percent a

628 year for four years, and further reductions thereafter.
629 Associate members have smaller emissions but wish
630 to offset them, while Participating members are those
631 that sell certified offsets.

632 The Federal government, in line with the current
633 administration's stated preference for voluntary
634 measures, sponsors some of these programs that
635 entail commitments to action. The joint EPA/Depart-
636 ment of Energy Climate Wise program (DOE, 1996)
637 has disappeared, replaced by the EPA's Climate
638 Leaders. Climate Leaders (www.epa.gov/climate-leaders) enlists companies to set goals for emission
639 reductions. One advantage listed is for companies
640 to "strategically position themselves as climate
641 change policy continues to unfold." The Department
642 of Energy's Climate VISION (Voluntary Innovative
643 Sector Initiatives: Opportunities Now) (www.climatevision.gov) enlists trade groups to reduce their
644 members' GHG intensity. However, voluntary action
645 does not ensure that companies meet their existing
646 commitments. A Government Accountability Office
647 report (Stephenson, 2006) found that participants in
648 the EPA's and the Department of Energy's voluntary
649 emission reduction programs have not always met
650 the conditions of those programs, and did not bear
651 any consequences. This is not a problem only for vol-
652 untary programs, as many parties to the Kyoto
653 accord are on a trajectory to miss their targets
654 (UNFCCC, 2005).
655

657 As cap-and-trade systems become the basis for exist-
658 ing and proposed climate policies, some firms are
659 anticipating that preparation for emissions trading
660 could establish a strategic advantage, particularly
661 for those with relatively efficient operations, opportu-
662 nities for innovation, or simply a well-developed
663 trading capability. Many large firms have called for
664 a national cap-and-trade system to end the uncer-
665 tainty posed by the emergence of multiple state and
666 regional systems (Donnelly, 2007; USCAP, 2007). An
667 advantage of CCX over the DOE and EPA programs
668 is that the mechanisms are likely to be similar to
669 future trading systems. The Climate Group and Pew
670 Center reports do not tabulate climate trading,
671 although make note of some firms who have adopted
672 voluntary restrictions (Pew, 2006; The Climate Group,
673 2004). The Ceres report (Cogan, 2006) includes mea-
674 sures related to emissions trading in two of its scoring
675 categories: up to 24 points of the 100 are for 'Emis-
676 sions Accounting', a vital precursors to trading; and
677 participation in emissions trading is one of three
678 activities evaluated within the 32 point 'Emissions
679 Management and Strategic Opportunities' score.
680 Adopting emissions trading is cited as a way to "gain
681 experience and maximize credits" (p.3) ahead of
682 future requirements.

683 However, participation in trading schemes is uneven
684 for even the supposed strategic leaders. The Euro-
685 pean Trading Scheme (ETS) mandates emissions
686 accounting and trading for firms operating in Europe

687 in particular sectors, but with various exclusions for
688 smaller facilities and power plants. Firms with North
689 American operations could choose to join the Chi-
690 cago Climate Exchange. Of the top 13 firms rated in
691 Strategic Opportunities by Ceres (Table 3), only
692 Dupont, Bayer, and AEP are members of CCX
693 (www.chicagoclimatex.com). Abitibi and Interna-
694 tional Paper, who have Strategy scores at the top of
695 their industry if not overall, are members of CCX.
696 Although Honda is the highest rated auto manufac-
697 turer by Ceres, Ford, with scores only average for
698 automotive industry, is a current and founding
699 member of CCX. Moreover, while voluntary trading
700 is seen as both a way to reduce emissions and to gain
701 experience in a carbon-constrained environment, the
702 low trading prices (\$3-4 during 2007) indicate that
703 the limits are neither particularly constraining nor
704 do they provide much of a signal to encourage emis-
705 sion reductions.

706 It is notable that cap-and-trade based systems have
707 emerged as the centerpiece of policies designed to
708 constrain carbon emissions. Emissions trading was
709 originally advocated by the United States in interna-
710 tional negotiations as a flexible mechanism that
711 would encourage firms and countries to pursue eco-
712 nomically efficient opportunities to reduce their
713 emissions (Aulisi *et al.*, 2005). The European Union
714 and some environmental organizations had
715 expressed early concerns that highly flexible trading
716 systems would raise problems regarding condition-
717 ality and verification, enabling companies and coun-
718 tries to evade their responsibilities through creative
719 accounting and buying carbon credits of dubious ori-
720 gin (Haar and Haar, 2006). By 2006, however, the
721 European Trading System accounted for 62% of the
722 volume and over 80% of the value of total carbon
723 trading worldwide, estimated by market analyst
724 Point Carbon at €22.5 billion for 1.6 billion tonnes
725 of carbon dioxide equivalent. This global market is
726 expanding very rapidly, more than doubling since
727 2005 (Point Carbon, 2007).

Table 3 Top Thirteen Firms in Strategies, Rated by Ceres (out of 32)

BP	Oil and Gas	UK	29
Dupont	Chemicals	US	28
Royal Dutch Shell	Oil and Gas	Netherlands	27
ALCOA	Metals	US	24
Nippon Steel	Metals	Japan	23
Bayer	Chemicals	Germany	23
Statoil	Oil and Gas	Norway	22
AEP	Electric Power	US	21
ALCAN	Metals	Canada	21
Honda	Automotive	Japan	20
GE	Industrial Equip	US	20
ABB	Industrial Equip	Switzerland	20
Calpine	Electric Power	US	20

Source: (Cogan, 2006).

728	Business Political Action			
729	Firms also express their response to climate change	More recently, the United States Climate Action Part-	787	
730	by participating in collective political action. Busi-	nership (USCAP) was launched with considerable	788	
731	ness associations such as the International Chamber	publicity in early 2007 as a coalition of major busi-	789	
732	of Commerce have made clear that the acknowledg-	nesses and environmental organizations advocating	790	
733	ment of business responsibility for emissions and	mandatory cap and trade (www.us-cap.org); they	791	
734	their willingness to dedicate resources to addressing	support eventual international agreement but want	792	
735	the issue entitle business to a significant role in policy	the United States to take immediate action. They call	793	
736	development (ICC, 1995). Joining or funding alli-	for relatively modest reductions, but with mandatory	794	
737	ances, industry associations, coalitions and the like	limits, broad coverage, and accountability of offsets	795	
738	allow businesses to engage in collective action, some-	(USCAP, 2007). USCAP appears to be attempting to	796	
739	times outside of their normal area of expertise. The	shape the emerging emissions regime in anticipation	797	
740	trajectory of the Global Climate Coalition (GCC) is	of future regulations; it is calling for features of ben-	798	
741	an illustrative example (Levy and Egan, 2003).	efit to member businesses, such as credit for pre-reg-	799	
742	Formed to be the industry voice on climate policy,	ulation action and carbon price limits. In March 2007,	800	
743	firms began leaving GCC in the late 1990's as its posi-	USCAP's position was joined by 65 investor groups	801	
744	tions became unpopular, and, as some would argue,	and financial companies who called for Federal legis-	802	
745	its mission had been fulfilled: the United States with-	lation and significant GHG reductions by 2050 (Don-	803	
746	drew from Kyoto in 2001. ExxonMobil remained the	nelly, 2007). The firms involved expressed a desire	804	
747	last major supporter until GCC deactivated in 2002.	for greater certainty in emissions regulation; they	805	
		may also prefer uniform Federal action to a patch-	806	
		work of State and regional rules.	807	
748	Nevertheless, several other organizations, primarily	Yet there is not a simple alignment of those in favor	808	
749	US-based business associations and conservative	versus those opposed to action on climate change;	809	
750	think tanks, continue to act in opposition to climate	indeed, some companies can simultaneously be	810	
751	change regulation at all levels. These include the	members of multiple organizations and initiatives	811	
752	Coalition for Affordable and Reliable Energy	with apparently conflicting agendas. One indicator	812	
753	(www.careenergy.com), the Cooler Heads Coalition	of being in favor of action is participation in volun-	813	
754	(www.globalwarming.org), the American Council	tary schemes. The U.S. Department of Energy's Cli-	814	
755	for Capital Formation (www.accf.org) and the Center	mate VISION (Voluntary Innovative Sector	815	
756	for Energy and Economic Development (<a a="" href="http://www.ceed-</td> <td>Initiatives: Opportunities Now) (<a href=" http:="" www.climatevi-<="">	816		
757	www.ceed-	<a href="http://www.climatevi-</td> <td>817</td> </tr> <tr> <td>758</td> <td>net.org). The model legislation by the American Leg-	<a href="http://www.climatevi-</td> <td>818</td> </tr> <tr> <td>759</td> <td>islative Exchange Council (Greenblatt, 2003) and</td> <td>enlists trade groups to reduce their mem-</td> <td>819</td> </tr> <tr> <td>760</td> <td>ballot initiatives throughout the West attempt to limit</td> <td>bers' GHG intensity. However, about half of the</td> <td>820</td> </tr> <tr> <td>761</td> <td>the ability of States to enact environmental policy.</td> <td>organizations participating in Climate VISION are</td> <td>821</td> </tr> <tr> <td>762</td> <td>These organizations typically mount a multi-</td> <td>also members of CARE (www.careenergy.org),	822
763	pronged attack: casting doubt on climate change sci-	which strongly supports coal power and opposes to	823	
764	ence, highlighting costs of emission limits, opposing	any emissions caps. In these cases organizations are	824	
765	government limits in general and international	at the same time making a commitment to solve cli-	825	
766	agreements in particular. The Competitive Enterprise	mate change problem, advocating voluntary and	826	
767	Institute (CEI) advertisements in 2006 attacking the	market based solutions instead of mandatory ones,	827	
768	concept of carbon dioxide as a pollutant (Zabarenko,	and questioning whether there is a climate change		
769	2006) parallel a 2004 talk by the head of Canada's	problem at all.		
770	largest oil company (Morgan, 2004). The Cooler			
771	Heads Coalition resumed its activities in February	Part of the recent upsurge in corporate political activ-	828	
772	of 2007 (www.globalwarming.org) as a project of	ity comes in response to the development of pro-	829	
773	CEI, but some prior supporters, including ExxonMo-	grams for mandatory emission trading at the State	830	
774	bil, have ceased funding. In February 2007, shortly	level in North America. Two multi-state agreements	831	
775	after the release of the Fourth Assessment Report of	in particular illustrate the local policy trend. The	832	
776	the IPCC, the American Enterprise Institute (AEI)	Regional Greenhouse Gas Initiative (RGGI) initially	833	
777	offered a \$10,000 incentive to scientists and econo-	included seven States – Connecticut, Delaware,	834	
778	mists who write papers challenging the IPCC find-	Maine, New Hampshire, New Jersey, New York,	835	
779	ings. The AEI continues to receive significant	and Vermont – which signed on to a model rule that	836	
780	funding from ExxonMobil and many other compa-	would institute a cap-and-trade program covering	837	
	nies in the energy sector.	CO2 emissions from power plants. Although they	838	
		had recently abandoned RGGI, Massachusetts and	839	
781	Other organizations occupy more proactive positions	Rhode Island announced their intention to rejoin in	840	
782	on climate change. Organizations such as the Pew	January 2007. Maryland, Pennsylvania, and the East-	841	
783	Center and the Business Council for Sustainable	ern Canadian Provinces are observers in the RGGI	842	
784	Energy, which have been around since the mid-	process (www.rggi.org). On the West coast, the Wes-	843	
785	1990s, constitute a counter-movement to the AEI,	tern Regional Climate Action Initiative is an agree-	844	
786	CEI and other oppositional industry organizations.	ment between Governors of Arizona, California,	845	
		New Mexico, Oregon and Washington to set a	846	

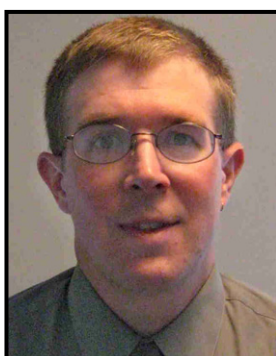
847	GHG emission target and develop a market based	rick for rejoining it. AIM stated that it would be	907
848	system for meeting it. This is the latest action in	costly for Massachusetts to act ahead of Congress	908
849	States that have been working individually and in	(www.aimnet.org).	909
850	various combinations towards emissions trading sys-		
851	tems (information and press release at www.pewcli-		
852	mate.org). These regional cap-and-trade systems do		
853	not impose severe restrictions and are designed to		
854	limit the price of carbon credits and any increases		
855	in power generation costs. RGGI, for example, will		
856	become effective in 2009 and cap emissions in the		
857	power sector at approximately current levels until		
858	2015, after which the emissions cap will be incremen-		
859	tally reduced by 2% a year. Although RGGI is ini-		
860	tially targeted toward emissions from power		
861	generation facilities, the program includes an offset		
862	mechanism that would encourage companies in		
863	other sectors to engage in product and process inno-		
864	vations that reduce GHG emissions. While these		
865	other sectors would not be constrained by a cap,		
866	the potential offsets would offer benefits to non-		
867	power emitters of CO ₂ as well as emitters of other		
868	GHGs, such as HFCs, methane and sulfur hexaflu-		
869	oride (SF ₆). Participants in these initiatives expect		
870	them to become the prototypes for a national multi-		
871	sector mandatory emissions trading scheme whose		
872	caps could be ratcheted down as political opportuni-		
873	ties arise.		
874	More than half of US states are addressing climate		
875	change in some manner; many are drafting climate		
876	change action plans and enacting renewable portfolio		
877	standards, which require a growing percentage of		
878	generation to be from renewable sources (Rabe,		
879	2006). In response to State actions, some business		
880	organizations have mobilized to oppose local as well		
881	as national and international regulation. The US auto		
882	industry is vigorously contesting efforts by Califor-		
883	nia and New York to exert direct regulatory control		
884	over vehicular carbon emissions (Hakim, 2005). Var-		
885	ious California business groups have been attempt-		
886	ing to slow its moves towards regulating emissions		
887	(Baker, 2006). Corporate lobbying has been impli-		
888	cated in the (temporary) withdrawal by Massachu-		
889	setts RGGI in early 2006 (VanDeveer and Selik,		
890	2006). Another business oriented group, the Ameri-		
891	can Legislative Exchange Council (ALEC), has been		
892	developing model legislation at the state level to		
893	limit regulation of GHGs, and claims almost a third		
894	of all legislators in the country as participants		
895	(Greenblatt, 2003; Rabe, 2006).		
896	While some US-based organizations oppose regula-		
897	tion at all levels on libertarian principles, others act		
898	more narrowly to preserve their economic interests.		
899	The libertarian CEI opposes GHG limits, ethanol sub-		
900	sidies, and clean coal subsidies (www.cei.org), while		
901	the industry group CARE opposes GHG limits but		
902	supports research funding for coal and ethanol		
903	(www.careenergy.com). The Associated Industries		
904	of Massachusetts (AIM) has opposed RGGI from its		
905	inception, praised former Governor Romney for		
906	abandoning the pact, and condemned Governor Pat-		
		Discussion and Implications	910
		The indicators we examined show considerable ambi-	911
		guity in the responses of the business community	912
		towards climate change. Various external organiza-	913
		tions come to different conclusions when evaluating	914
		firms' achievements. Broad patterns seen in the rat-	915
		ings with respect to industry and home country in	916
		some cases contradict other indications. Voluntary	917
		emission trading schemes seem to represent greater	918
		investment in trading infrastructure than in emis-	919
		sions reduction. And firm and industry political	920
		action through various associations are sometimes	921
		seem at odds with their other actions and statements.	922
		The review of corporate strategic responses to cli-	923
		mate change sheds some insight into the paradoxical	924
		coexistence of a beehive of corporate activity on cli-	925
		mate change yet with few tangible outcomes. Of	926
		course, it might simply be too early to evaluate the	927
		impact of corporate efforts; some investments in	928
		innovation are unlikely to yield short-term gains,	929
		and preparations for establishing the infrastructure	930
		for carbon trading are bound to take some time. Nev-	931
		ertheless, the results reported here suggest that busi-	932
		ness responses, especially in North America, are	933
		uneven and rather ineffective, at least in relation to	934
		the scale of action needed. Corporate responses tend	935
		to be directed toward organizational changes rather	936
		than emissions reductions per se. Here we argue that	937
		these corporate responses can be understood in the	938
		context of the emerging GHG regime. To the extent	939
		that a global regime can be said to exist, it is frag-	940
		mented, and carries very weak price signals, and out-	941
		side of Europe is still largely voluntary. The	942
		emerging GHG regime is simply not up to the task	943
		of a radical restructuring of energy and transporta-	944
		tion markets.	945
		Firms clearly pursue different response strategies	946
		with various degrees of vigor, depending on their	947
		exposure to climate risks, their sectoral location, their	948
		individual capabilities, and the idiosyncrasies of par-	949
		ticular business leaders. Some firms emphasize inno-	950
		vation for reducing emissions while others plan to	951
		rely more on carbon trading. A central problem is that	952
		many businesses plan to continue to grow their sales	953
		at a rate fast enough to offset any reduction in emis-	954
		sion <i>intensity</i> (per unit of output). Even the actions	955
		of many clear leaders in the business response to cli-	956
		mate change are limited and tentative. The operating	957
		GHG emission reductions achieved by BP and Shell	958
		are a tiny fraction of the emissions produced by the	959
		use of their products (The Climate Group, 2005).	960
		GE's Ecomagination campaign amounts to 17 prod-	961
		ucts with sales of \$10 billion within a diversified	962

- 963 \$150 billion revenue company, and R& D commit- 1022
 964 ments of about 10% of the \$14 billion GE invests in 1023
 965 development (www.ge.com). The products other 1024
 966 than wind turbines mostly comprise incremental 1025
 967 improvements to efficiency and production processes 1026
 968 for existing products, as would be expected to occur 1027
 969 in normal technological development. 1028
- 970 The emerging climate governance regime comprises 1029
 971 a patchwork of market-based approaches, energy 1030
 972 efficiency measures, voluntary corporate action, and 1031
 973 weak regional trading systems. The incentives and 1032
 974 sanctions in such a weak and fragmented regime 1033
 975 may simply be inadequate in the face of the growing 1034
 976 global economy and the risks of irreversible global 1035
 977 climatic change ([Azar and Dowlatabadi, 1999](#)). While 1036
 978 North American companies increasingly realize that 1037
 979 climate change is a long-term issue to which they will 1038
 980 need to develop market and technological responses, 1039
 981 in the short term they face only modest political and 1040
 982 economic incentives for strong action. The emerging 1041
 983 regime comprises a relatively loose system of inter- 1042
 984 national governance involving significant contesta- 1043
 985 tion as well as collaboration among states, firms, 1044
 986 non-governmental organizations (NGOs) and multi- 1045
 987 lateral institutions ([Levy and Prakesh, 2003](#); [Newell 1046](#)
 988 and [Levy, 2006](#)). The reliance on voluntary measures, 1047
 989 particularly in the United States, reflects a wider 1048
 990 trend in environmental governance toward various 1049
 991 forms of industry self-regulation ([Cashore et al., 1050](#)
 992 2004; [Delmas and Terlaak, 2001](#); [Potoski and Prak- 1051](#)
 993 ash, 2005). 1052
- 994 Ironically, it is largely the resistance of fossil fuel 1053
 995 dependent countries and industries to more stringent 1054
 996 regulation that has induced the fragmentation and 1055
 997 flexibility of the current governance system. While 1056
 998 these compromises have facilitated the evolution of 1057
 999 a politically viable governance system, they are also 1058
 1000 the fundamental source of the weakness of this sys- 1059
 1001 tem. The specific mechanisms and targets agreed 1060
 1002 by the parties to the Kyoto Protocol helped to bring 1061
 1003 reluctant countries on board and accommodate 1062
 1004 industry opposition. The main elements of the Proto- 1063
 1005 col include mandatory but modest emission targets, 1064
 1006 which are substantially weakened by broad and flex- 1065
 1007 ible mechanisms for implementation and weak 1066
 1008 enforcement ([Grubb et al., 1999](#)). The inclusion of car- 1067
 1009 bon sinks introduces considerable uncertainty and 1068
 1010 room for creative accounting, and the ability to buy 1069
 1011 carbon credits in international emission trading 1070
 1012 schemes enables countries of the former Soviet 1071
 1013 Union to sell large amounts of "hot air" credits. 1072
 1014 The Clean Development Mechanism and Joint Imple- 1073
 1015 mentation further reduce the adjustment burden. 1074
- 1016 While the momentum of this fragmented multi-fac- 1075
 1017 eted regime is clearly gathering pace, there is not 1076
 1018 yet a firm regulatory or economic incentive for firms 1077
 1019 to adopt radical changes in their strategies. Recent 1078
 1020 trades on the Chicago Climate Exchange have been 1079
 1021 priced very cheaply, falling towards \$3 per ton of 1080
 CO², illustrating the weakness of a voluntary system. 1081
 The RGGI program in the Northeastern United States
 will most likely include a 'safety valve' designed to
 prevent the price of carbon credits exceeding \$10 a
 ton ([VanDeveer and Selik, 2006](#)), which is insufficient
 to drive substantial innovation or efficiency mea-
 sures ([Fischer and Newell, 2003](#); [Krause et al., 2002](#);
[Neuhoff, 2005](#)). The proposed trading mechanism
 would also enable participants to purchase credits
 from external sources, such as the Clean Develop-
 ment Mechanism, generating concerns about the fun-
 gibility and verification of emission reductions. In
 Europe, carbon prices collapsed in 2007 to just about
 \$1.50 a tonne after too many permits were allocated
 relative to industry demand. The current price for
 2008 contracts, the first year of a new trading period,
 is around \$15–20 per tonne.
- Emissions trading systems are also beset by concerns
 relating to high transaction costs and the additional-
 ity of internationally traded credits ([Michaelowa and 1039](#)
[Jotzo, 2005](#)). An investigation of projects to incinerate 1040
 HFC-23 in developing countries revealed that the 1041
 revenue stream from carbon credits actually encour- 1042
 aged the production of refrigeration units, which 1043
 generate significant emissions of GHGs in their man- 1044
 ufacture and operation. Moreover, credits are being 1045
 sold for several times the cost of generating them, 1046
 with lawyers and accountants taking a substantial 1047
 portion of the money ([Bradsher, 2006](#)). Overall, we 1048
 see a huge investment of corporate energy in prepar- 1049
 ing the organizational and accounting infrastructure 1050
 for emissions trading, but resulting carbon prices 1051
 that are too low to induce any fundamental market 1052
 changes. 1053
- In the absence of a significant price signal from car- 1054
 bon trading, the basic economic and political forces 1055
 that structure energy markets ensure the continued 1056
 growth of fossil fuels for the foreseeable future. In 1057
 the United States, the oil industry maintains suffi- 1058
 cient political influence to secure subsidies and 1059
 favorable tax treatment. The efforts of European oil 1060
 companies exemplify how climate strategies fre- 1061
 quently represent small niche markets that do not 1062
 significantly impinge on existing core activities. 1063
 Though BP and Shell have each committed to invest 1064
 more than \$1 billion in renewable energy, and have 1065
 been particularly active in promoting their efforts 1066
 in the media, these new businesses are miniscule in 1067
 comparison with their core oil and gas operations, 1068
 which continue to grow ([The Climate Group, 2005](#)). 1069
 Oil MNCs on both sides of the Atlantic have con- 1070
 verged on the view that constraints on carbon emis- 1071
 sions are not likely to present a serious threat ([Levy 1072](#)
 and [Rothenberg, 2002](#)). Oil production is expected 1073
 to peak around 2020 to 2030, with a slow subsequent 1074
 decline; at higher prices, vast reserves of oil shale 1075
 and deeper ocean sources become viable. All the oil 1076
 companies are well diversified into natural gas, the 1077
 demand for which is booming, primarily for power 1078
 generation, while renewables are not expected to 1079
 1080
 1081

- pose a major threat before mid-century due to cost and infrastructure limitations. Oil is used primarily for transportation, with no commercially feasible substitutes on the horizon, and any improvements in fuel efficiency, for example, from hybrids or advanced diesel, are more than offset by growth in vehicle sales and miles traveled, particularly in developing countries. Air transportation is also growing rapidly, and in any event is not covered by Kyoto. Biofuels such as ethanol from corn can slowly be incorporated into existing infrastructure and business models, but will supplement rather than substitute for oil as a liquid fuel.
- Some substantial business opportunities clearly do exist. The rapid growth of markets for renewable and clean energy, and for energy efficiency, is one example. Global markets for wind, solar photovoltaic (PV), and fuel cell power are growing at an annual rate of approximately 20%, albeit from a tiny base, and are forecast to reach \$115 billion by 2015, from a 2005 base of only \$24 billion (Makower *et al.*, 2006). Markets for associated electronics, materials, construction, and services will also experience rapid growth. The global market for energy efficiency products, currently estimated at \$115 billion, is projected to grow to over \$150 billion by the end of this decade. These markets, however, present substantial market and technological risks, and many of the small firms active in these areas are currently in a precarious financial position. Moreover, the growing market for renewable energy is only slowing, rather than reversing, the growth of fossil fuel based generation; indeed, in the United States, that has recently been a resurgence of planned investment in coal-fired generation. In other sectors, the incentives for action are even less clear. In the insurance industry, for example, despite rising insured losses that many attribute to climate change, major North American firms are reluctant to take action on the issue due to a tradition of conservatism, relying on the federal government for disaster relief, and the lack of clear financial benefits from action (Haufler, 2006).
- ## Conclusions
- Given the prospect of a flexible and fungible carbon regime with weak caps, high transaction costs and low, if unpredictable, carbon prices, it is perhaps unsurprising that companies are currently placing more emphasis on management processes, policy influence, and market image than on major investments in risky low-emission technologies. Ahead of any mandatory caps, especially in advance of setting any baselines, investing in emissions trading infrastructure has a greater potential return than investing in reducing emissions. Firms seem to be responding to a vast, bureaucratic, complex GHG system, but one that does not actually require much in the way of emissions reductions. Yet firms also create and sustain this governance regime, both through their political advocacy, and through the legitimacy conferred by perceptions of success. External reports rate firms highly for small positive steps, reinforcing the 'win-win' discourse of ecological modernization.
- When the United States first agreed to a binding international agreement in Geneva in July 1996, it provided an explicit assurance that industry interests would be integrated into the climate regime. Chief negotiator Tim Wirth promised that the United States would pursue "market-based solutions that are flexible and cost-effective", and that "meeting this challenge requires that the genius of the private sector be brought to bear on the challenge of developing the technologies that are necessary to ensure our long term environmental and economic prosperity" (Wirth, 1996). The emergent regime is sufficiently weak and flexible that it does indeed accommodate most business concerns about short-term disruption to markets, and many firms appear willing to engage in substantial organizational and technological efforts to work toward a long-term carbon constrained future. In a sense, companies are hedging their bets by investing in long-term alternatives while acting to preserve the value of their technological and market assets in the short to medium term. Simultaneously, however, the locus of regulatory activity is moving to the state level in the United States, and when these policy initiatives threaten to impose more immediate and stringent caps on emissions and to create a model for national regulation, business is reverting to its oppositional stance of the 1990s.
- By examining several indicators of business response, we are able to discern the multiple dimensions of strategy that firms pursue. The existence of ambiguity even within indicators, such as profound differences between different rating reports and participation by firms in contradictory political associations, shows that these indicators do not separate the dimensions of strategy completely. Future research might be able to separate the dimensions more carefully, to better discern changes in each dimension as the responses to climate change evolve. Yet the ambiguities overall show how limited and tentative the emerging governance regime is.
- Emissions trading represents the heart of a corporate compromise with pressures to address climate change, and it is the area in which we witness the greatest amount of corporate activity. Emissions trading represents the emerging consensus around market-based, low-cost policy instruments. While business and states are engaged in considerable organizational efforts to establish the infrastructure and capabilities for trading systems, the incentives for a major shift in resource allocation toward low-emission energy sources, products and technologies is mitigated by political pressures for highly flexible

- 1198 trading schemes in which carbon prices will remain
1199 low.
- 1200 Overall, we see a series of energetic efforts yielding
1201 ambiguous and tentative results. The implication is
1202 that we are not on a trajectory towards a genuine
1203 solution. Breaking the inertia of past practice is not
1204 sufficient. The global GHG regime appears to be
1205 institutionalizing within the middle ground, with
1206 marginal improvements on past practice but without
1207 reaching sustainability. A dramatic environmental
1208 'shock', or an unlikely assertion of political leader-
1209 ship might well be required to provide the necessary
1210 impetus for change.
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